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A Model for Regional Technology-Based Economic Development

A Dissertation

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements for the degree of

Doctor of Philosophy
In
Engineering and Applied Science

by

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May 2009

Acknowledgement

The Author would like to acknowledge and thank his doctoral committee and advisors for their time, guidance and invaluable advice:

Dr. Russell Trahan, Dean, College of Engineering

Dr. James Logan, Dean, College of Business Administration

Dr. Mahdi Aldelguerfi, Department Chair, Computer Science

Dr. Jay Hunt, Adjunct Professor of Engineering Management

Mr. Will Lannes, Professor Emeritus

Ms. Dinah Payne, Engineering Management Chair and Advisor

The Author is also honored by the incredible individuals, many of which are considered good friends; who were kind enough to be interviewed for this work.

The Honorable Sandy Baruah, Assistant Secretary of Commerce for Economic Development, CEO of EDA

Mr. Robert Fudickar, Technology Industry Director, Louisiana Department of Economic Development

Mr. Kevin Pollard, President - GlobalSolve™ Management (Venture Capital)

Dr. Vijay Gopu, Professor, University of New Orleans (India)

The Honorable Stephen Moret, Secretary, Louisiana Economic Development

Dr. Timothy Ryan, Chancellor, University of New Orleans (Professor of Economics)

Ms. Eileen Walker, Chief Executive Officer, Association of University Research Parks (AURP)

Ms. Jackie Kerby-Moore, Executive Director, Sandia Science & Technology Park

Dr. Michel Bernasconi, CERAM School of Business, Sophia Antipolis, France

Mr. Jacques Masbouni, Deputy Managing Director of Sophia Antipolis Development Corporation

Mr. David O'Flynn, Venture Capitalist

The Honorable Michael Olivier, Regional President, Americas for Future Pipe Industries,
Former Secretary of LED

Mr. Ashton Ryan, Jr., President and CEO, FirsTrust Corporation and its subsidiary First
Bank and Trust, Venture Capital

The Honorable Pete Wilson – Governor of California, 1991- 1999

The Honorable Michael Hecht, President and CEO, Greater New Orleans, Inc.

Dedication

Finally, the author wishes to dedicate this work and thank certain special people without whose support this effort would never have been completed.

First, his long-time (17 yrs) Executive Assistant, Joy Stuart

Second, his wife and life-long best friend, Lori Savoie

Third, his children, for their support and understanding

Mallory K. Savoie, a Junior at Southern Methodist University

Matthew F. Savoie, a Senior at Isidore Newman School

William R. Savoie, a 6th grader at Isidore Newman School

And lastly, his parents, Judge and Mrs. Felix H. Savoie, Jr. for instilling a life-long love of learning and a belief that anything is possible.

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Abstract

Technology-based economic development has been a highly sought-after objective for regions in developed and developing countries alike. The wealth created by regional knowledge-based economies like Silicon Valley is an attractive outcome. Without understanding cluster-based economic strategy, the different types of technology-based economic development approaches, the factors that dictate success or failure, and how those factors interrelate within a particular region, then the probability of success is minimal at best.

Economic Development is a process and hence lends itself to a Systems Engineering approach, which was chosen as the methodology for analyzing and designing a better model for studying regions around the world to identify Factors that were both common and key to successful regional development. Each region was viewed as a system with inputs and outputs. The challenge in developing a useful system model is the development of the required Factors and Processes to be used. In the development of the model most of the Factors are internal to the system, but many may be affected by external events. The weighting (importance) of these Factors is the topic of much debate. To develop a baseline of Factors the Delphi method was used. Fortunately, a number of world-wide experts agreed to participate in one on one interviews to analyze these Factors, which in itself added a great deal to the body of knowledge of economic development beyond just the Factors. One obvious result was the essentially unanimous opinion of the group that leadership was the most important factor. A less obvious outcome, but one of equal importance was that there are two classes of regional economic development: one for mass job creation and another for the creation of a knowledge-based regional economy. Often regions undertake economic development without understanding this significant difference. While the model developed can be used for either goal it is extremely important that developers know in

advance which goal is being pursued, which is also one of the critical outcomes of strong leadership.

While all indications are that this model is a major improvement over current approaches, because this is a new approach until this research is followed by additional interviews, and by applying the model to actual regional technology-based economic development environments it's validity remains unproven.

Keywords: Delphi method, Research and Engineering, Stages of Economic Development

CHAPTER 1

Introduction

Most municipalities, from mid-sized towns to large cities, expend both effort and funds seeking economic development and job growth. While there are many creative strategies employed to achieve these ends, most simply end up competing with other similar regions based on a traditional series of economic development strategies and indicators. In an attempt to show near-term results, many municipalities use top-down strategies such as attracting a “new” employer to the area, usually with broad incentives, and sometimes at the expense of local businesses and taxpayers (Blakely, 2002), (Bingham, 1993). Many municipalities and political leaders are so concerned about brain-drain that they miss the opportunity for “brain-circulation” (Saxenian, *New Argonauts*) – the return of educated, experienced natives who can grow new businesses. Some leaders concentrate on their area’s core competencies, which may range from blue collar mechanics to international shipping, to the exclusion of the greater upside potential of technology-based entrepreneurship. These top-down strategies typically result in a municipality capturing its own slice of an ever decreasing pie that it can retain only so long as it continues to offer low-cost strategies to corporate decision makers. The efforts made by municipalities and local developmental regions are typically focused on intra-state and inter-state competition that stresses a low-cost and high-return environment for business attraction (Bingham, 1993). These strategies, if they succeed at all, can result in disconnected industries or corporations that are non-synergistic for future economic development. This is a self-defeating cycle that cements the already stagnant positions of second-tier cities and regions (Shapira and Youtie, 2008).

Many economic development organizations in the United States (U. S.), whether they are regional (intra-state and inter-state), state, or local would like to capture technology-related jobs

– clean, non-polluting, well-paying, knowledge-based, technology jobs. However, governmental and quasi-governmental organizations that attempt to impact economic development typically fail to fully recognize or appreciate the totality of factors that can positively or negatively impact technology-based economic development in a global economy (Baruah interview and Fudickar interview). This is due, in part, to the pressure placed on these organizations to generate short-term results based on the existing workforce and economic environment; further increasing the pressure for these organizations is the ever-present risk of discontinuation of the organization’s funding. But it is also due in part to a lack of understanding of how the many economic development variables that affect long-term economic health and progression of a local or regional economy interact in a global economy (Olivier interview).

The economic cluster model defined by Dr. Michael Porter from Harvard University (Porter, Harvard Business Review, 1998) is still the most broadly utilized approach to initiating regional technology-based economic development (U.S. Office of Technology Policy, Department of Commerce, 2000), (Woodward, *Clusters, Competitiveness*). But identifying and creating clusters, even ones that have a natural affiliation with a particular region, is but one of many steps necessary to yield successful growth of a regional technology sector. It is the identification and successful implementation of the other enabling factors that dictates whether or not a regional technology-based economy will grow (Wooldgridge, 2005), (Woodward, *Porter’s Cluster Strategy*), (Lee, 2000).

Technology-based regional economic development is also not just a “western” phenomenon. When many people think of successful regional economies they think in terms of modern western civilization. This is particularly true for technology-based regional economies.

However, in his book *“The Post-American World”* (Zakaria, 2008), Fareed Zakaria points out that the West “acquired its distinctive character around the eighth or ninth century, but became modern only around the eighteenth century (page 74). Becoming a modern society is about industrialization, urbanization and rising levels of literacy, education and wealth (page 74).” To many people in modern western society, non-western countries may seem strange. But many of these non-western regions have enjoyed extraordinary success as regional technology-based economies without becoming truly “western” especially regions in Japan and India. Japan, for example, is more technologically advanced than most western nations, but is not truly “western.” “If wealth did not Westernize Japan, the argument goes, it will not Westernize the rest (Zakaria, 2008, page 74).” The point is that economic regions have enjoyed great success in technology-based job expansion without following a truly western model. Clearly then, the factors that drive technology-based economic development are not just those which are apparent in western cultures. The success of “India’s Silicon Valley,” Dubai (the United Arab Emirates), and Saudi Arabia’s “Economic Cities” are but three examples of non-western regions that have succeeded in technology-based economic development (Singh, 2002), (Hamm, 2007), (www.sagya.gov.sa), (Pollard interview). As will be shown in Chapter 5, contrasting these regions with similarly successful regions in western countries offers excellent lessons on the factors that affect technology-based economic development.

The real question of this dissertation research is “how do we create a technology-based economy, whether as a small part of a larger economic base or as the leading economic growth factor for a specific city or region?” There are many examples of successful development of a technology-based economy. In the United States, Silicon Valley is of course the prime example, but Research Triangle Park, Massachusetts Route 128, Austin and others are worthy of note.

Internationally, Bangalore (India), Limerick (Ireland), Sophia Antipolis (France) and Dubai (UAE) are a few regions that warrant further analysis. Additionally, there are many others that some consider successes, such as the Cummins Research Park in Huntsville, Alabama. But are these really successes? If the government spending at Redstone Arsenal and the NASA Marshall Space Flight Center were discontinued would Huntsville, Alabama still have a technology economy or would it revert economically to a second-tier region?

Many articles have been written about individual municipalities, regions and facilities, or even specific aspects of technology creation or technology-based economic development (Blakely, 2002), (Bingham, 1993), (U.S. Office of Technology Policy, Department of Commerce, 2000), (U.S. Office of Technology, Department of State, 2001). However, the key to understanding how to create a technology-based economy lies in understanding two concepts.

- (1) Defining and understanding the concept of “success.”
- (2) Understanding the complex interaction of quantitative and qualitative (affective) variables that made Silicon Valley, Research Triangle Park, Limerick, Sophia Antipolis, Bangalore and many other such regions successful to one degree or another.

A thorough understanding of these concepts requires an examination of those regions before they existed as centers of technology to determine what happened to create the initial concept and how the first steps towards technology-based economic growth were initiated. It is critical to understand how these regions eventually reached the point at which economic growth became self-propelling and the point at which the regional economy itself became sufficiently diversified

as to be self-refueling (Jacobs, 2000). For example, it would be immensely instructive to ascertain when and why the leaders of Limerick, Ireland, an historically agricultural economy, determined that Limerick and, subsequently, all of Ireland, would become the Information Technology (IT) access point for Europe. Further, it would be interesting to dissect its progress from an agricultural economy to an epicenter of more than 25,000 IT jobs into elemental questions, steps and decisions (Hughes, 1997). It would be equally instructive, if not more so, to analyze Ireland's performance in light of the current global economic crisis, which has yielded thousands of job losses in the same technology fields that started Ireland's ascent. If the same is done for numerous real success stories as well as perceived success stories, it should be possible to isolate the key success factors and the variables that affect success, and build a model of how to create a technology-based regional economy.

1. 1 THIS DOCUMENT: A LITERARY GUIDE

This document represents a foray into the questions presented above. There are ten chapters included, all with very precise purposes in discovering the best ways to create a self-refueling, mature economic region. Chapter 1, the Introduction, briefly sets forth the ideas spurring the development of the research questions. In this chapter, the definition of the concept of success, as well as the understanding of success, is presented as being imperative actions to understanding and creating an environment of successful economic development. Further, Chapter 1 suggests that another source of aid in the understanding of this research is the study of the complex interaction of quantitative and qualitative (affective) variables that have made successes of various geographic regions studied in this research.

Chapter Two, The Hypothesis sets forth the hypothesis of this research. Simply presented, this dissertation presents and analyses the hypothesis that the development of technology-based regional economies can be analyzed and modeled on the basis of a finite set of common factors and variables found in each economy. A study of these factors and variables can yield predictable bifurcations that will propel economies into the various phases of existence and, ultimately, success or failure. Chapter 2 provides seven hypothesis statements, based on three categories: factors and variables, phase progression and the effectiveness of the model designed in this research.

“Methodology – Systems Engineering Approach” is the title of Chapter 3. In this chapter, the author describes and explains his use of the Systems Engineering Approach to create his model. This process contains seven steps, the first five of which describe the development of the model: the statement of the problem, the investigation of alternatives, the modeling of the system, the integration of the elements of the system, the initiation of the system. The final two stages of the Systems Engineering Approach as it is used in this research are the performance assessment of the system and the continuous evaluation and re-evaluation of the system to check that it is working properly.

Chapter 4, “Core Issue/Analysis of Hypothesis,” provides basic definitions of concepts vital to the understanding of this research. Economies can be “mature,” “adolescent,” or “neophyte” in the developmental life cycle; economies may also be self-refueling, stagnant or depreciating in their current stage of the life cycle. Armed with a thorough understanding of these concepts, the study of the economic regions which have already felt the failure or success

of economic development in terms of both phase of development and nature of economic development can begin in earnest.

“Lessons Learned from Specific Regions and Models” are presented in Chapter 5. Seven specific regions were chosen for an in-depth review of their economies and the strategies that proved successful or not, in the progression of time. The author had opportunity to visit these cities, as well as doing a thorough job of literature review to aid in his understanding of these unique economies. These areas in the United States (U. S.), heavily studied, are: Silicon Valley, California, Massachusetts Route 128 in Massachusetts, Huntsville, Alabama and Research Triangle Park in North Carolina. Internationally, the areas of Sophia Antipolis, France, Southern India and Ireland were studied. Other areas of interest, though less intense, were Albuquerque, New Mexico, both Phoenix and Tuscan in Arizona, the U. S. State of North Dakota and Saudi Arabia’s Economic Cities Initiatives. Finally, the author quickly presented information on the Scandinavian Model, as well. These geographic locations were all chosen to present specific environments designed to aid in the development and understanding of the factors and variables used in the model designed and presented here to help predict economic development health.

Chapter 6, “Understanding the Factors through Analogies,” presented four analogies deemed to be useful in understanding economic development: why it is successful for some economies and yet less successful for others. The Ecosystem model, the Ancient Rome model, the model of Corporate Development and the Product Development Lifecycle were all compared and lessons utilized in the development of the research undertaken in this dissertation. Study of these models have all added knowledge to the determination of what factors and variables are most important to create and sustain a self-refueling, mature technology-based economy.

“Initial Discussion of Factors that Affect the Advancement of a Regional Technology-Based Economy,” Chapter 7 is a complete description of the factors and variables used in the model to help predict economic success. There are six factors: environmental, inflow, attitudinal, leadership and policy, knowledge and social factors. Each of these factors is comprised of a set of variables which further define the factors. Factor 1, Environmental Variables, includes elements related to quality of life in an area, support for technology initiatives and a talented, well-educated workforce. Inflow Variables include inflow of equity capital and debt financing, as well as inflow of talent and the associated ideas and innovation. Factor 3, Attitudinal Variables, represents tolerance for entrepreneurial risk, responsiveness to innovative investors and an entrepreneurial focus of the population. A business friendly tax structure, tax breaks for research and development and State and local support for workforce development are example of variables to be found in the fourth factor, Leadership and Policy. Knowledge Variables, Factor 5, include variables like the depth of technology initiatives and targets and technology commercialization support. Finally, the Social Variables of Factor 6, include, among other things, the culture of collaboration, of change and the development of a collective identity.

Chapter 8, “Constructing a Model That Can be Continuously Improved,” presents information on artificial neural networks. The processes of process flow, learning and adaptability are critical to the successful process of economic development: these are the processes inherent to a good artificial neural network. The intent of Chapter 8 is to suggest that the combination of a systems engineering approach and a neural networking approach is a combination that provides a mathematical model for quantifying and optimizing qualitative, affective variables as a learning system.

The chapter presenting the in-depth findings drawn from the subjects interviewed is Chapter 9, “Empirical Expert Interviews, Lessons, Conclusions and Structuring the Model.” Section 9.2 is a comprehensive listing of all subjects who were interviewed, as well as past and current affiliations, etc. Section 9.3 is a discourse on leadership as identified and defined by the interviewees, as synthesized by the author. Further interviewee insights are provided in Section 9.4: on the subject of knowledge-based or mass job creation economic development. Arguably the most important section of this research is Section 9.5: “Lessons Learned and Anecdotal Findings from Expert Empirical Interviews.” In this section, 13 interviewees’ thoughts are reported and analyzed, in light of the elements of this research: the phase of economic development in existence in a region, the nature of the economic health of the region (i.e., self-refueling or depreciating), the product life cycle, etc. Finally, in Section 9.6 the analysis of the factors and variables is presented.

Chapter 10 is a recitation of future work in the area that can be anticipated to be necessary based on the findings of Chapter 9. A chief limitation is that the research is limited to only a few (relatively speaking) geographic regions, out of the many, many regions in need of economic development. Further, the research is based in large part on qualitative research: future research would greatly benefit by the quantitative analysis of the validity of the factors and variables.

CHAPTER 2

Hypothesis

Introduction

Chapter 2 of this dissertation presents the hypothesis that is the basis of the qualitative and quantitative empirical research presented in Chapter 9. The hypothesis concerns the factors and variables that impact, positively or negatively, the development and continuation of a technology-based regional economy. Specific research issues have been formulated and are presented here, as well. Finally, this chapter outlines briefly the existing scholarship which bears directly on all elements of the hypothesis.

Hypothesis

This dissertation presents and analyzes the hypothesis that the development of technology-based regional economies can be analyzed and modeled based on a finite set of common factors. These factors and the variables that comprise each can be affected to yield predictable bifurcations that can cause a regional technology-based economy to progress from one developmental phase to the next. As seminally defined by this research and described more fully in Chapter 4, technology-based regional economies can be generally categorized according to their developmental phase of economic maturity as “mature,” “adolescent”, or “neophyte” based on their relative status against these same factors. Within each category, economies can be self-refueling, stagnant or depreciating at each stage; these concepts are also defined fully in Chapter 4.

The type of technology that can serve as the cornerstone of regional growth may differ from one region to the next based on the natural genesis of the region. Further, the relative impact and importance of these factors and variables may vary depending upon the nature of the region and the technological basis of the economy. These factors can be placed in a systems process model that can be used to evaluate and categorize the technology-based economy of a region. This model can never be completely accurate or “finished,” as economic factors are too fluid and will vary in importance between regions. Therefore, the model must “learn” from continuous input and refinement. An open-source model such as an artificial neural network can be used to facilitate and “teach” the model. By properly bounding a regional technology-based economy and thoroughly evaluating that economy against these factors, a plan can be developed for the progression of a regional technology-based economy from one developmental phase to the next.

2.1 Research Issues that Comprise the Hypothesis

There are seven elements of this research for which information is sought. These elements may be subdivided into three categories, relating to the factors/variables, the economic progression of the region and the model developed to test the hypothesis itself. The first category includes questions relating to factors and variables within each factor that would affect the success of technology-based economic efforts. The second category relates to questions relating to the stages of the economic progression of such economies. Finally, research is envisioned which will address the issues surrounding the model developed here and its use in attempting to discover what makes a successful technology-based economy a reality.

Hypothesis Category	Statements of Hypothesis
Hypothesis Statements on Factors and Variables	<p>(1) There is a common set of factors from one region to the next that drive the development of a technology-based economy.</p> <p>(2) These factors and the variables that comprise each factor can be identified and isolated. Further, these factors may be quantified.</p>
Hypothesis Statements on Progression	<p>(3) The stages of progression of a technology-based economy can be categorized and quantified.</p> <p>(4) The identified factors may change in predictable ways as a regional technology-based economy progresses from one stage of maturity to the next. These changes be can identified and quantified.</p> <p>(5) The progression of a regional technology-based economy can be modeled based upon a finite set of factors and variables. The proposed model fits with the historical literature.</p>
Hypothesis Statements on Model	<p>(6) The model can be tested through empirical research. The model can be designed for continuous learning.</p> <p>(7) The model can be applied to a particular region in a manner that facilitates the creation of a plan for advancing the region’s technology-based economy.</p>

Table 2.1: Statements of Hypothesis

2.2 Review of Existing Scholarship/Historiography

While there is no scholarship directly on point with this research, there are a number of books and articles that are very instructive. The development of a regional technology-based economy requires the existence of certain enabling conditions, influences and inputs, as well as the existence of needed infrastructure. To that end, U.S. Government and State agencies collect a series of metrics important to “high-tech” economies, including:

- “A Resource Guide for Technology-based Economic Development; Positioning Universities as Drivers; Fostering Entrepreneurship; Increasing Access to Capital; U.S. Economic Development Administration”
- “Partners on a mission: Federal Laboratory Practices Contributing to Economic Development, Office of Technology Policy, U.S. Department of Commerce”
- “Drivers for a Successful Technology-based Economy: Benchmarking Washington’s Performance, A Technology Alliance Report”

These metrics are specifically focused on the U.S. and are limited to existing activities. Similarly, and of more importance to this effort, the August, 2006, volume of the Economic Development Administration (EDA) of the U. S. Department of Commerce published “*A Resource Guide for Technology-based Economic Development – Positioning Universities as Drivers, Fostering Entrepreneurship, Increasing Access to Capital*” (USDC EDA, 2006) that was set forth as a primer for “economic development practitioners in their efforts to accelerate transition of technology-based economies”, (U.S. Economic Development Administration, page 6).

While these publications are valuable, they are insufficient to fully describe the variables that affect the growth and expansion of a technology-based regional economy. Thus an additional, excellent source of information and insight, particularly when considering knowledge variables, is the work of Dr. Phillip Shapira and Dr. Jan Youtie in the School of Public Policy at Georgia Institute of Technology. Their paper “Learning to Innovate: Building Regional Technology Development Learning Networks in Midsized Cities” (European Planning Studies, 2008) provides excellent input on both the role of Universities in technology-based economic development and the descriptions of a neophyte technology region.

There was also an excellent article from Dr. Suleiman K. Kassicieh from the Anderson School of management at the University of New Mexico published by IEEE Xplore in 2005 titled “Statistical Analysis of variables Affecting Technology-based Economic Development” (Kassicieh, 2005). Dr. Kassicieh’s article does not try to explain through empirical research why certain variables (factors) are present in technology-based regional economies or to create a predictive model, nor does it attempt to gauge the relative impact of individual variables. It does, however, provide an excellent framework for the statistical significance of the presence of various factors that were shown by a literature review to exist in certain regional technology economies. This is an extremely useful and important data set in studying technology-based economic development, and offers a good reference point for the expert interviews conducted as described in Chapter 9, particularly in determining the relative importance or “weight” of specific factors, and their impact on regional technology-based economic development.

Conclusion

This chapter of this work has presented the basis research questions ultimately answered by the empirical research reported in Chapter 9: are there identifiable factors and variables that can aid in the understanding of what makes an economy a candidate to be a successful technology-based one? Further, can the progression of an economy towards or away from a technology-base be predicted? Finally, this chapter suggests the hypothesis that models may be developed that can add value to the understanding of what makes an economy a successful candidate to develop a technology base.

Chapter 2 also provides a brief review of existing scholarship of these issues. This review has revealed that, while there is interest in this area of study, there is no research, empirical or not, that has developed or utilized a specific model to determine what factors may be of impact on the progression of an economy relative to its technological base. Thus, the research done for this dissertation should be a catalyst for new understanding of what makes for a successful technology-based economy on a long-term scale.

CHAPTER 3

Methodology – Systems Engineering Approach

Introduction

In Chapter 3, the methodology of this research is presented. The methodology chosen is one of Systems Engineering. Systems Engineering offers an excellent framework for the systematic analysis of the factors that affect regional technology-based economic development. Further, viewing a regional economy as a “system” with inputs, processes and outputs allows for the quantification and modeling of factors that impact the performance of the system. If the factors and their impact (positive and negative) on the functioning of the system can be identified and quantified through both quantitative and qualitative means, then a mathematical process model can be derived.

Systems Engineering

Systems Engineering as a structural process originated in the 1940s with Bell Telephone (Bahill, 2007), (Thompson, 2003) and was subsequently refined and applied to complex engineering projects primarily by the Department of Defense and NASA. Derek Hitchins, former President of the International Council on Systems Engineering (INCOSE), defined Systems Engineering as “the art and science of creating optimal solution systems to complex issues and problems (INCOSE Delaware Valley Chapter, University of Pennsylvania, September 19, 2000).” It is in this context that Systems Engineering was chosen to provide a structured approach for defining a technology-based regional economic development model. According to A. Terry Bahill and Frank F. Dean (2007), the Systems Engineering process, shown graphically

in Figure 3.1, can be defined as a seven step process. Table 3.1 is a representation of the steps and a description of each step in the Systems Engineering process used to help develop the model upon which this research is based.

Step	Step Description
1. State the Problem	Stating the problem is the most important systems engineering task. It entails identifying customers, understanding customer needs, establishing the need for change, discovering requirements and defining system functions.
2. Investigate Alternatives	Alternatives are investigated and evaluated based on performance, cost and risk.
3. Model the System	Running models clarifies requirements, reveals bottlenecks and fragmented activities, reduces cost and exposes duplication of efforts.
4. Integrate	Integration means designing interfaces and bringing system elements together so they work as a whole. This requires extensive communication and coordination.
5. Launch the System	Launching the system means running the system and producing outputs – making the system do what it was intended to do.
6. Assess Performance	Performance is assessed using evaluation criteria, technical performance measures and qualitative measures – measurement is the key. If one cannot measure it, one cannot control it. If one cannot control it, one cannot improve it.
7. Re-evaluation	Re-evaluation should be a continual and iterative process with many parallel loops.

Table 3.1: Systems Engineering as Defined by Bahill and Dean (2007)

The steps described in Table 3.1 can be modified to provide a structured approach using the same Systems Engineering principals to guide the development of a model for creating a regional technology-based economy as described below. The first step in the process is to state the hypothesis. As with stating the problem this key step entails identifying the end results

desired, stakeholders, requirements and system functions. The second step is closely related to the first one: it is the identification of the elements of the hypothesis, or the statements to be investigated, questions to be answered and results to be achieved.

The investigation of the elements of the hypothesis, the third step in the Systems Engineering Process as defined here, is no more than a literature review. This step is comprised of a comprehensive analysis of the existing scholarship in the area of technology-based economic development. An analysis of current academic writing and hypotheses is completed; an evaluation of “real-time” data on economic growth of the regions studied and of the economy as a whole is made. Finally, step 3 includes the interview of leading scholars and professionals in the field of technology-based economic development.

The fourth step in the process is to define the model attributes, factors and variables that impact the model. In this step the model begins to come together. The processes that comprise the system are identified along with the factors that impact those processes, as well as the inflows to the system and outflows from the system.

The creation of an initial process model is the next step in the process. The data and information collected provides for completion of the initial model and base lining of both the hypothesis and the model. While the 4th step is still one of discovery, step 5 is one of creation or construction of the systems/model itself for future analysis, testing and applications.

The validation of the model against existing technology-based regional economies using empirical research is the sixth step in the process. Validating the model requires capturing empirical data on the growth of leading technology-based economies. This step involves direct,

original research to follow the developmental steps of certain economic regions from the inception of the idea that they will be a technology-based economy to their current economic status, as a mature, adolescent or neophyte technology-based economy. This is based initially upon direct observation, using interview techniques to quantify affective data. These observations serve as inputs to refine the model and help it to “learn.”

The last steps of the process are to further refine the model and then apply the model to one or more representative regions. The final steps constitute an ongoing process that is discussed in Chapter 10. Each time the model is applied, it should continue to learn and be refined. To facilitate continuous improvement, the model should be developed as an open source application and made available to other researchers.

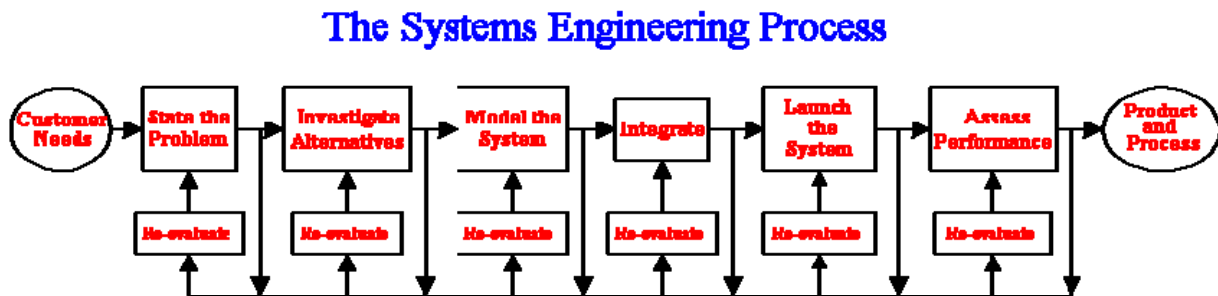


Figure 3.1: Systems Engineering Process

Conclusion

In summary, Chapter 3 has provided a description of the model upon which the empirical research, via qualitative interviews, as well as the completion of an instrument designed to

identify, quantitatively factors and variables that will aid in the understanding of what makes an economic region a success on the basis of its technology. The academic frameworks of Bahill and Dean (2007), which also drew upon data from the previous publication by Bahill and Gissing (1998) provide a solid foundation of a systems engineering approach that is admirably suited to use in the testing of the hypothesis of this research. Further, the author has developed a Process Model for Regional Technology-Based Economic Development on the basis of the systems engineering processes researched and described in this chapter.

CHAPTER 4

Core Issue/Analysis of Hypothesis

Introduction

Analyzing technology-based regional economies paints a picture of varying degrees of success that can be likened to the stages of growth from childhood to adulthood. Many regions, states and/or municipalities have tried to develop technology-based economies. The initial literature research indicates that regional technology-based economies can be segregated into three primary categories of development or success – mature, adolescent, and neophyte. Most regions set out to reach the stage of having a mature, self-refueling technology-based economy, but few have actually succeeded in achieving that level, including many that are perceived to be major successes. This chapter presents basic definitional issues on the level of maturity of an economic region and on the nature of the technology base of the economic region.

Key Definitions

4.1 Definitions: Economies Can be Self-Refueling, in Equilibrium or Depreciating

Before defining the stages of relative maturity of technology-based regional economies, there are three key definitions that need to be defined: self-refueling, equilibrium and depreciating. A self-refueling technology-based regional economy is one that can maintain itself and continuously earn new “fuel” (imports), irrespective of the loss of a single business, product or industry (Jacobs, 2000). Just as a living organism must self-refuel in order to survive, an economy must add value to the resources it processes in order to import the fuel it needs to

prosper (Jacobs, 2000). In this case, the fuel of a technology-based economy takes the form of cash, knowledge, skills, investment capital, natural resources, raw materials, etc. (Bingham, 1993), (Blakely, 2002), (Jacobs, 2001, page 95), just as food and water are the fuel for a living organism. These resources must be earned by value-added processes. When these value-added processes are developed in a regional technology economy to the extent that the growth and diversification of new businesses is incubated through a process of import stretching and import replacement, the economy can be thought of as self-refueling (Jacobs, 2000), (Saxenian, 1999). It is critical that both processes of import replacement and import stretching be present for an economy to become self-refueling. Within the context of a model, a self-refueling regional economy is represented conceptually in Figure 4.1. In a self-refueling regional economy, the sum of the inflows is greater than the sum of the outflows, thereby causing the regional economy to expand, much in the same way as a balloon expands as the amount of air flowing into the balloon exceeds the sum of all of the air lost by outflow.

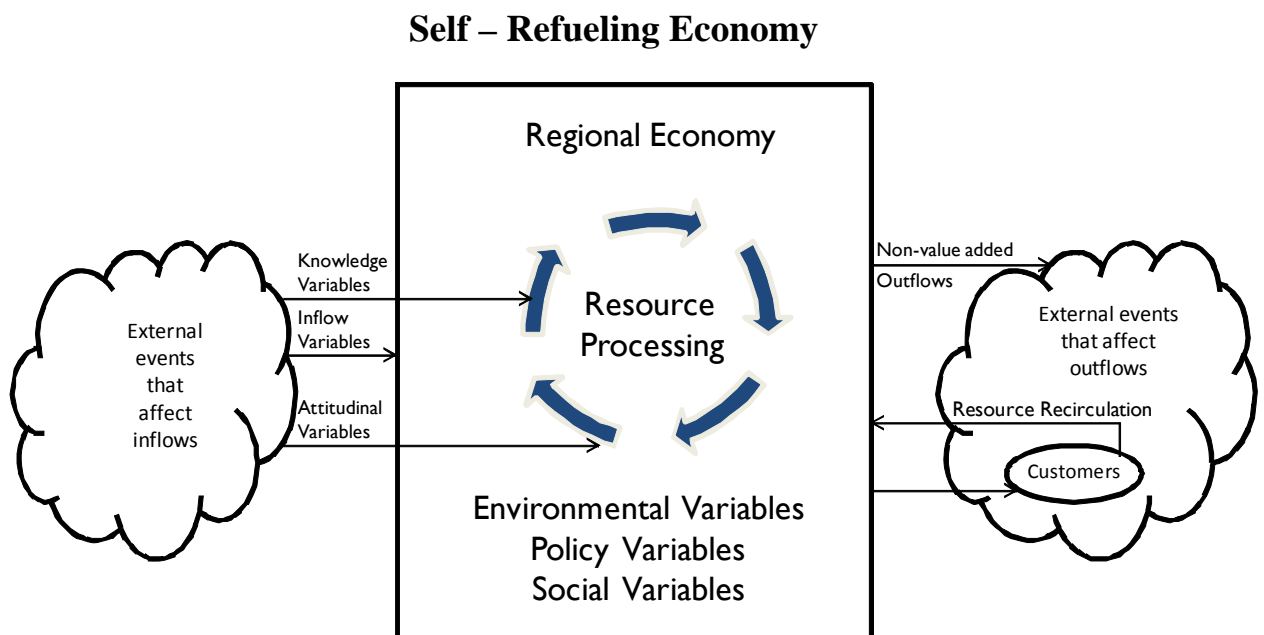
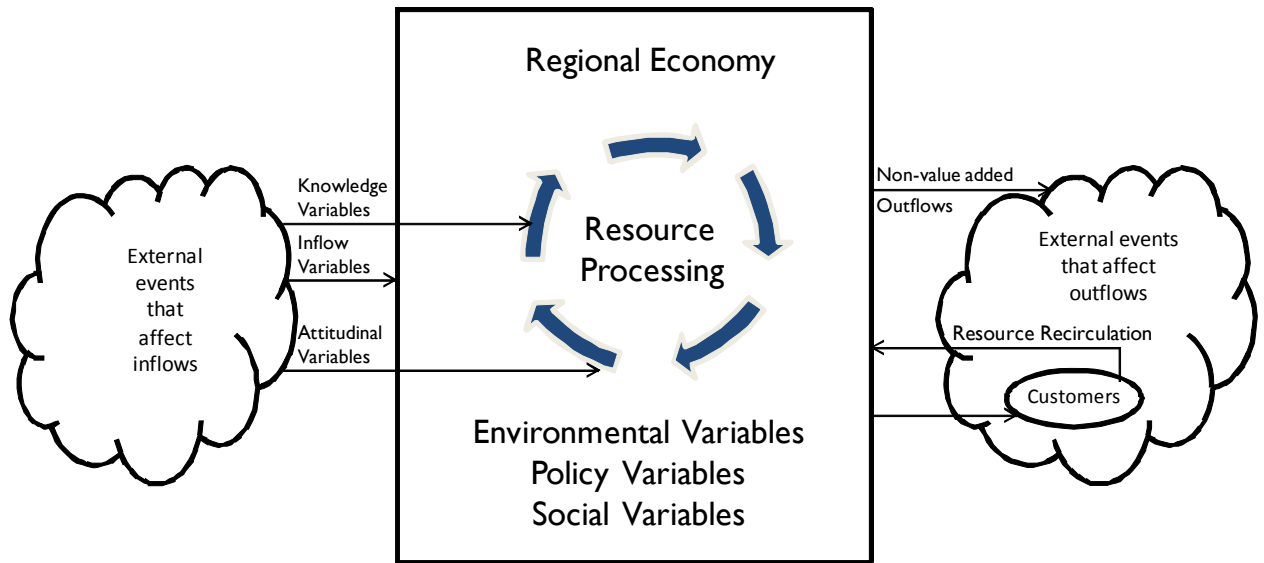


Figure 4.1: Representation of a Self-refueling Regional Economy

Clearly, not all economies are self-refueling. Many localities and regional economies, regardless of their developmental phase, fall into the category of technology-based economies in equilibrium (See Figure 4.2). Equilibrium can occur in an economic region of any size, age or even traditional strength. Technology-based economies in equilibrium are not by nature self-refueling and can begin depreciating.

These areas may have many excellent attributes and may even have a moderately strong traditional economic base and some technology-oriented businesses. However, such regions fail in one or more of the six primary factors and many of the variables within each factor category identified as important in the hypothesis tested by this research. The region's technology-based economy may not yet have "gotten off the ground" or it may have simply stopped expanding and become sluggish, inert or even dormant. For example, one region identified in this study has a long tradition of being one of the world's leading cities and has many attractive attributes. However, the region fails both the knowledge and attitudinal factors and has weaknesses in some variables and the factors associated with them. These areas can still become self-refueling and progress through the various maturity phases of economic development if they address these weaknesses. Unfortunately, the root causes of any regional economic phases often go unrecognized.

Economy in Equilibrium

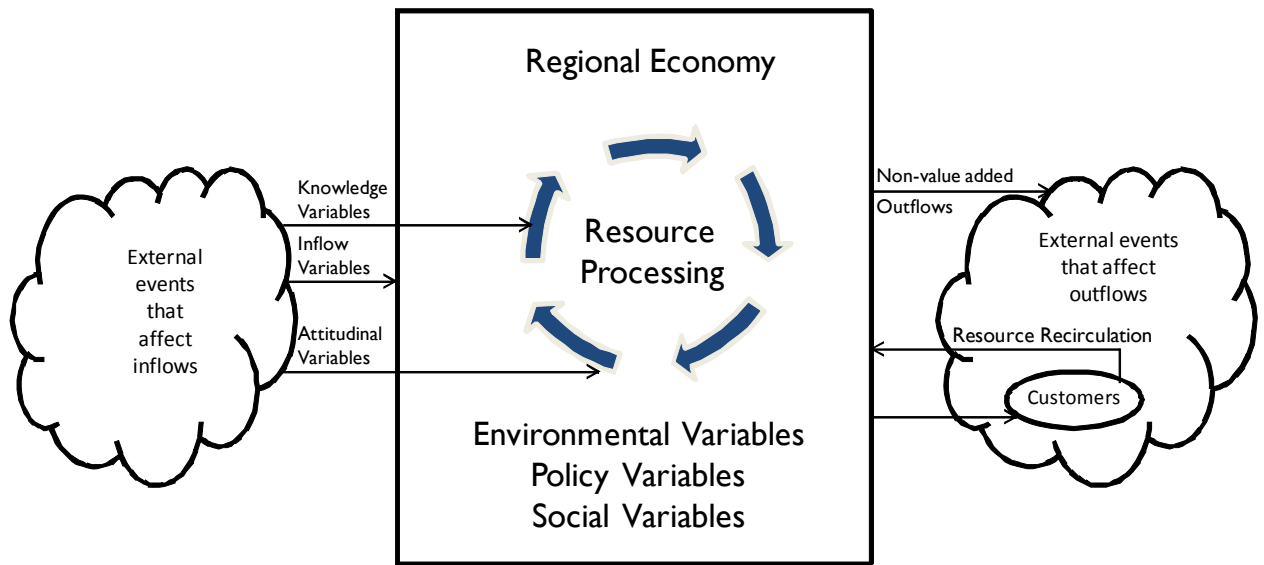


Sum of Inflows + Value Added Processes = Outflows

Figure 4.2: Representation of a Regional Economy in Equilibrium

Finally, a regional economy that has not only stopped expanding, but has actually started to shrink can be thought of as depreciating (Figure 4.3). In this case, the outflows exceed the inflows so the economy shrinks in the same manner as a deflating balloon. This is the same process as depreciation of an asset, a corporation or even a national economy as a whole. It is based on the Factors and processes that impact the model. Depreciating economies are not “doomed” to extinction. By altering the Factors and/or improving the processes, even a depreciating economy can be turned around.

Depreciating Economy



Sum of Inflows + Value Added Processes < Outflows
Figure 4.3: Representation of a Depreciating Regional Economy

4.2 Definitions: Mature, Adolescent and Neophyte Economic Status

Having a firm understanding of what self-refueling, balanced or depreciating economies are, the discussion now moves to the definitions of the types of economic life-cycles a region can be in with regard to their technology base. There are three distinct stages in the economic life-cycle of any region: an economy could be a mature economy, an adolescent one or neophyte economy.

Mature Economic Status

A self-refueling economy with sufficient diversification and dynamic stability to support continued economic health and expansion constitutes a mature economy. The ultimate goal for technology-based economies is to reach a point at which the economy is mature enough to withstand the withdrawal or termination of any single source or set of economic drivers and still

survive as a viable economic engine (U.S. Economic Development Administration, Department of Commerce, 2006). Silicon Valley and Massachusetts' Route 128 in the U. S. and Sophia Antipolis, France may have set out on the road to self-refueling economic maturity as a result of government supported research (Lee, et.al.,2000), (Saxenian, 1999), but are now far beyond their dependency on the government or any other single source of economic stimulus to ensure continued viability. The same may be true for the economies of Bangalore, India and the Research Triangle Park in North Carolina in the U. S., as well as other U.S. and international regions (Global Province) (IC2 Institute).

This economic security may not be the case, however, for less mature economic regions such as Huntsville in the U. S. and Dubai in the UAE. Through time, mature regional technology-based economies have gone through revealing cycles of relative success and failure. These cycles can be described in terms of self-refueling periods and periods of depreciation. A mature economy must be innovative and open to change if it is to remain viable and self-refueling, otherwise it may begin to depreciate.

Adolescent Economic Status

Regions that have a strong base of technology-oriented companies and jobs, but which are highly dependent upon a single source or a small group of highly portable primary sources for sustaining those technology jobs are considered adolescent technology economies. Huntsville, Alabama in the U. S. may be a good example of an adolescent technology economy (Souder. 1993), (Huntsville Chamber of Commerce). Huntsville boasts the Cummings Research Park that supports the Redstone Arsenal and NASA Marshall Space Flight Center. Together, these entities result in over 40,000 direct technology-oriented jobs and many more indirect jobs.

However, if the Redstone Arsenal and the Marshall Space Flight Center were to be removed as economic movers in the region, the technology economy of Huntsville could fall apart even during its continuing economic diversification.

Thus, Huntsville has not yet grown to the stature of a sufficiently diversified and self-refueling technology economy so as to have a chance to survive independent of government spending. The same is true for Albuquerque, New Mexico with its reliance on the Sandia National Laboratories and the Air Force Reconnaissance Laboratory (Jackie Kerby-Moore interview). Similarly, while Dubai has been an extraordinary 21st century example of economic growth in a region not normally known as a technology-based economy (Pollard interview), it enjoys enormous support from an investment by governmental sources. If this support system is removed, Dubai may cease to grow (Pollard interview).

Too many regions try to become what they are not by force fitting technology enterprises into a mold of what they think the Silicon Valley economic model is. It fails just as surely as a wet-weather agricultural crop fails in the desert. The resources needed to feed the crop are not present naturally so the crop dies without intervention. An unnatural economy dies in the same way. Silicon Valley developed over decades and did so naturally. When today's regional economies try to create the "next" anything and try to do so – a few months or even a few years – or by attempting to force-fit a particular technology into the region, they typically fail. Adolescent and even neophyte regional technology-based economies must supplement and build upon their natural strengths in concert with strategies to address the variables delineated herein in order to progress to the next level of economic maturity. Many areas in the United States that are considered successful technology centers may actually fall into the adolescent category.

Neophyte Economic Status

Neophyte regions are those areas that have a decent economic base, possibly including technology-oriented work and businesses, but have not yet successfully developed or implemented a growth model to create a viable, self-refueling technology-based regional economy by building on that base (Schultz, 2004), (Shapira, 2008). Usually this is due to either a lack of focus or funding, or because other economic interests take priority (Siegel, 2001). It is also possible that the various governmental or quasi-governmental entities that are responsible for economic development are not sufficiently knowledgeable of the strategies they can implement to build a technology-based economic model (Schultz, 2004), (Siegel and Waxman, 2001). Georgia's "second region" Centers for Innovation initiative is a possible example of a neophyte technology-based economic development initiative (Shapira, 2008). The lessons to be learned from the early stages of Sophia Antipolis, France are particularly instructive for neophyte regions (Quere and Coutures, 2002), (see Chapter 5).

Conclusion

In sum, Chapter 4 presents the core issues regarding an analysis of the hypothesis under consideration. In doing so, the concepts of mature, adolescent and neophyte economic development have been discussed. Further, integrated into this discussion of economic development is a discussion on the issues of the types of technology-based economies that may exist in conjunction with mature, adolescent, or neophyte economies. Technology-based economies may be defined as being self-refueling, in equilibrium or in depreciation. It is the combination of the stages of economic development with the types of technology-based

characteristics that is the subject of Chapter 5 and constitutes a large portion of the lessons learned as a result of this research.

CHAPTER 5

Lessons Learned from Specific Regions and Models

Introduction

The variables that affect the progression of regional technology-based economic development can be identified and characterized by studying the collective experience of the regions around the world that have undertaken such efforts intentionally or not. There are lessons to be learned, both positive and negative, from each region. This chapter addresses many such regions, but it represents just the tip of the iceberg of what can ultimately be learned.

Much has been written about the success of Silicon Valley and many regions have attempted to recreate Silicon's Valley success (Graham, 2006), (Gregory, 2007), (Hamilton, 1997), (Saxenian, Motoyama and Quan, 2002) and (Saxenian, 2006). But the ability to quantify the factors that led to the establishment, growth and long-term "staying power" of Silicon Valley remains elusive. Much as wave resonance can, with the right frequency, pitch and amplitude, yield extraordinary outcomes (think rogue wave or a bridge collapse), in Silicon Valley, the right mix of quantitative and qualitative factors yielded explosive results. It is worthy to note that on a much smaller scale Huntsville, Alabama achieved a similarly impressive outcome in the aerospace field thanks to Werner Von Braun and scientists from NASA (Ward, 2005), (Souder, Schoening, 1993), but could not reach beyond that to create a diversified economy. Similarly, regions such as Sophia Antipolis, France, which is widely considered an international success story for the stimulation of a knowledge economy, have found various levels of success (Innovations Champion Network, 2004), (Koch, 2007). (Quere and Coutures, 2002). Interestingly, Sophia Antipolis effectively failed in its initial attempt at creating a technology

region (Quere and Coutures, 2002). Using these considerations as a backdrop, this chapter explores the lessons to be drawn from literature on several key regional technology-based economies around the world, and sets the stage for the broader lessons derived from the empirical interviews described in Chapter 9.

5.1 Silicon Valley, California, U. S.

Of the many books and papers written about Silicon Valley, for the purpose of this study the most useful are “*The Silicon Valley Edge*” (Lee, et. Al., 2000) and “*Regional Advantage: Culture and Competition in Silicon Valley and Route 128*” (Saxenian, 2006) and “*The New Argonauts: Regional Advantage in a Global Economy*” (Saxenian, 2006). As stated in the *Silicon Valley Edge*”, (Lee, Miller, Hancock, Rowen, 2000) what sets Silicon Valley apart is not the technologies discovered here, but the companies created in the region that develop, market, and exploit these technologies. In other words, the Silicon Valley story is predominantly one of the developments of technology and its *market* applications by firms – especially by start-ups. The results of this technological development and application is that new companies were able to focus on new technologies for new wealth creation. Like a natural habitat for flora and fauna, the habitat of Silicon Valley is one in which all the resources high-tech entrepreneurial firms need to survive and thrive have grown organically over time. Silicon Valley’s habitat includes people, firms, and institutions – their networks and modes of interaction. And like a natural habitat, it is marked by complex, dynamic, interdependent relationships. (Lee, et.al., 2000, page 3). The factors that can be drawn from this quote and the research of its authors include environmental, policy, attitudinal, knowledge and social variables. The authors go on to identify ten specific features that were crucial to the formation of Silicon Valley: (Lee, et.al., 2000):

- Favorable “rules of the game”
- Knowledge intensity
- A high-quality and mobile work force
- A climate that rewards risk-taking and tolerates failure
- Open business environment
- Results – oriented meritocracy
- Universities and research institutions that interact with industry
- Collaborations among business, government and non-profit organizations
- High quality of life
- A specialized business infrastructure

Any of these factors would be major breakthroughs in most other regions, but in Silicon Valley, they fed on each other with extraordinary efficiency. Silicon Valley was the prototype for many of the key factors that drive regional technology-based economic development including clusters, sharing of talent and ideas, social networks, university-industry collaboration, leveraging government investments, access to capital, flexible organizational structures and many more. But the leaders of Silicon Valley also took innovation to a new level. No one was solely concerned with creative technology; nor was this dynamic and organic environment simply focused on the mass job creation associated therewith. The whole structure and purpose of this phenomenon of Silicon Valley was about a constant and consistent cycle of innovation and wealth creation, similar to the product development life-cycle analogy described in Chapter 3.

In her books “*Regional Advantage: Culture and Competition in Silicon Valley and Route 128*” (Saxenian, 1999) and “*The New Argonauts: Regional Advantage in a Global Economy*”

(Saxenian, 1996), AnnaLee Saxenian discusses in-depth the importance of education, “brain recirculation,” social networks, entrepreneurial culture, collective learning, horizontal communications, university collaboration and a supportive infrastructure in the development of the “Silicon Valley way.” Dr. Saxenian goes on to describe the process of industrial specialization and fragmentation – the building of companies that then spawn new start-ups – as a cornerstone of regional diversification. It is this diversification that stabilized Silicon Valley’s regional economy such that the failure or removal of a single company or single source of economic growth would not jeopardize the region’s economy. Silicon Valley became a truly self-generating, self-refueling, mature regional technology-based economy.

5.2 Massachusetts Route 128, U. S.

According to Dr. Saxenian, Silicon Valley progressed beyond “the Massachusetts Miracle,” the economy that developed in the area around Massachusetts Route 128, in large part because of its progressive corporate approaches and agile business processes.

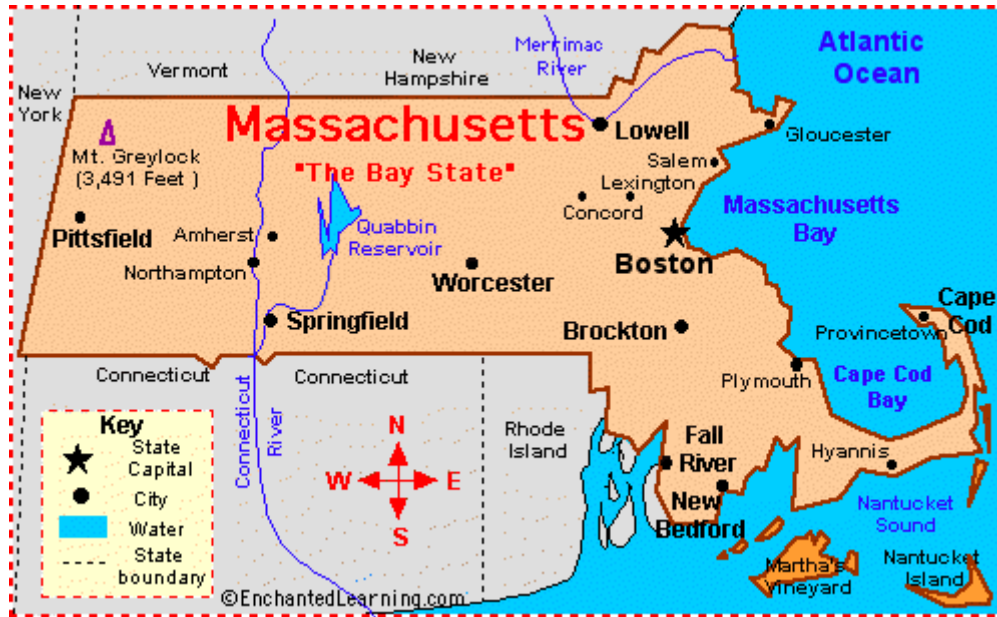
Notwithstanding the organizational innovations of firms like DEC and its imitators, most Route 128 firms continued to rely on a formal, vertical structure, more conservative and top-down management styles, and significantly greater formality in the workplace, dress, communication patterns, and attitudes toward authority than those located in Silicon Valley. In short, Route 128’s technology firms remained stable, formal, and centralized organizations compared with the loosely linked confederations of engineering teams in emerging Silicon Valley (Saxenian, Regional Advantage, page 78).

While there was and is a fundamental difference between the two areas in the organic nature of the areas, it should be noted that Route 128 firms employed more than twice as many workers in the electronic components sectors as Silicon Valley firms in 1959. In 1975, these positions had reversed: employment in Silicon Valley had tripled to more than double that of Route 128, which had fallen to nearly half of its earlier level. By 1990, the gap had widened still

further. In an interesting side note as will be noted later in this publication, it was other regions that could take advantage of low cost of labor (rate arbitrage) and virtually free education such as Bangalore and Ireland that Route 128 had relied upon that ultimately became the new threat in the 21st century.

In this review of what geographic areas have been successful mature self-refueling economies, it is inappropriate to give short shrift to Route 128. Although Route 128 failed to maintain its initial lead over Silicon Valley, it was still one of the original models for technology-based economic development. There are lessons to be learned from the “race” between Silicon Valley and Route 128, including the limits of an independent firm-based industrial system in an environment of technological and market volatility. While the Route 128 system provided the stability that is critical in an environment of volume markets and price-based competition (Saxenian, 1999), it was inadequate for the accelerating pace of technological and market change in semiconductors (U.S. Office of Technology Policy, Department of State, 2001). But Route 128 also offered one of the first lessons on the importance of cooperation with academia and inflow of government funding (especially in engineering, science, information technology and R&D) to regional technology-based economic development (The Brookings Institute, 2007). Route 128 remains today an outstanding example of a mature knowledge-based economy (The Brookings Institute, 2007).

Another lesson to be learned from Massachusetts is the failure of its gateway cities, Massachusetts’s traditional mill communities, like New Bedford, Fall River, Brockton, Springfield and others.



“*Lessons Learned and an Agenda for Renewal*” (2007), a joint project of MassINC and the Metropolitan Policy Program at the Brookings Institutions, describes an environment wherein Massachusetts Route 128 and many other areas of the commonwealth enjoyed one of the most successful economic transitions to a knowledge economy, while these trends effectively bypassed and wholly ignored the gateway cities, which actually fell further and further behind. The gateway cities lagged in education, opportunities, jobs and most of the factors that made the other aspects of the commonwealth successful. This same pattern has repeated itself in many regions of Massachusetts as well as other states. It is apparent that without clear political and economic leadership whose aim is shared prosperity across the state, prosperity for one sector need not benefit all.

5.3 Huntsville, Alabama, U. S.

Much can be learned from the economic development history of Huntsville, Alabama. As a small agricultural community of 15,000 people in rural northern Alabama, Huntsville was

the site chosen to host Werner Von Braun and his team of German rocket scientists in the Spring of 1950. As described in the book “*Dr. Space: the Life of Werner, Von Braun*” (Ward, 2005), two unused World War II Army Ordnance and Chemical Corp facilities were transformed into the Redstone Arsenal and, subsequently, the NASA Marshall Space Flight Center. A walk through the Huntsville Airport reveals Huntsville’s scientific, military pedigree. Welcome signs adorn the concourses from the world’s leading technology companies. The Huntsville region is now home to over 22,000 federal civilian and military personnel and an equal number of private employees employed by numerous federal contractors (Souder and Schoening, 1993), (Huntsville Chamber of Commerce). Today, the Huntsville region “has one of the highest concentrations of engineering and Ph.D. degree holders in the U.S.” (Souder and Schoening, 1993, page 4).”

Because of its knowledge-based economy and the growth of the Huntsville region due to U.S. Base Alignment and Reclosure (BRAC) decisions, the potential for enormous positive growth in sheer numbers of jobs in the Huntsville region exists. However, despite the extraordinary technical and knowledge resources available to Huntsville, this region is considered an adolescent technology-based economy. The reason for this is assessment is primarily because of the region’s reliance on a single economic source, i.e., the federal government. Removal of this single inflow factor would be economically disastrous for the Huntsville region. Despite Huntsville’s impressive pedigree, this lack of diversification keeps the Huntsville regional economy from maturing past the adolescent stage. As will be seen in the next section, there are many parallels between economic regions of Huntsville and Sophia Antipolis, France.

As one learns from correctly completing a task, so can one learn from one's mistakes; Huntsville can be most instructive regarding what generates a successful self-refueling economy through understanding of the economy's limitations. Huntsville has been limited by its own success by focusing on the aerospace industry Huntsville has created many thousands of jobs and has solidified its position as one of the leading aerospace engineering regions in the world. However, this same focus and success has limited Huntsville's ability to expand into other high-tech fields. But the critical question is "What comes next?" Does Huntsville remain as it is with its existing limitations or does it attempt to grow and diversify? Huntsville scores brilliantly on the knowledge, social attitudinal factors (as revealed in Chapter 9), but it is so highly dependent upon inflow that it could easily follow Ireland down a dangerous path, as will be discussed in Section 5.4. But Ireland created a mass-job oriented regional technology-based economy whereas Huntsville has developed a knowledge-based regional technology-based economy. The success factors of each, although similar, are vastly different, as are their weaknesses and threats (a thorough discussion of each of these types of economies is presented in Chapter 9). The Huntsville story is really one of a government industrial complex albeit based on a high level of acute knowledge (Souder and Schoening, 1993).

Huntsville's economic history offers many lessons for other regions trying to achieve similar results. The Huntsville region has recently enacted strategies to move to the next level of economic maturity. Huntsville could become "the next Silicon Valley" in part because it is not trying to – it's trying to be Huntsville, Alabama. Huntsville, then, is a good example of creating a knowledge-based regional economy, excelling at nearly all of the variables that impact this type of development. However, despite the increased level of innovation in Huntsville, its focus remained on the government-industrial complex from which it sprung. Yet it was essentially

“too easy” to remained focused on NASA, MICOM, SSDL and other critical government high-technology commands that generated revenue, jobs, and innovation, and demanded a knowledgeable, trained, skilled, and dedicated workforce in return.

Perhaps recognizing the precariousness of the safe environment in which Huntsville finds itself, leaders in the Huntsville region have began, albeit only recently, to seek additional sources of revenue from outside the Huntsville region. Further, commercial markets for products or services generated in Huntsville have been sought; the development of such markets could yield a continuous innovation cycle, perhaps generating success similar to that found in Silicon Valley (see Section 6.4).

5.4 Sophia Antipolis, France

Much can be learned from the successes and challenges encountered in the Sophia Antipolis “experiment.” Formed in 1969 in large part due to the vision and dedication of Senator Pierre Lafitte as “The International City of Wisdom and Science,” the Sophia Antipolis Park now has over 1200 companies and fifty research and educational institutions as tenants that employ over 30,000 knowledge and technology workers (*“Innovation Champions Network: The Sophia Antipolis Cluster Description”*). The accomplishments in Sophia Antipolis are staggering: over 30,000 high-tech jobs and 30,000 students in the French Riviera region.

Sophia Antipolis was created outside of the French Riviera near Nice primarily due to its quality of life and its proximity to international transportation (air and rail). The founders of Sophia Antipolis built on this environment by adding knowledge, education, corporate incentives, government support and an entrepreneurial attitude. Even with these additions, Sophia Antipolis struggled initially. Sophia Antipolis is in many ways similar to Huntsville in

numbers and the technology level of its jobs. Unlike Huntsville, however, Sophia Antipolis had no one government-industrial complex upon which to base its success. Sophia Antipolis learned creative innovation through its only early failure. Ultimately the factors applicable to Sophia Antipolis mirrored in many ways those of Huntsville. This is discussed further in Chapter 9.

5.5 Southern India

The success of Bangalore and Southern India, as well as the relative lack of success of India's Northern provinces, offer many lessons for regions seeking technology-based economic development. For example, many regions do not recognize the extraordinary difference between regional economic development based on mass-job creation, such as in Ireland, India and China, and regional technology-based economic development built on a foundation of true knowledge and innovation. Although the basic Factors are the same six Factors identified in Chapter 7, their relative importance, weight and application vary greatly. This is discussed extensively in Chapter 9. The success of Bangalore was based largely in its ability to offer quality technology oriented labor at rates substantially lower than the U. S. and other industrialized nations. However, labor rates in Bangalore and Chennai are now substantially higher than those of many other countries and even India's own Northern provinces (Gopu interview). In spite of the differences in labor prices, the success of "India's Silicon Valley" continues, while the Northern Indian provinces remained economically developmentally unsuccessful (Gopu interview). Why the enormous difference in a country where policies and culture are so similar? To a large extent, the success differentiation between Southern and Northern India can be attributed to several key factors (Gopu interview, 2009):

- (1) An attractive environment climate, quality of life, standard of living
- (2) Education

- (3) Literacy and qualified work force
- (4) Innovative work processes and investors

Based upon the book “*Bangalore Tiger*” (Hamm, 2006), and the interview with Dr. Vijay Gopu (2009), an assessment can be made that, clearly, the part of the value chain in technological development that India has pursued and captured with great efficiency is the mass job portion of that value chain.

India has made a focus of capturing the middle of that cycle, which means hundreds of thousands of technology workers (Hamm, 2000), (Nirvikar, 2002). These technology workers are not necessarily paid well, particularly by U. S. standards and, contrary to popular belief, they are not necessarily better educated than U. S. workers (Gopu interview). Many of these workers man help desks, call centers, or internet support activities and are even now going into some of the service sectors; although they may be considered science and technology workers in India, they typically do not have a four-year degree or certainly not a four-year degree that would be considered an engineering or science degree by U. S. standards (Gopu interview), (Pollard interview). However, by building upon its rate arbitrage capability and by creating enormous physical and technological infrastructure, including the construction of buildings, high-speed and high-tech communications systems, both internet and phone systems, easily accessible airports, strong school systems, strong higher education systems, India perfectly positioned itself to be an assembly line for lower- and mid-level technology workers. India very successfully brought back ideas from Silicon Valley and from other areas of the U. S. and created a knowledge based workforce to carry out the manpower intensive aspects of that work.

While this may not create wealth to the same extent that it does in the U. S., it creates jobs on a much greater scale than that in the U. S. To seek the mass creation of jobs and the

mass migration of jobs, as opposed to the mass creation of wealth, appears to be a conscious decision on the part of India, particularly in the southern regions. The differences between regional technology-based economic development targeted towards mass job creation and regional technology-based economic development based on an innovative knowledge economy are described in detail in Chapter 9.

5.6 Ireland

In the 1980s, Ireland actively and successfully sought to gather technology jobs from around the world, creating what has been termed “The Celtic Tiger” (Hughes, 1997). To a great extent, Ireland’s success was based on attractive tax policies (corporate income tax rate of 10%), focused economic development organizations known as Industrial Development Agencies, and a business-friendly fiscal policy (Hughes, 1997). Ireland created four primary “Centers of Growth” (clusters), focused in different regions of the country: for example, growth in information technology was centered in Limerick. Ireland developed a long-range plan to create regional technology-based economies based on mass-job creation. Even with the worldwide economic downturn, software still comprises Ireland’s second largest export after agriculture (O’Flynn interview).

Ireland first pursued mass job creation policies by offering attractive relocation incentives for global technology companies. It then added focus on education, collaboration between Universities and industry, and enhanced focus on innovation, research and development. Whether by intent or necessity, Ireland planned to initiate regional technology-based economic growth first through the inflow of mass jobs using attractive policies and incentives; then the leadership of the area planned to transition to the next level of regional technology based

economic development by injecting an innovative, knowledge based economy based on University collaboration (City of Limerick), (Hampshire, 2007), (Gunnigle, Collins and Moreley). However, Ireland's ability to offer both attractive incentives and moderate labor rates to multi-national technology companies was driven in many ways by an enormous real estate and credit bubble that has since burst. The current economic crisis (2008-2009) has caused large reductions in the Irish workforce of global technology companies and real estate prices have plummeted (O'Flynn interview), (Shannon Development, 2007).

The Irish economy was much more vulnerable than expected. Although efforts were underway to address all of the factors identified herein, the current study has shown that those efforts had not progressed sufficiently to allow the Irish technology-based economy to reach a self-refueling point. Ireland as a whole, as well as the various regions listed previously, was heavily dependent on inflow factors and these regions were therefore vulnerable to economic conditions in other industrialized countries. It is unfortunate that time and economic conditions did not allow the Irish experiment to succeed or fail on its own. It has now clearly failed. "After more than a decade of rampant growth, Ireland now looks anemic. The economy could shrink as much as 6.5% this year (Time Magazine January 16, 2009, Vol. 173, page 26-27)." Dell has recently announced 2,000 additional layoffs, which is just part of the job losses (O'Flynn interview). The challenge of seeking mass-job creation through attracting inflow of jobs and capital based on low cost and attractive incentives is that the life time of this approach lasts only until either another region offers lower costs and better incentives or the region successfully completes a difficult transaction to a knowledge-based regional economy.

5.7 Research Triangle Park, North Carolina, U. S.

The Research Triangle experiment, based in North Carolina, began as an initiative to create a knowledge-based economy using the natural outgrowth of the agricultural (tobacco) economy (Pollard interview), (Renault, 2007). Through a coordinated review of each University's strengths and by focusing each University on a particular strength, each University could build a center of excellence in a particular field that would lead to University/business collaboration in that field (Research Triangle Institute, 2007). This vision, created by Governor Hatch, was immediately embraced by both the business community and by elementary and secondary education as a long-term (20 + year) vision for the future of North Carolina (Pollard Interview), (Baruah interview). The critical lesson for any location or any region of any nation is that the vision, leadership, governance and "follow through" can and must exist if success is to follow. The extraordinary knowledge-based economy that exists in North Carolina today started with that vision in leadership 40 years ago.

5.8 Additional Economic Regions of Interest

Albuquerque, New Mexico, U. S.

Albuquerque, New Mexico follows much the same model as Huntsville, Alabama (Jackie Kerby-Moore interview). Albuquerque has three primary drivers of its economy: government research and development (and the companies associated therewith), tourism, and medicine (Sandia Science & Technology Park Post, March, 2009), (New Mexico Small Business Assistance Program, Perspectives 2007). Of these three types of economies, the first is by far the strongest and most lucrative. It is also the single point of potential failure. Albuquerque, like Huntsville, has developed excellent technology companies, but it is still highly dependant upon a

single source of inflow, the federal government, if it is to survive. Until Albuquerque sufficiently diversifies, if that is even possible, it will remain dependant upon a single source of inflow for survival.

Phoenix and Tucson, Arizona, U. S.

An additional finding of this study of high importance was that cities within a region or regions within the same state or within the same country that have not developed equally despite having similar policies and similar tax structures, can be compared and contrasted to identify which specific factors and variables were different between those regions. Within the state of Arizona, Phoenix and Tucson were compared. (Phoenix was listed in 2007 as one of the top cities for business attraction as described on the City of Phoenix Community and Economic Development Department website. Phoenix has a population of 1.41 Million, an average annual growth rate of 2.9% and a 2004 Gross Metropolitan Product of \$141 Billion (City of Phoenix). The city of Phoenix has had extensive economic growth, much of which was in the technology sector. The city of Tucson, on the other hand, has seen very little growth and particularly little if any growth in the technology sector. While the city of Tucson is considered an excellent place to live with a high concentration of Aerospace and Defense companies (KMK Consulting Strategic Analysis, 2006), its regional economic picture differs greatly from Phoenix. Where Phoenix can point to actual metrics of its success, Tucson has struggled to create its own economic development plan “Securing our future now: An Economic Blueprint for the Tucson Region (Tucson Regional Economic Opportunities) in 2005 and has yet to see results.

In an interview conducted in Tucson (Eileen Walker interview), it became very clear that both cities in that state have the same tax structure, the same legal policies, administrative

policies, are relatively equally accessible by road. Moreover, both have the same structure for telecommunications and internet access; both have access to good Universities. However, the attitudinal variables in the city of Tucson substantially differ from those in the city of Phoenix. Tucson does not have an attitude or image of being forward thinking and interested in technology-based economic development. Further, Phoenix enjoyed leadership and vision related to technology-based economic development that was not equally strong in the city of Tucson.

North Dakota, U. S.

When one thinks of regional technology-based economic development, North Dakota rarely comes to mind. But North Dakota has built a team of talented leaders and a vision to go with that team that has lead to a net inflow of knowledge jobs in the past six years Governor John Hoeven's Economic Development Initiatives, (Hoeven). Like many successful regions before them, North Dakota did not limit its thinking to the next election or for all the reasons it shouldn't succeed. Rather, North Dakota set in place an economic development program that created a vision for building a "new" North Dakota, using the best that the public sector, the private sector and academia had to offer. North Dakota's goal grew from creating jobs to creating higher paying jobs to creating a knowledge based economy. Now, their biggest challenge is finding enough highly educated workers to fill the jobs they have created. A quick comparison of North Dakota's approach with the model developed in Chapter 9 shows a close correlation that bears further analysis.

Saudi Arabia's Economic Cities Initiatives

It is difficult to compare the areas previously cited with the relative progress of an economy like that of Saudi Arabia, where cost is not a factor and investment can be measured in billions of dollars rather than millions (www.sagya.gov.sa). However, regardless of the investment or approach, the factors and variables considered and their relative impact on regional technology-based economic development is valid nonetheless. Saudi Arabia set out to create several specific economic city initiatives, each with its own objective. The Jazan Economic City concentrated on physical infrastructure, a seaport, an industrial zone, a commercial zone, and public amenities such as hospitals, schools, and training institutions. In effect, the Jazan Economic City concentrated on mass job creation and the factors associated therewith.

The Prince Abdul Aziz Bin Mousaed Economic City (PABMEC) was established as a transportation and logistics hub. It was designed on the basis of a cluster model, using transportation, logistics and supply chain centers as its clusters. It will be interesting to follow the economic success (or lack thereof) of PABMEC, since it is focused only on clusters and not necessarily on the factors that dictate cluster success. The Knowledge Economic City (KEC) was designed as a research, development, and innovation center tied to knowledge-based industries and educational institutions. It follows closely (or it is designed to) the Sophia Antipolis model of research and development rather than mass job creation. This too should provide interesting review as time reveals its success or failure. Finally, the King Abdullah Economic City is designed as a combined knowledge center, job generator and economic operations center. All of these cases present organic examples of the model presented by this research: study of these cases constitutes a tremendously important opportunity for learning more about what generates a successful regional economy or a failure.

Additional Regional Models and Lessons

The Scandinavian Model as described by Moene and Wallerstein (2007) places great emphasis on wage compression – the artificial lowering of labor costs to enhance global competitiveness. However, it is not wage compression itself that aided economic growth in Scandinavia between 1935 and 1970, but the rate arbitrage that resulted therefrom. Again, the reduction in cost per unit of work that resulted from wage compression is attractive to firms seeking to maintain lower production costs. As in the case of Bangalore, India during the 1990s, this rate arbitrage attracted outside investment in new, employment-creating businesses, which subsequently drove economic development. The purpose of this paper is not to argue for or against a Keynesian policy such as wage compression, but rather to note its impact. In Scandinavia, wage compression led to a move from low productivity industries/firms to higher productivity industries/firms that could take advantage of artificially low wages to increase productivity and profitability by reducing the cost per unit of work. This led to improved margins and increased employment in Scandinavia. Moene and Wallerstein (2007) further argue that wage compression actually increased the pace of economic development by increasing both the profitability of “modern production” and the size of the end-market. While this approach may follow a socialist democratic model, which is anathema to free-market economists, the outcome is worthy of note. Additional documents worth reviewing include “Investing in our Competitive Future: Approached to increase Early Stage Capital in Washington State” (Washington State Technology Alliance, 2007) and “Assessment of Entrepreneurship Policies across Nations and Regions” (Max Plank Institute).

Conclusion

This Chapter, 5, has presented a comprehensive review of geographically dispersed regional economies identified as economies either seeking technology-based economic development. Cities in the U. S. and areas around the world were studied to glean information regarding factors and variables that could positively or negatively effect technology-based economic development. From the studies of these geographic sites, lessons and insights were learned and shaped, forming, in part, a basis for the development of the research model presented in this dissertation and the conclusions drawn there from.

CHAPTER 6

Understanding the Factors through Analogies

Introduction

Chapter 5 presented lessons learned by studying various regional technology-based economies. This chapter (6) builds on that understanding through closer examination of the behavior and development of technology-based regional economies and the qualitative variables that affect the progression of a technology-based economy. With this enhanced understanding, a better model may be generated to test the identification of the factors and variables as being worthy indicators of what makes an economy a self-refueling, mature one. Specifically, four specific analogies have been studied to enhance understanding: the ecosystem model, the model presented by ancient Rome, the corporate development model and the product development life cycle model.

6.1 Ecosystem

The book “*The Nature of Economies*” by Jane Jacobs attempts to describe the concept of economic growth in terms of ecosystem analogy. Jacobs argues that economic development is a version of natural development. Development and co-development, diversification and generalization, and expansion and contraction are natural process cycles that are repeated over and over, and can be affected with relatively predictable outcomes. While it is not within the scope of this writing to support or disprove this analogy, there are two important economic development concepts that can be readily explained by this analogy.

First are the concepts of economic inflow and diversification. It is common to think of an economy in terms of its exports. Many think that by increasing exports the economic health of a region is increased. Jacobs points out that in ecology, “expansion depends on capturing and using the transient energy of the sun. The more different means a system possesses for recapturing, using and passing around energy before it discharge from the system, the larger are the cumulative consequences of the energy it receives (Jacobs, 2001, pg. 47).” The same logic can apply to the concepts of economic inflow and diversification. Just as an ecosystem requires constant replenishment through the inflow of energy from the sun and nutrients from the earth, a regional economy must have a constant inflow of ideas and capital – investment capital, working capital and human capital – to survive.

The second economic development that it is important to understand is the concept of co-development – “development without co-development webs is as impossible for an economy as it is for biological development” (Jacobs, 2001, page 19). The concept of co-development holds two lessons for a technology-based economic development model. First, a regional economy, technology-based or otherwise, cannot be sustained over the long-term on a single industry or company. Second, the factors that affect technology-based economic development are interrelated and interconnected as desired for and described by a neural net model.

6.2 Ancient Rome

In his book “*Rome, Inc.: The Rise and Fall of the First Multinational Corporation*,” Stanley Bing (2006) draws a humorous, but thought-provoking analogy between the development of ancient Rome and the operation of a modern corporation. Interspersed in the facts presented in Bing’s (2006) book are the basic elements present in the creation of an

economic engine. Amongst other things, Rome was a great economic success. From the founding of the city of Rome over 500 years before the birth of Christ through the formation of the Republic and eventually an empire that included the entire civilized western world, Rome was built on a vision. There are several lessons for today's regional economic development initiatives that can be gleaned from ancient Rome: vision adoption, organization, opportunity, creative culture, attraction and commonality (Bing, 2006).

Vision and "Buy-in"

The "idea" of Rome was as great as Rome itself. The critical elements of every level of the Roman "organization" bought into the idea of Rome. Creating a vision and garnering the acceptance, support and "buy-in" or enthusiastic acceptance of or for that vision is a critical first step and ongoing requirement of any endeavor. This is particularly true for a non-mathematical science like economic development. The stakeholders in regional economic development, from municipal governments and private corporations to non-profit entities and economic development professionals, must share and support a common vision if progress is to be made.

Organization

The organization of the Roman Legions, the Senate and the administration of the Roman government was perhaps Romulus' greatest achievement. He enrolled everyone at every level, even his enemies, in the organization of Rome and gave each stakeholder class a vested interest in Rome's success. He crafted a bond between the common people and those who stood to benefit most from their labor. He engaged families in the success of the individual, and in doing so, in the success of Rome itself (Bing, 2006). Similarly, for a regional technology-based

economic development initiative to succeed, the various stakeholders, from individual corporations to the State government, must be engaged and invested in the success of the region.

Opportunity

Rome had one focus from the outset: to conquer and annex anyone and anything that could provide a benefit to Rome. For Romans, the end goal was always clear, as was their role. Every Roman at every level had the opportunity and duty to participate, in one way or another, in achieving the end result. While some Romans may have benefited far more than others, the goal and the opportunity to achieve that, formed a common bond.

Creative Culture

One lesson from the Roman Empire that has carried forward for two millennia and is still true today is the need for leisure-time creative cultural activities to supplement the hard work that goes into building a company, empire or economy. When Romans were not conquering another country, there was an abundance of other activities to occupy their time. Initially, Romans “developed” their cultural activities like they did everything else – by conquering another people (in this case, the Greeks and Etruscans) and absorbing their culture. Eventually, many of the marvels of Rome, including the Coliseum, were dedicated to keeping the populace busy, distracted and culturally entertained. The type of creative class that is required to build a technology-based economy, much like the creative class that builds a company, empire or personal fortune, demands access to creative cultural activities.

Attraction

Although peoples do not chose to be physically and culturally conquered, to be absorbed by Rome’s military machine did have it positive elements. Once Rome “annexed” a country, the conquered people were offered Roman citizenship and great economic opportunity. It was very attractive to be Roman. The type of creative people that will build a technology-based economy cannot be pushed into a certain geographic region or political subdivision; rather, they must be attracted to that geographic or political region. They seek a certain image and environment. They demand attractive leisure-time activities, opportunities and social interactions. These factors all interrelate to form the nexus of an attractive locale for technology professionals.

Commonality

In ancient Rome, each new conquest brought new culture, art, creativity, advancement, slaves, women, treasure and wealth to all of Rome. Although the elite few may have gained the most, every economic and social stratum gained something. It is not enough for there to be a single or small group of entities that benefit from economic growth. For the economy to be sustainable, the benefits from that growth, both economic and social, must flow to the entire community.

6.3 Corporate Development

With regard to the third analogous tool, corporate development, the author has drawn on two sets of knowledge. First, the author himself has been deeply involved, as the CEO and “father” of a highly successful corporation; the knowledge and experience gained throughout that company’s generation and development has incalculably aided in the understanding of the model

used to predict factors and variables that would have an impact on the stage and type of economic development of a technology-based economy. Second, a thorough study of WIPRO, an Indian company, was undertaken to provide further meaningful insights (Hamm, 2006).

SEA

The author of this dissertation has significant direct experience in corporate development, having guided a company through explosive, sustained growth (Savoie, 2009). That company, SEA, began as a one-man consulting firm, survived many years of struggling and two mergers to emerge as a \$200 million technology company with over 1000 employees (*New Orleans Times-Picayune*). This substantial experience provided first-hand knowledge of each phase of corporate maturity. SEA began with a strong individual knowledge base, but virtually no capital, infrastructure, corporate intellectual capital, customer recognition, image attraction or strategic planning. This was a true neophyte start-up company, very much analogous to a neophyte regional economy. After almost 10 years of operation, the company had accumulated a reasonable amount of capital and had established some degree of infrastructure and customer recognition, but still lacked sufficient diversification and depth in intellectual capital and strategic planning, making it an adolescent company with a positive, but not sufficiently attractive image. The company was strong, as were thousands of similarly situated companies, but had not yet become self-propelling or self-refueling. It was two years after a key (small) merger that the company was able to gain a strong corporate base of intellectual capital and investment capital. It developed a visionary strategic growth plan that capitalized knowledge/intellectual property, infrastructure, investment capital and customer recognition, all designed to establish both the image and reality of a self-fueling company entering a phase of

explosive growth. As usual, success beget success and the company was able to capitalize on and further promote its image of success to achieve explosive growth from \$13 million of annual revenue to over \$200 million of annual revenue in five years (Times-Picayune, February 6, 2005, Front Page, Money Section). The firm rapidly surpassed the barriers that derail the plans of many companies, to become a mature, attractive, self-propelling and self-refueling corporation. Many of the same variables that were challenges and contributors to SEA's corporate growth, and many of the strategies that contributed to the company's growth, have direct analogies for regional technology-based economic development.

WIPRO

The Indian corporation WIPRO embodies the success of the Bangalore, India region as described in the book "*The Bangalore Tiger*" by Steve Hamm (2006). WIPRO's global technology business added 14,000 people in the fiscal year ending in March 2006, bringing the total number of those employed to 53,742. WIPRO Ltd. employs more than 60,000 people, which is nearly as large as Microsoft. To handle the flood of new employees, WIPRO recently completed the construction of a brand-new campus that consists of nine buildings in Bangalore's Electronics City technology office park.

- Using the Internet as the digital equivalent of America's interstate highway system, more than 700 Indian tech services companies are delivering vital, high-quality brainwork for hundreds of large American, European, and Japanese corporations. These Indian tigers are a new breed of tech company (Hamm, page 3).
- India produces 120,000 college graduates with information technology degrees each year, and 3 million people with other undergraduate degrees, according to NASSCOM (National Association of Software and Service Companies), the Indian software and tech services trade association. And since Indian knowledge workers are paid about 20 percent of the level of their counterparts in the West,

the Indian companies start off with a large cost advantage over their clients' traditional ways of getting work done and a big pricing advantage over the tech services industry's traditional power, such as EDS, IBM, and Accenture (Hamm, page 3).

- Supplying low-cost brains via the Internet is just the beginning of what the Indian tech services outfits do for their clients. They are expert at managing people and business processes. They typically can do everything from writing computer programs to processing mortgages and insurance claims more efficiently than their clients can (Hamm, page 4).

There are a number of lessons to be learned from Bangalore, WIPRO and similar corporate analogies. The first is to focus on and feed the single most self-refueling of all economic resources, the human brain. The second important lesson found in these experiences is to initiate efforts utilizing one's strengths and ultimately to build into diversification and co-development. This also has and will become obvious when studying the Silicon Valley and Huntsville models.

The third key element of economic success is attitude. India started as a second-class technology-based regional economy that succeeded only because of its rate arbitrage relative to developed countries (Hamm, 2000), (Nirvikar, 2002). Now, with Indian software and services exports reaching \$23.6 Billion in 2006 and growing at 33% per year, the "psychology of India" and the world's view of India have changed dramatically (Gartner found in Hamm, page 20), (NASSCOM - McKinsey found in Hamm, Page 11).

Another lesson gleaned from the studies of SEA and WIPRO is that of "ongoing talent transformation." There are eight specific leadership qualities identified in WIPRO's Leadership Training as described by Hamm (2006). These qualities can be considered analogous lessons that can be used in designing regional technology-based economic development strategies. Of these eight leadership qualities, three can be thought of as elements of corporate attitude:

strategic thinking, self-confidence and the use of a global approach to thinking and acting. Two of the elements may be considered as attention to the customer: customer orientation and a commitment to excellence. Two additional qualities, attributable to establishing good developmental tactics, are the encouragement of working in teams to problem solve and the development of future leaders, through education and training. Finally, one leadership quality identified in WIPRO’s Leadership Training can be seen as a quality to encourage in all situations: aggressive commitments to all the identified leadership qualities.

The final lesson to be derived from the studies reviewed here is to “set audacious goals to inspire bold strategies (Hamm, 2006, page 175).” Using this strategy, Hamm (2006) described four specific “growth engines” at WIPRO. First, organic growth should occur in the area of global technology. It should be seen in India and the Middle East. “Game-changing” initiatives should be expected and, finally, strategic acquisitions will be common. These growth engines are then built into six specific growth enablers: building appropriate capability and leadership, developing new delivery paradigms, enhanced performance management, encouragement of innovation, conduct consulting and enriched branding. These leadership qualities, growth engines and growth enablers can be synthesized and are represented in Table 6.1.

Leadership Qualities	Growth Engines	Growth Enablers
<ul style="list-style-type: none"> • Strategic thinking • Self confidence • Global thinking and acting • Customer orientation • Commitment to 	<ul style="list-style-type: none"> • Organic growth in global technology • Organic growth in India and the Middle East • Game-changing initiatives 	<ul style="list-style-type: none"> • Building the right capability and leadership • New delivery paradigms • Performance management

<p>excellence</p> <ul style="list-style-type: none"> • Working in teams • Building future leaders • Aggressive commitment 	<ul style="list-style-type: none"> • Strategic acquisitions 	<ul style="list-style-type: none"> • Innovation • Consulting • Branding.
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Table 6.1: Hamm’s (2006) “Ongoing Talent Transformation” Model

6.4 Product Development Life Cycle

One of the many lessons of the Silicon Valley experience is that the creation and sustenance of a technology-based economy requires constant innovation. In the case of Silicon Valley, this involved the repeated development of new products through regional collaboration between different firms and between product developers and their customers. These repeated product development lifecycles, when taken collectively, generated a regional technology-based economy.

According to the Urban and Regional Innovation Research Unit at Aristotle University (URENIO), a product life cycle has five distinct stages:

1. Product Development
2. Product Introduction - Low/sales; high cost
3. Product Growth - Increasing sales; break-even
4. Product Maturity - High sales; maximum profits
5. Product Decline - Decreasing sales; decreasing profits

These stages and their impact on revenue and profit for a company can be viewed graphically as shown below:

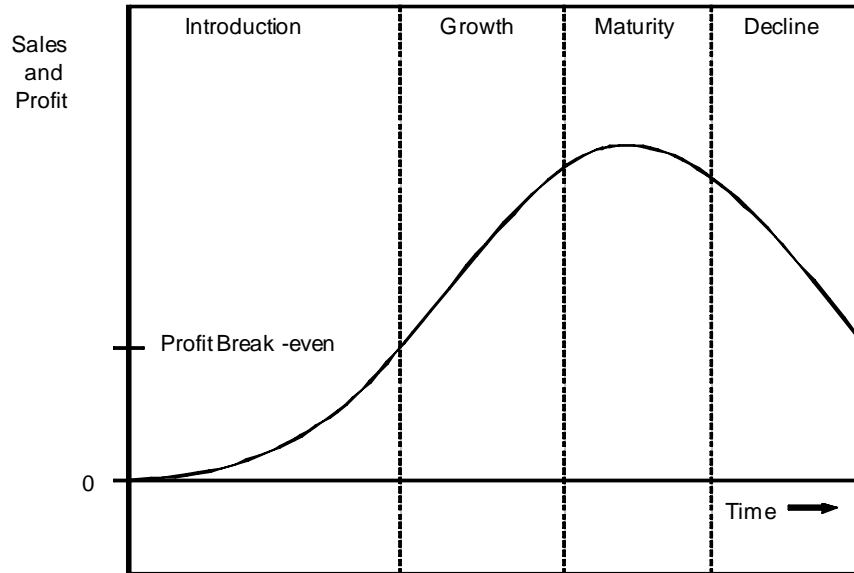


Figure 6.1: Product Development Life Cycle

Clearly then, even if everything goes well in every phase of the product development life cycle, a single product is a high-risk undertaking. Thus, a company must be willing to risk losing money initially if it hopes to reach profitability. Further, a product life cycle may vary from a few months to decades (Thompson and Strickland, 2003). Diversifying the product portfolio can spread both the risk of failure and the impact of early stage adverse product performance over a larger corporate base, thereby minimizing risk (Thompson and Strickland, 2003). Further, it can create a synergistic environment wherein the development of one product is supported by the success of another (Thompson and Strickland, 2003). This can create a self-refueling corporation in much the same way as a diversified ecosystem becomes self-refueling.

In this scenario, the individual product life cycles can be strung together to maintain steady corporate growth as shown in Figure 6.2 below.

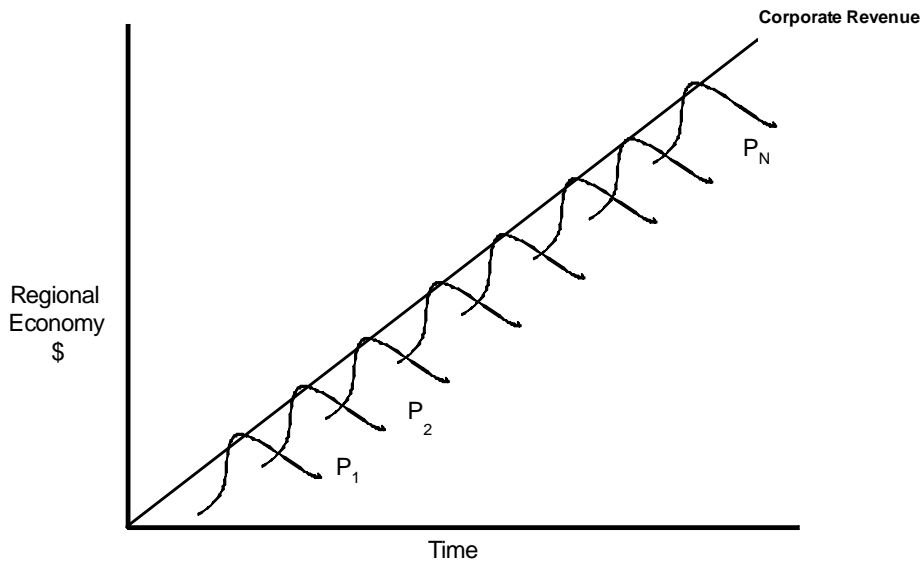


Figure 6.2: Impact of a Series of Product Development Life Cycles on a Regional Economy

The same concept can be applied to regional economic development. An economy that depends on one company, one industry or one source of jobs, regardless of its nature, risks stagnation or self destruction at some point. The “company towns” that dried up when GM laid off thousands during hard times or oil path economies that dried during the oil bust of the 1980s are but a few examples of many (US Office of Technology Policy, Department of State, 2001), (Shapira and Youtie, 2008), (Saxenian, Motoyama and Quan, 2002). Diversifying a regional economy at multiple levels (industries, companies, education, inflow sources, etc.), while still focusing on the basic strengths of the region can substantially reduce economic risk, create a

more attractive business climate, establish a long-range trend of positive performance and create synergy amongst individuals, corporations and industries.

As described in Chapter 8, many knowledge-based economies go through continual cycles of innovation as shown in Figure 6.2. Silicon Valley endured many such cycles where it would eventually lose its manufacturing jobs to less expensive regions, but its continual ability to innovate created both jobs and wealth (The Sophia Antipolis Concept). Knowledge economies such as Silicon Valley often do not see job creation on the “lower end” of the cost scale, but they do see job creation due to innovations (Lee, et.al., 2000). Further, the wealth created by this innovation in turn engenders new technological opportunities and the cycle repeats itself. In many cases, the value creation of a product is in the early stage when it is possible to identify a product that is innovative and creates a new market. It can be a new market that has never existed before. It can be a new way of doing business. It can be new processes. The type of innovation is less important than the fact that it is indeed innovation.

Conclusion

Chapter 6 presented analogies designed to aid in the understanding of distinct economies. The understanding gained through this closer examination of technology-based regional economies and the qualitative variables that affect them, have enabled the construction of a better, more precise model upon which to base the empirical, qualitative research undertaken here and envisioned as quantitative research in the future. A review of the ecosystem model, the model presented by ancient Rome, the corporate development model and the product development lifecycle model have all added knowledge to the determination of what factors and

variables are most important to create and sustain a self-refueling, mature technology-based economy.

CHAPTER 7

Initial Discussion of Factors that Affect the Advancement of a Regional Technology-Based Economy

Introduction

Before any model to help describe the elements that could spawn a successful regional technology-based economy can be developed, it is necessary to consider the influences that affect regional technology-based economic development. Based on the regional analyses in Chapter 5 and analogies in Chapter 6, and an extensive literature research into technology-based economies, an initial set of six factors have been identified, each comprised of a family of variables, that directly affect the development of technology-based regional economies. These factors were derived by viewing a regional technology-based economy as a system with inputs, processes and outputs. These studies produced the factors and initial model represented in Figure 7.1 and discussed fully in this chapter. Further, each factor is described herein in terms of the specific variables that describe and comprise the factor.

Factors and Variables Impacting the Success or Failure of a Regional Technology-Based Economy

It should be pointed out that the original cluster model developed by Dr. Michael Porter at Harvard (Clusters and the New Economics of Competition), still the most widely-used model for technology-based economic development, does not delve into the detailed factors that dictate the success of a regional technology-based economic development initiative. Extensive research has been and will continue to be performed on the factors that affect technology-based economic

development. Hopefully, this work will continue well beyond the scope of this dissertation and will be facilitated by the model developed herein. Some of these factors are qualitative and a few are even measured on an ongoing basis. However, many of the factors encompass qualitative (affective) variables and cannot be readily measured. Too often, this causes economic development organizations to implement policies that affect the quantitative factors that they can measure, but fail to sufficiently address the qualitative factors that cannot be easily measured. Based on the regional analyses in Chapter 5 and analogies in Chapter 6, and an extensive literature research into technology-based economies, an initial set of six factors have been identified, each comprised of a family of variables, that directly affect the development of technology-based regional economies. These factors were derived by viewing a regional technology-based economy as a system with inputs, processes and outputs. These studies produced the factors and initial model represented in Figure 7.1. Each factor is described herein in term of the specific variables that describe and comprise the factor. The original research described in Chapter 9 will be used to improve the model by validating, refining and weighting the factors.

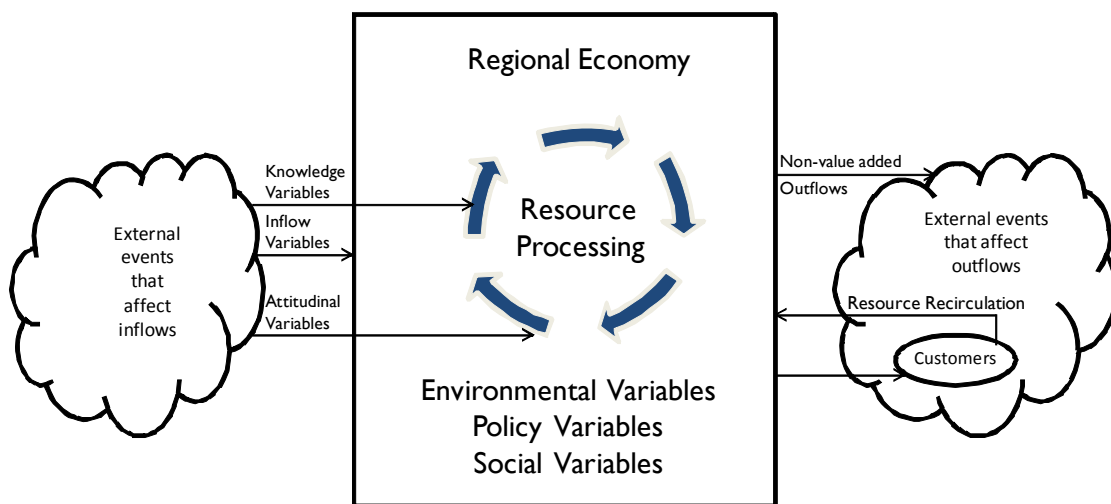


Figure 7.1 Initial Model

7.1 Factor 1: Environmental Variables

The first factor is comprised of Environmental Variables that define the infrastructure, quality of life and technological baseline of the region. Some of these variables are quantitative and include the type of data that is typically measured when analyzing the propensity of a region for technology-based economic development. There are ten key variables within this factor; these are presented, with corresponding descriptions of variable characteristics in Table 7.1.

Variable	Variable Characteristic
1. Quality of Life	Attractive leisure-time activities; safety/relatively low crime environment
2. Support for technology initiatives	Institutional support for technology transfer and commercialization
3. Availability of technology-savvy investors	Local or non-local investors that understand investing in technology companies
4. Technology population	Households with a computer; households with internet access/high speed digital access
5. Non-economically disadvantaged workforce	Average annual pay vs. national average; percentage of population living above poverty line; percentage of workforce that is employed
6. Non-technology infrastructure	Transportation systems, particularly air travel; availability of legal, financial and other professional services
7. A talented, educated workforce	Percentage of workforce with graduate-level education
8. Quality of K-12 education systems	Percentage of workforce with high-school-level education; low, adequate, substantial funding of school systems
9. Undergraduate, graduate and post-graduate programs in technology sectors, including Science and Engineering	Availability of University-level education; reasonableness of education costs

10. Strong regional University system	State, private funding of University system; public attitude towards higher education
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Table 7.1: Factor 1: Environmental Variables and Characteristics

There are many government reports that measure quantitative environmental variables (U.S. Economic Development Administration, U.S. Department of Commerce, U.S. Office of Technology Policy). These reports will be used in quantifying this factor for input to the model. In addition, non-quantitative, or qualitative, environmental variables must be further developed and measured through observation. Many quality of life variables are delineated in “*The Rise of the Creative Class*” by Richard Florida (2002). Further discussion on quantitative environmental variables can be found in “*The Dynamics of Technology-based Economic Development*” published by U.S. Office of Technology Policy, Department of State.

7.2 Factor 2: Inflow Variables

The second Factor is comprised of Inflow Variables. Present research has revealed that this Factor is often overlooked in traditional thinking about economic development. As shown previously, and as described in Jane Jacobs’ book “*The Nature of Economies*” (Jacobs, 2001), for a regional economy to expand, net inflows must exceed net outflows. This is true for a technology-based regional economy as well. In a self-refueling economy, inflows exceed outflows and the economy expands. A stagnant economy exists when inflows equal outflows. A depreciating economy is occurs when outflows exceed inflows. While this factor is strongly influenced by other factors, it is sufficiently critical to both the neural net model and the nature of a regional technology-based economy to merit specific focus. Unfortunately, however, expanding this Factor rarely garners the appropriate attention in traditional economic development activities. Specific variables that comprise this factor are presented in Table 7.2.

Variable	Variable Characteristic
1. Inflow of equity capital and debt financing	Inflow of new capital to the region (increase in overall available capital)
2. Inflow of talent	Personnel knowledge resources
3. Inflow of ideas and innovation	New business ideas/incubation from entrepreneurs coming into the region
4. Inflow of government research and development grants	Funding from government research and development sources
5. Inflow of revenue from outside the region	Inflow of corporate revenue that originates outside the region. This is different from investment capital in that it is revenue from day-to-day operations
6. Inflow of science and technology funding	Knowledge-oriented funding into the region from any source
7. Inflow of private research and development funding	Similar to federal grant for R&D; not limited to Science & Technology
8. Retention of capital within the region	Typically tied to companies who maintain corporate or regional headquarters in the region; Funds that flow back into corporate and civic projects
9. University research and development expenditures with the region	Same concept as government or private R&D, but specific to Academia
10. IPO funds raised by companies in the region	Initial public offering funds raised whether from sources inside or outside of the region; creates investable capital

Table 7.2: Factor 2: Inflow Variables and Characteristics

Seminal publications that can be used to define the inflow variables include “*The Nature of Economies* (Jacob, 2001),” “*Local and Global Networks of Immigrants Professionals in Silicon Valley* (Saxenian, 2002)” and “*A Resource Guide for Technology-based Economic Development: Fostering Entrepreneurship*,” U.S. Economic Development Administration, Department of Commerce.

7.3 Factor 3: Attitudinal Variables

Another factor that is often overlooked is Attitude. This is not a factor that can be easily quantified, measured or even understood. However, technology-based regional economic development is impacted by the attitude of the indigenous population toward the region and the economic development therein. This seems to be particularly true for technology-based economic development, as opposed to traditional economies that may be impacted more by physical factors. Understanding the impact of attitudinal variables is critical to fully comprehend what a regional technology-based economy can be and how to create it. Key Attitudinal variables in this factor are presented in Table 7.3.

Variable	Variable Characteristic
1. Tolerance for entrepreneurial risk	A qualitative group of the entrepreneurial focus of the population
2. Willingness to collaborate for mutual success to technological advancement as described in the concept of “Communities of Practices	Willingness of technology corporations to work together in order to increase the size of market for all; a measure of trust
3. Image of creativity and value creation	The image of the region in these eyes/minds of outside stakeholders
4. Value place on human capital	The degree to which the region recognizes the value of human capital and invests therein
5. Responsiveness to innovative investors	A measure of the degree to which technology personnel respond to invests who understand technology
6. Active promotion of the technology sector	Investment in organizations and media that promote/present the tech sector in a positive light
7. Attitude of “grow your own” versus focusing funding on outside attraction	Outside attraction is of value, but is usually based on low-cost or state investment; growing entrepreneurial technology personnel and firms are longer term, but also have a larger and

	more diverse impact on the regions long-term technology growth
8. Willingness of investors to consider technology investments	A measure of the degree to which existing regional wealth holders understand, support and invest in technology
9. Belief of business and education communities in the importance of technology transfer and commercialization	Technology transfer and commercialization is but one factor of technology-sector growth, but it is a good indicator of community attitude
10. Entrepreneurial focus of the population	<ul style="list-style-type: none"> • Number of new businesses started • Number of new businesses started in technology sectors • Number of Technology Fast 50 Companies or similar list • Payroll of ongoing business concerns in technology industries

Table 7.3: Factor 3: Attitudinal Variables and Characteristics

There are several publications that give guidance in developing this Factor, including “*Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (Saxenian, 1996).” The keynote address by Assistant Secretary of Commerce for Economic Development, Sandy K. Baruah at the Association of University Research Parks, February 6, 2006 also provided valuable insight. Finally, “*The Silicon Valley Edge* (Lee, Miller, Hancock, Rowen, 2000)” was helpful, as well, in the development of the variables included in this factor.

In the book “*Management of Technology Operations*,” (Ray R. Gehani, 1998), Professor Kanter was quoted as considering the essential skills needed for a person to become an entrepreneur or a change agent within an organization. These skills for an innovating change agent are presented in Table 7.3.1. While these concepts are not considered specific attitudinal variables within this factor, they do provide some guidance in understanding this factor.

Skill Sets	Description of Skill Set
1. Kaleidoscopic Thinking	The innovators use existing data and information, process it, and come up with new types of conclusions. They are able to use the information around them to develop new and interesting patterns-that is, patterns which produce wealth for their organizations.
2. Communicating the Vision	They champion the need for innovation, and then hard-sell it to others even when they face stiff resistance. Communicating in clear and easy to understand ways is very important.
3. Persistence	The innovating change agents persist and put their full power behind their innovations and visions. At times the situation and progress seem hopeless. But the innovators cannot give up.
4. Coalition Building	To build momentum, innovators enlist others to rally behind their vision and “buy into” their innovative ideas.
5. Working Through Teams	The innovating change agents operate through team-based joint ownership of innovations. They participate in others’ teams, and they invite others to participate in their teams. In the globalized economy, more than one head is better than a lone head.
6. Sharing the Credit	Finally, the innovating change agents make heroes out of their subordinates and supporters. They share the credit of success with them. This keeps their contributions coming for future innovations.

Table 7.3.1: Skill Sets and Descriptions

7.4 Factor 4: Leadership and Policy Variables

Leadership and Policy Variables comprise the fifth factor. These variables are to be found where the typical efforts of local, state, and even federal lawmakers are focused in an

attempt to influence economic development (Note: Thomas Library of Congress and/or State Legislative Libraries). The reason these variables can be found in these environments is because these are the variables which are the easiest to change before the next election cycle. As with the other variables, these variables can also impact and be impacted by changes to other Factors and variables. Changes to policy variables can be a positive step, but should not be considered in isolation. The interrelationship between the policy variables and other Factors should be considered when policy changes are made. This can be reflected in the networking nature of the neural networking model. Policy variables include those listed in Table 7.4:

Variable	Variable Characteristic
1. Business friendly tax structure	The relative attractiveness of the business tax structure of the region when compared to competitors
2. Tax breaks for R&D, Angel investment and start-ups	A measure of the commitment of the region to technology start-ups, particularly in comparison to competitive regions
3. State and local support for workforce development	A measure of training assistance that is typically very attractive to technology firms
4. Simplified application processes for new businesses	Not as important to the firms as it is to show the commitment of the region to a business friendly atmosphere
5. Establishment of business incubators and tech parks	This has become a common practice; when focused on truly visionary technology businesses and job growth can actually be a discriminator
6. Public-sector vision and leadership	The single most important Factor – Vision, Leadership and Governance to create a long-term technology-based economic base.
7. Private sector vision and leadership	Private sector for support for item (6)

Table 7.4: Factor 4: Leadership and Policy Variables and Characteristics

There are a number of important sources which explain elements of the Leadership and Policy Factor. One such seminal publications related to the Leadership and Policy Factor is “The Effect of State and Local Taxes on Economic Development: A Meta-Analysis (Philips, Gross, 1995.” Another excellent source of information of the variables related to this factor is “The Effect of State and Local Taxes on Economic Development: A Review of Recent Research (Bartik, 1992).”

7.5 Factor 5: Knowledge Variables

The purpose of Factor 5, Knowledge Variables, is to create sufficient knowledge capital to form the cornerstone of a technology-based economy. This factor is not just about academics. It is necessary to achieve brain recirculation rather than brain drain (Saxenian, 2007). The sharing of knowledge between regions of the world (brain recirculation) has proven to be one of the global success stories of Silicon Valley, as described by AnnaLee Saxenian in “*The New Argonauts* (Saxenian, 1996).” Key variables that comprise this knowledge-oriented Factor are presented in Table 7.5.

Variable	Variable Characteristic
1. Applicable University research and development	University programs focused in the technology sectors the region seeks to grow
2. Technology transfer and technology collaboration between Universities and industry	Plans or Strategies for targeting technology sectors
3. Depth of technology initiatives and targets	Existence of technology/business incubators
4. Entrepreneurship development/collaboration	Private and public programs to support entrepreneurship mentoring

5. Collaboration and idea sharing between firms; joint marketing	A measure of trust between firms in developing a growing technology market for the region
6. Defined strategy for creating future knowledge workers	Matching education and training to long-term needs of the technology sector
7. Technology commercialization support	Support industries (legal, accounting, etc.) needed to commercialize technology
8. Strategies for regional cohesion in technology transfer and commercialization	Regional support of technology commercialization, including use by appropriate regional firms of new technology
9. Economic development organization with knowledge and charter to focus on technology	Specific understanding and focus on growth of technology-based economy, not just “one more item”
10. College of Business Administration involvement with focus on entrepreneurship	Entrepreneurship training via College of Business (can be part of MBA)
11. Educated workforce	Percent of workforce with undergraduate or graduate degrees in the Sciences or Engineering
12. Advanced education	Percent of workforce with post-graduate work in the Sciences or Engineering

Table 7.5: Factor 5: Knowledge Variables and Characteristics

Several publications that described these knowledge variables were most instructive.

First, “*A Resource Guide for Technology-based Economic Development: Positioning Universities as Drivers, Fostering Entrepreneurship, Increasing Access to Capital* (U.S. Economic Development Administration, Department of Commerce)” was most helpful. Further, “*Learning to Innovate: Building Regional Technology Development Learning Networks in Midsized Cities* (Shapira and Youtie, 2008)” provided great insight into the development and understanding of these variables of the Knowledge Factor. Finally, “*Innovation U. New*

University Roles in a Knowledge Economy”(Tornatsky, Waugaman and Gray, 2002)” and “*The New Argonaut: Regional Advantage in a Global Economy* (Saxenian, 1996)” were also helpful sources.

7.6 Factor 6: Social Variables

One of the primary lessons to be learned from Silicon Valley, Huntsville and many other regional technology-based economic development success stories is the importance of social networking between professionals (Florida, 2002), (Saxenian, 2006). These informal networks correlate with and serve as attractors for technology sector growth. Not only do these interactions create an attractive environment for young, educated professionals, but they also encourage entrepreneurial thought and aspirations. For corporations, informal networking encourages collaboration and co-development, which support growth and diversity. Variables within this Factor are shown in Table 7.6.

Variable	Variable Characteristic
1. Culture of collaboration	Degree to which local technology personnel naturally collaborate
2. Culture of change	Understanding of the need for change (personal and corporate) to maintain competitiveness
3. Dense, inclusive social networks	Social networks of technology personnel for informal sharing of ideas
4. Collective learning	Ability and willingness of technology personnel to share new knowledge regardless of firm affiliation
5. Geographically clustered/technological base	Technological base that can work/socialize together on a localized basis

6. Focus on growing and attracting technology jobs instead of sole focus on established industries and companies	Ties to the vision of a technology industry-attract what the region <u>can be</u> rather than what it is
7. Investment capital with an entrepreneurial focus	Willingness of existing wealth in the region to focus investment in entrepreneurial technology
8. Collective identity	An understanding and mutual respect within the technology community
9. Openness to risk-taking and experimentation	A subjective measure of entrepreneurship within the technology population

Table 7.6: Factor 6: Social Variables and Characteristics

Seminal publications in the development of this variable are principally three. First, Saxenian’s two works “*Regional Advantage: Culture and Competition in Silicon Valley and Route 128*” and *The New Argonauts: Regional Advantage in a Global Economy*” provided substantial aid in the understanding of this variable. Additionally, two other thought-provoking sources were of immense help in the development of the individual variables delineated above for Factor 6: “*The Rise of the Creative Class* (Florida, 2002)” and “*The Silicon Valley Edge* (Lee, et. Al., 2002).”

Conclusion

Chapter 7 has presented all of the Factors and Variables found therein that are the basis of the empirical research done in this dissertation. These Factors and Variables are the foundation for the model through which conclusions can be drawn as to what influences the development and successful continuation of a self-refueling, mature technology-based regional economy. The

Factors are six: environmental, inflow, attitudinal, leadership and policy, knowledge and social. The empirical use of these Factors and Variables via the neural network model presented in Chapter 8 form the vehicle by which this research can show regions a surer pathway to economic success.

CHAPTER 8

Constructing a Model That Can Be Continuously Improved

Introduction

This chapter briefly describes the mechanism chosen by the author to test his hypothesis, as stated in Chapter two. An artificial neural network has been chosen to aid in the implementation of the testing of the hypothesis. In this chapter, the nature of an artificial neural network is explained. Additionally, the application process of the Systems Engineering model to be used to test the hypothesis is presented.

An Artificial Neural Network

Regardless of the extensive nature of the research concerning the factors and variables that affect the development of a regional technology-based economy, the model used to decipher the information will never be 100% accurate. The global economy and its impact on regional economic development is simply too immense, diverse and fluid for any single, static model to capture or predict. Further, the relative importance of any particular factor will vary from one region to the next. However, that does not mean that a model cannot be of value. On the contrary, the identification of the key factors and their respective inputs and interactions in a properly engineered model can be of immense value in decision support. Such a model must be dynamic; it must be able to “learn” from new knowledge. To optimize its value, a model must also be continuously and cognitively updated and improved. Just as an organization must be open to new ideas, , a self-generating system must be sensitive to new conditions. The same is true of any model that attempts to represent a self-refueling regional economy. As related to the

systems model of a regional technology-based economy, the system and the model that represents it must be sensitive to new data; it must be continuously “taught” by new information and thereby improved.

To meet these criteria an open-source learning model using the approach embodied in an artificial neural network is recommended. An artificial neural network (ANN) is often simply called a neural network without the term “artificial.” The online encyclopedia Wikipedia defines a neural network as “a mathematical model or computational model based on biological neural networks.” It consists of an interconnected group of artificial neurons and processes information using a connectionist approach to computation. In most cases an ANN is an adaptive system that changes its structure based on external or internal information that flows through the network during the learning phase.

The key elements of a neural network which are attractive for designing a model for creating a technology-based regional economy are the concepts of process flow, learning and adaptability. A neural network can be used to define a complex model as a network of simple elements and the interconnection of those elements. In the case of a neural network, learning means solving “a class of functions (F)” using a set of observations in order to find $f^* \in F$, which solves the task in an optimal sense (Wikipedia)” This is essential to modeling technology-based economic development.

The factors that affect technology-based economic development are primarily composed of qualitative affective variables. These variables will be measured and quantified through structured observations. These observations will become input to the model shown previously in Chapter 3, while the factors defined herein serve as the functions that will be optimized by the

model. Systems engineering provides an approach for solving a complex problem in a systematic manner. Neural networking provides an approach for optimizing factors (functions) as a set of interconnected observations. The combination of these two techniques provides a mathematical model for quantifying and optimizing qualitative, affective variables as a learning system.

Conclusion

In order to create any mathematical process model, the inputs (variables) must be quantified and weighted. If the initial factors can be weighted and the interrelationships identified in a mathematical model, then the model can be tested against specific regions. The mathematical model should produce the same outcomes as the qualitative assessment of the region. By comparing theoretical data with “real” data, the model can be tested and “taught.” As this Chapter has presented, the use of an ANN and a systems engineering approach, combined with the appropriate empirical research, should provide a remarkable learning environment for politicians and economics students alike: that is, a better understanding of what makes for a successful self-refueling, mature technology-based economy.

CHAPTER 9

Empirical Expert Interviews, Lessons, Conclusions and Structuring the Model

Introduction

The empirical research conducted as a natural culmination of this dissertation is constituted of a series of expert interviews. These interviews were conducted to help develop a better understanding of the dynamics of technology-based economic development, to validate and rank the factors and variables, and to structure the model such that it accurately represents regional technology-based economic development. This Chapter attempts to synthesize and delineate the critical lessons learned from these interviews. To sufficiently delineate the conclusions and lessons learned by synthesizing the expert interviews with the literature discussed previously and grading/weighting of the factors and variables, this chapter will present three specific sets of information. First, lessons learned from the synthesis of the empirical interviews are presented. Second, an analysis of the factors and variables, including relative ratings, importance and weighting is developed. Finally, a decision analysis is presented that allows the data to be logically broken down into two critical findings and to be reconstructed into a model for regional technology-based economic development.

9.1 The Subjects

Many distinct disciplines and job positions/experiences were represented among those interviewed. There were several venture capitalists interviewed, who focused their funding efforts on technology on two continents. Representatives from the banking industries of two nations were interviewed, as well. Economic development professionals from eight states and four countries were included. Interviewees also included members of the academic community

and University Research Parks. On the political front, the author interviewed a retired U. S. State Governor, a former Administrator of the U. S. Small Business Administration, two former State or National Secretaries and one current State or National Secretary, a representative of the Sandia National Nuclear Laboratories, and representatives of two state governmental agencies. Finally, included in the interview process were six or more entrepreneurs. Several of the interviewees covered more than one of the roles mentioned above, which was found to be of great benefit to the interview process

In addition to representing diverse disciplines, the information taken from the interviews covered a broad geopolitical spectrum, including eight regions in the United States and five additional countries. Physically, the author visited Arizona, Louisiana, New Mexico, North Carolina, and Washington, D. C. within the U. S., as well as France and Ireland, to conduct this research. The names of those interviewed, as well as other information is presented in Table 9.2. Please note that all of the information contained in this chapter was extracted directly from these interviews (included in total in Appendix C). Therefore, the interviews are used as the sources rather than attempting to seek references for the information gained from the empirical expert interviews.

Table 9.2 Empirical Expert Interviewees and Pertinent Background Information

Name in Alphabetical Order	Current Title	Pertinent Past Affiliations	Region or Country Represented	Interview Logistics
Secretary Sandy Baruah	Assistant Secretary of Commerce for Economic Development CEO of EDA	Director, U.S. Small Business Administration; Hurricane Katrina Lessons Learned Task Force; Performance Consulting Group	U. S.	Personal interview, Washington, D.C., U.S.
Dr. Michel Bernasconi	Director of High Tech Entrepreneurship Center of Expertise at the CERAM School of Business	Associate Dean for ESC Programme; Guest researcher at San Jose State University and HEC Montreal; Multiple corporate start-ups; Author of “High-tech Start-ups” (Dunod, 2000)	France, Canada, U.S., European Union	Personal interview; CERAM School of Business, Sophia Antipolis, France
Mr. Robert Fudickar	Technology Industry Director for the Louisiana Department of Economic Development	Arthur Anderson; ConsulttUS Group; Century Tel; Avex Investments	Louisiana, U. S.	Personal interview; Baton Rouge, Louisiana, U.S.
Dr. Vijay Gopu	Professor of Engineering, University of New Orleans		India; Louisiana, U.S.	Personal interview; New Orleans, Louisiana
Mr. Michael Hecht	President and CEO, Greater New Orleans, Inc.	Director of Business Recovery Services with LA Economic Development; Assistant Commissioner, N.Y. City Dept. of Small Business Services	Louisiana, U.S. New York, U.S.	Personal interview; New Orleans, Louisiana, U.S.

Ms. Jackie Kerby-Moore	Executive Director, Sandia Science and Technology Park		New Mexico, U. S.	Personal interview; Sandia Science and Technology Park, Albuquerque New Mexico, U.S.
Mr. Jacques Masboungi	Deputy Managing Director of Sophia Antipolis Development Corp.	Chief Urban Planner, BETEREM; Urban planning experience in Ivory Coast, South Africa, Brazil, Vietnam, Italy, Turkey, Lebanon, Cyprus and Algeria	France, European Union	Personal interview, SAEM, Sophia Antipolis, France
Secretary Stephen Moret	Secretary, Louisiana Economic Development	Baton Rouge Area chamber of commerce; McKinsey & Company; Harvard MBA	Louisiana, U.S.	Personal interview, Louisiana Department of Economic Development, Baton Rouge, Louisiana, U.S.
Dr. Timothy P. Ryan	Chancellor, University of New Orleans	Dean, College of Business Administration, UNO; Hibernia Professor of Economics; Homer L. Hitt Distinguished Alumnus, 1987	Louisiana, U.S.	Personal interview, University of New Orleans, Louisiana, U.S.
Mr. Ashton J. Ryan	President and CEO, FirsTrust Corporation and First Bank & Trust	Vice-Chairman, Bank One; CEO, First National Bank of Commerce; Arthur Anderson	New Orleans, Louisiana, U.S.	Personal interview, New Orleans, Louisiana, U.S.

Mr. Kevin H. Pollard	President, Global Solve™, a consulting and venture capital firm	Served in executive roles with 30 corporations and venture capital firms including Golden Gate China Acquisition Corp.; MPM Holdings; Advanced Internet Technologies; The World Trade Center Horizon Initiative; Pioneer of the outsourced Managed Storage Services (MSS) Industry	Saudi Arabia; Dubai; U.A.E., Research Triangle Park, North Carolina, U.S.; Louisiana, U.S.	Personal interview, New Orleans, Louisiana, U.S.
Ms. Eileen Walker	Executive Director, Association of University Research Parks	Arizona Bioindustry Association; Angelou Economics; Masters of International Management	University Research Parks throughout the U.S.; Phoenix and Tucson, Arizona	Personal interview, Tucson, Arizona, U.S.
Governor Pete Wilson	Former Governor, State of California (1991-1999)	United States Senator (1983-1991); Mayor of San Diego, CA (1971-1983); California Assemblyman (1967-1971); Of Counsel to Bingham McCutchen and Principal in Bingham Consulting Group; Pacific Capital Group; (numerous other positions and honors)	California, the United States and some foreign interests	Personal telephone interview between New Orleans, Louisiana and California, U.S.
Secretary Michael Oliver	Regional President for America, Future Pipe Industries	Former Secretary, Louisiana Economic Development; Executive Director and Chief Executive of the Harrison County Development Commission; CEO of International Relations Consultants	U.S. Gulf Coast; Dubai, U.A.E.	Personal interview; Future Pipe Plant, Gulfport, Mississippi, U.S.

All interviews were conducted in person with one exception. The interview questionnaire is included in Appendix A and all available biographies for all persons interviewed are included in Appendix B. Each interview was recorded, and the transcripts are included in Appendix C.

9.2 Leadership

In many if not all interviews conducted as part of this research, the need for leadership and government involvement in the design and implementation of a successful technology-based economic region is abundantly clear. This research has shown that leadership of the right type with the right vision and the right government structure to implement that leadership was the single most important factor in the success or failure of regional technology-based economic development. This section of Chapter 9 presents the findings of the research relating to leadership, its definition and its role in the success of any economic region.

9.2.1 Political Leadership

As derived from the interviews, it has been determined that the leadership needed to spark technology-based regional economic development initially is political leadership, rather than private sector leadership. While it is true that the private sector could help drive the leadership of the public sector, unless the public sector was willing to take on a leadership role that was going to extend well beyond the next election, then private leadership was pointless. One example of such public leadership can be found in Governor Hunt's original vision of Research Triangle Park in North Carolina. Governor Hunt presented a twenty year vision, knowing that it was going well beyond his time in office and the time in office of all the people

involved with it. Establishing that type of a vision is essential to the initial development of a region as a technology-based region

9.2.2 Private Sector Leadership

The second component of the leadership required to generate a technology-based economic region is the leadership of the private sector. Once the public sector leadership is in place and has bought into a new vision, then the private sector must accept and champion that vision. One of the great calamities of many regions is that when there is leadership from the public sector, the private sector may pay lip service to it, but doesn't truly get embrace the concept presented or the long term nature of the proposed development. There are good examples that clearly reveal that the adoption by the private sector leadership of public leadership's vision is critical and can be most effective. The tourism industry in New Orleans, Louisiana, traditionally a non-technology oriented environment, is a good example of where private sector acceptance of public sector leadership worked very well.

The tourism industry today in New Orleans is thought of as being extremely successful. Twenty years ago, however, New Orleans had an image of being a dirty, high crime city. Although it had jazz and blues and good food, New Orleans was not necessarily a place to visit except during Mardi Gras. New Orleans is now one of the leading convention cities of the United States and has repeat customers. Crime is down, cleanliness has increased, and there are both chains and local hotels that are five star hotels. The restaurant population has increased dramatically, but so have the number of people eating at those restaurants. That was all a twenty year vision developed by the public and private leadership of the community. The hospitality community and the restaurateurs, etc., twenty years ago chose to not only compete with one

another, but, more to the point, also to increase the size of the population that would utilize their establishments. That was done extremely effectively, with the result that now the overall “pie,” the economic base upon which these companies and the community draws, is many times the size that it was some twenty years ago, and the tourism industry has been extraordinarily successful.

The same end can be achieved for technology-based economic development, regardless of the starting point, with the right vision and the right leadership in the public sector, and the right vision and the right leadership and support from the private sector. Support does not necessarily mean monetary support; it means support for continuing the vision, continuing the fight, continuing to pursue that twenty year goal in light of the many, many hurdles that are going to be faced along the way.

9.2.3 The Governance Model

In addition to the leadership by the public sector and the private sector, a governance model that allows economic development must be established. Most governance models today are in place to try either to mediate arguments between different entities surrounding a metropolitan area, or to force them to work together, hopefully to increase the overall economic base. These efforts are usually not developed or implemented with a specific, well-defined vision of economic growth or endpoint as the goal. Without that vision and endpoint, then the governance models quickly alienate private sector interest and quickly lose funding, causing the governance model and the government entities that support it to fail. Thus, the challenge to initiating a successful technology-based economic environment is to utilize a governance model that does not alienate private sector leadership adoption or funding.

One of the best examples of how that challenge was extremely effectively met in the U. S. was in North Carolina's Research Triangle Park. As referenced in Section 9.5.4, Research Triangle Park satisfied the requirement of having strong public sector leadership, in the person and vision of Governor Hunt. In this section, again Research Triangle Park stands out as a successful example of a working governance model developed and led by the government itself. The model was envisioned to use the natural resources of the state, which at the time were agricultural in nature, while simultaneously encouraging research and development activities that would complement that basic structure of the state. The government's leadership then immediately engaged the Universities in the State to create an education system and knowledge-based skilled work force and a knowledge-based economy that supported that research and development.

Thus, the combination of a government's model, with the public sector and private sector leadership, was effective at establishing the infant technology-based regional economy. An enormously important condition to this success is that the plan for the development of this economy was a long-term one: a twenty year model as envisioned. Clearly, the implementation of the plan did not happen overnight. All of the leadership involved in the implementation of the plan was committed to the long-term model. It is an unhappy reality that most leaders, particularly political ones, in this country demand immediate success, success must be shown to exist before the next election. This reality alone is a serious stumbling block to the effective growth of technology-based regional economic growth, since in technology-based economic development, whether the development is one of mass job creation or a knowledge-based economy will not occur according to an electoral schedule.

9.2.4 The Synthesis: Public Leadership, Private Leadership and the Appropriate Governance Model

As we begin to build a model for technology based economic development, the first step is to determine whether there is public sector leadership, private sector leadership, and a governance model to match. Without any one of these factors, no efforts toward technology-based economic growth will be highly successful over time. For example, if the public leadership factor is strong, if the private leadership factor is strong, but there is not a governance model in which the leadership may act and work together, the result of economic growth efforts may be futile. As long as all of these three factors exist, hopefully as strongly as possible, there is every chance of success for economic growth.

A number of subjects, including Secretary Sandy Baruah, Mr. Robert Fudickar, Mr. Kevin Pollard, President of GlobalSolve Management Services, and Dr. Vijay Gopu all indicated strongly that the existence of each of these elements was required as a basis to initiate economic growth, without any one of which, all efforts would fail.

Of these three requisites to economic development, leadership was considered by many subjects to be of paramount interest. Secretary Stephen Moret, Secretary of Louisiana Economic Development for the State of Louisiana, Dr. Timothy Ryan, Ph. D., an Economist and the Chancellor of the University of New Orleans, Ms. Eileen Walker, CEO of the Association of University Research Parks, and Jackie Kerby-Moore, the Executive Director of Sandia Science and Technology Park all agreed that the leadership component was required and was the most important feature of the environment needed to establish a plan for economic growth. The international view, as expressed Dr. Michel Bernasconi of the CERAM School of Business and

Mr. Jacques Masbounji, Managing Director of Sophia Antipolis Development, was that it was unimaginable to try to embark upon an experiment such as that without leadership. The issue of leadership was discussed further in other interviews, particularly with Secretary Michael Olivier, Regional President for the Americas for Future Pipe Industries and former Secretary of Louisiana Economic Development, Mr Ashton Ryan, CEO of FirsTrust Corporation, and Governor Pete Wilson, former Governor of the State of California. In fact, Governor Wilson felt so strongly about leadership as a prerequisite to economic success that he started and ended his conversation with the topic of the importance of leadership. It clearly is one of the single most important factors in this analysis. Indeed, though it had not been so ranked in the original work for this research, it is now recognized as the single most important enabling factor and will be regarded as such henceforth in this research. Too many regions will undertake a economic development efforts without fully considering the impact of leadership, and whether or not that leadership can be put in place. If this research can prevent such a waste of efforts, a good purpose would have been served by the research.

9.3 Knowledge-based or Mass Job Creation Economic Development

In addition to the discussion of leadership, there was another important discovery made as a result of study of the various interviews that will be discussed at length: the distinction between the desire to pursue a mass job creation development strategy or a knowledge-based economic development strategy. The model that is typically used in looking at economic development, particularly technology-based economic development, is the cluster model developed at Harvard University by Dr. Michael Porter. Dr. Porter designed the cluster model, which is in use throughout the country and throughout the world, to exhibit that cities will choose clusters that they want to base their economy on, and then pursue those clusters. The

difficulty is that most regions choose clusters that they believe will be of value, but not necessarily clusters that are indigenous to the region or even can become common to the region. The findings of this research suggest that, while the cluster model is indeed valid, it should be refined to include consideration of whether mass job creation or the development of a knowledge-based economy is the desired strategy.

These interviews were of enormous value and captured information and opinions related to the different types of technology-based economic development, and the success or failure thereof, that was rarely if ever published previously. Perhaps the single most relevant discovery was that there are two very distinct types of technology-based economic development that are built upon the same sets of factors. However, as discovered by this research, these types of technology-based economic development are built for two very different purposes. Unfortunately, many regions fail to recognize the difference and in doing so, set themselves up to fail. Failure to recognize these differences and properly apply and weight the appropriate factors is a major cause of frustration.

The first type of technology-based economic development is knowledge-based development. Normally, when one thinks of technology-based economic development, one thinks of innovation, research and development, and science, such as occurred in the early days of Research Triangle Park in North Carolina, California's Silicon Valley, Route 128 in Massachusetts, Sophia Antipolis in France, and many others. Pursuing a knowledge-based economy founded on technology-based economic development typically creates wealth in the initial phases of development, the research and development phase. Wealth is also created at the final stages of economic development, as a product grows and is developed and the profits

remain in the region. Attempting to pursue this knowledge-based type of technology-based economic development as a means of mass job creation is often destined to fail. Job creation is certainly one outcome of knowledge-based technology-development but those jobs are often shifted to lower costs regions, thereby requiring a knowledge-based economy to continually evolve and innovate to remain self-refueling. Regional technology-based economic development based on knowledge-creation and regional technology-based economic development based on mass-job creation may in many ways be mutually exclusive in the start-up stages of technology-based economic development.

A mass job creation approach is the second type of technology-based economic development to be very clearly identified by this research. An example of this approach can be seen as that practiced at the inception of the “Celtic Tiger,” in the early days of the recent effort to develop Ireland into a technology-based economic region. More recently and more economically importantly, this approach was also used in southern India. The success of Bangalore and other Indian cities is largely due to mass job creation, spurred by technology-based economic development initiated by rate arbitrage. It is very clear that the India model is not one of creating technology. It is not one of research and development. It is not one that is even heavily involved with academia, except to the extent that, from the beginning of the economic development initiatives, academia did prepare the workforce to become good knowledge workers in a skilled environment. Rather, the entire focus of the Indian technology economy is on mass job creation. Some other region/country, usually the U. S., creates the technology and innovation; it even creates the market. Then, using a combination of wage arbitrage, a skilled workforce, and many of the other knowledge-based factors proposed, Indian is able to mass-produce jobs that support technology from other countries.

This conclusion is a key finding of this dissertation and the research upon which it is based. A detailed discussion on these two types of technology-based economies and technology-based economic development will be presented in the form of a decision analysis and a detailed model in Section 9.7.

9.3.1 Knowledge-based Economic Development

One approach to economic development is to create a knowledge-based economy. A knowledge-based regional technology economy in the U. S. is many times easier to create than a gross job creation economy. The U. S., for all of its faults, is still the single most innovative country on the earth, even perceived to be most innovative internationally. In fact, given this perception, many countries send their college-age intellectual capital here to learn about innovation, how to be creative and to learn about entrepreneurship from U. S. sources.

That a region or country is perceived primarily as a knowledge-based economy does not automatically mean that a regional economy cannot or will not create many tens of thousands of jobs; it can. But, based on conclusions founded in this research, it is not going to create a manufacturing environment that will create 100,000 jobs. It is not going to create the next Research Triangle, as North Carolina originally approached it twenty years ago. It is not going to create the next Bangalore, India, or anyone, anywhere in Southern India that utilized rate arbitrage to bring in technology-related jobs that were created in the U. S., but then moved to be performed less expensively in India.

9.3.2 Mass Job Creation Economic Development

Pursuing a mass job creation technology economy, which is the second major permutation of a regional technology-based economy, is much more difficult in the U. S. simply

because the U. S. does not enjoy a rate arbitrage advantage over most of the world. The U. S. does enjoy a productivity advantage, and, therefore, it is certainly not impossible to pursue a regional technology-based economy based on mass job creation. But the creation of a regional technology-based economy based on mass job creation is typically done in conjunction with a repetitive product development life cycle, as presented in Figure 6.2. An excellent example of how a repetitive product development life cycle can mimic mass job creation can be found in Silicon Valley. The Silicon Valley economy was one wherein extremely successful and lucrative products were developed and, consequently, manufacturing facilities were constructed to put these products into production; ultimately, of course, that manufacturing was lost to cheaper production environments around the world. So Silicon Valley then created its next innovation, another very lucrative, very profitable project, or product that created its own level of wealth. It started the manufacturing effort, that manufacturing effort again was typically outsourced to somewhere else in the world that could do it cheaper, but, by then, there was another cycle of product development on-going.

Silicon Valley lived on repeated product development lifecycles. The outstanding factor of that is that it created an atmosphere of constant entrepreneurship, constant innovation, and wealth creation. The wealth creation came from the innovation in the product, and then the residual of the product's sale. Within the Silicon Valley example, Apple presents a great example in the microcosm. If one breaks down the price of an Apple product, Apple's, who invented the product and who ultimately marketed and owns the product, profit margin in a typical product is thirty percent. Those who actually manufacture the Apple product, which is typically done overseas, may have a margin between three to five percent. Thus, while there may be many jobs created overseas, the wealth creation, and the ability to continue to innovate

and create a knowledge economy, a regional technology-based knowledge economy, exists here in the U. S.. That is what has set the U. S. apart in regional technology-based growth in many areas.

9.3.3 Choosing the Right Approach

Once the leadership, both public sector and private sector leadership, and the governance model are in place, a choice must be made whether the region is going to pursue a knowledge-based regional technology-based economy or a mass job creation regional technology-based economy. These are two very distinct choices. Many regions would choose to pursue both strategies: this is a mistake that was discussed repeatedly, at least anecdotally in the interviews constituting this research. Pursuing the two of these strategies simultaneously is almost a definite recipe for failure. Pursuing one and then attempting to create on the other is optimal, if it is clear that there is a tremendous difference between the factors and the different activities that need to be undertaken to do both. This section presents the insights gained as a result of the interview process, specifically as it relates to certain geographic locations.

In determining the vision for the technology-based economic development programs for a particular region, it is critical that the right approach – knowledge-based or mass-job creation be chosen, along with the appropriate set of clusters. This is equally as important as choosing the appropriate vision, leadership and governance models. In fact, these two steps must be mutually supportive.

For example, it would be easy for the leadership of New Orleans, Louisiana, to decide that it wanted to build an aerospace cluster: a huge NASA complex, the Michaud Assembly Facility, is located in a suburb of New Orleans. The Michaud Assembly Facility is a blue-collar

facility that builds external tanks for the space shuttle (SOURCE); thus, to some extent, it is an aerospace cluster. However, impacting a vision of success as an aerospace cluster, all of the engineering, the intelligence, and the funding for these activities is done or decided upon in Huntsville, Alabama. Thus, turning the decision to become a cluster around which an aerospace industry could grow into reality becomes problematic.

To further illustrate the point, Huntsville was the lucky recipient of 120 German rocket scientists in the 1950's, and it became the cornerstone of the rocket science engineering and industry, in the U. S. It would be foolish and impossible for any other city to try to take over that position from Huntsville. Interestingly, Huntsville is an adolescent economy, and it has never quite grown beyond that one inflow, that one education and knowledge area of aerospace. While there are many other businesses in Huntsville, they all revolve around the government entities of the NASA Marshall Space Flight Center, and the Missile Defense Agency and Redstone Arsenal.

Indeed, there is nothing necessarily wrong with Huntsville's state of development: it creates many thousands of jobs and has strengthened the Huntsville economy. But it is not necessarily a model that can be followed by other states. A city cannot choose to become Huntsville, any more than Huntsville chose to become Huntsville sixty years ago when the German rocket scientists entered that area. There will be more discussion on why this particular approach is not realistic for most cities as the presentation of research findings continues.

Other examples help lead to the conclusion that it is critical that the cities or regions choose clusters that fit the nature of that city or region that they intend to be some twenty years later. There must be a vision, but not a vision for next year or for the year after, that fits the area and its strengths and weaknesses to the desired and appropriate economic development strategy.

For example, North Carolina was not a research area; it was an agricultural community, which mainly grew tobacco. It is now considered one of the premier research regions in the world.

Another example studied in this research is Ireland, which was not a center of technology creating mass jobs; it was an agricultural society. It became a major exporter of software and, despite the recent economic downturns, software remains the second largest export from Ireland behind agriculture. More discussion on Ireland and its issues will be discussed at more detail subsequently.

To conclude the discussion of the examples provided above, in creating and choosing clusters, one of the key lessons learned from this research is that those clusters need to be the right ones for the region. There are two directions that any region can go in determining what type of clusters it is going to create. This is critical, and perhaps, again, one of the two most relevant discoveries made as a result of conducting these qualitative interviews. There are two types of technology-based economic development. They are built upon the same sets of factors, but for very different purposes, and the factors have very different reasons for their importance and very different weightings depending upon which direction is chosen. It also determines which types of clusters a particular region should try to choose to pursue. Previous models, while they may discuss clusters and their importance and even their impacts, they do not give factors for how to determine what type of technology economy should be chosen. Additionally, they fail to set forth the type of factors required and in what manner used to build that particular technology based economy. Finally, the current models do not provide value in aiding a decision as to which type of economic development should be sought

9.4 Lessons Learned and Anecdotal Findings from Expert Empirical Interviews

Before simply trying to capture the end results of the various interviews conducted, an examination was made of the information captured from each of the individual interviews. It is critical to understand that the individuals that agreed to be interviewed for this dissertation have extraordinary backgrounds; they are able to offer insights and information that can rarely be obtained regardless of the amount of effort expended. Therefore, it certainly is worthwhile to review extensively two of the qualitative interviews, as these two particularly qualitative sources are truly excellent sources of information and insight into the issues surrounding economic development, success and failure.

9.4.1 Secretary Sandy Baruah

The first interview in time and in importance was with Sandy Baruah, formerly, the Assistant Secretary of Commerce for Economic Development and the Chief Executive Officer of the U.S. Economic Development Administration under President Bush. Secretary Baruah also became the head of the Small Business Administration for the last seven months of the Bush Administration. Interestingly, Secretary Baruah does not consider himself an expert in economic development. Rather, he felt that he had been chosen to provide his insights because of his ability and capabilities in the area of knowledge in management.

The primary reason for Secretary Baruah to have been chosen to participate in this study is that he has met and spoken with those who constitute the intellectual capital who actually make economic development happen all over the world. As well as interviewing him with

specific regard to this dissertation research, the author has studied many of Secretary Baruah's speeches that specifically address regional economic development. In his capacity as the Assistant Secretary of Commerce, Secretary Baruah was able to lead delegations to the key organizations of economic cooperation development throughout the world and to study himself the numerous approaches to economic development on a worldwide basis.

When asked about factors that affect economic development, Secretary Baruah was able to identify some very critical items. It is noteworthy that he was able to provide these insights before he was given the list of factors that are the basis of this research. (The author did discuss, at length, with Secretary Baruah, each of the individual factors and variables his research identified as influencing economic development in a technology-based region. That information is presented in Appendix C and D.

In Secretary Baruah's opinion, the first order of business for any region desirous of any kind of economic development is to look at itself tactically. In other words, the leadership of the region should develop a mental picture of how it should be as an engine of economic development. For example, the leadership of a region may want to describe the region as the next Silicon Valley or the next Boston Corridor, even while it lacks the very necessities that would make it successful. Thus, it is necessary to achieve an objective, fairly representative understanding of the region as it is in reality.

According to Secretary Baruah, in terms of being able to predict the success of regional technology-based economic development, one fairly simple but very hard to actually describe or quantify metric must be identified. That metric is: do the area and the leadership of the area have the governance and vision to be able to elicit the best economic performance possible?

Does the synergy that can be created thereby create a whole greater than the sum of the individual parts? Secretary Baruah was very clear to point out the need to come down to that one simple metric: is the whole greater than the sum of the parts? While some regions have been able to achieve such performance using non-technology factors in non-technology-based economic environments, such performance is far more difficult to achieve using technology factors in technology-based economies. Such difficulty can be attributed to the fact that the factors that impact technology-based economic development have not been sufficiently measured, identified, or even quantified (see Porter's research on clusters)

One of the points made by Secretary Baruah and by many other interviewees was that, while the leadership of a region must engage in a hard, honest review of the region, there must also be a reasonable set of factors against which the region can be measured. Secretary Baruah identified specific factors that the present research identified as well. In looking at factors that were necessary for successful economic development, purposely fostering industry clusters was a factor clearly recognized. The creation of a business environment in any region must relate to the clustering of businesses and industries and must also include both political and non-political leadership that would allow the region to develop spontaneously. While these clusters need not be indigenous to the region, at a minimum, they must be compatible with the region in its current state of economic development.

An idea closely associated with the importance of clusters is the idea that the economic development approach chosen must be holistic in nature. It must take into account the organic activity of the government, the academic environment, the presence and health of non-profit organizations: all of the actors, whether human or fictitious legal entities, of the region. Further,

an examination must be made of how well these people and organizations can and will work in unison: can they be brought together to bring about change?

A common theme developed throughout many of the interviews, particularly among those with higher political status and business stature. In particular, Secretary Baruah stated this theme extremely well. The theme is that regions must examine the factors and variables that influence economic success not by the next election, not by what may happen in four years, but rather review them in a 20 or 40 year timeframe. The political and business leadership of Research Triangle Park in North Carolina, Sophia Antipolis, France, Bangalore, India, Massachusetts Route 128, California's Silicon Valley, and many others, have taken a long-term view of what could be done, what the weaknesses of the region were and how these challenges could be overcome. The leadership of these regions were not thinking in terms of the next election, but of the future generations of the region and the legacy that could be built for them.

Secretary Baruah shared insights on what he considers one of his favorite lines from one of the speeches he gave often:

Competition today is not necessarily the firm next door or the town next door or the company in the next state; it's anybody with a good idea, good education and a good internet connection on any point in the globe. That is the reality today, the international perspective that we are competing with.

Unfortunately, too many regions, including the author's own region of southeast Louisiana, still compete with each other locally, within the forum state and even within the broader geographic region. For example, the Port of New Orleans competes with the Port of St. Bernard, which competes with the Port of Mobile; these ports should be acting in concert to best serve the needs of the U. S., competing instead with international rivals or even acting in concert

with those ports in the best nature of comparative advantage. The attitudes of isolationism and rivalry are long obsolete and damage extraordinarily any region's ability to create a technology-based regional economy. Further, it should be clear from this discussion that a regional economy need not be geographically contiguous to be considered one regional economy. The region must, of course, however, have sufficient similarities and synergies in terms the factors and variables that influence economic success; the entities in the region must be connected in some legitimate way and they need to work together.

In conclusion, Secretary Baruah strongly believes that a model that steps beyond the cluster models currently in vogue to help predict economic success is certainly possible. Further, he believes that the approach taken by this research, of conducting numerous qualitative interviews, is certainly a legitimate and appropriate way to begin constructing such a model. Finally, Secretary Baruah is of the opinion that this is a critical time for such a model to be developed and implemented.

9.4.2 Mr. Robert Fudickar

Mr. Robert "Bob" Fudickar is the Director of the Technology Industry for Louisiana Economic Development. He is considered a business practitioner, working in the business environment on a daily basis. His business background is in investment banking, though his efforts are now devoted to economic development and competing for technology-based economic development in this region. The author of this research has had an extensive, business related personal relationship with Mr. Fudickar for many years. Because of this relationship, the author also has specific knowledge of the difficult prospect Mr. Fudickar has had in his attempts

to bring the State of Louisiana into the realm of being a technology-based economically developing region.

What is particularly useful about the interview with Mr. Fudickar is that he is very familiar with the weaknesses that exist in his regional economy. He fully understands the factors that keep a region, such as Louisiana, from being considered ripe for technology-based economic development. For example, when asked whether economic growth, specifically regional economic growth that is technology-based, is predictable, Mr. Fudickar's answer was that it was easier to predict technology-based economic growth within a region than it is economic growth as a whole because you can look at specific Factors for a specific region and understand whether the region will be hurt or helped by its performance on those Factors. The hardest part of making any such prediction is to try to identify, quantify, and understand how those factors will affect each other and, ultimately, the economic environment. Indeed, to ease these problems has been the point of this research and it is believed that the model developed, utilizing the factors and variables identified by this research, will go far towards that end.

Mr. Fudickar also agreed to rank and rate the various factors, both in terms of his assessment of Louisiana's economic environment and in terms of what he thought would be necessary to positively change the economic environment to facilitate the growth of technology-based economic development. The technology-based industries in Louisiana were discussed at length during the interview process. For example, in the petrochemical industry, much of the petrochemical technology and job creation began in Louisiana. A substantial portion of the industry, as well as its jobs, have since relocated either to Houston or overseas, because the industry found sufficient support from the State of Louisiana to be lacking. This lack originated

with a failure of the educational system: Louisiana has not been able to either graduate sufficient numbers of engineers or to entice them to come to the area from other states. The failure of the State to educate or entice engineers has severely limited the State's ability to engage in the creativity and innovation that would raise the current technology of the oil and gas industry to the next level.

On a positive note, however, there are a number of factors in which Louisiana ranks very, very strongly. For example, Louisiana ranks very high in its quality of life rating: it is a very attractive place to live and outranks many other places on this variable. Additionally, there are many areas of the State's image that can be enhanced. Louisiana's image of corruption can be altered and is already being improved by the new Governor. The image of a poor school system can be altered as well: for example, the private school, parochial school, and charter school systems are not rated but are amongst the best in the country. A recitation of positive and negative factors associated with a particular economic region is necessary, as noted by more than one subject. These factors will be inserted into a matrix that will then be presented as a whole: the product of this research. The presentation of these examples at this point in the narrative is to exhibit the value of a thorough and knowledgeable assessment of the economic region, without which, the application of the model cannot yield effective results.

9.4.3 Dr. Vijay Gopu

Dr. Vijay Gopu (2009) provided the insights from which this section is derived; his interview revealed astounding and important information concerning the constant struggle between choosing a knowledge-based versus a mass job strategy of economic development. The first geographic location discussed was India, and in particular, southern India. Bangalore is the

principle area of interest. This area can arguably be described as the world's most successful technology-based economic development initiative that has also targeted mass job creation. It is very clear from the interview with Dr. Gopu and through a study of the extant literature that India is not seeking research and development. It is also clear that the leadership of this region is not seeking to create new technologies in the same manner that the U. S., or indeed other countries on a somewhat smaller scale, does with the purpose of leading the world in creativity and innovation. Instead, India uses its rate arbitration and its ability to create positive, profitable business enterprises to create many hundreds of thousands of jobs. This is a reasonable and even laudable goal, given that India's economy is known for its low standards of living: there is much to be gained by increasing the standard of living and, thereby the health of the economy. Almost as a result of economic necessity, India must seek the mass job creation nature of regional technology-based economic development and does so very effectively. It does so by offering lower wage rates, very attractive interest rate policies in southern India, and an outstanding lower and secondary education system.

Augmenting the information gleaned from Dr. Gopu's interview (2009), Hamm's description of the company WIPRO and its success in "*The Bangalore Tiger*" (Hamm, 2006) sheds additional light on the environment in Southern India. For example, not only is Bangalore an important geographic region of economic development, but so is Chennai, formerly known as Madras. Chennai is renowned as an area employing huge number of workers in Information Technology positions. In fact, Chennai is considered the Silicon Valley of India to a much greater extent than Bangalore is. Another city in the region, Pune, is a city in the sub-state of Maharashtra, which is also the location of Mumbai. Mumbai and Pune are the financial market equivalents of New York City, as the Mumbai Stock Exchange is located in this region. It is the

financial markets infrastructure which is strong in this area that supports the “Silicon Valley” nature of Chennai, as well as the IT and technology-based regional economic development present in Bangalore, Hyderabad, and other Southern Indian cities.

In India, the economic development of Southern India began initially, as previously noted, as a result of the extremely low labor wage rates to be found there, coupled with the presence of a reasonably well educated workforce. It is fascinating that the workforce has been able to transition away from a strictly low-cost, relatively basically educated (the norm being the achievement of a two-year degree) workforce working in call centers, help desks, etc. The workforce has now gravitated to doing, for example, transcription services, reading X-rays and providing medical opinions at a relatively low labor cost per hour through the use of a better educated population. This was all achieved from a movement away from an almost Soviet-style economy that was strictly controlled towards a full and open capitalistic system. This liberalized economic approach started in the 1990’s and allowed this vista of opportunities to be opened.

The most important factors affecting Southern India that have been identified in this study are the development of the physical and virtual infrastructures, social, economic and educational. These factors are presented in Table 9.5.1 below.

Social	Economic	Educational
Transportation in the nature of high-band width communications, facilitating communication exchange exponentially	Open currency policy: capital inflow and expatriation are facilitated	Strong commitment to education

Development of good language skills, primarily English, but also including numerous other languages as well	Low wage rates aim at mass job creation	Strong K through 12 Strong two-year degrees Strong Vo-Tech school system Strong four-year degree, post-bac programs
	Capitalistic approach to business activity	Educational emphasis on science and technology

Table 9.5.1: Social, Economic and Educational Infrastructure Improvements

Of these factors, the availability of capital presents an interesting conundrum. In India there is not a great deal of start-up capital or “angel” capital for new technology initiatives in new ventures. Rather, there is extensive capital made available through existing wealth in companies that may have nothing to do with technology. It is a common practice for companies, such as WIPRO, which started as a peanut oil company, to begin in their industry of choice and then to turn technology initiatives. In return for these investments in technology, extraordinary returns are forthcoming. Thus, there is significant willingness among businesses in Southern India to make investments in technology: thus, funding for technology investments is a given in Southern India.

Another conundrum, however, is presented by a significant lack of funding at any level for research and development stemming from interest in science and technology. What appears to happen is that the research and development of technological innovations, the design function, are conducted in other nation or regions, but also that industries in Southern India will then adapt that research and development into the manufacturing component of production (rather than the

design component). As a consequence of this adoption of the manufacturing phase of production, mass job creation occurs.

9.4.4 Mr. Kevin Pollard

Mr. Kevin Pollard, President, Global Solve™, a consulting and venture capital firm, was an excellent source of information (2009) about several geographic regions, including Research Triangle Park in North Carolina and the environments of Dubai in the UAE and Saudi Arabia. Of these, the initial focus is on Research Triangle Park in North Carolina. Originally known as Research Triangle, it began as area truly focused on research and development, in the early days of the 1950's.

In North Carolina in the late 1950's and early 1960's, two governors, Terry Sanford (also both a U. S. Senator and the Chancellor of Duke University) and James Hunt, had a vision of creating not a mass job environment for North Carolina, but, rather, a technology-oriented research and development or science and engineering-oriented regional technology economy. At that time, North Carolina was an agricultural economy.

As stated in many of the empirical interviews, Mr. Pollard also agreed that the first step in the process of creating a technology-based economic region is the development of the vision. This first task was to create the vision of a science and technology-oriented or knowledge economy-oriented regional technology-based economic development initiative. The second task in this process was to identify a champion who would help develop and support the vision. This champion was to be charged with the development and implementation of a structure of governance to execute the vision. Third, to create a technology-based economic region, the

governance structure designed to implement the vision must be designed to outlive the political tenure of the individuals involved. Neither the vision nor the technology-based economic region will be created before the next election. This is an immensely important point: all three elements of the process need to be in place, but the success of a process of this nature is critically dependent on acceptance that the process will span multiple political terms. Governor Hunt and Governor Sanford were able to bring all three of those aspects of the process together.

The process of creating a technology-based economic region was begun in North Carolina by using the intellectual capital and facilities of the Universities in the surrounding areas. This University system included North Carolina State University in Raleigh, Duke University in Durham, and the University of North Carolina in Chapel Hill, all within approximately 20 miles of one another. As is typically the case, these Universities did compete as they do in many states and in many areas. The governors were able to look to each of the Universities and identify individual strengths. Subsequently, the Universities were brought to agreement as to which entity would receive appropriate funding to enhance what strengths relative to the economic development model chosen. Thereafter, the Universities would work in conjunction with each other, drawing on each others' strengths and mitigating the weaknesses of each.

The parochialism within small regional areas among entities such as Universities is an element in the environment that can and has caused a delay or prevention of economic growth. For example, parochialism is one environmental element that has prevented the greater New Orleans region and the State of Louisiana, as well as many other states and countries throughout the world, from really excelling in economic development. That situation certainly existed in

North Carolina back in the 1960s, but it was an environmental element that was overcome through the visions of Governor Hunt and Governor Sanford.

Once the governance to carry out the leadership vision was in place and the Universities had agreed to support the vision, the next step in the process was identified. The public sector leadership was to reach out to the private sector leadership, to create synergistic leadership relationships and to ensure that with the most appropriate economic development policy had been chosen. Further, it was imperative that the private sector leadership would embrace the policy and make the corresponding investments in the local area. Companies like Monsanto and Roman Haus, and others realized that much could be gained by doing agricultural product research in the Research Triangle area, given the region's historic economic base. Other companies, such as Air Products and DuPont, soon followed Monsanto and Roman Haus.

Once these companies realized that they could, indeed, undertake research and development, with better results at a lower cost in an environment marked by a high standard of living and a reasonable good physical, social and educational infrastructure, by working with the State and area's Universities, first Research Triangle was formed. It has developed into the highly successful Research Triangle Park. Research Triangle Park has become, in many ways, self-fulfilling and certainly self-refueling economy. The presentation of the empirical results of this research, i.e., which factors are most important in determining the success or failure of this region, in Section 9.6 at the conclusion of this Chapter will bear this conclusion out.

Even now, Research Triangle Park still follows the cluster model, but it follows the cluster model with the proper set of variables given the proper weighting such that money flows into the right areas, enabling technology development efforts to be successful. The jobs have

continued to be created, but at the science and technology and research and development expenditure level.

9.4.5 Dr. Michel Bernasconi and Mr. Jacques Masboungi

The interview of Dr. Michel Bernasconi (2009) at Sophia Antipolis, France, provides a good basis for comparison of different geographic regions discussed in the various interviews. Many of the same variables, many of the same factors, and many of the same challenges were found to be common to all the areas studied. Sophia Antipolis began in the same time frame and with a vision similar vision to that of Research Triangle Park. Senator Lafayette, then an influential senator in southern France, originally conceived of Sophie Antipolis as a city of science and technology. Senator Lafayette saw the opportunity to create a research and development area using the very attractive physical environment of the French Mediterranean. In doing so, the vision also included the importation of companies from throughout the European Economic Union that would be interested in doing science and engineering related research and development. A joint aim was also to create the jobs that were associated with science and engineering related research and development in Sophia Antipolis.

The original vision upon which Sophia Antipolis is based was one of creating much more of a mass job creation economy. That vision failed to the extent that it did not prosper as an area of high job creation. Once that initial vision was found to be a poor “fit,” the leadership of the area revised their vision. They began to look strictly towards the development of the engineering, science, and research and development job sectors in areas that were specific to the knowledge-base that existed and could be developed in Sophia Antipolis. In other words, the indigenous knowledge-base and a knowledge-base that could be compatible with the area were

identified as being critical factors to the success of the region's economic development. At that point, Sophia Antipolis became one of the best known and most successful research and technology parks in this world.

Sophia Antipolis concentrates on five specific areas of research and development: information technology, life sciences, fine chemistry/pharmacology, environmental sciences, material science and energy. By focusing on these five areas of science and technology-related research and development, Sophia Antipolis was able to attract the level of knowledge and intelligence needed to produce the jobs that it had sought originally. It had become an international center of science and technology research and development in very specific areas. Sophia Antipolis has not been successful, nor has it tried to become a successful mass job creation technology-based economy. The factors, presented in Section 9.6, are specifically oriented to fitting those clusters into a knowledge-oriented economy, one that is research and development based, in doing so, Sophia Antipolis have been extremely successful.

Interestingly, Dr. Bernasconi is, by his own admission and as evidenced by his resume, a serial entrepreneur in his own right. He spends much of his time both encouraging entrepreneurial networks and building entrepreneurial networks, not just in Sophia Antipolis or for the CERAM Business School, but he has also engaged in entrepreneurial networking in Canada and in Silicon Valley. Dr. Bernasconi considers entrepreneurs, typically, to be problem-solvers, network builders used to building relationships by outreach. Their aim is to build an environment of entrepreneurship within an organization, and turn uncertainty into solutions. Dr. Bernasconi also considers similar traits to be necessary in those creating a knowledge-based regional technology-based economy. He believes that that is indeed what has been done in

Sophia Antipolis and that that result is reflected in the factors and variables found in the research relating to Sophia Antipolis and in the weighting of those factors and variables for Sophia Antipolis.

9.4.6 Mr. David O’Flynn

An area that is very much on the opposite end of the spectrum from Sophia Antipolis, France is Ireland. Ireland began, primarily, by offering very attractive mass job creation opportunities. In fact, its entire regional technology-based economic development model was based upon mass job creation. The Irish limited the overall tax rate for corporations to 10%, kept wages artificially low, primarily, by allowing real estate prices to rise, thereby creating the perception of wealth creation. Further, Ireland actively pursued technology-related companies in five specific areas in different parts of the country. For example, Galway was focused on medical device production, while the areas of Limerick and Shannon were focused on computer software and hardware development. With the recent economic crisis being felt all around the world, Ireland has experience enormous difficulties, in effect removing any artificially engendered competitive advantage. Interestingly, even with the economic downturn, software remains the number two export in Ireland behind agriculture.

In the interview with David O’Flynn (2009), the reasoning of the need for the jobs was fully discussed, as well as the success that Ireland had in creating those jobs. Ireland purposely set out to do mass job creation, creating some 50,000 plus jobs, 25,000 in Limerick alone in information technology and related fields. This job growth is astounding when one considers that Ireland’s starting point was a purely agricultural economy: to grow 25,000 IT jobs in a matter of just a few years is an amazing feat.

Ireland's plan, at the initiation of the economic development efforts, was to follow its mass job creation technology-based economic development initiatives with collaboration with its University system. The plan was to strengthen the area's regional University system by providing a strong elementary and secondary education system. Moreover, the plan included the further development of the social, educational, physical, etc., infrastructures needed to maintain, on a broader basis, the same type of economy. All of those activities were proceeding when the worldwide economic downturn effectively crushed the job creation engine in Ireland, where the unemployment rate had far more than doubled and, just recently, several thousand additional IT job reductions were announced.

One of the unfortunate impacts of pursuing a mass job creation economic development strategy is that others are also pursuing this strategy. Thus, if an area cannot maintain its value to the corporations doing business there, to those that are creating the jobs, those businesses can very easily move. If the region is not able to offer less expensive resources more effectively, the job-growing businesses will look for more attractive opportunities. Ireland's plan to offer such low cost, highly productive resources and then follow that with the creation of a knowledge-based economy has not succeeded: not only has there been an economic shift downwards, but also many of those jobs had already been move to the next region, Southern India, which could offer even lower cost, more highly productive workers and services. One challenge that should be interesting to follow over the next 10 years is whether India will be able to maintain the many hundreds of thousands of technology-based jobs that it had gained by pursuing a low cost mass job creation strategy. Further a comparison of the variables and factors associated with the different economies, especially when socialistic economies or even communist economies (like China) are involved, should reveal remarkable insights. China is noted as a good example here

since China, a controlled economy, can better control the cost of labor, etc.: which country will become their major competitors in this game of economic strategic development.

The interviews thus far have focused on the difference between a regional technology-based economic development initiative that targets mass job creation and a regional economic development initiative that targets research and technology or science and technology development, basically, a knowledge-based economy. That there is such a difference is one of the key findings of this study, as is the fact that there is a serious the lack of understanding of how to approach those two types of economic development initiatives using a cluster-based model. Most areas will simply use a cluster-based model without understanding the factors, the difference in weighting appropriate to those factors, or how those factors should be applied.

The upcoming interviews discuss in more detail the concept of an adolescent technology-based regional economy. Ms. Eileen Walker, currently the CEO of The Association of the University Research Parks, addressed this issue more specifically than others. She is associated with the economic development in the area of Arizona. Ms. Jackie Kerby-Moore also addressed the topic of the phases of economic development in which a region might find itself; she is the Executive Director of the Sandia Science and Technology Park in Albuquerque, which is associated with Sandia National Lab. The geographic region with which she is most familiar is New Mexico. Finally, the third region the study of which provides insights into the phases of economic development is a deeper study and analysis of the area of Huntsville, Alabama; the factual information noted in this section is rooted in the materials presented in Section 5.3 of Chapter 5.

9.4.7 Ms. Eileen Walker

Ms. Walker has spent her career in technology-based economic development. She has had worked with the prestigious firm of Angelou Economics, which is one of the better known economic development firms in the U. S. Ms. Walker, based upon her many years of experience, believes that economic growth, particularly technology-based regional economic growth, depends upon the strength or weakness of the kindergarten through 12th Grade educational systems and the University education systems of the areas.

The factors and variables that could be utilized and quantified to help predict success of economic growth have not been identified, even through Ms. Walker's years of work with Angelo Economics. Since her work was or is characterized by the utilization of effective qualitative variables used to quantify and predict regional technology-based economic development, Ms. Walker's inability to fully identify the permutations of the economic growth phenomenon is unpleasantly remarkable.

The discussion between the author and Ms. Walker focused to a large extent on the factors and variables themselves. The ratings produced by Ms. Walker are included in Appendix D and are also discussed in Section 9.7 There were a number of factors Ms. Walker found to be critical to the success of economic development. The environmental variables, quality of life, the attractive leisure time activities, and a place that technology individuals would wish to live, i.e., one that had safety along with the types of leisure time activities usually attracted to technology-oriented people, were deemed to be very important, in her opinion. Additionally, the availability of a workforce that is not economically disadvantaged, and the ability to travel easily and effectively; i.e. an international airport were also clearly identified as being critical factors in

developing a technology-based regional economy. All of these are factors that can be changed by the political powers that be in a region but these are difficult, time consuming, and expensive policies to change.

The second key point from Ms. Walker's interview worth discussion involved the concept of the adolescent nature of the Arizona area's economic growth. This discussion also involved an interesting exercise in a comparison between Tucson and Phoenix. Phoenix is a strongly adolescent, strongly growing technology-based economy that scores well on many of the factors and variables. This area is certainly one that has major, positive potential, as it is not dependent upon one single set of inflow variables. Dependency on a single set of inflow variables, as has clearly been shown in numerous real-life examples, is, unfortunately, one of the most limiting factors to the growth success of many adolescent technology-based economies. Phoenix shows great potential as a city that could grow beyond an adolescent technology-based economy. However, it is now lagging primarily in leadership, vision, and the structure needed to implement that leadership and vision. The difficulty is not in poor leadership or vision; the difficulty lies in the fact that there does not now exist a good 10 to 20 year vision for the economic growth of the region.

The comparison of Phoenix with Tucson revealed that Tucson has lagged behind the economic development of Phoenix significantly. Phoenix was revealed as being progressively oriented, progressively lead, progressively growing, etc. Tucson, which is in the same State, is subjected to the same sets of policies, and has the same type of physical environment, strongly lacks the growth or the innovation Phoenix has seen. In fact, Tucson even seems to lack the desire for innovation growth.

The primary factor that has limited Tucson appears to be attitudinal. There is not the same degree of interest in growth in Tucson as Phoenix; as in many cities, there are individuals and groups within Tucson that do not share the same desire for growth that one expects in Phoenix. That is revealed in the results of the attitudinal factor ratings. The second set of variables that appear to be a negative influence for Tucson are incorporated into the social factor. Again, the social factor must be addressed in a satisfactory manner for an area to succeed economically. In Tucson, the social networks tend to be less inclusive of individuals newer to the area who are involved with the technology economy. That “closed” society mentality, in and of itself, would be an interesting study, perhaps an area for future research.

9.4.8 Ms . Jackie Kerby-Moore

Another interesting regional technology-based economic development questionnaire and analysis that falls into the adolescent category is Albuquerque, New Mexico. In the similar way that Huntsville has relied upon Aerospace, particularly, the NASA Marshall Space Flight Center and the Army Missile Command in the Redstone Arsenal. Albuquerque has leaned heavily upon Sandia National Nuclear Laboratory; the Sandia National Nuclear Laboratories have brought a few million dollars annually into the Albuquerque economy and has lead to the development of numerous companies in that area. Albuquerque has a very successful science and technology park at Sandia, which Jackie serves as the Executive Director of, and numerous businesses that are involved with Sandia National Nuclear Laboratories ranging from, simply, personnel staffing usually in engineering or information technology to high-tech technology development. A company which the author previously ran started in that area in nuclear weapons affects testing and did very well in working with Sandia National Nuclear Laboratories.

However, in the same manner that it had become almost too easy for companies to become dependent upon the NASA Marshall Space Flight Center and Redstone Arsenal in Huntsville, Alabama, the same phenomenon exists in Albuquerque, New Mexico because of the high-tech nature of Sandia National Nuclear Laboratories, because of the extensive amount of work, because much of that work is, indeed, subcontracted to local companies and local companies are aided in their development and growth, there have been far too little effort placed upon reaching outside of either the Albuquerque region or the U.S. Department of Energy's nuclear programs, even if they may exist outside of the Albuquerque region to utilize that technology or that technological base to grow additional jobs.

So, that structure has become self-limiting and has placed Albuquerque, the Sandia Science and Technology Park, and the many companies associated there with, in a self-limited or self-limiting environment because those companies and because the city itself had become so dependent on the federal funding for the Sandia National Nuclear Laboratory and the U.S. Department of Energy's nuclear programs, it is structured such that it is highly dependent upon a small group of inflow factors. If those inflow factors are removed then the regional technology-based economy will tank and could fall apart completely causing enormous economic difficulties for that region.

With that said, a review of the factors and variables related to Albuquerque indicate a very high potential for science and technology growth. Again, this model is based upon a knowledge-oriented model, one that is science and technology related, not one that is mass job creation related.

Again, we will review the details of the outcome of the variables in the next section.

Albuquerque is a city that has great up-side potential, strong environmental factors, although is somewhat weak in its image, outstanding starting point from a technological basis, however, again, far too dependent upon inflow variables and certain small groups of variables that keep it in, fairly much, equilibrium state and certainly very strongly in the adolescent state of a regional technology-based economy.

9.4.9 Mr. Michael Olivier

The last section of empirical expert interviews are individuals who hold higher, more general positions that bring a broad perspective, in some cases, a unique perspective to the research. I will start with Secretary Mike Olivier. Secretary Olivier is a former Secretary of Economic Development for the state of Louisiana. Interestingly, Secretary Olivier and Secretary Moret, whose interview will follow, are pretty much the opposite ends of the type of person who might hold that position. Secretary Olivier is not a formal economic development profession, rather, he is a practitioner who has spent a large portion of his career in economic development, not so much seeking planning or leadership or even the specific type of regional technology-based economic development but, rather, serving as a practitioner to land specific jobs and specific types of jobs for the region.

Secretary Olivier started his interest in technology-based economic development working at the University of Louisiana Lafayette under Raymond Blanco who, ultimately, became the husband of the governor, Kathleen Blanco, and Secretary Olivier became Secretary of Economic Development under Governor Blanco.

Secretary Olivier views economic develop, and particularly regional technology-based economic development, as a process where one aspect of that process is to be the practitioner; i.e. to be the one who goes out and actually lands the additional jobs, lands the additional work and brings it in, which is what he viewed his position, primarily, in economic development, first in Hancock County, Mississippi, then as the Secretary of Economic Development for the state of Louisiana. Whether that is the appropriate roll or not for that position, that is the role that he viewed himself in, in the approach that he took.

The author did not follow the normal interview process laid out in Appendix A with Secretary Olivier but, rather, sought to allow him to pick up the questions that he felt comfortable discussing and to do so. Interestingly, he also brought up the issue of economic development being primarily based upon a vision and that vision needed to have the appropriate leadership and organization in which to carry it out.

Secretary Olivier is another one who felt it critically important for a region to do a SWOT analysis, strengths, weaknesses, opportunities, and threats, to do true, honest evaluation of where the regional may stand against, not just competitive regions, but against the economies of the world considering that we are in a global worldwide economy. Look at what other regions, not only had done, but were doing and what other visions of other regions might be so that you could evaluate where they may be in 20 years and where you, potentially, could be in 20 years and then from that, build the vision for your region, seek the leadership and attempt to carry it out.

Another interesting factor was the honest and, appropriately placed criticism of the southern states, in particularly, Louisiana, Mississippi, and both the southwest Mississippi, southeast Louisiana and greater New Orleans area. Secretary Olivier's term was inertia, that

here is a 200-year history of a lot of old families in Louisiana, in Mississippi, much as there is in Tucson and a lot of other older cities, in that inertia and competition within the boundaries of these various political entities are one of the most difficult factors to overcome in trying to implement a vision, particularly a longer-term vision, that is going to change the dynamics of the region from a regional technology economic perspective.

Secretary Olivier evaluated the factors and variables but did not weight the individual factors and variables but, rather, to look at them logically to whether or not he felt like they, indeed, comprised to be types of factors that needed to be affected in order to impact technology-based economic development. The Secretary was very much in agreement that those factors, indeed, were the correct ones that needed to be considered. He also went on to discuss the Bell Institute of Learning and the model developed by Dr. Bell by which you can evaluate the relative success possibilities of an individual and the implacability of that to a region and then use that as an analogy to the different factors and variables that we had identified previously. It was very supportive of the approach that had been identified previously in literature and in the other interviews.

Interestingly, Secretary Olivier had great confidence and great hope for the country but also recognizes the extreme challenges, not just of today's economy, but of the electoral process and the difficulty in developing a long-term vision and building around that long-term vision when you have a four-year election cycle. Secretary Olivier and the author did discuss, at length, the difficulties of building that vision. He also, as stated previously by Assistant Secretary Baruah and others, was very adamant about the need to create such a vision and to carry out that vision should a true regional technology-based economy be developed.

9.4.10 Dr. Timothy Ryan

Dr. Tim Ryan, the Chancellor of the University of New Orleans (UNO), was also interviewed in this research process (2009). Although currently he is the Chancellor of UNO, he was also the Dean of the College of Business Administration at UNO. However, it is not in the capacity of Chancellor or Dean that Dr. Ryan was chosen to be interviewed. He was chosen because he has a Ph.D. in Economics and is one of the best known economics professionals along the Gulf Coast. He is a much sought-after economic analyst for any economic development question in the Gulf Coast region of the U. S. Dr. Tim Ryan is considered a true chief economic development spokesperson for the Southwest Louisiana region.

There are several points of discussion taken from this interview that are worth review. One was the question of whether Dr. Ryan felt that regional economic growth, particularly, technology-based regional economic growth, was predictable. He ended up making a distinction between economic growth and economic development and offered an interesting perspective related to the model as the study progressed. Dr. Ryan's quote on this issue is presented as a whole below.

And, so, talking about economic growth now, the answer is, it is predictable. Anything is predictable that follows historical patterns. So, if we have a normal situation, we know that we are going to have certain economic reactions. If the price of oil goes up and we are an oil-based economy, we pretty much know what is going to happen as a result of that and most things in the economic world do follow historic patterns. So, is economic growth predictable? Sure, to an extent. Can you predict it to 99.9% competence level? No. Our question, however, is, is regional economic growth predictable? And is the same answer, again, depending upon the region that you are talking about. For instance, let's say the New Orleans region versus the Baton Rouge region. It is way easier to predict the Baton Rouge region because the Baton Rouge economy is anchored by some very, very stable forces such as state, government, and universities. Their economy is very predictable. They have a little bit of growth every year. They never had a lot of growth and they never shrink. They very seldom stay

stagnant so they grow a little bit every year. When you look at New Orleans, New Orleans has a very unstable economic base. Our economic base is in an area like oil and gas which has been volatile over the years and declining at least in terms of the employment. The port and tourism within the port, let's talk about, again, which has been declining over the years and is relatively unstable because you have so many factors, worldwide economic recessions, economic growth exchange rates, fluctuations, import/export factors, all basically an export port and so forth and so on. Then you have tourism which, again, is subject to economic factors. So, we do not have a very stable economic base. So, when you do experience economic growth in this region, it is usually because our base is growing, people assume that means New Orleans economy never grows. So, if you look, for instance, between the period, of let's say, 1992 and before Katrina, Katrina, obviously, complicated things but up to 2005, the average rate of growth of employment which is the best measure at the regional level was very low, maybe 1%. Where people look at other nationalities, it was probably around 2% per year. What would happen is we had an economy that was producing new jobs but what was happening was our economic base was shrinking and so we were losing jobs so part of the jobs that were created would just be offset by the losses. If you had a stable economic base, all of those new jobs would have shown up as new jobs and as net new jobs. So, yes, economic growth is predictable, obviously, within a range and some economic trends and some economies tend to be more stable so they are more easily predictable. Some economies are very unstable but sometimes unstable in a predictable way (2009).

The reason these statements are important is that if certain variables are analyzed, the inputs and the outcomes of economic growth, then economic growth becomes more predictable. In the Chancellor's opinion, this phenomenon becomes even more true in a regional technology basis. If the regional technology-based factors and variables that affect a regional technology-based economy can be identified, then, indeed, the increases or decreases in the health of a regional technology-based economy can be predicted.

On a separate note, Dr. Ryan addressed the extent to which data exist, particularly data that might have been researched by University faculty members related to regional technology-based economic development. The point that Dr. Ryan made was that, although there are many business faculty and other Ph.D.'s, both at UNO and other universities who research various business phenomena, they do not necessarily understand or even regard the data as being related

to regional technology-based economic development. These researchers gather relatively small amounts of interview data, among other things that can be measured, that could be fed into a model of the sort proposed here, but that last step of consolidation and synthesis of that information is not being done.

Another issue that was discussed was brain recirculation, a term developed by Dr. AnnaLee Saxenian (2006). This term refers to the inter-relationships of individuals and groups of individuals at different educational institutions, from different countries or regions; further, the term encompasses the process of the sharing of ideas. It is the opposite of what is meant by “brain drain,” of which many people complain: the loss of well educated, intelligent individuals in any region. However, what is truly important to successful economic development is not so much the “brain drain” as it is a brain recirculation, the sharing of ideas amongst numerous people and locations. It is the brain recirculation that helped create the regions of Silicon Valley in California, Bangalore, India, Ireland, Sophia Antipolis, France, and many other areas. Both Dr. Ryan and the author agree that, in fact, unfortunately, States like Louisiana tend not to see the value of brain recirculation in growing a successful regional technology-based economy. Thus, this is not a strategy that is used by the leadership in the area of economic development to the extent that it could be and would be very helpful.

9.4.11 Michael Hecht

Mr. Michael Hecht is the CEO of Greater New Orleans, Inc., a 10-Parish business economic development initiative designed to coordinate the economic development initiatives amongst the various Parishes in the State of Louisiana. The first point of interest in Mr. Hecht’s interview was that whether or not economic growth is predictable, he did believe that it was

precedented. He believed that there were templates that could be applied that would allow a determination to be made as to the condition of a particular region in regard to regional technology-based economic development; using those templates, the factors needed to assure economic success could be determined and addressed. Unfortunately, these templates did not necessarily have the factors nor the variables identified or evaluated, but Mr. Hecht was eager to utilize the factors that this dissertation has developed in the implementation of his particular template. This template, with the factors and variables provided by this dissertation, could then be applied to any region, and in Mr. Hecht's hope, particularly, the greater New Orleans region, as well as the southeast Louisiana/southwest Mississippi regions. Such an application might reveal to a more accurate degree than ever before what a region's economic development goals should be, as well as what the appropriate leadership and governance initiatives and structures should be to achieve the desired and appropriate vision.

Mr. Hecht also understood, as presented in Chapter 6, the continual product development lifecycle analogy. Continuous product development, continuous innovation, and continuous business development were the elements that spurred continuous wealth creation in California: the basis of Silicon Valley's success. Again, by using these templates and factors and variables, it would be possible to establish continuous product development lifecycles that would then create additional wealth. In turn the creation of that wealth makes available the funding that could, then, create further jobs.

9.4.12 Stephen Moret

The last two interviews are of critical importance to the overall body of knowledge related to regional technology-based economic development. The first was with Secretary

Stephen Moret, the current Secretary of Economic Development for the State of Louisiana. Secretary Moret is very much a student of economic development, not so much as a practitioner, but as someone who truly understands what economic development, particularly, technology-based economic development. Further, he appears to possess the vision for developing the type of technology-based economic development that would be needed in a State like Louisiana.

He received the top research award by the Government Research Association when he was doing his graduate work at the Harvard Business School. He worked with McKinsey & Company. Steven has a Harvard MBA. His educational and professional background inject additional depth into this research because it allows one to look at the theoretical and conceptual background, not just those who grapple with the difficult situation that is economic development. Because of his diverse experiences, Secretary Moret can “step back,” objectively examining how technology-based economic development should be done in a State like Louisiana or in a city like New Orleans.

Secretary Moret also understood the difference between Georgia and Atlanta: the Second Cities initiative of Georgia in comparison with the growth in the Atlanta area. He understood the difference between Route 128 and the Massachusetts Miracle as opposed to the failure of the Gateway Cities in Massachusetts. Understanding these differences allows one to look at regions similar to Louisiana and the greater New Orleans, etc. in a different manner. It allowed Secretary Moret to see “the good, the bad, and the ugly.” He is able to discern the things that have worked and have not worked in economic development strategies. He is far more concerned about what should happen 10 or 20 years from now to change the nature of economic

growth within the State of Louisiana towards one of a self-refueling, mature technology-based economy. He is far less worried about the next election.

There were several critical points made by Secretary Moret. One was that most areas that have started and eventually grown into self-refueling, mature technology-based regional economies did so with initial government funding. That was true of Silicon Valley and Route 128 and certainly true of Huntsville, Albuquerque, and many areas of the country. The difference, however, is that they were able to identify the factors and variables, many of which have been identified in this study, and use that information to grow beyond the dependence on that government funding. It is important to understand need to grow beyond dependence on government funding. While it is true that trying to initiate technology-based economic development without any such funding is many times more difficult, it is equally true that becoming dependent upon funding is a recipe for equilibrium at best and possibly even failure of economic development.

Secretary Moret also understood a critical fact about the State of Louisiana: it is in many ways currently in the worst economic situation possible. While the State has great positive potential and opportunity, to be in the bottom economic tier does not build confidence in the potential for positive economic growth. Louisiana's apparent aspiration to mediocrity must be addressed. To be able to get out of that bottom tier, in the absolute sense, to generate momentum, to generate technology-based economic growth that will move Louisiana, not just from the lowest tier to the next tier, but to continue that growth well beyond that, pursuing a 10 or 20 year vision, will require leadership, vision and governance, and it will not be done by the next election.

There is one more section of Stephen Moret's interview that is worth quoting directly. It is related, specifically, to technology-based economic development growth and the predictability thereof.

I think that the first and, in some ways, the most important thing that technology-based economic development does not happen in a vacuum. It happens in a context, it happens in an operating environment and so I think of economic development as a kind of a pyramid where the base of the pyramid is the fundamentals of the operating environment, the quality of the talent, and, in fact, in reality if you had to boil it down to a single thing, if I could only have one silver bullet, I would say give me the best talent because out of the best talent I can get everything else.

It is noteworthy that this concept of talent is an element generated in the factors and variables developed by this research; the quote by Secretary Moret is supportive of the findings of this dissertation. To continue Secretary Moret's quote,

So, the public education and the private education pipeline, to put it more directly, what you actually have is a first and most significant driver both in terms of your existing industry base and your talent base. It can tell you a lot about where you are going to be in the next few years. If you were going to predict a growth rate of the state, probably the most practical way to do that would be to say, well, let me look at the break down of the economy, pick out all the retail, take out all the real estate, banking, etc. I just want to look at headquarters and the economic driver in the industry and what proportions they make up and then I am going to look at, nationally, where the growth rates are, most likely for each of those sectors, blend that all together, adjust it to the population, that is probably not a bad prediction of where it is going to go. If you look at a state like Louisiana, if you run that analysis, it would say that we're going to shrink, most likely and that creates this real sense of urgency in our state that we have to be thinking about. We have to first accept where we really are and then think about what it takes to change.

Secretary Moret's thoughts are brilliant and extremely honest: regions desiring economic growth must engage in a strong, hard, honest examination of themselves and address the factors that need to be addressed, not just the factors or policies that have always been addressed or that are easy to address by the next election. This attitude has been one of the most important

findings of this dissertation and research. It will be quantified in more detail in the model in Section 9.7.

Another critical element pointed out by Secretary Moret is that those concerned with economic development must look at a second huge challenge: the current state of the economy. Ultimately, this country, as well as the other regions studied, is, indeed, in a global market system. Local, regional and national economies are at the mercy of the economic environment as it develops: for example, a region cannot simply unilaterally decide to become a biotech research based economy with headquarters and commensurate high-paying jobs. The leadership of a region may have some type of modest impact on economic development, but they cannot control, for example, the usurpation of a mass job economy by another region capable of providing cheaper labor and technology infrastructures.

The leadership of a region, however, can act to protect and improve the competitiveness of industries currently in place, which may have become stagnant. This leadership must also look at their region's economic development as a capital investor and look at it from a capital investor's perspective. What jobs are being created in the long-term is worthy of examination, as well. The leadership should try to anticipate what the next big opportunity will be for the region and to pursue and identify new growth opportunities. These efforts must be much more structured, much more visionary, and should not be done as a reactive result of being in competition with every other region trying to achieve the same goals.

Fortunately for the State of Louisiana, Secretary Moret has given thought to these matters. He has identified a series of industries that the State of Louisiana should be moving into, perhaps not tomorrow or next year, but in 10 or 20 years. That movement can create a new

economy for the State of Louisiana. It is not going into competition with others that are already five or 10 years ahead, regions that already have, not only the Universities, but the elementary and secondary education systems in place to support those industries. The leadership of each region must look to an area that is going to be, 10 or 20 years from now, the “hot, new” area that everyone will be looking to as the source of economic success.

That is the type of vision that had been discussed throughout this research and by those who have discussed vision. Regions should try to create a vision that can be achieved, that can set the state or region apart, that can develop leadership and develop a structure by which that leadership can provide governance. Then, in a process of continuous improvement, the region must evaluate itself against these factors and variables developed by this research, and determine what future actions should be taken to maintain or improve the vision of economic development. At that point, an assessment must be made to determine whether the region and its leadership and population are willing and able to do what is necessary to achieve the chosen vision.

Again fortunately, that is Secretary Moret’s message. Should Secretary Moret be able to sufficiently communicate that message and be in a position to gain political support and leadership, then this geographic region can also gain the private sector leadership. The achievement of the end result, however, is still uncertain. The assessment of this region presented here, however, is one of the best brief analyses of the current and potential state of the State of Louisiana.

9.4.13 Governor Pete Wilson

The final interview conducted as a part of this research was with Governor Pete Wilson. Governor Wilson is the retired governor from the State of California; he is someone with whom the author enjoys a close rapport. The Governor was kind enough to agree to perform the interview. His is the only interview that was not performed on a face-to-face basis.

As a starting point, it should be noted that Governor Wilson inherited a State government with an enormous budget deficit and enormous challenges. People think of California as rich, think of Silicon Valley as an “easy” success story and think of the Pacific Coastline as wonderfully prosperous. They rarely think of a thirty-million plus person State that would be the 10th largest economy in the world as a stand-alone economy, but also that cannot deficit spend and has enormous budget challenges. Governor Wilson stepped in, took on those challenges and did an extraordinary job. He embraced the Marine Corps, the Navy, and the Military, which have bases throughout the State; Governor Wilson was actually able to create economic development, to a large extent, because of his embracing relationship with the Military.

When Governor Wilson stepped in, he had enormous Military payrolls. While there were these great payrolls being expended, civilians and California’s Universities were not engaged with the Military. To a large extent, Governor Wilson saw that as an opportunity and was able to entice educational institutions to come to California or to further develop themselves as leading educational institutions. Institutions like large name hospitals, such as the Salk Institute, the SCRIPPS Institute, and others, as well many of the previously existing California Universities, such as UC Berkeley, UCLA, USC, UC San Diego. These Universities barely existed at the time. Governor Wilson was able to facilitate relationship building among these institutions with

the Military in collaborative efforts. In doing so, he created numerous private sector jobs which, obviously, created an enormous tax base for the State. When running for and entering the Office of Governor, Governor Wilson may have thought he inherited a five-billion dollar budget gap; but, by the time had analyzed the first budget, he realized with the Barrack Base closures, etc., as well as the spending bills that had been passed just before he took office, the actual budget gap was closer to \$14.3 billion. This clearly constituted a stunning a challenge for any first-term governor, or indeed for any seasoned political veteran.

Without going into excessive detail, this was also a time during which Silicon Valley was losing manufacturing jobs primarily due to the cost of doing business in California. What Governor Wilson was able to do was to take an honest look at where California stood by travelling around the nation and learning all of the negatives about why companies were moving away from California, why companies were not opening plants in California or why individuals might be leaving. He went back and effectively forced the changes that were necessary, reduced the tax burdens, made it easier to deal with that State. He completely changed the government and business environments. There was little that the Governor could do quickly to improve the quality of living, but he could impact the environment of dealing with the State, change the tax structure, refocus on attracting businesses, utilize the already extremely strong and extremely popular technology-based economic development initiatives, and fold in the appropriate leadership, policies, and governance. These changes were all done in accordance with the factors and variables uncovered by this research, although, at the time, Governor Wilson, of course, was unaware of the model he was intuitively using. He was able to precipitate such change in the State that during his last two years as Governor, California was producing more jobs annually than New York, Pennsylvania, and Illinois combined.

It was an extraordinary story of how to turn a state around and California's leadership did not do this as a regional economic development initiative, they did it to save the State of California. It is probably one of the best regional economic development lessons that could possibly be learned. It is worthy of its own detailed study: the steps taken by the State of California, the leadership, the work with individual regions, the policies that were put in place. It should be noted that many of the factors described in this dissertation were those (along with an extraordinary effort) that the Governor was able to affect in a manner that put California back on track as one of the most productive economies in the world.

9.5 Analysis of Factors and Variables

In Chapter 7, an initial set of six factors, each comprised of a series of variables, were identified that were believed to impact regional technology-based economic development. One initial goal of the interviews was the validation, correction, and weighting of both the factors and the variable that affect regional technology-based economic development. The expert empirical interviews presented verbatim in Appendix C included an assessment by most individuals of the degree to which these factors and variables were believed to actually impact the development of a regional technology-based economy. Each of the persons interviewed was asked to grade and analyze the factors listed previously in Chapter 7 and to rank those according to their impact on the regions with which they were most familiar. The grading sheets were normalized and are included in Appendix D. This is the second key result of the empirical research. The decision analysis presented in section 9.7 will also allow for the presentation and analysis of these findings in the form of decision analyses and formulas.

There were two key questions for which answers were sought:

1. Were these the right six factors and, if so which factors were of greatest impact, and
2. Within these factors, were the right variables identified and how important were the individual variables in comparison to one another.

As pointed at in Section 9.1 there was one key factor that was so obvious as to have been overlooked – Leadership. Without Leadership and the governance structure associated therewith, technology-based economic development simply failed to exist. Fortunately, this error was discovered in the first interview and questionnaires were able to be modified accordingly. Therefore, there were seven key factors evaluated:

1. Leadership and Governance
2. Environmental
3. Inflow
4. Attitudinal
5. Policy
6. Knowledge
7. Social

Of these factors, Leadership and Governance, and the vision associated therewith, was unanimously considered the most important. Inflow, without Leadership, Governance and Vision, technology-based economic development became a waste of time and funds. It is in effect the enabling factor for all others.

Beyond the singular importance of Leadership and the variables associated therewith, the relative importance of the other factors depends upon the type of regional technology-based economic development a region chooses to pursue. If a region plans to pursue mass job creation or attraction, then the key three factors are by far Policy (corporate attractiveness), Inflow, and an Environment. If on the other hand a region chooses to pursue a knowledge-oriented regional technology-based economy more focused on research and development than mass job creation –

such as Sophia Antipolis, Albuquerque/Sandia, or the initial phase of Research Triangle Park, then the Knowledge Factor is first followed by the Environmental Factor and Attitudinal factors about equally, and then Social Factor and Inflow Factor at about the same level of importance. The Policy Factor tends to be last under this approach.

The two models for regional technology-based economic development are presented in the form of a decision analysis in Section 9.7. For the purpose of comparing factors and variables, Appendix D promotes a matrix of each variable for each factor. Interestingly, the type of approach used for regional technology-based economic development had little impact on the relative ranking of the variables as much as it did on the relative importance of the factors at a higher level. Appendix D presents each factor and each variable within each factor with individual scores from those individuals who actually scored each variable. The scores were normalized and are presented individually. An average score for each variable is then computed. It is worth noting the relative rankings of each variable within each factor, as opposed to simply looking at the average scores. Based on the normalized scores and average outcomes, the variables within each factor can be viewed as follows (the Leadership Factor was intentionally not included).

Environmental Factors

- High
- Quality of Life
 - Science and Engineering Education
 - A talented, educated workforce
 - Quality K–12 education system

- Medium
 - Strong regional University system
 - Support for technology initiatives
 - Non-technology infrastructure
- Low
 - Non-economically disadvantaged workforce
 - Technology population
 - Technology-savvy investors

Inflow Factors

- High
 - Inflow of revenue from outside the region
 - Inflow of talent
 - Retention of capital within the region
 - Inflow of ideas and innovation
 - Inflow of potential funding for R&D
- Medium
 - Inflow of Science and Technology funding
 - R&D expenditures in the region by Universities
 - Inflow of government R&D grants
 - Inflow of equity and debt capital
- Low
 - IPO funds raised by companies in the region

Attitudinal Factors

- High
 - Willingness to collaborate for mutual success
 - Value placed on human capital
 - Image of creativity and value creation
 - Technology transfer and commercialization
 - Tolerance for entrepreneurial risk
- Medium
 - Active promotion at the tech sector
 - Entrepreneurial focus of the population
 - Willingness of investors to consider technology investments
- Low
 - Responsiveness to innovative investors
 - Attitude of grow your own vs. attract

Policy Factors

- High
 - Business friendly tax structure
 - Tax breaks for R&D, Angel Investment
- Medium
 - State and local support for workforce training
- Low
 - Simplified acquisition process

Knowledge Factors

- High
 - Commercializable University R&D
 - Technology transfer and collaboration
 - Technology commercialization support
 - Focus on technology by Universities

- Advanced education (post-undergrad.)
- Medium - Defined strategy for creating future knowledge workers
- Collaboration and idea sharing between private firms
- Entrepreneurship training and collaboration
- Low - Strategies for regional cohesion in tech transfer and commercialization
- College of Business with focus on Entrepreneurship
- Entrepreneurship training and collaboration

Social Factors

- High - Focus on established industries and companies
- Openness to risk-taking and experimentation
- Geographically clustered technology base
- Investible capital with entrepreneurial focus
- Medium - Culture of change and collaboration
- Dense, inclusive social networks
- Collective identity and learning

9.6 Modeling the Factors and Variables in a Decision Analysis

One of the outcomes of this research was to identify those Factors and even attempt to quantify those identified. Further, an attempt was made to arrange the Factors according to the most fitting types of technology-based economic development. Whether a region was going to

seek mass job growth or knowledge growth were the two massively different ways to approach technology-based economic development.

Numerous pieces of data have been identified in this dissertation. Further, much of the data has been characterized and utilized, sometimes with great result and sometimes not. Too often we have seen data misused. So this final decision analysis begins with that which is known and presents a logical decision approach.

As discussed in Section 6, there are many factors that must be considered in developing a regional technology-based economic development program. There are also many qualitative factors that, as shown previously, can be quantified even in the case of qualitative, affective variables that comprise the factors that impact technology-based economic development, the simple decision analysis structure will be utilized to represent the impact of both the quantitative and qualitative variable within each factor.

The first decision to be represented is whether or not a region has or can develop the leadership, vision, and governance to pursue technology-based economic development. Although it may seem that the question is simply pursue/don't pursue regional technology-based economic development, the impact of failing to have leadership, vision, and governance is the same as a "no" decision, so this can be easily represented as a single decision tool (Figure 9.6.1).

Initial Decision Whether or Not to Pursue
Regional Technology-Based Economic Development

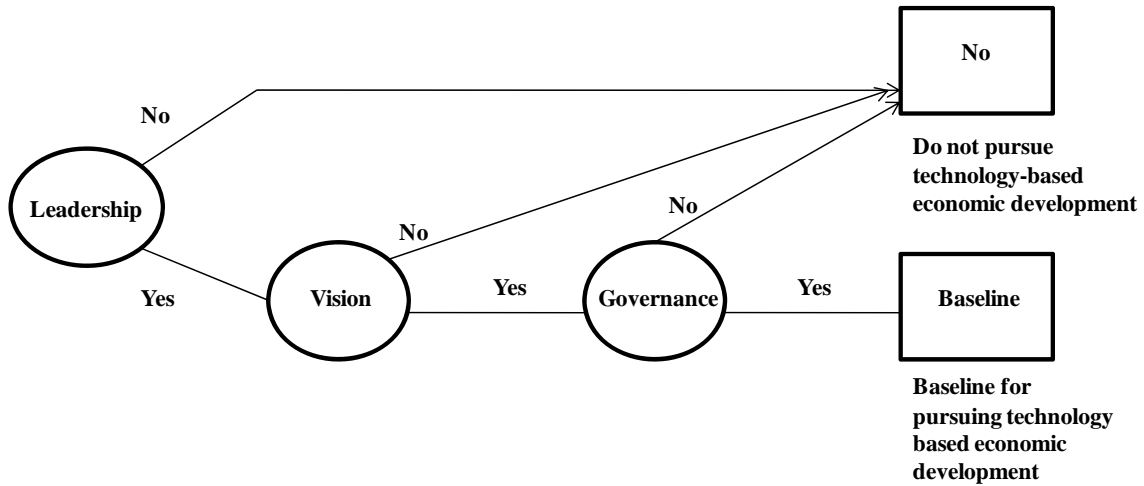


Figure 9.6.1: Model for Pursuing Technology-Based Economic Development

If the leadership, vision, and governance factor is credible, the next decision factor is whether to pursue a knowledge-based economy or one which seeks mass-job creation. This is critical to the determination of which factors you want to focus, as described in Section 9.6.

Figure 9.6.2 provides a simple representation of this next decision phase.

Choosing Which Type of Regional Technology-Based Economic Development to Pursue

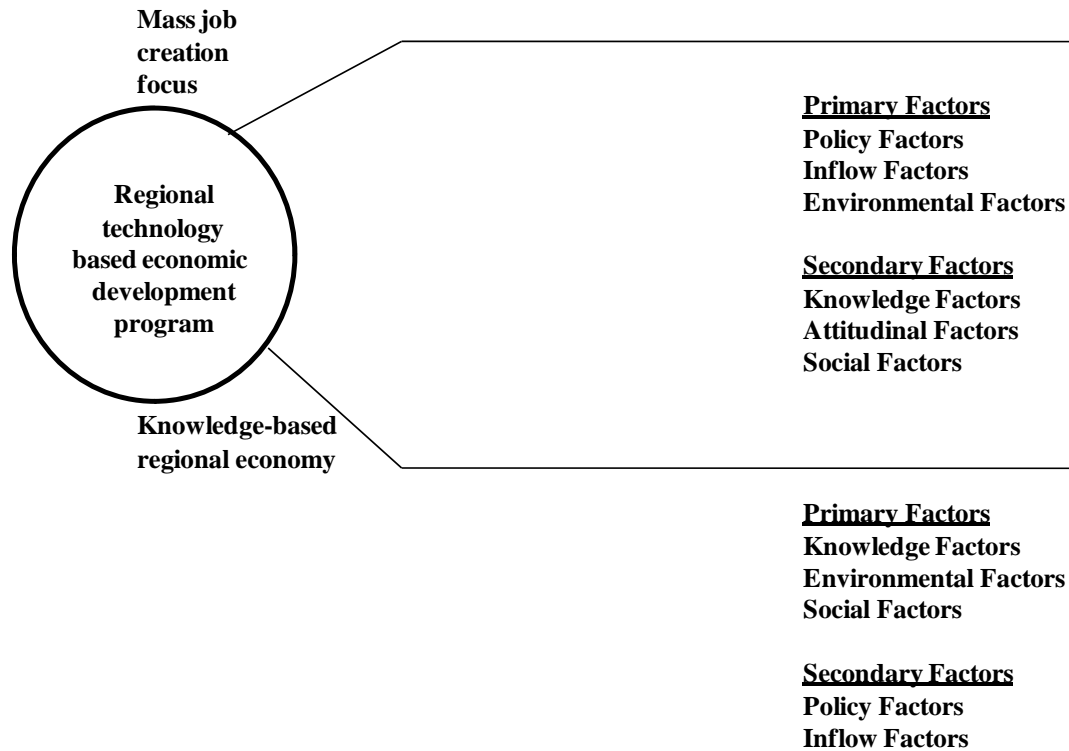


Figure 9.6.2: Model for Pursuing Knowledge-Based Economic Development

Based on these simple decision trees/decision analysis diagrams, and the analysis of factors and variables presented in Section 9.5 and Appendix D, it is possible to generate formulas for ranking the relative performance of a region’s success in technology-based economic development. It should be noted that there is no right or wrong formula, and that these ratings are not intended to be used for ranking one region against another. Rather, it is designed to help a region to honestly evaluate itself against these critical factors and, hopefully, identify areas where improving performance might have a positive impact on the regional technology-based economy. It is also hoped that these formulas can serve as a starting point for continuous

improvement that will one day produce much more effective formulas. On this basis, the formulas proposed are as follows:

$$\text{Rate mass job creation} = 2P + 2 * n/3(I) + 2E + K + A + S$$

$$\text{Rate knowledge economy} = 2K + 2E + 2A + 2F + P + I$$

Where each factor constitutes the average of each variable that comprises that factor where each variable is rated from 1 (lowest) to 5 (highest) for the region in question. There is one critical caveat to the ratings, is a regional economy is too dependant upon any single factor it cannot reach the mature category. For example, a region that is highly dependant upon a single source of revenue inflow, such as Huntsville, Alabama is with federal spending, that region cannot become truly mature unless sufficient diversity of revenue can be achieved. Therefore, the multiplier for the inflow variable is handled differently than the multipliers for other variables. It is critical that inflow variables originate with a minimum of three sources (per expert interviews) and that the origins of these sources be sufficiently different as to not be impacted by a single action. Therefore, the multipliers utilized for Inflow Factors is the number of primary sources (n) divided by the minimum required sources (3). As our example, to determine the value of P, the Policy Factor, assuming the values shown, would be calculated as follows:

Value of Business Friendly Tax Structure	= 4 (1-5)
+ Value of Tax Breaks for R&D and AI	= 3 (1-5)

+ State and Local Support for Workforce Training	=	3 (1-5)
+ Simplified Application Process for New Businesses	=	3 (1-5)
+ Establishment of Business Incubators and Tech Parks	=	2 (1-5)
	Sum	15
	Divided by Number of Variables	5
	Value of P	= 3

If a hypothetical region seeking a knowledge-based economy is rated as follows:

$$K = 4; E = 4; A = 5; S = 3; P = 3; I = 2/3 (3)$$

Then that region's rate would be:

$$R = 2 (4) + 2 (4) + 2 (5) + 2 (3) + 3 + 1 = 36$$

As discussed previously, regions can be rated as Mature, Adolescent, or Neophyte, based primarily on the regions studied and the anecdotal evidence from the expert interviews, the recommended rating ranges for each category in each type of regional economic development type are as follows:

	Mass Job Creation	Knowledge Economy
Mature	36 +	40 +
Adolescent	25 – 36	30 - 40
Neophyte	10 – 25	15 – 30

CHAPTER 10

Future work: Redefining Factors and Producing a Model that can Learn from Continuous Application

1.0 Staged Approach to Research and Engineering

The research presented in this dissertation has been developed and is presented in stages, meaning: the author has identified a systems engineering approach, coupled with an artificial neural network approach that has the capacity to help the leadership of geographic regions initiate and establish economic success for their regions. The understanding of the concepts of the stages of economic development, the mature, adolescent and neophyte stages of development, together with an understanding of nature of the economic development, whether the economy is self-refueling or otherwise, is the initial key to understanding how to solve the puzzle that is successful economic development. By adding the analogies presented in Chapter 6, the Ecosystem, Ancient Roman, Corporate Development and Product Life Cycle, the journey to full appreciation of what generates economic health is further shortened. By bringing an understanding of such concepts and systems together with these analogies, the enlightenment shed by the interviewees materializes into a comprehensive whole: a model from which the understanding and achievement of mature, self-refueling economies can be developed.

2.0 Limitations and Future Work

One of the key limitations of this work is the number of regions evaluated against the identified Factors. This work can be enhanced and expanded substantially by a series of detailed surveys to better understand the relative weights of the variables and the interactions between the variables and Factors. On the same basis, more detailed work comparing and contrasting the knowledge-based economic development approach with the mass-job creation approach could

substantially advance the body of knowledge related to technology-based economic development. There are several additional actions that should be considered to maximize the value of this work. First, a broad survey of the ratings of the factors and variables by a many regional leaders, political leaders, economic professionals, and economic development professionals as possible would be of enormous benefit in refining the model. This would achieve one of the objectives of this body of knowledge – creating a model that can continuously learn and improve. A second step which would be much more expensive and time consuming, but would also add enormously to the value already achieved from the expert empirical interviews, would be to continue the interview process and expand it to additional countries. Such an action would be extremely costly but would be of immense value. The final step is to apply the model to as many actual regions as possible, thereby identifying not only the factors and variables, but to go the additional step to identify solutions. That would be the ultimate value achievement – to identify not only the factors and variables to be considered, but also the potential actions that could achieve the outcomes desired.

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APPENDIX A

Interview Questions

- (1) Please describe briefly your current position and role within your organization and community.
- (2) Do you consider yourself knowledgeable about economic growth and development? How about technology-based economic development? Please provide a brief discussion of your background related to economic issues.
- (3) Do you think economic growth is predictable?
 - (a) Do you think regional economic growth is predictable?
 - (b) More specifically, can regional technology-based economic growth be predicted?
On what basis?
- (4) What factors do you think impact technology-based economic development? Please think about and try to describe both quantitative and qualitative factors. Can these factors be measured?
- (5) What specific types of quantitative factors or variables do you believe could be measured as indicators of regional technology-based economic growth (after the fact)?
 - (a) Do you think there are factors or variables that might be predictive of technology-based economic growth?
- (6) The next six questions list and describe factors that may affect regional technology-based economic development in an attempt to identify the population of variables that impact regional technology-based economic growth. For each handout, please review each factor, and the variables listed that comprise and describe each factor, and answer the following questions for each;

- (a) Do you think these variables sufficiently describe this factor?
- (b) Are there variables that you believe are missing?
- (c) Should any variables be eliminated?
- (d) Please assign a weight to each variable based on relative importance such that the sum of all weights equals 100.

ENVIRONMENTAL FACTOR

1. Quality of Life (i.e.: Attractive leisure-time activities;
Safety/relatively low crime environment) _____
 2. Support for technology initiatives (i.e.: Institutional support for
technology transfer and commercialization) _____
 3. Availability of technology-savvy investors _____
 4. Technology population (i.e.: Households with a computer; Households
with internet access/high speed digital access) _____
 5. Non-economically disadvantaged workforce (i.e. Average annual pay
vs. national average; Percentage of population living above poverty line;
Percentage of workforce that are employed) _____
 6. Non-technology infrastructure (i.e. Transportation systems, particularly
air travel; Availability of legal, financial and other professional services) _____
 7. A talented, educated workforce _____
 8. Quality of K-12 education systems _____
 9. Undergraduate, graduate and post-graduate programs in technology
sectors, including Science and Engineering _____
 10. Strong regional University system _____
 11. Other _____
 12. Other _____
- Total 100

INFLOW FACTOR

1.	Inflow of equity capital and debt financing	_____
2.	Inflow of talent	_____
3.	Inflow of ideas and innovation	_____
4.	Inflow of government Research and Development grants	_____
5.	Inflow of revenue from outside the region	_____
6.	Inflow of Science and Technology funding	_____
7.	Inflow of private funding for research and development	_____
8.	Retention of capitol within the region	_____
9.	R&D expenditures within the region by Universities	_____
10.	IPO funds raised by companies in the region	_____
11.	Other	_____
12.	Other	_____
	Total	<u>100</u>

ATTITUDINAL FACTOR

1. Tolerance for entrepreneurial risk _____
 2. Willingness to collaborate for mutual success or technology advancement _____
 3. Image of creativity and value creation _____
 4. Value placed on human capital _____
 5. Responsiveness to innovative investors _____
 6. Active promotion of the technology sector _____
 7. Attitude of “grow your own” vs. focusing funding on outside attraction _____
 8. Willingness of investors to consider technology investments _____
 9. Belief of business and education communities in the importance of technology transfer and commercialization _____
 10. Entrepreneurial focus of the population
 - a. Number of new businesses started _____
 - b. Number of new businesses started in technology sectors _____
 - c. Number of Technology Fast 50 companies _____
 - d. Payroll of ongoing business concerns in technology industries _____
 11. Other _____
 12. Other _____
- Total 100

POLICY FACTOR

1. Business friendly tax structure	_____
2. Tax breaks for R&D, Angel investment and start-ups	_____
3. State and local support for workforce training	_____
4. Simplified application processes for new businesses	_____
5. Establishment of business incubators and tech parks	_____
6. Other	_____
7. Other	_____
8. Other	_____
Total	<u>100</u>

KNOWLEDGE FACTOR

1. Applicable University research and development _____
 2. Technology transfer and technology collaboration between Universities and industry, including plans or strategies for targeting technology sectors _____
 3. Depth of technology initiatives and targets including existence of technology/business incubators _____
 4. Entrepreneurship training/collaboration _____
 5. Collaboration and idea sharing between firms; joint marketing _____
 6. Defined strategy for creating future knowledge workers _____
 7. Technology commercialization support _____
 8. Strategies for regional cohesion in technology transfer and commercialization _____
 9. Economic development organization with knowledge and charter to focus on technology _____
 10. College of Business with focus on Entrepreneurship _____
 11. Educated workforce – Percent of workforce with Bachelors or Master Degrees in Science or Engineering` _____
 12. Advanced Education – Percent of workforce with a Ph.D. in Science or Engineering _____
- Total 100

SOCIAL FACTOR

1. Culture of collaboration	_____
2. Culture of change	_____
3. Dense social networks	_____
4. Collective learning	_____
5. Geographical clustered/technological base	_____
6. Grow your own and attract vs. focus on \$ and established industries/companies	_____
7. Investable capital + entrepreneurial focus	_____
8. Collective identity	_____
9. Openness to risk-taking and experimentation	_____
Total	<u>100</u>

- (7) Having considered the six factors that may affect technology-based economic growth - Environmental Variables, Inflow Variables, Attitudinal Variables, Policy Variables, Knowledge Variables and Social Variables,
- a. Do you think these factors actually affect technology-based economic development?
 - b. Are there factors you consider more important than others? If so, please rank them.
 - c. Are there aspects of technology-based economic development factors that are missing or not adequately described by these six factors?
- (8) Considering the previous questions, please rate the region with which you work, or the region with which you are most familiar, on each of these six (6) factors according to the following scale:
- 1 = Performed minimally (Neophyte)
 - 2 = Performed modestly
 - 3 = Performed average (Adolescent)
 - 4 = Performed well
 - 5 = Performed excellent (Mature)
- b. Do you consider this region to be a success or failure? In what ways?
- (9) Do you think technology-based economic development can be influenced by federal, state or municipal policies?
- a. In what way?
 - b. Which policies do you think are particularly effective or ineffective?

- (10) Can governmental entities affect the quantitative factors that impact technology-based economic growth?
- (a) Qualitative factors?
- (11) Having considered the factors and variables that might impact regional technology-based economic development, do you think these factors and/or the process of regional technology-based economic development can be modeled?
- (12) Please review this simple diagram (hand-out); do you think a diagram like this could represent a technology-based regional economy?
- (a) If these factors can be quantified, do you think a model could be created to represent technology-based economic development?
- (b) Are you familiar with any such models?
- (c) What about modeling tools?

APPENDIX B

Biographies of Interviewees

Sandy K. Baruah

Sandy K. Baruah (Bah-roo-ah) was nominated by President Bush on September 6, 2005 to serve as the Assistant Secretary of Commerce for Economic Development, and confirmed by the U.S. Senate on December 17, 2005. Mr. Baruah has served the Bush Administration since 2001. Prior to his nomination and confirmation as the Assistant Secretary, he served as the Deputy Assistant Secretary for Program Operations and Chief of Staff at the Economic Development Administration (EDA).

As Assistant Secretary, Mr. Baruah's role is to lead and manage the U.S. Department of Commerce's Economic Development Administration, the domestic economic development arm of the Commerce Department. The mission of EDA is to *lead the federal economic development agenda by promoting innovation and competitiveness, preparing American regions for growth and success in the worldwide economy*. EDA's annual investment budget for fiscal year 2006 is over \$200 million and the bureau has an investment portfolio under active management of \$1.5 billion. In addition to its headquarters in Washington, D.C., EDA has six regional offices across the nation with 175 professional employees.

Assistant Secretary Baruah represents the agency before the White House, the Congress, the Organization for Economic Cooperation and Development in Paris, France, and other forums on a broad range of economic development issues. Mr. Baruah also served as the Commerce Department's senior representative to President Bush's post-Hurricane Katrina Lessons Learned Exercise that examined the federal response to the 2005 hurricane and made significant recommendations for improvements in how the federal government handles future significant disasters.

Working with his predecessor, David A. Sampson (now Deputy Secretary of Commerce), Assistant Secretary Baruah helped lead significant accomplishments for EDA, including the agency's induction into the *Balanced Scorecard Hall of Fame*, passage of EDA's Congressional reauthorization, the agency's inclusion in President Bush's Executive Order which established the *Preserve America Initiative*, and achieved the second-highest effectiveness ranking from the White House's Office Management and Budget.

Prior to joining President Bush's team at the Commerce Department, Sandy spent seven years with Portland, Oregon-based corporate management consulting firm Performance Consulting Group. As a business consultant, he worked on engagements with clients such as Walt Disney World, Intel, Key Bank, Citizens Bank and others.

Sandy Baruah's previous government service includes work with U.S. Senator Bob Packwood and service to President George H.W. Bush, with positions in the office of the Secretary of Labor and the Secretary of the Interior. Mr. Baruah holds a B.S. from the University of Oregon and earned an M.B.A. from Willamette University.

Secretary Stephen Moret

Prior to being appointed by Gov. Bobby Jindal as secretary of Louisiana Economic Development in 2008, Stephen Moret served as president and CEO of the Baton Rouge Area Chamber of Commerce (BRAC). Under Moret's leadership from 2004 to 2007, BRAC grew into a national-caliber, regional economic development organization. Revenues tripled at the chamber during Moret's tenure, following the launch of "The Campaign for a Greater Baton Rouge," a five-year, \$15 million economic development initiative for the nine-parish capital region.

Also while at BRAC, Moret emphasized that business retention and expansion efforts are equally important to business recruitment efforts, and that Louisiana must address such fundamental economic issues as eliminating unorthodox business taxes, improving workforce development, adopting comprehensive governmental ethics reform and addressing statewide transportation priorities.

Moret's other professional endeavors include working as a management consultant with McKinsey & Company, a leading global consultancy serving senior executives of Fortune 500 companies and large public sector organizations. At McKinsey, he specialized in healthcare and service operations. Previously, he was a project supervisor with Trinity Consultants, where he advised large industrial facilities in Louisiana, Arkansas, Mississippi and California on environmental issues related to major plant expansions.

Moret also served as an assistant to the LSU chancellor, an independent consultant to Harvard University and a public policy fellow with the Public Affairs Research Council of Louisiana (PAR). His research at PAR on restructuring Louisiana's higher-education system earned the Most Distinguished Research Award from the National Governmental Research

Association.

A native of Mississippi, Moret considers Baton Rouge, La., his adopted hometown since attending LSU as an undergraduate. He holds bachelors in mechanical engineering from LSU and an M.B.A. from Harvard Business School. He is a graduate of Leadership Louisiana and was selected for the Greater Baton Rouge Business Report's "Top 40 Under 40."

Timothy P. Ryan, Ph.D.

Timothy P. Ryan's passion for the University of New Orleans began more than 30 years ago. As an undergraduate studying economics, it seemed almost impossible to imagine he'd one day become Chancellor, but on October 31, 2003, the distinguished UNO alumnus, renowned economist and respected academic leader was named the fifth Chancellor of the University by the Louisiana State University Board of Supervisors.

Having served a decade as Dean of UNO's College of Business Administration and elevating its programs to national prominence, Ryan advanced to the position of Interim Executive Vice Chancellor only three months prior to his appointment as Chancellor. A former Director of the Division of Business and Economic Research and a Hibernia Professor of Economics at UNO, he has demonstrated his commitment to the academic, research and service missions of the University since joining its faculty in 1976.

Dr. Ryan is a widely published and often quoted expert on the local, regional, state and national economy; managerial economics; economic development; the New Orleans and Louisiana tax structure; public finance; and the hospitality and tourism industries. He has presented his research throughout the United States and internationally.

Dr. Ryan holds leadership positions with numerous community organizations, including Greater New Orleans, Inc.; Committee for a Better New Orleans/Metropolitan Area Committee; World Trade Center; Idea Village; United Way; Junior Achievement of Greater New Orleans; Greater New Orleans Sports Foundation; New Orleans Educational Telecommunications Consortium; INROADS Louisiana; National D-Day Museum; and the Ogden Museum of Southern Art. He has served on many local and state government advisory panels.

Dr. Ryan is a 1987 recipient of the Homer L. Hitt Distinguished Alumnus of the Year Award, named in honor of UNO's first Chancellor. He has also received the UNO Excellence in Teaching Award and the Young Leadership Council Role Model Award, among others.

He earned a Bachelor of Arts in Economics from UNO in 1971 and a Ph.D. in Economics from Ohio State in 1978.

Dr. Ryan is married to Louise Schreiner, also a UNO alumnus. Ms. Schreiner is an independent Certified Public Accountant currently providing small business consulting services. They have two teenage daughters, Katherine and Rebecca.

Jacques Masboungi

Mr. Masboungi is the Deputy Managing Director of Sophia Antipolis Development Corporation (SAEM SACA) near Nice in Southern France. He had held this position since January 1990. Sophia Antipolis is known as one of the most famous science parks in the world and the first in Europe.

Mr. Masboungi was born in Beirut Lebanon on May 10, 1948, he is married with two children. Mr. Masboungi received a Master's degree in Architecture from Paris University in February 1972 and a Master's in Town Planning, from the Town Planning Institute in Paris in June 1974.

Mr. Masboungi has past consultancy experience with Abidjan science park on the Ivory Coast; Capricorn science park in Capetown, South Africa; Porto Alegre technologies in Brazil; Ho Chi Minh City Industrial and technology park in Vietnam; Pavia science park in Italy; Gebze' technology park in Istanbul, Turkey; Berytech incubator in Beirut, Lebanon; Cyprus Science and technology park on Nicosia, Cyprus; ITC Center in Arriyadh, KSA; and Cyberpark in Algiers, Algeria.

Mr. Masboungi's past experience:

- 1982 to 1989 – Chief urban planner in a programming and design group located in the south of France, Beterem, a subsidiary of the “Caisse des de'pots et consignations” one of the major public investment companies in France.
- 1978 to 1981 – Independent urban planner and architect in Paris.

- 1976 to 1978 – Urban planning assistant project manager. Ministry of public works and housing in Metz, east of France.

Mr. Masboungi is author of a publication by the ministry of public works and housing dedicated to professionals in urban planning. Title of the book is “The public open spaces and low density housing areas.”

Ashton J. Ryan, Jr.

Ashton J. Ryan, Jr. currently is the President and CEO of FirsTrust Corporation and its subsidiary First Bank and Trust. Previously, he was vice chairman of Bank One, Louisiana and chairman of its New Orleans market. He was formerly President and CEO of First National Bank of Commerce, prior to its acquisition by Bank One, a position he had held since 1991.

Mr. Ryan earned a Bachelor of Science in physics from Tulane University and a master of business administration in 1971 from Tulane's College of Business Administration (now the A.B. Freeman School of Business).

Following graduation, Mr. Ryan joined the New Orleans office of Arthur Andersen and Company as a staff accountant and was promoted to senior auditor in 1972, audit manager in 1975, and audit partner in 1981. During his 20 years with Arthur Andersen, he specialized in auditing and consulting for a large number of financial institutions.

During tenure at Arthur Anderson, he developed the largest financial institution auditing and consulting practice in the South (over 30 financial institutions with over \$30 billion of assets): member of AA's international banking specialty team; hired by FDIC to assist with creation and execution of nation's first Bridge bank (Capital Bank in Baton Rouge); hired by Federal Home Loan Bank to oversee the operations of the Federal Land Bank of Jackson receivership including valuation of its loan portfolio for purposes of sale; supervised numerous loan workout services for the RTC including loan workout strategy development, workout analysis and valuation; RMA speaker on loan underwriting; qualified expert witness in both Federal and state courts regarding loan underwriting; developed and teaches all of Louisiana CPA courses on banking.

Accepted assignment as President of First NBC with objectives of (1) cleaning up a loan portfolio reflecting marked deterioration and significantly upgrading loan culture and (2) significantly expanding business development efforts. Inherited a commercial/real estate portfolio of \$950MM with \$60MM of non-performing loans, an 18% charge-off rate, 65% classified to capital and 77% criticized to capital. During first two years, reorganized personnel, lending policies and procedures, and dealt effectively with \$200MM of deteriorating loans while reducing losses to 7% by 1992. Through personnel changes and shift in lending culture, put in place a team capable of significant loan expansion while maintaining high underwriting quality. From 1993 through September, 1997, grew commercial/real estate loans from \$795MM to \$1.9 billion, a compound growth rate of 20%, while generating a zero net charge-off ratio and an average classified to capital of 17% and an average criticized to capital of 28%.

Established and supervised FCC's SBIC, FCCI, which in its three-year history has generated \$15MM of gains through its investments. Developed and implemented team concept to providing banking services to commercial clients resulting in tremendous increase in referrals from Relationship Management to Trust, Marquis Investments, Cash Management, Bankcard, ATM placement, FCCI, etc. During the last two years, significantly increased both the number of Marquis commercial clients and our penetration of their financial wallet.

After the acquisition of First Commerce by Bank One, Ashton left Bank One to join a small community banking organization in New Orleans – FirstTrust Corporation as President of that company and its lead bank subsidiary, First Bank and Trust. Under his leadership, First Bank has grown from \$78MM to approximately \$450MM and has set for itself the objective of becoming New Orleans's dominant community bank.

Michael Hecht

President and CEO

Greater New Orleans, Inc.

Before being tapped by the area's business leadership to lead GNO, Inc., the region's economic development nonprofit, Michael Hecht served as the Director of Business Recovery Services with Louisiana Economic Development, where he led the \$232M Small Business Recovery Program, designed to revitalize the small and independent business sector of Louisiana devastated by Hurricanes Katrina and Rita. Working in partnership with the Louisiana Recovery Authority and the Office of Community Development, Michael implemented a portfolio of initiatives that offers businesses critically needed grants, loans and technical assistance to help them through current challenges and position them to adapt to a changing market. While at LED, Michael also established the \$90M Louisiana Revolving Capital Fund, the first of its kind in the nation.

Prior to repatriating to Louisiana from New York City in 2006, Michael served as an Assistant Commissioner in the NYC Department of Small Business Services. Working for Mayor Michael Bloomberg and Deputy Mayor for Economic Development and Rebuilding Dan Doctoroff, Michael developed and ran NYC Business Solutions, a new initiative designed to help the 200,000+ small employers of New York City prosper and grow. NYC Business Solutions assisted over 25,000 businesses in its first two years of existence, with results including helping local businesses close on over \$23M in new financing, guiding over 7,000 entrepreneurs through business planning, and an overall customer satisfaction rating of 4.3 out of 5.0. Michael's last effort before coming to Louisiana was to develop an emergency no-interest loan program for the business community of Queens, following a crippling extended power outage.

In addition to his public and private ventures, Michael also has experience in the nonprofit sector, where he was Director of Business Development for the Food Bank in New York City, the largest of its kind in the country feeding over 200,000 people everyday. Michael began his career as a strategic management consultant to large multinationals, working for Marakon Associates in North America, Australia and Europe.

Michael also brings with him the experience of starting and managing his own business, having founded a conglomerate of restaurant venues in San Francisco, including the award winning “Foreign Cinema.” Starting with a business plan and no equity, he raised over \$2M and built a \$7M business that continues to operate today.

Michael holds an MBA from Stanford Graduate School of Business, where he was a member of the Public Management Program, and an undergraduate degree in Race Relations from Yale University, *magna cum laude*.

He was a member of Coro Leadership New York, and has lectured nationally and internationally on entrepreneurship and economic development.

Michael whose Louisiana family roots extend back to the 1830’s resides in New Orleans, with his wife Marlene, an ESL professor, and two small children, Dexter and Kaj. As the new leader of GNO, Inc., Michael’s focus is to work with the ten parishes to spearhead economic development in retaining and promoting investment.

GNO, Inc. has an extensive history of working with the ten parishes and Michael comes on board with a mission to unite the region in a stalwart economic alliance. This ten parish region has long been on the map of meeting the demands of the national and international

marketplace, and in the 300 year history of Greater New Orleans, never has this region had such an opportunity to change the direction of the economy to create new jobs and investment. With a Roadmap in place for the regional economic recovery, Michael is executing the plan with a focus on business development, workforce and public policy.

Kevin H. Pollard

Mr. Pollard is President (January 2003 to present) of *GlobalSolve™* Management Services, a consulting firm that develops and executes a broad range of business, financial and marketing strategies for a diversified international client base. *GlobalSolve™* accelerates access to markets, channel partners and proven technologies, so that its clients can immediately improve near-term cash flow, while increasing long-term enterprise value. Mr. Pollard has assisted businesses in more than 20 foreign countries, on six continents.

Over the years, Mr. Pollard has served in leadership and strategy roles on over 30 for-profit and not-for-profit boards, including Golden Gate China Acquisition Corp.¹; MPM Holdings LLC²; tyBit™ Inc.²; Advanced Internet Technologies¹; the World Trade Center of the Horizon Initiative^{1, 3}; and Tau Kappa Epsilon Fraternity¹. He is a Past Chairman (1990) of The Chamber/New Orleans and the River Region.

Prior to *GlobalSolve™*, he was CEO of *Access Data Consulting Corporation* (May 2001 – December 2002), where he repositioned the Company's business strategy for growth, despite a telecommunications market downturn; he was recognized for those efforts with several industry awards, including the recognition as one of the top 100, fastest growing companies in its field. He sold his interest in the Company in December 2002.

Mr. Pollard was a pioneer of the outsourced Managed Storage Services (MSS) Industry when he founded *Arsenal Digital Solutions Worldwide, Inc.*³ in August 1998, now and the leading MSS in the world, with operations throughout the U.S., Europe, Latin America and Asia. As its first Chairman, CEO and President, he guided the Company through its early stages launch before transitioning management responsibilities; he remains highly involved as an active

Founder and a Director. While serving as its CEO, the Company received Dun and Bradstreet / Entrepreneur's *Top 100 Companies*, Ernst & Young's *Top Technology Company* in North Carolina and several other awards that recognized the Company's growth and excellence. It was sold to IBM in January 2008.

Mr. Pollard successfully guided *Athena International LLC* (November 1997 – December 1998), a long-distance telecommunications reseller from near-bankruptcy through a successful turn-around and subsequent sale of the Company.

Mr. Pollard held several executive positions of increasing responsibility at *FREEMPORT-McMoRan, Inc.* (January 1989 – August 1997), in the areas of business development, strategic planning, finance and international business operations; his responsibilities included corporate development, mergers and acquisitions, general operations and organization restructuring. During a 5 year posting in Indonesia as Executive Vice President and Director of the Company's largest affiliate, he led a team that received international recognition for monetizing and redeploying nearly \$1 billion in non-core business assets, while concurrently outsourcing approximately 10,000 of the Company's 17,000 employees, a model that has become the model for global natural resource companies.

Prior to Freeport in 1989, Mr. Pollard held staff and management positions in Sales, Marketing, and General Management for *Air Products and Chemicals, Inc.* (March 1975 – January 1989) and was a Sales Representative for *Procter & Gamble Distributing Company* (March 1973 – March 1975).

B.A. in English from DePaul University (1973) in Chicago IL; M.B.A. (1981) from Duke University, Fuqua School of Business.

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² Board Chairman

³ Executive Committee 114 Mulberry Drive Metairie LA 70055 USA +1 (504) 834-7889

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Eileen Walker

TUCSON, Ariz., Aug. 21 /PRNewswire-USNewswire/ -- The Association of University Research Parks (AURP) announces the appointment of Eileen Walker as the association's new executive director. Eileen, who served as consulting Program Development Director for AURP for the past year, will lead the organization from headquarters in Tucson, Arizona. AURP also has offices in Washington, D.C.

Eileen is a former member of the AURP board of directors. Most recently, Ms. Walker consulted with AURP, and also with Angelou Economics, a firm specializing in technology-led economic development. She previously directed the Arizona State University Research Park in Tempe, Arizona.

For several years, Ms. Walker served as an officer of the Arizona Bioindustry Association, where she was the designated Arizona representative to BIO. Ms. Walker is a graduate of the University of

Colorado at Boulder, and holds a Master of International Management degree from the American Graduate School of International Management (Thunderbird). Currently, she is Vice President of Habitat for Humanity, Tucson.

"Eileen brings a background as a long-time park director and board member, along with a strong commitment to the goals of AURP," said Austin Beggs, President of AURP. "Eileen has shown tremendous leadership in her past activities with AURP and we look forward to her applying her talent and skills to the numerous opportunities that AURP sees in the science and technology

based economy.”

Beggs also thanked the Drohan Management Group for their past service to AURP, noting that "Drohan has been pivotal in the development of AURP to its current success. Their contribution is greatly appreciated." "This is an exciting opportunity to lead an organization known worldwide for its advocacy of research and innovation," says Walker. "AURP is an invaluable resource for all who are involved with technology-led economic development. I am honored to have been chosen to lead this outstanding organization at such a promising stage in its history," said Walker.

Robert E. (Bob) Fudickar

Bob Fudickar has served as the Technology Industry Director for the Louisiana Department of Economic Development since August, 2005. He brings 25 years of business development experience to the LED with an emphasis on technology, finance and capital markets. Most recently, he served as executive director of the Investor Relations Practice for ConsulttUS Group. He, also, served in technology related finance and investor relations capacities for Arthur Andersen, Avex Investments, and CenturyTel. He began his career as an investment banker with Paine Webber. His background demonstrates his command of international technology markets since his tenure with uniView Technologies, a leading technology bridge between China and the U.S. He focuses his efforts on working with universities, research organizations and businesses to promote research and development of new technologies in the state; interact with technology companies to understand opportunities and obstacles to development; and lead team efforts to attract new technology businesses to the state and start new in-state ventures.

Bob sits on the Southern Growth Tech Council Board, and the Louisiana Optical Network Initiative Management Council Board. He attended Louisiana State University and graduated from University of Louisiana.

Pete Wilson

Pete Wilson was California's thirty-sixth chief executive, serving as Governor from 1991 to 1999. Wilson previously served eight years as a United States Senator (1983-1991), eleven years as mayor of San Diego (1971-1983), and five years as a California state assemblyman (1967-1971). Most recently, he was co-chair of the campaign of Arnold Schwarzenegger to replace Gray Davis as governor of California.

Wilson's eight years as governor saw California emerge from the depths of recession to a resounding economic recovery. Inheriting the state's worst economy since the Great Depression, Wilson insisted on strict budget discipline and rehabilitation of the state's then hostile environment for investment and job creation. Among the many pro-business accomplishments of his administration, he provided for market-based unsubsidized health coverage for employees of small businesses, and obtained anti-fraud measures that drove down workers' compensation premiums by 40 percent.

Governor Wilson also successfully pushed to enactment sweeping welfare reforms, including time limits and work requirements, and historic education reforms, including rigorous curricular standards, class-size reduction, and the replacement of social promotion with early, effective remedial education. He also began new programs of individualized testing of all students, teacher-competency and training, a longer instructional year, and a return to phonics and early mastery of reading, writing and mathematical skills.

Wilson led efforts to enact tougher crime measures and signed into law "Three Strikes," (25 years to life for repeat felons) and "One Strike," (25 years to life upon the first conviction of

aggravated rape or child molestation). He left office with a public approval rating identical to that received by Ronald Reagan at the conclusion of his service as governor.

He is of counsel to Bingham McCutchen LLP and is a principal in Bingham Consulting Group LLC. After leaving office, Wilson spent two years as a managing director of Pacific Capital Group, a merchant bank based in Los Angeles. He serves as a director of The Irvine Company, U.S. Telepacific Communications, Inc., National Information Consortium, Inc. and IDT Entertainment. He is a member of the Board of Advisors of Thomas Weisel Partners, a San Francisco merchant bank.

President George W. Bush appointed Governor Wilson to serve upon the President's Foreign Intelligence Advisory Board and Secretary of Defense Donald Rumsfeld appointed him a member of the Secretary's Defense Policy Board. While still in the Senate, Wilson received the Distinguished Alumnus Award from Boalt Hall. As Governor, he was the first recipient (1997) of the Bernard E. Witkin Amicus Curiae Award given by the Judicial Council of California in recognition of his outstanding contribution to the enhancement and more effective operation of California's state court system.

Since leaving office, Wilson has received the Woodrow Wilson Institute award for Distinguished Public Service and was awarded the Patriots Award by the Congressional Medal of Honor Society.

Wilson is a Distinguished Visiting Fellow of the Herbert Hoover Institution of Stanford University, concentrating on the reform of primary and secondary education, and national

security issues, and the governing boards of the National D-Day Museum, the Ronald Reagan Presidential Foundation, the Richard M. Nixon Library and Birthplace Foundation, and the Donald Bren Foundation, and as founding director of the California Mentor Foundation.

Michael Olivier

Mr. Michael Olivier holds a Bachelors and a Masters of Science from the University of Louisiana in Lafayette and is a Certified Economic Developer from the Economic Development Institute at the University of Oklahoma.

Mr. Olivier began his career as the founder and CEO of International Relations Consultants, Inc. in 1979, before moving on to academia, where he was a Counselor, Assistant Dean and then Director of International Programs at the University of Southwestern Louisiana. He has also served over 17 years as the Executive Director and Chief Executive of the Harrison County Development Commission in the casino and industrial region of the Mississippi Gulf Coast and held the positions of General Manager and Executive Vice President of the Lafayette Economic Development Authority and Secretary for Economic Development for the state of Louisiana.

In his current role as Regional President for the Americas for Future Pipe Industries, Mr. Olivier is responsible for the management and growth of our operations in the Americas region.

APPENDIX C

Dissertation Interview Questionnaire – Sandy Baruah 02/11/2009

(1) Please describe briefly your current position and role within your organization and community.

All right. First, why don't we start with your position and roll within the organization and community. Now, I realize that you have left your position with the Bush Administration. Could you give me a couple of words about the position you left?

For the purpose of this interview I will confine this to my position as Assistant Secretary of Commerce not as the Head of the Small Business Administration since that is more relevant. As the Assistant Secretary of Commerce for Economic Development, I was essentially the Chief Executive Officer for the U.S. Economic Development Administration. That position, as the title would indicate, responsible for the policy, the direction and the overall management of EDA's investment programs which roughly on average was about 300 million dollars a year in investment funds that we invested in communities and states, in conjunction with the private sector for the purposes of economic development.

Outstanding. We could have another conversation about how you made the decision on where to invest. That is good.

I will send you... I might still carry these around with me. I do, here you go. Note: Pamphlet titles "What you need to know about your Economic Development Administration."

(2) Do you consider yourself knowledgeable about economic growth and development? How about technology-based economic development? Please provide a brief discussion of your background related to economic issues.

The next question deals with economic growth and economic development. Obviously, I would consider you knowledgeable and I would hope that you would consider yourself knowledgeable; building on what you have just told me about the position that you were in, stepping back to before that and just as an individual; not so much the power of the position but as an individual, how do you think you stand as far as knowledge of economic development and technology-based economic development?

I would say it is strong but I would not overstate it for the following reason. Here we are meeting at the Council of Competitiveness which we are surrounded by certified smart people in the area of economic development who have studied this their entire lives or at least their entire adult lives in some form or fashion. To be very honest, I do not come from that academic rigor of economic development, and frankly prior to my service to the president I did not have a substantial economic development background. I was brought on to the Department of Commerce when I came to the administration in 2001 not as an economic development expert,

but as a management expert. I was part of a team that was created to help revive, recast, rejuvenate and frankly make relevant the Economic Development Administration which was an agency that was none of the above and so I was brought in for my management talents. After four years in that role learning about economic development not just from the people I worked with but even more importantly from economic development practitioners themselves across the country. I did between 100 and 200 thousand air miles every year that I was in office. Just as importantly, I learned from the certified smart people in the field, people like Deborah Wince Smith and the Council on Competitiveness, people like Michael Porter and the Harvard Institute for Strategy and Competitiveness, people like Mark Drabenstott and the Federal Reserve Bank,

people like the OECD, IECD and NARC -- people who know these issues from an academic rigor standpoint.

What about internationally? Just made me think about that. Did you travel internationally and look at what other countries did as well?

I did travel internationally. One of the great joys of being the Assistant Secretary of Commerce is that I got to lead the U.S. delegation to the OECD (Organization on Economic Cooperation and Development) on economic development competitiveness issues. At least three times a year I would meet with my counterparts from the industrialized world, if not in Paris in some international locale, so I did a good deal of international travel. I would say roughly two trips per year to meet with folks.

(3) Do you think economic growth is predictable?

That is actually a good lead-in, based on what you have seen, I am not looking for metrics or anything, do you think economic growth is predictable? The follow-up to that, I am focusing on regional economic growth not necessarily the whole economic crisis that is going on in the world right now, and more specifically technology-based economic growth. If you are looking at an area, do you think that growth is predictable?

I think the answer is yes. In fact, I am sure the answer is yes but I am also thinking about the follow-up questions to that; what is predictable. The answer is yes with this clarification. It is certainly not the same answer for every region.

(4) What factors do you think impact technology-based economic development? Please think about and try to describe both quantitative and qualitative factors. Can these factors be measured?

I agree with that, too. I have noticed that the unique attribute that different regions within themselves to different types of economic development and it is extremely difficult when someone tries to force fit technology-based growth into a region that it just does not fit.

If you look at just a tactical example, in the early 1980's what did everybody want? Everybody wanted to be the next silicon wafer manufacturer hub of the world and you would find places say in the border region of Texas without power, without transportation, without water but other than that they had everything they needed to make silicon wafers who wanted to be the next silicon wafer king of the world. You saw that in the early part of this decade on Bio-Tech. Everyone was wanting to be it; everyone was going to be the next Boston corridor. In my hometown, Portland, Oregon, fell into that as well, too.

A second point on that is, in terms of prediction, I think it comes down to one fairly simple but hard to actually describe or actually quantify metric and that is; is the whole greater than the sum of the parts when you are looking at it? That is answered through an art not a science.

I have observed the same thing and cannot quantify it either but that is part why I am taking an engineering approach to this.

If you ask me right now, and I reserve the right to revise and extend my remarks later, the X-factor is leadership.

I completely agree with that. In fact, I do not know if I quantified it or listed that sufficiently. I will have to look at my variables. Again, good lead-in, just off the top of your

head, not looking for anything exhaustive, what do you think the factors are that impact technology-based economic development? What are the ones that come to mind that you believe are the most important?

(5) What specific types of quantitative factors or variables do you believe could be measured as indicators of regional technology-based economic growth (after the fact)?

I'm not sure I am going to do these in order. First of all, it is the education research entities, capacities in the region, federal labs, research universities, private sector research activities, that is one.

Two is the successful fostering, I use the word fostering very purposefully, of an industry cluster approach to economic development in the region.

Third, the business environment of the region, which obviously is related to the clustering but there are some things that are unique to that but that also includes the leadership aspect and you may want to break out leadership on its own.

I think the fifth one, it is probably a sub-point of another one but let me just say it, the international posture of the leadership and the economic development approach of the business community. In other words, it is the holistic organic activity from a government, academic, business, non-profit perspective, all of that - do they realize that they are part of the global economy as opposed to, we are looking at ourselves as part of the state versus the rest of the state or the state next door?

I understand exactly what you mean. I can give you an example, in Louisiana we have five ports from Baton Rouge down to the mouth of the river and they compete with each other while Houston and Mobile are growing past us. It is not about competing with each other, it is

about competing with the Gulf ports and ports all over the world. We have the river and we do not use it sufficiently.

One of my favorite lines, and I used this for three years because I absolutely loved it, if you read my speeches, by the way, I am sorry you had to read those, but one of my favorites lines was “competition today is not necessarily the firm next door or the town next door or the company in the next state, it is anybody with a good idea, good education and a good internet connection on any point in the globe.” That is the reality today. That international perspective is not just a trade perspective because obviously trade is critical but it is a partnership perspective. In today’s world you do not have to be next door to someone to partner with them. One of the emerging, and I am sure you have seen this, thoughts in economic development is now that we can be an economic region without being contiguous to each other and I find that fascinating. Had I still been at EDA or if I were still there, that is one thing that I would be really pushing the agency to do more and look at and foster because doing that is very difficult.

Most people cannot envision that. They think, well okay, the region is southeast Louisiana, southwest Mississippi. What do you mean our region includes people in California, people in France?

It is hard for people to think about and it is also hard to execute just from a financial standpoint because, one, you have got local dollars that should be spent locally. Local officials ask: so why would we be spending money to help develop or help partner with someone in California – let them use their own federal money that comes to them. We tie, and it is not just the department of commerce, federal dollars to an area and if folks in southeast Louisiana want to partner with folks in southern California, how do you authorize federal dollars there? It

sounds like a small issue but the tactical issues on and around it are huge; the smaller the stakes, the bigger the battles.

You got it. I like the way you put that.

I am glad to hear that it is that way all over the country not just in Louisiana.

(b) Do you think there are factors or variables that might be predictive of technology-based economic growth?

The next question, the one I am going to ask you right now is different; I have a number of variables broken down into six factors that I want to walk through. Before we do that, without prejudicing your answer at all, EPA measured certain quantitative factors to look at economic development of different regions. What specific types of quantitative factors do you believe should be measured or could be measured?

One is you have got to look at the bottom line which is jobs created and tax base. At the end of the day, economic development may be an art but you have got to put some hard numbers to it. When I say jobs created, it cannot be just counting heads. It needs to be a much more nuanced approach. First of all it needs to account for the longevity of the job, so we are not talking about say construction jobs to build something. But we also need to look at, are these higher skilled, higher waged jobs. In other words, are we creating jobs that are pulling up the income average in the area as opposed to pushing them down? The service industries will come, it is the whole," if you build it they will come" approach; the dry cleaners, the subway shops. We need to be focused on those kinds of metrics, like tax base.

The other ones are certainly more nuanced and art. I would definitely be looking at some way to quantify cluster progress. We re-did our balanced scorecard right as I

was walking out the door and I will send that to you. We took our policy priorities, innovation and competitive, a regional approach, kind of an international approach, higher skilled, higher waged jobs, we took those policy priorities and built our balanced scorecard around our policy priorities. So, we had strategic goals that are all backed up by actual performance metrics.

I would love to see that.

It is not perfect, it will never be perfect because, again, it is just as much art as it is science but it is the best I have ever seen. I will get that to you.

I would like to see it. I appreciate that.

Now I am going to kind of project some of my opinions, I guess, and ask for your feedback on them. I am going to give you six sheets that basically represent six factors. What I did is this, I have read a lot of books, a lot of Silicon Valley, Route 128, Richard Florida's book about the creative culture and, a couple hundred articles looking at a lot of these different regions. I broke out variables, categorized them into six factors that I think support technology-based economic development. It certainly does not represent the entire population of things that impact regional technology-based economic development, but I have found some consistent pattern in these different elements. Some are measured by your former organization and some are not; a lot of them are affective, qualitative variables that are very difficult to measure but this is the basic question about these factors. What I would like to do is walk through the different sheets. What we are trying to get to is a list of overall factors, in this case, the environmental factor and the variables that make it up. Do those variables describe that factor sufficiently? Is

there anything that should not be there? From your knowledge, just that should not be there or are there things that I have missed? You may want to scan through the six different pages just to see how I have looked at it. What I am ultimately trying to get to is to weight these different factors as to how important they are so that it adds up to 100 or close enough. I realize this is kind of a mathematical test or activity, I do not want to waste your time by doing too much. What I did was break down the factors, and there is a diagram I am going to show you in fact let me go ahead and show it to you, just looking at it...

Let me look at it just real quick so I know what I am looking at.

Again, I am looking at this as an engineer would look at it, I am not an expert in economics and certainly not psychology but if you just consider a regional economy as a system effected b numerous external things but as a system, on the inflow side, the knowledge variables, the inflow variables, attitudinal variables effected by external events that effect the value adding processes, and then within that region the environmental variables, policy variables that you can actually effect. I am taking 20 or so regions and trying to study them in my own way. These are the items that I have identified, not common to all regions but identified with some regions. Huntsville, for example which I would consider a adolescent technology-based economy because it is still dependant on the federal government, has some of these factors, does not have all of them. So, what I am trying to do is ultimately judge these different factors and variables. I have done the literature research and gotten to the point where the literature is going around in a circle. When I reached that point I figured, okay, I have covered most of it. That is how I ran into you and a number of others, actually, that have done studies.

What I did with these different regions that I have looked at is I classified them as depreciating, stagnant or self-refueling. A self-refueling economy has all these different factors involved with it in one way or another. Then, within that classified them as neophyte, adolescent or mature; a mature economy can be depreciating or it can be self-refueling; adolescent economies that are still dependant upon one industry or one source of inflow of knowledge or capitol or whatever else, like Huntsville; if you take that one source out they are going to fail. If you take the federal government out of Huntsville, it is an agricultural community; best aerospace community in the country, maybe in the world but take the federal government's money out, it is an agricultural community. That is an adolescent, in my mind, technology-based region or economy.

So, this part is trying to get to the factors and I will ask you a couple of questions about the model and we will see where it goes. I do not know if these different variables within a factor fully describe the environment that is necessary for technology-based economic development. Some of these are probably impossible to measure but what I would hope is that people who are trying to do something, like build a cluster, if they want to go into advanced manufacturing or nano technology or whatever it is, preferably thinking in terms of what is natural to that region, that they would consider these factors and variables.

So, these are the 10 variables that I came up with that I believe define an environmental factor. I will throw it back over to you. Take your time, think about it however you chose to and please know that if you think I am dead wrong, please tell me that.

Note: See separate sheets for factor/variable ratings.

As you said earlier, there is probably no right or wrong answer. Just flipping through the pages and that is the reason I wanted to take a second to flip through because, again, this is

where the art comes in as opposed to the science. We could probably interchange some of these elements from one page to another. The other issue with creating any kind of list, and I am sure you struggled with this, is how do you get all of the elements kind of at the right level, if you will. For example, 8, 9 and 10 could be combined into one, perhaps, as just an overall strength of educational institutions and how you phrase things and how you list things, obviously, will impact how they get ranked.

Having said that, looking at the list, it seems like the right elements are here. It is a little bit like choosing amongst which child is your favorite.

If you think that any one or two stand out as being overly important or being overly non-important, that would be good enough.

Here is why I am having difficulty. It depends, it depends on... I am going through my head and I am saying this, this and that and the answer to all of these is yes. There is not anything on here that does not matter. There is nothing on there that is not important but when I go through my head I think of my hometown of Portland versus other places where I have traveled, I am thinking if I am going to engage in a holistic economic development competitiveness strategy and I can bring all the players together and I have the magic wand, I can get everyone to agree, I am going to focus on: a) what my competitive advantages are, and b) what are the weaknesses I need to address to get to par. The Portland, Oregon list is very different from the Huntsville, Alabama list.

I am going to try to do this in phases, and if this takes too long we can try another approach. Okay.

I thought about actually having people rank them that way and if you want to do it that way, that would be sufficient. I can assign quantitative numbers from the letter grades.

You know, this is not in the old days where you worked for GE and they say you are going to be moved to Sacramento, California and the husband shows up at home and says, honey we are moving to Sacramento. Now, it is like, have a good time, send me a postcard when you get there.

A) We hired 1,000 people into Louisiana to do IT and a lot of them came from California and the east coast, etc., there were actually times when we had to pay people extra so they could send their kids to private schools because schools in New Orleans has such a bad reputation. I learned the importance of the environment first hand in trying to attract technology workers to an area that they did not consider a technology area. The other part was just a social aspect, they wanted to go where they had alternatives, if they for whatever reason did not like working for my company but liked the area, was there anybody else to go to work for? Which, the answer was no and that made it even more difficult. It was an interesting thing to deal with.

That is where that list is. The A's versus the non-A's, it is existing factors that are law and that have been developed over a long period of time. Who is there? What kinds of people live there? The quality of life issues versus what can we build? What can we improve?

Let's say I am the czar of the Seattle region, I can build a technology program. I can build a commercialization program. I can do those things and in the short term I can do that in three to five years and have some success of that. I can't change demographics of my area in 5

years. I can't significantly change the quality of life of my area, significantly in five years. I can do it in 10 but I cannot do it in five.

Right, that is a great point

That is why that list is so difficult for me because if you are a company or a person and you are thinking about where to list, the short-term factors, hey, I am going to offer you an incentive to move here. Used to be the driving force for relocation activities or we are going to green field the site or we are going to invest in an area. Now it is a much more holistic perspective because, as you found out, you are bringing people in from California or New York to Louisiana, they are going, "I'm sorry, you want me to run to San Diego, why?"

Bobby: Yea, I like that break down, I appreciate your doing that, can you do some more?

The quick logic to the inflow is to view this as a system, I just view it as a balloon; if the inflows are greater than the outflows, it expands.

How does this differ from 4 and from 5 or from 7? Inflow of Science and Technology funding versus inflow of private funding for research and development and inflow of government research.

One is government, one is private and then the revenue can be generated...

To me 6 is a rollup of 4 and 7.

Actually, you may be right.

Unless there a nuance I am missing. I am going to put a line through 6 and I will just put a note.

What I had in mind was academic but that would be covered by government and private, that is a source of academic funding.

Academic funding would either be public or private.

So is this, retention of capitol, is this where... what do you mean by that?

Let me give you an example, there are very few large companies headquartered in Louisiana. Where the companies are headquartered they tend to spend their overhead fund, their profit, etc., and if they are going to do research and development they tend to do it co-located with wherever they are, whether it is a regional office of headquarters. What happens in Louisiana is companies who are working there, even if it is high-tech work, they are shipping their profits, they are shipping their overhead funds, they are shipping the civic expenditures outside to the parent company; it is not invested locally. The Shaw Group is one of only two fortune 500 companies in Louisiana. The fact that they are located on Essen Lane in Baton Rouge has caused a bunch of subcontractors companies that work with them to be located around them. Created its own little cluster and they spend money at home.

Four and 9 so depend on the commercialization approach and I am using commercialization as a very broad term here. You make me look at New Mexico, for example, look at Sandia versus Los Alamos. Los Alamos is isolated, I do not know what the funding differential between Los Alamos and Sandia is but Sandia has a much more integrated holistic

approach. They have a great research park and they are integrated into the economy of the area. Now, Los Alamos has, obviously, disadvantages.

Kind of a secretive in its beginning and if you lived up there, you did not go anywhere. Very remote.

Even though a lot of money could be flowing to an area, it could just end there. So, there is a little asterisk by 4 and 9 here.

The quality of the expenditures is important if you are going to attract anything else.

I am not sure quality is the right word because, obviously, Los Alamos is doing some amazing things there but they have not integrated the regional economy into their work. Again, I think just right there within an hour and fifteen minutes of each other, they are two great examples. The quality of work may be the same but it depends on the nature of the work, to a certain degree, and it is relying upon how both the institution and the community are partnering to capitalize on that work.

I look at this list and fortunately it kind of feeds into the previous list, inflow of talent, incredibly important, inflow of ideas and innovation which is kind of hard to quantify. I guess, I am not sure how these two differ. Ideas and innovation come from people and I guess the difference is that, “is someone physically moving to the area?”, which is number 2 versus, number 3 is, “how open are people, companies, entities in the region to doing something different?”

Right. You can have somebody come in from the outside with great ideas and they decide to perform the business in a particular region for a lot of reasons. They imported a lot of

ideas and made it attractive, and companies try to locate in that region, but inflow of talent does not necessarily come with ideas and vice-versa. When I brought in lots of IT people to do work in New Orleans, they came because we had good jobs and good money and we had a great contract, but they did not necessarily bring in entrepreneurial ideas or product ideas; a couple of them did but the majority of the did not. We never really capitalized on any of them we were all just busy working. You can have the inflow of talent without the ideas that might generate a new entrepreneurial activity.

That helps clarify.

This is a great element, image of value creation. I really like the focus on the value creation.

Is payroll here another word for just number of people?

Yes. I look at it as dollars as opposed to number of people but yes. There are very few of these factors that are quantitative, but this is one where you can just look at some specific quantifiable factors or elements and try to roll that up to judge the entrepreneurial focus of the population.

The a, b, c and d through these quantitative numbers, are you going to get a qualitative element?

Right. That is what I am trying to do with that variable. Those are numbers that are measured; that your prior organization measures.

Now, if I were to write letter C here, I would write it a little bit differently. Instead of Technology Fast 50 companies, there is a whole bunch of different lists. Inc. Magazine has got a list, the Initiative for Competitive Inner City (ICIC) has got a list, Business Week has got a list, the National Incubation Association they have a list of hot companies. So, there is a myriad of lists that are out there and sometimes they overlap, sometimes they do not overlap. I put it as a B only because it is a specific list and I said, or any one specific list. If it were a combination of lists... because it is a little bit like the list of best colleges, it depends on what you are looking at. Are you looking at size? Are you looking reputation? Are you looking at value for the dollar? Are you looking at journalism versus business versus medicine? So, it depends.

One of my companies had made that list which is the only reason I was familiar with it but I will look at that others. I appreciate that recommendation.

Every state or most states have their own lists. Back home in Oregon, we have the Business Oregon Magazine and they give a list of the top 50 going companies.

We had that as well.

Responsiveness by whom? Who is being responsive here on number 5? Responsiveness to innovative investors, is that based on the company, is that from the government, who is being responsive?

I meant that in two ways and actually that is not good. I am trying to get discreet elements. The responsiveness of the technology community to invest if they may have money to invest. For example, there is a small angel capitol fund in Louisiana and for years it went untapped. Even though the state was supporting it, you had an investment fund for technology

companies and nobody used it. So, the people themselves were not responsive to an innovative investment strategy. The other part of that was whether or not the government's policies - state policies, local government policies - were attractive to an investment, if you were going to invest in innovative companies. We now have a tax credit program for angel investors and for digital media in Louisiana. We had the tax credit program for film tax credits, so having government policies that are responsive and having individuals that are responsive when someone has the money. That is actually a very complex element, isn't it? I need to break that down.

Again, this is choosing between your children on those.

These are things that a local government can actually effect through their policies. That is where a lot of elected officials try to focus because the other things are too hard.

Not only is it too hard but it is also what they can control. Great example is, when I was running the Small Business Administration. I got there just in time for the credit crisis. What congress wanted to do was, to lower our interest rate; if you lower our interest rate that will help. And I said, well, it will not hurt but that is a little bit like saying, I lost something over there but I will look for over here because the light is much better. We are already at record low interest rates now. People are not declining loans because of the interest rates; people are not making loans because they are scared and no one is offering credit. So, if you lower our interest rate you are still offering a product that no one has access to; you are just offering it at a better rate but still people do not have access to it. That is kind of the congressional mind set. We can do this, we can change interest rates, it is just writing another check, we will lower your interest rate.

I tell people that we bought Diamond Data in August of 2008. If we had to do that today, we could not do it, we could not get the credit. We did it right before everything dropped and it is great because the company is doing fantastic. In Louisiana if you do not have the cash in the bank they do not loan it to you, they do not make risky investments on technology.

For policy variables, by the way, I know that this is a short list and I probably missing a lot of things. I have not put as much effort into this as I should so if you have any big items I have missed, that is fine but if you just me to just go do more research that is fine.

Here is my sense of this; all of these are important. However, any individual one may not be; this is where the whole needs to be greater than some of the parts. The overall answer needs to be an A but any individual element here is not necessarily over-riding. At least as I look at it.

Again, it gets back to, "it depends." Companies are willing to do business in high tax areas because of other factors. Boston is an example; companies like to be engaged in Boston because whatever they pay in high taxes is more than made up for in access to capital, access to workforce, access to market, all that stuff. So, it is a holistic picture, the overall needs to be an A but on that list I do not see one particular thing that is most important. For example, just because you do not have a decent tax policy doesn't mean you will fail or if you do not have incentives available for research and development you will fail. It is not like that.

Number 9 really depends. If the economic development entity in the area has everyone at the table, is viewed as the honest broker and the convener-in-chief, has a balanced and highly respected and very senior level board or governing body that includes academia, government, business, non-profits, and has all those things then the answer is an A because then they really

can be a force. If they just have knowledge and a charter to focus on technology but they do not have all those other things, then it is a D. Then they are kind of irrelevant. They are not necessarily harmful if they are focused on the right things but if they do not have the ability to convene and to actually accomplish something then it is just another entity. It is not a factor, it is not a, "you notice it when it is not there thing." I have seen economic development organizations with all the right words and all the right desires and interests, but at the end of the day nobody pays attention to them.

Makes perfect sense.

On 11 and 12, do you find a distinction between degree level? When you are thinking about the educated workforce, the people with bachelors or masters versus Ph.D.'s, do you think having a number of Ph.D.'s in the area is important or overly important?

I gave 12 a B as opposed to an A and I gave 11 an A because I think that just having an educated workforce is important. I do not think it is overly important because if you are trying to build a tech-focused economic development strategy, you do not necessarily need doctorates. Now, I would certainly use it as an element in determining how tech-savvy or how forward-leaning technology wise an area is because the more Ph.D. that are there, the more tech-savvy it is. If you look at Silicon Valley and other high tech regions, you are likely to find more people with Ph.D.'s there. So, I think it is more of an outcome factor as opposed to an input (?) factor.

I like that.

So, number 1 is either an A or a D depending on the realization piece, 2 is an A, 3 is an A, 4 I gave a B, 5 I gave an A, 6 I am going to give a B, I am probably going to be struck dead

for that. It is critically important but the reason I gave it a B is just by the way the question is phrased. I am not a huge believer in long-term strategic plans because the world moves so fast today and I always thought that I was kind of nutty about that until Carlos Gutierrez came to be the Secretary of Commerce and here is the incredibly successful CEO of Kellogg. He pulled Kellogg out from the brink; is a celebrated CEO and he said in a meeting once (because we were talking about long-term strategic planning) “Why are we spending so much time on long-term strategic planning? First of all, what the world looks like five years from now versus today is going to be completely different and five years from now we are now even going to be here it is going to be another team.” So, we should have a vision, a direction that we are going and we should know what we want to accomplish but having these kind of detailed, clear, strategic budgeting plans for the long-term really is not the best use of our time. It really becomes a more academic exercise because if we have learned anything about ourselves and the world in the last 20 years is that the greatest skill, the greatest talent we can have is flexibility and adaptability. A year ago no one was thinking that we were all going to hold hands and jump off the economic cliff together but that is exactly what we have done. So, whatever plans that most companies had a year ago, I hope they are being re-written right now, so that is why I give that a B, not that creating future knowledge workers is not critically important. I gave 8 an A but I had to think about that one for a while. Nine is the A or the D, depends. The College of Business is a B, 11 is an A and I gave 12 my only B+ for the area.

Down to the last one, here.

We have a couple of clean-up questions that we can go through quickly.

Dense social networks, wow, great.

A lot of that comes from AnnaLee Saxenian's work. I actually found the experience of Silicon Valley with regard to social networks telling; my own personal experience in the nuclear business, and then Huntsville, Austin, a lot of places that I looked, same type of thing. In Huntsville it is more limited; in the aerospace community, they all hang out together. It is not a "people go to work and go home" thing; they get together quite a bit. Interesting, Louisiana seems to lack that.

It is so social.

Very much so. In Louisiana people are social with friends who have children in school together; not friends from work where you get together and talk about anything to do with work.

This is all heavy on the A's.

Of that entire list, there is really only one, and possibly up to three elements that are impactable by government or some other effort.

These would be very difficult to impact, I agree. You are right, obviously, you have learned this from your own experience. I do not know if we can impact any of these. It is a tough question but people cannot take no because it is too hard to deal with.

I really appreciate that you have very clear scheme in terms of grow your own versus smoke stack chasing. People focus on that because that is easier in the short-term; that demonstrates results short-term but you need to do both. You need to work on things that are impactable in the next year to five years. You also need to start laying the ground work for what is long-term. Actually, this is one example of where my hometown of Portland and the state of Oregon in general did a pretty good job of the long-term piece because before the 1980's

Oregon was not really known for anything other than being 'California light'. Two things occurred simultaneously; one, we had a governor in the late '70s, and early '80s, who made a lot of difficult choices budget-wise but also put the state on an international perspective. He really kind of made the state think of itself as a part of the Pacific rim and repositioned the state to participate in the technology boom when that was coming but no one saw at the time. We worked more with Japanese companies, Fujitsu and others, to bring in the silicon wafer manufacturers and that is what led to the technology boom. Shortly right before that in the mid-70s there was a mayor in Portland, Neil Goldschmidt, who had his vision of making Portland a very livable city. Again, he made a lot of tough decision, a lot of expensive decisions, one, revitalize the downtown and invest a lot of money in making downtown beautiful and a destination spot - retail and hotels and beautification. We moved an interstate freeway which used to run along the river. Portland sits at a "T" of two rivers. There are major rivers, the Willamette River splits the town in half east and west and then the Columbia River borders it on the north and flows out to the Pacific. The freeway ran along the river that split the city in two, so this great waterfront that we had was dominated by semi-trucks, not exactly a real attractive environment. So we moved that, we completely moved the freeway. Incredibly expensive and pretty controversial.

A heck of an idea, it has got to be controversial.

We created this public square downtown and now, Oregon has a community culture kind of very focused on the soft things so he was dealing with a population that got it. The ecology movement started there. So, long-term it has paid off, generally, because Portland, like

southeast Louisiana, did not have a lot of companies headquartered there at all but it was very entrepreneurial; it is very technology savvy with a good quality of life.

With a great image; a very clean place to live with good people; it has a great image as a city.

Austin is Portland with cowboy hats and country music – and no hills. So, that is an example of, doing short-term things as well as bringing in companies but they really had some long-term perspective. The state, as a leader in technology, positioned the city of Portland as a destination place, a place of beauty, all the Richard Florida-type stuff.

I have not studied Portland but I have this image of Portland in my mind because I have worked with a lot of people from there who cannot wait to move back to Portland. I met them in Las Vegas and other places where we had offices; all they wanted to do was go back to Portland. In fact, I had several cousins move there and loved the lifestyle. I will have to look into that, I do not know that much about Portland.

What is it about cities with really great lifestyles that people love that are not great places to build a career, Portland is not a great place to build a career necessarily; San Diego, as well known as it is, there are not a lot of bit companies based in San Diego. SAIC and some others and some defense related ones but if you want to build a business career, San Diego is not the best place to do it. I guess the ultimate example is probably Santa Fe, talk about a city that is all about culture and the arts and style, if you will. Unless you want to sell tie-dyed t-shirts out of the back of a Volkswagen van at a square in Santa Fe, there is not much to do there.

I worked in Santa Fe for a while. I remember going to my office there a couple times in a suit and people were looking at me like I was crazy. Santa Fe is hard to get in and out of, it is not a great place to do business but the people love it.

Let me finish with just a few quick questions, if you do not mind and I will run through these quickly, not to take too much of your time. We have discussed a lot of this but I would like just a brief answer. Do you think the six factors actually have an impact on technology-based regional economies? You have already ranked the factors so I do not need to ask you to do that again. Do you think that from a holistic perspective we have missed anything? Is there some big glaring error or omission that I do not have?

The one piece that I did not see a lot of focus on just in the lists but I know you are focused on it, but it did not show up on the list, is the leadership questions. Is the leadership and coordination question. There is some coordination elements of the...

Yeah but not enough. I think that is a very valid point because it is implied but it is not explicit.

I keep saying, "Who is doing this?"

It is not going to be people who get elected every two or four years.

Right.

They focus on the next election. You are familiar with a lot of different regions, you have talked a lot about Portland. What I would like to do, if you are willing and able, is to try to understand... pick any region you are familiar with, this is easier when I have someone who is

working a particular region but what I would like to know is, for the six factors, has that region performed minimally, modestly, average, well, excellent. Again, this knowledge will automatically be out of date five minutes after it is produced but hopefully I can keep teaching the model as the time goes on. But in order to quantify any of this stuff, as you said, trying to grade things to where holistically taken everything together ought to be a certain grade. Pick a region that you know and tell me how you think it performs on each one of these factors. I do not mean the breakdown of the variables just the broad factors.

(7) Considering the previous questions, please rate the region with which you work, or the region with which you are most familiar, on each of these six (6) factors according to the following scale:

1 = Performed minimally (Neophyte)

2 = Performed modestly

3 = Performed average (Adolescent)

4 = Performed well

5 = Performed excellent (Mature)

Well, let me give you one of my favorite examples, North Dakota. I am a huge fan and hugely impressed with what North Dakota has done. Talk to Shane Goettle, he is the Commissioner of Commerce for the state of North Dakota, works for governor John Hoeven, who in my mind is one of the best governors in the country. Starting at the results, North Dakota for years, for generations, was experiencing population outflow. They are not experiencing population inflow. North Dakota is the one state in the country which is not in recession. North

Dakota is now a leader in technology, again, it is all relative because obviously it is a small state. Do you realize the second largest Microsoft campus in the country is located in Farmville, North Dakota? No one does. What John has done, what the governor has done is exercised the leadership as well if not better than anyone else in the country to make a real impact on the state. Primarily focused on technology and technology related industry research jobs. He has unified the government, the academic and the business communities around a common vision and a common actionable list of items to build this technology-based economy in North Dakota. They are focused very clearly on leading edge technology, energy, value-added agriculture and one other element I cannot remember but they are all related. What he has done, as an example, is improved the universities around the state, which were actually quite solid,- it is not Stanford but these are good universities,- good solid universities and many of them are research universities. Each one has a piece of that puzzle, so North Dakota State is focused on energy and the University of North Dakota is focused on leading edge technology and they have build incubator parks, they have done all this stuff, the business community, again, everyone is fired up executing this vision. It is because one guy, one guy had the vision. In fact, I remember shortly after he was elected, I happened to be giving a speech. He was giving a speech at the same event and this was fairly early on during my tenure and he was laying out his vision and I said, "Wow. That is a great vision." Now, literally eight years later, that vision has come to fruition, very impressive.

I will make a point of going to look at that.

Tell Shane that you talked to me.

If I can use your name that would be good.

...absolutely, and ask Shane if, there anyway you can get some time with the governor.

Let's face it, the governor of North Dakota is a lot easier to get a hold of than the governor of California. John would just call me up directly and say, hey I have a question - great, great guy.

One of the guys I am interviewing is the former governor of California, Pete Wilson. I sit on a board with Pete. He is a great man. I will go look at North Dakota, that sounds great, I would love to go back and brief our governor.

Steve Moret is one of the certified smart guys in the room.

(8) Having considered the factors and variables that might impact regional technology-based economic development, do you think these factors and/or the process of regional technology-based economic development can be modeled?

Two quick questions to close out because we have talked though all the rest of these. I am developing a model and I am sure you are familiar with neural network models where they learn from being utilized, do you think it is possible to take all of this information, put it in a model and let people play with it, or are there any models you know of?

This is overly simplistic but basically I believe we can quantify all of this.

Here is what the model can do, a model can drive a region to action but the model must be applied or viewed, I am not sure what the right word is, in the context of the existing environment. So, I think models are or can be exceptionally valuable but there is no model that you could diagram on a board that will spin out the answer. It is the difference between human thinking and computerized thinking which is why we still have fighter pilots that are humans. Constantly evaluating the terrain, the environment, the threats, the opportunities, and making decisions based on judgment, feel, in addition to the hard facts. The one thing models are not

good at is answering the “what’s next” question. The best model is out there that is used for that is the Michael Porter industry cluster analysis, where you can see a kind of chart; is this a growing industry, how big is it in relation to the rest of my industries and all that kind of stuff. Which is fantastic and I use that a lot but even that is based on yesterday’s newspaper. So, just like you cannot run your business just on what the spreadsheets say or what the quarterly report says but you cannot run your business without those things; a regional economy is similar.

That is right and I am not trying to claim that a model can substitute for human decision making. That was a great answer, though.

(9) As a final question, do you have any suggestions to improve this interview process?

No, it certainly worked for me and I think you have a great approach to it because I really appreciate the systems approach to it and I think that is what a good doctoral dissertation does is take practitioners out of their comfort zone.

Just like economic development is a holistic enterprise, we cannot just approach it from the tools that we have sitting on the shelf, we have to take a look at it in a new way and looking at it from a technology system’s perspective is great. I think the way it has been looked at for so long is either very much just a financial approach or more of an organic approach. There is nothing wrong with any of those but what we learned from what you are going to be doing will be added to what we have already learned, what we continue to learn, and that will just continue to evolve the art and the science. Just like there is no one model, there is no one answer. There is no one approach that is going to work. Just like it is in life, there is no one answer or one right approach for anything in life. There are so many ways to skin the cat, as they say. So much of it depends on marrying up the right approach with the

leadership in the region with the existing assets in the region and not everyone has to follow the same model.

I agree.

So, your model may be just perfect for certain regions with certain type of leadership and some of it maybe 100% applicable to those types of areas say, well I am going to take this piece and that piece from you and this piece and that piece from Richard Florida and this piece from Michael Porter.

I appreciate you saying that, as an engineer, I think systematically but I realize this is a touchy-feely, sort of science, but there is a lot of logic that goes into it. There is a lot of great information and if I can make it just a little easier for people to get that and look at ideas that people have already tried, then I will feel like I accomplished something with it.

I appreciate your time.

Let me ask you, did you get what you needed from me?

Absolutely and more. I appreciate that.

Dissertation Interview Questionnaire – Bob Fudickar 02/16/2009

(1) All right, what I want to do is to walk through each one of these questions and some of these I think I know the answer to anyway but just whatever brief answer you would like to give me. I will take notes but I am also recording it so that I can have it all transcribed and I will send you the recording so you can take a look it and we can correct it.

Sure.

Let's start gently. Give me a quick background on your current position, your roll within your organization and community and then the next question is going to be about your background in economic development and your qualifications.

Okay. I am Robert Fudicker, as you know, and my current position is, I am a director for the technology industry here at Louisiana Economic Development in our business development area. Brief description of that is, and economic development as you know, its sole purpose is to attract capitol investment and create jobs, plain and simple. So, they designate certain industries sectors and in mine, being named technology industry, that is an all-encompassing title opposed to oil and gas, or international or durable goods or advanced manufacturing, virtually all industries have some technology components, mine is far reaching spectrum. We are pretty adamant about touching on any type of technology we can to attract into the state or expand it into the state.

Good.

(2) Do you consider yourself knowledgeable about economic growth and development?

How about technology-based economic development? Please provide a brief discussion of your background related to economic issues.

I am sure you have probably answered part of the second questions which is your background specifically in technology based economic development and whether you consider yourself knowledgeable about economic growth and development in that area. Is there anything you want to add?

Yes. My background is corporate finance. Starting right out of school I went to work for Payne Webber and then my last stint with, the name of the firm was Arthur Anderson, in their corporate finance practice and corporate finance working for private entity is basically economic development for those particular entities.

So, in my roll in the public sector in the state of Louisiana, I have had upwards of 30 years of background working deals and in the economic development organization, you work deals for the state. I have since taken on a state role, I have taken continuing education classes, as a matter of fact, I will graduate in April, with an Oklahoma University degree, certificate program and then qualify to sit for the exam for the certified economic developers designation.

That is great.

I will finish up in April.

That is a good program.

It is a good program. It just adds a degree of acknowledgement that you are an economic developer more than just experience.

(3) Third question, do you think, and this is personal opinion you do not have to back it up with anything, do you think economic growth is predictable? And then, more specifically, regional economic growth and technology-based economic growth.

I am going to tackle the second question first. Easier, regional economic growth is predictable. Then back up to the first question, do you think economic growth is predictable, and the answer is yes, when you see trends. The growth might be slow compared to fast but with the world economy as we are in right now and the fact that it looks to be retreating, I think there are factors to allow us to predict economic growth much less regional economic growth because of said factors in a given area. So, you said be more specific, and I will focus on mine, technology, you and I have been working the industry enough to know that even in a downturn if you are cognizant of a trend then you can after that trend and specifically have a measure of predictability that you can aim towards to go after that particular business development and growth.

That is a long answer to say yes. Yes to all of the above. I think growth is predictable. I think regional is more predictable and specifically, because we like technology and we know it, let's put it this way, if we claim to be knowledgeable in our area of expertise then we better be able to grow it in our area.

That is a good answer with good specifics.

(4) Building on that, what factors do you think impact technology-based economic development? More specifically regional and think in terms of both quantitative and qualitative factors.

I think factors of good work; I can provide a positive answer. As you know, our factors end up being a focus area so we put a pretty significant focus area on NASA, so we do believe that NASA or spin-off from NASA through the technology area can be a significant, positive business development opportunity. Now, we can measure that quantitatively by certain numbers as we achieve them but from a qualitative measure, I think we already believe that the quality speaks for itself.

Now, that is NASA. Let's go to the other extreme, let's just say for the sake of extremism, you talk peanut farming. Well, you do not think there is a whole lot technology related in peanut farming but nothing could be farther from the truth right now because look what is going on in Georgia...

Right.

... and their epidemic, for lack of a better word for what is going on with salmonella and everything, so if technology were better or if there was a new mousetrap that we could help peanut farmers increase their quality assurance program, bingo.

Right.

There is a qualitative component much less a quantitative component. I do think they can be measured, I do not know that they can be predicted in advance but I think once in place, they can be measured.

Actually, I am glad you said it that way because one of the things that I have noticed is that if a region builds on its natural strength, then it is much easier to have technology-based economic development where as if you try to extend beyond what is natural for that region, it is that much harder.

Perfect example, falling gas, Petro-chem industry...

Right.

... has not been a new refinery built in the U.S. in 30 years and part of the reason is, and we know it all too well in Louisiana, is because as technology improves these big refineries are adjusting and making improvement to their current refineries...

Right.

... and so I have talked, and oil and gas is not even my expertise but technology within it is, and I have talked to these folks and they are like, "Hey, we do not maybe need to build a new refinery because if we implement and keep upgrading our current refineries with new technologies, our production gets better and we are meeting all the production we need with the amount of oil we produce anyways." I would have to agree whole-heartedly.

(5) This builds on, in fact you answered part of this question on the previous answer, the specific types of quantitative factors and variables that can be measured and, in this case, Bob, what I have in mind is numbers of degree, numbers of people in technology fields, amount of money available for venture capital, those type of quantitative factors and whether there are any of those factors that might be predictive of future technology-based economic growth?

I think my first knee-jerk response to that would be, it starts with education. If we can get our curriculums to crank out the degree programs, the certificate programs, the associate degree programs, that we need now and we know we need them in the various sectors and it all ends up being in our focus, when I say ours, mine, because you and I do the same, in technology then you can measure it from graduates. You can also measure it from job applications that can be filled. We see that, like our secretary has been promoted to the fact that there are 100 thousand unfilled positions in Louisiana.

Right.

Whatever measurement you want to use to determine what they are technology wise but down in New Orleans, let's take Bollinger Ship Yards, we know there are certain engineer-tech or related-tech positions, certification positions that we cannot fill right now. If we had the graduate, when I say graduate I do not mean undergraduate, post-graduate, I mean if we had graduates from Tech Schools, Vo tech Schools, Community Colleges, Certificate Programs, those types of certificate-type graduates, you can measure it both in need from job applications and job fulfillment. So, I know it can be measured. Then, let's say you cannot fill them all with education, then you recruit them in from other states which is another one of our goals.

Right.

I think it is easily measured. A deficit measure from job openings and then a fulfillment measurement from unemployment rolls or employment rolls.

Right. I have found a lot of factors that are, when I say factors, factors and variables that make up those factors that are measured, it is tougher to make a correlation between that and real

growth. I do not know if as a country we measure the right things. I think we measure what we can measure.

You took the words out of my mouth.

So it is harder to measure qualitative factors.

I have a question proposed to us from a big prospect we have right now and it is a labor, hey you have proven to us you have the labor force, you have proven to us that we can fill the jobs but they ask us to measure the quality of it. I said, "Well...

That is hard.

I said, "I do not know how to do that. We can go to the unions, if it were a union situation, and measure their performance but they are going to be tainted and slightly skewed towards the union." But I think testimonials, we came up with the idea, well maybe if we can get testimonials from big employers and say, "Give us your opinion of your workforce."

Right. Which may be the best way to measure your qualitative factors.

We all recognize it, Shaw is probably not going to put a testimonial out to bludgeon their attempt to get better workforce.

Right.

So, sure anybody that gives a testimonial is prejudice towards their workforce or they would fire their HR director.

Right.

So, we do not know how else to measure it. That is the answer.

What I am going to ask you to do is look at the handout I gave you for question 6 and this is actually a six-part question. On pages 7, 8, 9, 10, 11, 12, what I have done is breakdown what I have been able to identify from literature research as six different factors that I believe effect technology-based economic development. Then I have broken each of those into the variables that I believe make up the factors. And this is a synthesis of 30 or 40 books and probably 100 articles and more than anything it is an opinion but part of what I am doing with these interviews is gauging that against economic development professionals and professionals from a number of industries around the country. What I would like to do with each one of these is have you go through them and look at them in terms of whether you think that factor is important, whether you think the variables that are listed make up the factor or is anything missing and try to look at the relative importance of each variable under there and what I am having people do, Bob, is either put numbers on it or graded it from an A to an F, A meaning it is very important, F meaning I do not think it is important at all, with some very interesting results. So, this will take a little while but I would like you to just take a look at each one of them and kind of walk through them. As an example, if you take the environmental factor, and if you look of all of this, environmental, inflow, attitude, broken into what I consider to be major factors and then each one of those is made up into a number of variables that if you add them all together, they would comprise that whole factor.

I will just start with environmental quality of life, from business development.

Right.

Quality of life is a big factor. First of all, I do not think you left any out and that is the trouble part is that there is so many I am scared I am going to over-weight them. Easily, quality of life is very significant, knowing I have 10 or more, it weighs more than 10%. I would say, let's see how far I can get over 100.

Put whatever numbers you want.

Quality of life, I would say, support for technology initiatives, it should be, and we are dealing with Louisiana, now.

Right.

It should be higher, I bet it is 5% and that might be stretching high. We are really poor in number 3, availability in technology savvy investors and we need to be higher so if we had 5% there, I would be happy to see that.

Well, tell me what you think they ought to be. Not necessarily what we are here yet.

I can tell you what I think they ought to be. Let's do both. So, quality of life is 30%, it probably ought to be 30% we will leave that. Support for the initiatives is 5%, it ought to be 15%. Availability of investors is 5%, in my opinion it probably ought to be 25%. Technology population, that is going to be a tough one, we have tried to measure that, by the way, and you cannot. Then we tried to measure the workforce and we got a little better idea but we probably have a bigger population than we think. I am going to say 15% and that might sound low but in Louisiana that is probably a big number and we would always want it higher, theoretically, we would want it at 100% but you would never get there but I would love to see half of everybody in the state had some prowess with a computer. Remember now, we are getting over the number.

It does not matter. Keep doing that and I will work them.

On number 5, you know we are way under.

Right, I know we are.

And that is bad news for them, it is good news to recruit.

Right. It is not necessarily as bad of a thing as a lot of people it is.

See, we use that to our advantage. Like underemployment is a factor and we use that to our advantage. Theoretically, we all like to believe we are underemployed, that we are worth more than we are getting but the fact of the matter is in Louisiana the quality of life is so good, the top one, that people work for less to be at home in Louisiana and have a better quality at their workforce. So, that is a bad factor but a good recruiting measure. We do not have a talented, educated workforce compared to other states so that would be a 5%, needs to be 15%. I skipped over, non-technology infrastructure, we have poor non-technology infrastructure, highways and roads and we want better than that so I would say... we do not have quality K-12. We do not. I mean, it might be 2% in my mind. Now, we have a good superintendent, Pastorek, who is trying to change that but I do not know what his...

I talked to him on the way up, I will tell you about that.

I would be curious if he thought we could get to 25% because you would certainly strive for 75%. Undergraduate, graduate and post-degrees of technology is still, from a number standpoint, I think quality we are there but numbers are so poor, I am going to go with 5% there. Now, the funny part is, we do have a strong university system, I believe.

I think we do, too.

It is strong, it is just small. So... if I peg that at 18% that puts us to 90% and then I am just going to put 10% for other. Now, that is the left side column, that gets me to 100 but on the right side column for undergraduate, post-graduate, post-degrees of technology, we really, quality is pretty significant. I mean, Louisiana Tech has got flagrantly good nano technology now.

Oh, yeah. Tech is strong.

Tech is real strong. You know, LSU has got the CCT program. Tulane and Xavier got really good bio-med stuff. So, I am going to move that up the scale, now the right hand column is going to skew a bit but I am going to say we are in the 35% on undergrad, grad and post-grad in science and engineering. Now, I will back down the number 10 strong because the numbers are not there, it is strong but the numbers are not there. So, how bad did I go over on the right side? I am about 200% on the right hand side. That just means we got room for improvement. Now, that is on environmental.

Right. We have a few problems here.

Inflow factor is something that I have identified that I have not found it explicitly identified in other literature but if, just like a balloon when you blow air in a balloon and you have more coming in than is going out, people do not look enough at inflow.

We are horrendous in Louisiana, in my opinion.

Yeah. We do not attract it.

Inflow of equity and debt financing, we are horrible. The debt financing, we are only good at it in the public sector, none in the private sector. Nobody wants to lend money in the private sector and we already talked before the interview about how we need to motivate our venture capital...

There needs to be more capitol available in the state.

Inflow of talent correspondently is a little better than the money but not good. Now, that all ends up being better as far as recruiting at the end of the day. Inflow of ideas is a little better. We are getting some momentum there, I put that at 15. Inflow of government research is horrible.

We are way under there.

We are way under. I do not know what the average is but I know we are under. Inflow of revenue from outside region is better than the talent and the grants. Inflow of science and technology funding, that is poor. Inflow of private funding, that is even worse than public. Retention of capitol, now we do retain it, I am going to say we are pretty good at, once they are here because the environmental factors...

Right, because we keep them.

... we keep them. R and D expenditures by region, by universities, I think it is not good but it is not their fault. In other words, it is up to all factors, I mean, and we being...

We do it in some areas but we do not do it in a manner that...

I mean, like Pennington is really good at it.

Pennington is good at it.

But it is because they have a reputation. Tulane is probably second best good at it but that is it. Nobody else knows anything, we are doing anything else in the state.

One of the reasons I think Tulane really messed up with its engineering program is, they were getting a lot of research dollars at the engineering program and they cut it.

Well, and then all fairness to everybody, August 2005 comes and whatever momentum we had just got flushed out. Let me see how bad we did on numbers there. I did not miss but about 25%.

That is good.

But I did not leave any for other on inflow.

Attitudinal factor, tolerance for entrepreneur... I do not think we have the tolerance. It is funny, oil and gas, we probably do.

We do in oil and gas.

But anywhere else.

And I think we will fund oil and gas but what about anything else? What about technology that is...

It is better but it is still now where it needs to be. Willingness to collaborate for mutual success, I think we are getting better at that but it still has a long way to go. Image, no good image. Valuable placed on tech, I think that is a low number, I am writing 7 down on it.

Responsiveness to investors, now, that is a good one. I think if you get, the trick is getting an innovative investor. If you get the innovative investor you are going to get the responsiveness, so I am going to say that is a bigger number, 25%. Active promotion of technology, you know, it is the old saying, it's not very good but it is better than it use to be and it has a long way to go.

I agree with you. I think that your organization is helping that a lot.

Take your past, the whole transaction, that was the biggest thing that hit and that is a good news thing. It is the only thing that hit and that is a bad news thing.

Let me tell you, 10 years ago, we went out of state because there was not any support here. There is a lot more now.

A long way to go. Attitude of grow your own, and that is a, man, you want the attitude of grow your own...

Both are important.

... but you could grow faster if you take on outside, like ya know, your method, ya know. It is not good, I mean, it is not as good as it ought to be. See, in Louisiana, we are going to have a problem with number 8. There is not the willing, because of that earlier thing I mentioned, it is unknown what is available out there and they all fall back on the oil and gas down the road. So, the willingness is not there because there is no education of that so I am going to have that at 10%. Belief of business and education of communities... that part is getting better but not all universities subscribe to it but it is getting better, I am going to say 18% there. Now, we do have a real good entrepreneurial focus of the population because at a, I am going to say, if there is 100

thousand companies in Louisiana, 80,000, 80% of them are mom and pop entrepreneurs, whether it is dry cleaners, truck farm or diamond data, you know what I mean, it was entrepreneurial.

I find the population here just decides to be very entrepreneurial.

It is, and I do not have the numbers at the tip of my tongue but I can get them.

This is not so much wanting the numbers, because I can get them, it is a matter of how important do you think they are?

All right.

For example, on 10c, Sandy made the point that well it is not just technology fast 50 but a lot of other measures that are equally as important as the variable.

But we want the fast 50 because that gives us exposure.

And the only reason I know that is because we made it one year.

We want that, that is right, we want to be able to brag on you guys.

That is right because when you are looking at other businesses and trying to convince them to be here, if they know that there are companies that kin to theirs, it is easier.

It is funny, it ought to be a bigger percentage but the payroll... how do I answer that, Bob, if we know the technology jobs are better, we know the pay more but we also know you know, I know, that one of the advantages of doing a technology company, in Louisiana, we want to see three years ago is because we are so competitive on the low-end and we have good talent.

I do not know how to put a number on that.

You know where that matters is a lot of people in the technology fields, if they are going to move to Louisiana to take a technology job, and I ran into this so many time at SCA, they want to know that if it does not work out at that company that there is another option offered. People look at it and say, "Well, Bobby, if this does not work out, I cannot get another job anywhere else."

Policy factor, boy this is a good one.

This is one that ought to be right up your alley.

This is, we do not have a business friendly tax structure but we are getting one, we are building one. So, we are probably, I am going to say, 10% but then we are getting to be 25%. Tax breaks are good though, we do have...

Just not enough.

... That is right, we have average or better, I am going to say 25% but we can always improve that. That is probably the only bright spot on the policy. State and local support, you got state support but not local because locals depend on the state. So, I am going back down to 10%, it needs to be 25%. Now, we do have simplified application, so that is good and we do excel in establishing incubators and tech parks, we just do not have enough numbers. So, that is... I am going to put 30, that is a good thing but it could always be improved and I am going to leave the others unknown.

Is there any major thing that you think we missed on it? We will come back.

Okay.

Now this is different from the environmental factors, this is basically knowledge within the population, education of the workforce, economic develop organizations that have the understanding, they are not just there because somebody said we needed a new economic development, technology, commercialization.

On the number 1, applicable university research and development, even though the quantity is low, the quality is significant. That is a big number, I am going to... technology transfer is better but it has a long way to go.

By the way, I do not find anybody in the county that does that very well. There is a few bright spots around the country.

Here is the, ya know, probably MIT, Harvard, those guys and Stanford... Florida has Gatorade and that, ya know. Depth, that is the buzz word there, I do not think we have depth, we do not have enough depth, I can tell you that.

Maybe depth is not the right word. What I had in mind is the stuff that you do. You drove down into the industry and actively work it.

That is a good news thing but there is only one of us that has been there. You need a team, you need a whole department.

I think if we had a team of people doing it we could do a lot better.

Entrepreneurship training, it is okay. Collaboration ideas sharing between firms is horrendous, I mean, horrendous.

Let me tell you, that is so important.

I know.

Go to Charleston, those firms get together in the space club and they talk and they share ideas and if you are a part of that, you know what is going on and if you are not, then you cannot get in. We do not do that worth a damn here.

I am not sure if it is because, you said, because the competition. I mean, I do not know how you fix that one is a small populated state.

It is tough.

Define strategy... we do not do, that is not a good one, I wish we could improve that....We need to improve on that one. Technology and commercialization support, I think there is support but it so needs improvement. We are poor at this and we need it, number 8. We need better strategies, If you get better strategies then you would have the cooperation and the comfort and the confidence.

We are beginning to work it, like working with Stennis but we are just beginning to work.

I might be a prime obstacle there. Now, I do not know that I want to go to Stennis yet because I have got so much to do with Michoud.

Right.

Do not get me wrong I could probably get more done at Michoud if knew more of what was going wrong with, like a partner, with Stennis but it is a fine line of going from black and white to gray.

But you will reach out to Huntsville, you will reach out to Charleston and a region does not have to be contiguous. A region can be based on knowledge.

That is true. Economic development organization with knowledge and charter... we got it but we only got one of us so I am going to rank us poor.

Yeah, and we have other organizations, Louisiana Tech, it is greater New Orleans Inc., but what are they really trying to do? Get members and pay their bills.

That is right. Chicken and egg thing.

Yeah, runs behinds you and trying to say, "Well, okay, we will do this, we will do that."

Give us some money to do it.

How about leadership?

Horrendous.

Which, by the way, Sandy Baruah brought it up to me, leadership, he said one of the glaring omissions in my list was leadership. If you do not have the leadership none of this other stuff matters.

Well, that is because you did not see any. I mean, how can you think to put it on the list if there had not been any there.

We do not do it here.

Quality of business with focus on entrepreneurship, ya know, I am going to write that okay but it is not, it is not as okay, as with all this stuff, we have a lot of improvement... Educated workforce is not good, it is horrible, as far as numbers, ya know, percentage number. Advanced education, that is even worse. Well, I did not get to 100, let me, I want to at least get to 100. I would rather be over than under. I will move that up to 10 instead of five. I am adjusting some to get to 100.

Social factor, culture of collaboration, we just said it, poor. Culture of change, now that is interesting, I think we do have, I think we are getting better.

We are getting better. Maybe old blue blood, New Orleans, old family money, that keeps us from change. They do not want change. They say they want change but they do not.

As a matter of fact, I visited with a bio-innovations center district folks the other day and then, as you know, we have had some hiccups going on between gene therapy and cancer conflicts and all that, well then the Two Lane folks are on the board and it is academic board driven. By the way, I do know if you will get to that, but that is a challenge that we need to bring to light. Too many of these functioning boards are stacked with a weighted average too heavily in academics opposed to private industry, it ought to be the other way around. I think it ought to be two to one private over academics, that is just me. I kind of regress there, so I apologize. Dense social networks, we got them but it is not necessarily positive. Collective learning, that is a good subject. I am going to leave that to come back to. Geographic clustered... we do have geographic cluster basis because of natural resources.

Right and that is fine. I like that. That means it is a natural outgrowth of what we do.

Grow your own and attract versus focus and... boy, we do not... boy, that is a good one, too.

In other words, are we throwing money at things we already do or are we trying to go after things that we would like to do?

Right. It is, ya know, old habits are hard to break. It comes back to our investment criteria we were talking about, ya know, trying to get investors in and we do not have a broad enough diversified spectrum because it is too easy to focus on oil and gas which is what your brother-in-law does. So, that would be the established, easy-way-out, to so speak.

And that is not necessarily bad because there is growth in that industry.

Except for when oil goes from \$150 a...

That is right. That is a good one. I am going to put 15%-25% because that... Investable capital versus... oh boy, we do not. Even if you have an entrepreneurial focus, we just do not have the investable capital.

Realistically, with that, what you are talking about there is after Silicon Valley did well, there was billions of dollars there that people just threw in new companies and maybe one out of 10 did real well. Upgraded a 10,000 full return.

That is right and they were happy to get one out of 10.

We have a lot of money in this state from oil and gas and, I mean, look at the Villarie going back wherever, they have a ton of money but they are not going to put it in an entrepreneurial business, they just do not do that.

That is right. Collective identity, we do have a collective identity and I do not think it is good. That is not diversified, that is good.

Huntsville has a collective identity and it works to their advantage.

That is right and it does work to our advantage when the cycle is in our favor. Again, that is the diversity thing. Openness to risk taking experimentation, you know, I do not think we have that because we go back to that focus on oil and gas, well it is not that their openness to taking risk it is that it is a habit. Hey, my brother did that or my uncle did it or my grandfather did it, that is not really risk taking that is just more following suit. So, we are pretty poor there. Particularly outside of the oil and gas thing.

Right.

Let's see where I am at. That is pretty good on social.

Very good.

Of course, from your recording standpoint, I did not say all those numbers out loud, you will have to go back to the...

I will get them from you. If you do not mind, I will take that with me.

Of course.

(6) Now that you have looked at those factors and the variables that make up that, do you think those factors actually, realistically effect technology-based economic development?

At glance, the first one is absolutely they effect it.

Do you think that there are some that are more important than others? Just taking the six broad factors, environmental inflow, attitude, policy, knowledge, social.

I do indeed and let's go back so I can try to rank them. Out of six, I think... See, inflow is a huge factor, it ought to be ranked high because it is so poor.

Right. Forget about how we are doing just on a generic basis, this is just...

We know it takes money to make business go so we know inflow... I am going to say education really is number 1. Is that what we called it? What did we call it?

Well, you call it education, I will put it where it needs to be.

Knowledge factor, so knowledge is number 1. I think inflow is number 2. I do not think policy, I am going to probably put policy at number 6, that does not mean it should not be up higher. Environmental, certainly, I am going to put environmental at number 3. Then, attitudinal at number 4 and then, what was my last one? Social, yeah, I kind of like where social ended up falling in there. I think that is probably right.

Do you think that we are missing any major factors with these six? Again, this is where Sandy said, you are missing leadership.

I am going to leverage off of his, I think that is absolutely accurate. Now, what would there be others? I am glad I could leverage off of that, I might not have thought of that but I know I struggle with it. You know I struggle with the leadership but are we leaving out a missing factor? You know what? I am because you had not brought it up but it is all, you know we both believe in this, marketing.

Good point.

Only way we get to where we do is market ourselves.

That is a real good point.

Improve our weaknesses and take advantage of our strengths. So, those would be the at least two and if you start adding them up...

Getting out to the public.

And we are doing better and I will say this, ya know, that is the beauty of riding Jindal popularity coattail is that good exposure. Bless her heart, we are crazy about Kathleen but her exposure was not positive because of the effects of Katrina.

(7) You have gone through and broken down all of the individual variables. I am just thinking in terms of the top six factors, how do you think we performed, have we performed minimally, modestly, average, well, excellent, just taking it as a whole. Just taking in term of Louisiana, I am assuming that is the region you feel more comfortable with?

I know we have vast room for improvement in every factor.

Let me explain, with regard to question 8, what I have found it that I can craft a description of different regions as neophyte, adolescent and mature. Mature would be Silicon Valley. Adolescent would be Huntsville because if you take out the federal government, they fall apart.

Now, I agree with that.

And neophyte, you may have a lot of good things going for you but you just have not quite gotten it together to move up the scale.

So, back to the factors trying to hit each factor with one of those as a whole?

Yeah, just range it from 1 to 5. Thinking strictly about our region.

It would be a stretch to say 2.

Good answer.

It would be a stretch because between your neophyte and adolescent in real light, you are close-minded because you have not seen enough of the world to open your mind and you know, I am not going to put words in your mouth but I will say, our state is still pretty darn closed-minded. Now, that is the bad news. The good news is that gives us so much room for improvement.

Right. Then taking that, the second part of question 8, do you think this region is a success or a failure and in what ways?

You know, I do not want to say failure because that is so harsh but it is definitely not a success. I think we have done fair. It is an either or question, we have been a failure because we have been closed –minded because we had it too easy literally relying on natural resources, oil and gas, timber, agriculture and we have not evolved, we have not diversified like other states as fast because it was too easy not to. But I will say, I hope you agree with this, I think you agree because I know in your personal industry you have done fabulous, when we see an opportunity we do run it down to the ground.

I agree with that.

So, I think we are getting past being a failure, how about that? I think we are getting past but I can easily say we have a long way to go before we can claim any success. I mean, she is a great example in the technology area, man we should have been capitalizing on that... now granted, the administration of NASA and they way they policy on closed campus, sole contractor campus, did not help us any...

Whose fault is that the state or is that Lockheed's fault or is that Washington D.C.'s fault?

That would be a good case study. What could we have done or could we have done anything?

So, we should have been, ya know, Louisianans should have been open minded to lobby Washington 25 years ago. Particularly when we had somebody like Russ Long] there and Vinnie Johnson there that could get things done and say, "Guys, we are missing the boat. We need to be leveraging NASA. We need to be having New Orleans east look more like Huntsville."

Granted, I am not saying it had to be design oriented, that would have been cool but we could have had little manufacturers out in the field. Anyhow.

(8) Looking at number 9, that is a good segue, do you think that technology-based, regional technology-based economic development can be influenced by federal, state or municipal policies then in what ways?

I do, indeed. And I do indeed because the last four years of working in here knowing full well that I needed, that I had some fun ideas that I needed people of affluence to help me influence Washington an our administration and municipal folks to wake up to the world of technology and have their area be more diversified. So, the answer is yes and I think we have tried to do that.

In what way?

I guess I am answering in what way.

That is a good way to answer.

When the storm hit, everybody was in a panic on how to dry-out and put people back to work. As you know, an I do not know if you remember this actually, but the very first time I met you was in the Hankle room when there was an improv to meeting called of technology and you were retired and you had a fairly bitter taste in your mouth because you knew you had been frustrated on what had been done and now that we had this storm... I actually thought, who is this guy? I would rather his glass of water be half full than half empty but the fact of the matter is you were not negative you were being realistic. Then subsequent to that, we tracked each other down and said, hey we are both passionate about the same thing, let's channel it. So, I

think if you channel public factors and private factors, let me say it another way, you channel expertise, then you can influence national, state and regional to enhance economic development. I absolutely agree with that.

That is a good way to put it because I can tell you at that point after 10 years of bloodying our heads against the wall and having nobody care, all of the sudden, and working with you for the last several years, it has been a totally different experience. This state, I do not want to say it is a night and day difference, but we are light years ahead of where we were six, seven years ago.

Well, I think, you know, we have been... back to the other questions in there, we have been so reliant on natural resources instead of thinking out of the box. We have gotten complacent and all of the sudden there is a little technology industry in here and the next thing you know was finding some folks with some success if not significant success in it and then somebody's eyelid opens up a little wider and says, "Hey, he might be onto something in that technology field. Let's see what else is down there." Well, that is not usually the way the state government, much less federal government, works. This all happens, I did not come from 30 years in state government, I came from investment side which is more your side.

Which is very refreshing.

So, we were kind of two ships that did not pass in the night but clanged up against each other, you know.

Which policies do you think are particularly effective or ineffective?

We both believe there is some effective and a lot of ineffective policies. Certainly tax policies have been ineffective and now are getting to be far more effective. So, tax goes from one

extreme to the other. We also know investment policy has transformed. It was not five years ago you had an angel program. So, let's say two would be investment and I am not saying these are good I am just saying they have been ineffective and now they are becoming more effective. Another policy is, I think you will agree, I am going to say it, I think marketing. We are getting, we are not effective but we are becoming a lot more effective so those are policies that...

I like that.

I think those are the first key that are true.

I think you have hit something with that whole marketing issue.

I do not want to leave that without one more thought. We do so much marketing for tourism, for example.

I probably should have been, I have been remiss when I am saying natural resources, tourism is a natural resource for us. Let's go to...

(9) This is similar, but what I am trying to get to with this is can government effect the factors that we were talking about earlier?

Well, we should be able to.

In other words, can we affect social? Can we affect our knowledge?

I am going to put should be able, I am going to admit to, it is unknown if we have been.

Do you think that government can affect qualitative factors as well as quantitative?

I do. I do. I mean, it is not just a numbers game or it better not be. Let me say that another way, it better not be just a numbers game. It better be both, matter of fact... we do have quality but the numbers are so small that we do not know about it. That goes back to our marketing thing that we picked up on, we need to market the quality because you do not really get noticed unless you have numbers, it is quantity. I do, there are factors. The answer to that one is yeah.

(10) Now, thinking about those various factors, do you think it can be modeled? A process model, a mathematical factor or whatever type of model? Can you build a model?

I do indeed.

And do you know of any models?

That is the only reason I know the answer to that, the answer is yes. You know the answer to this, maybe you do not want to say but I am going to say it, I am going to hit three that I know right away, or four. Research triangle model is a fabulous both incubator and policy, big tank for lack of a better... it is not a tank it is a region. South Carolina Research Alliance, fabulous. Georgia Research Lab Alliance, you know we are stealing... that is the best compliment you can give some of these folks is when you steal, borrow or imitate them. It is the highest form of flattery and I was just with them in national. Texas, in their workforce commission, we literally made the Louisiana workforce commission look just like it. Louisiana literally made Georgia's quick start program, Louisiana's fast start program, we hired the guy. I need to introduce you to that guy, by the way, Jeff Lynn. As you know, we have been taking

trips to Charleston to meet with South Carolina. I sit on, this is probably good data, I sit on the Southern Technology Council, which is a derivative of the Southern Group Policies Board which is a 13 state board. This is the thing right here. Olivia Blanco had put me on it. So, I just met with, our board meeting was Thursday and those are fabulous events although they are short lived and few and far between but in Louisiana, our department, literally goes after their best practices and they borrow and steals them to make ours better.

That is good.

Tennessee, I am going to add Tennessee in there, I would have to go look it up but, they have a significant department within their Department of Commerce and I will go find it for you but these are all models of factors that do modeling. These are models that do modeling and measure this stuff and the answer is, it is very effective.

That is great. That is very helpful.

I did not write those down but it is on the recorder, so.

By the way, one of the things that I did study early on in my research was the Georgia Research Alliance, they came after my company so hard when we were SEA and they offered us all kinds of things to move there. So, I went and I interviewed Dr. Phillips Shapiro up at Georgia Tech, he has worked a lot of that great stuff.

Yeah, and I do not know him, but that name sure rings loud.

I will send you some of his work.

Okay. Mike Cassidy is the gubernatorial appointment that heads up Georgia Research Alliance. He has been on this board of directors that I sit with and he has been pretty instrumental in helping... let me, this is good data I want on the record. So, we have been distracted for the last three and a half, four years because of hurricanes, the two in 2005 and the two last year but if we could ever find the bandwidth, we need to do what those successful states are doing and have, back to your friend's leadership factor, in particularly with Bobby Jindal notoriety, I do not know how we could get there but we need to be having that kind of leadership instigate and do more to this stuff because when I was in Nashville, I was there Wednesday and Thursday in ...with Bretazin was with us 70% of the time. And I mean we closed... it was impressive. It was impressive just because of the simple things like, he was at the meeting early, led it monitored it, when is say monitored, moderated it. He had to leave because legislature was in session, he had us at his residence, the mansion, and literally greeted us at the door and stayed with us for the two hours and there was like 18-20 of us and we had quality and quantity conversation with this guy. One-on-one and group.

Extraordinary.

It was extraordinary. And this guy, he is term limited, he is half way through his second term. It is not like he had any political gain out of this and easily, we were not voters. It was seriously impressive. So, we all came out impressed and that is his second year on. He did that for us last year.

That is a good example.

That is a good addendum to put in there. Anyways, I am going to stop.

(11) Look at page 19, pages 18 and 19 go together, which you have answered part of but if I was to build just, realistically, a mathematical model that took into account the variables and factors that we have been talking about, I actually could be a neuro network, mathematical model to show this. Now, the question is, the question I am asking you, do you think that it is possible to represent the factors that impact technology-based region technology-based economic development, using a model like that a opposed to a effective variable model like you have described South Carolina and research trying before and do you know of any quantitative models?

Well, I do not know of any quantitative models just because I am ignorant to them. I am sure they are there but I also know that you are right, you can quantify this stuff, you can put it in a formula and all variables need to be flexible or the assumption maybe should be flexible. I absolute agree that there is measurement and then predictable measurement for the future that you can base your equation on. I do, I mean, I think you add A, B, C, D, E and F with factors on all of the above and I think you can get to Z at the end of the equation. It has been done and I wish I had the knowledge to know where it had been done. Those states we just mentioned, I am quite sure they have their own models. I am quite sure, I just do not know where they are and I do believe it would be significant and effective. Again, by the way, we have a competitiveness subgroup upstairs now and it is not just technology. That is the trouble with Louisiana, we are not big enough to have a lot of these great subsets. We have to hit the general topics and so we have a guy upstairs that Jindal has allowed us to get to state competitiveness group to make our state more competitive with others. Does not matter what industry, it is always easiest to start with technology because it improves our lives so dramatically, so quickly. If we had the money

and the man power and much less the willpower to do a subset and start with technology, we could be off to the races. We just do not have enough time in the day, money in the bank.

What do they measure to determine state competitiveness?

They are going to give us, we do not know that yet. Angel investment, R &D credits, taxes, the tax structure, environmental factors, educational factors, it would be a big umbrella.

Good.

And they have a young bright kid up there that is heading it up that came out of London School Economics.

Really?

Bright guy. All these kids, you know, these bright kids, they are policy and that is out of my world.

They can effect policy, effect those variables that help us out. That is going to help us in the long term.

So, we need to go down that list but I think the answer to that is yes.

If these factors can be quantified, do you think a model could be created to represent technology-based economic development?

(12) Let me finish out with two questions, number 13 and number 14, now having done this interview, you still believe that there are qualitative and quantitative factors that effect regional technology-based economic development?

I do, I think there is no question about it.

(13) Then the last question is, do you have any suggestions for improving this interview process? This is my last page.

Well, there is no way I could suggest any improvement. I just wish that we all had the time and manpower to do this more prolifically. So, that would not be an improvement, that is just, can you not sleep and do this 24 hours a day?

I wish we could.

Could you do more of it?

I love doing this type of stuff.

The trick would just, the answer would be, no but just do more of it.

Dissertation Interview Questionnaire – Kevin Pollard 02/18/2009

- (1) Please describe briefly your current position and role within your organization and community.**

Why don't we get started? What I am going to do is ask you to tell me about your, what I am asking is current position and role within an organization or community that effectively has you on the stand with perspectives on economic development and the second question is more specific to economic development. But just for record would you mind describing whatever portion of your background you would like to...

Traditional business background here classically educated, classically trained as they say. I work for Proctor and Gamble, Airproxen Chemicals, Freeport McMoran and was able to retire when I was 49. Jumped into the entrepreneurial world, started two software companies, a telecommunications company, a third tier telecom company, an internet data storage company, the last of which we exited by selling to IBM in January of last year.

Since 2003 I have had an international strategy in marketing consulting business, which is a one-man job, and I will explain how that works in just a second. It chases me, I do not chase business, I do not make sales calls, it is all referral, it is global, I work with China, I work with middle east north African countries, I work in South America; there are two things I look for though, I look for technology and I look for hyper-growth opportunities. I have done turn around, I have done several work-outs, my preference is to take a small company that exists that cash flow is not taking them to the next level, and as a result I work in a niche that there are just

not a lot of people. I work with funds, I work with advanced capital for instance here but I work with funds all over the world.

I work with the Gulf Coast Venture Capital Association, the guy that founded that is actually the head of the Aramco Fund which is about twelve million but the Gulf Coast Venture Capital Association does not reveal its number but there is probably about two-hundred-fifty, three-hundred billion under management with it collectively representing the table. They are raising a new five billion dollar roll-up fund for, actually development one, this is the first, and out of their global advisors, I am their transaction person. That should be work for a long time.

What I do is I work essentially in the 1099 arrangement, there is not a lot of paperwork associated with what I do so I do not need to keep an office, I work out of my home as I have done with my four start-up businesses. I have all the infrastructure that I need there, sufficient broad-band, several computers, I have complete backup services so I can pick up anything, anywhere I am in the world but I am just a technology-oriented individual. I am not technology trained I just have an aptitude and I understand how it helps business so I eat my own cooking.

What I do is I have a network, actually my own network, probably a rolodex with close to 4,000 names, probably one-third to one-half of them are C level execs have known or worked for me or I have worked for in the past that are available to tap into. So, when I have a project that goes beyond me, I will do something like I did with the Spectra Capital Association right now who farmed a company called Botron Petroleum, they came out and said, "Well, tell us how do we do this." And it is as simple a question as that because they do not know how. They know they have private individuals, got a lot of money and they know conventionally what they want to but they do not know how to develop the strategies, tactics, all that and I do that. So, I will go

and I will flush out my ideas to a certain level then I will go to a UNO, as I did to Russ Trans, said I need an engineer to help me put together a project glance, I will just have you use Microsoft Project. So, we will develop anywhere from three to five hundred step program, put it all out there, I will test it with my probono network, people who just look and say, "Yeah, you missed this point. No, you got that." or "I think you covered it here or you do not need to do it here."

So, I will come back to them with that and then I will come back with a very concise strategy, almost a bullet point strategy because English is generally a second language to them so I try to keep things as simple and as clear as I can. That is always what I do when I try to talk to somebody who is not a native English speaker. I put that out, I have had people advise me to not put out a lot of steps because they do not know what to do but I believe in Dennis Lombardy when he had a playbook that was about six, eight inches thick, he said, "Take it. Execution is not knowing the plays." It overwhelms them so they come back and say we got to use you. So, I work on a lot of projects. It tends to be heavily oil and gas related and more on the upstream than the downstream side, do a lot of medical research, do some IT work, less of that now than before because there is more competition in that space.

I am essentially lazy, I do not want to do things to differentiate myself but I have more than upcoming on this side. I want to stay focused and I do not want employees anymore for this. Having said that, I am working right now on the intern CEO of a company that I am raising money for, in the strategic plan it was floundering out here but it has a blockbuster technology, basically, and they sort of blend it, makes it easier to extract organic carbon. There is no clean-ups, no tank cleaning, whatever, we are focusing on the Canadian Oil sales market right now

because we can do it more cost effectively, we can clean-up water that is processes, we clean-up oil tailings which are huge up there and we have no competition in that space.

So, we are in the process of raising seven million dollars, I will do that. My plan with them, which is accepted by them, is to stay on as intern CEO until the end of 2009 and then step up as a board chair and keep a consulting arrangement. I sit on about six boards. Only two right now are non-profit boards. I sit on the Horizons board and executive committee and was vice chairman, I stepped down as treasurer because you have to have the optics to make the things work here in the community and there is not a lot of demand for people of my characters. I am very involved in the World Trade Center, I am a past chairman of the Regional Chamber of Commerce here well before Metrovision and all that. But I am on the executive committee. I am chair of the strategic planning committee for the World Trade Center and probably one of two confidants to Connie Williams who is their current president. So, that gets me here.

I honestly believe that in several ways I come from a home ethic that says, as my immigrant grandmother use to say, "The more you have the more you owe." She did not know. So, I grew up not thinking that you should be patted on the back for doing this kind of work it was like picking up your clothes and putting them in the hamper at night, giving something back. I look to where I can add some value. I never have considered myself the smartest person or the dumbest person impact; I have considered myself a harder worker than most people. I felt that the hard work bridged a lot of my own intellectual weaknesses and it got stuff done. People pay for performance, they do not pay for intelligence unless you are in the academic world solely, and I am not and could not be.

So, very early in my career I got involved and I was all over the place. I did New York City Ballet Board, the Symphony Board, Big Brothers Big Sister, Junior Achievement but what I found was where I really had my greatest was when I sat down with other business people and I could sit down and talk. So, I actually have a group of probably five or six people who are, I would say very close friends but they are close business confidants; Frank Stewart with Stewart Enterprises is a very close friend of mine, we are confidants of each other; Bruce Thompson with Thompson Equipment is a very close friend of mine, we meet every three to four weeks and just talk about business ideas, Mike Hammer with Front Street Capital is another one we do that with. We do that because we respect each other's views and we are comfortable critiquing each other. I like that stress and growth because it helps me crystallize my thoughts, I need to work through things to get to where I get them.

So, after the storm I had gone away and in 1990 when I was chairman of the Regional Chamber, in 1991 I was the past chairs with George Denegg and Jones Walker that was his chair, I started traveling overseas and I told George, I said, "I have two years in this community, it has seen me too much, you need to know when to retire." And even though you have a three year commitment, the past chair really does not have much to do except ceremonially step-in and do some things. So, I traveled a lot and then I moved overseas for five years, which made it real easy. I came back and kept a very low profile, it is easy for people who have had a profile to step back in and dominate a conversation but that is not the way to get new ideas to the table.

Well, Katrina changed all of that because people went away and I got involved first because somebody, you may know her Penny LeBlanc, came up to me right after the storm, I was in my house the first day five weeks after the storm and she came up and said, "Well, David

Vitter is coming to town on Thursday,” and this is a Saturday, “he is looking for some ideas, can you give me some.” And so I said, “Well, where do you want to meet?” She said, “Well, we do not know.” I said, “Well, why don’t you come to my backyard, I have cigars, scotch and wine.” And so Condra Lapell came over and just probably six or seven people came over and we put ideas out and I put my ideas out and decided I was not the one with the strongest relationship because that is what I said, somebody else needs to take the message to David. I know David and he is best friends with people who live caddy corner from our house.

So, I came back, that was October, in November we had the first International Business Committee meeting since the storm at the World Trade Center, I looked out and all you could see was a sea of blue tarps. I made the comment, I said, “You know guys I think we need to look at something here at the beginning of our meeting. We have to step up and do more than what we have done here.” And some of us who had comfortably slipped into the back had to step up and do more and then Gene Shriver and his way of executive director start talking about all the calls that were coming in here. GNOE was shut down, the cities, everyone was shut down, the chamber nobody knew where anybody in the chamber was, and people were calling in trying to get help, wanting to get business, wanting to work and they were going to the World Trade Center, so Charles Nelson is at the head of this table, I said, “Charles, we need to change our business motto, at least for a couple of years.” And I said, “I suggest we do this.”

And so I laid it out like what I thought, I said, “We need to create a portal in Internet terms this is a portal. Let’s aggregate the information these people need, be the single source of contact for them and we could do it for the domestic companies outside of the area as well even though it is not our motto. The infrastructure works the same for international, if you are

allowed to go out here, you get what you want.” I thought about it some. Thirty guys said they wanted to get involved and we had about 85 at the meeting, that dropped down to about six and then nobody did any work and I will not mention names because you may know the people who wanted to be in on it but did not do any work.

I bet I know most of them if not all of them.

So, what I did was I went up to the World Trade Center one time and I asked Charles if I could meet him, I went up and I said, “Listen, and let me give you an idea here.” I said, “This person, this person, this person said they wanted to be involved and they are not helping, they are just not reliable. I will tell you what I will do is I will commit time to this and we will create a program and this is what it will look like, this is my vision for the program and if you like this, I will take this and run with this. And will get resources, whatever we need, I will get it done.” And Charles said, “Take it and run.” So, we went back to the IBC, the International Business Committee and said, “Kevin is going to run with this.” So, I put together Joe with Loyola helped me a lot, you know Joe, Pat O’Brian was still there, he gave me a little bit of help, I have got computers here, interns there and we finally put together a structure out with three levels with free information and the second was referrals and we used referrals for World Trade Center numbers and we used it as a benefit so we could back and attract more member and retain members and then the third was an executive lunch and dinner thing when people came into town. Bob Nordelli who you might know, who came to town but he is not going to sit down at a dinner with 100 people, he will sit at somebody’s home. There can be six or eight people and he will talk to them but he is not going to go 100... so we figured we needed to do that.

So, we set the structure up and once it got going and we got funded, we got a grant from the state for either fifty or 100 thousand dollar, we went up and knocked on the door and said, "Help." And they did and people who want to be involved started getting involved again and I went back to Charles and said, "Charles, I do not work like this. This is a volunteer organization. This thing is running, here is the mission, the infrastructure is in place, it just needs to be managed." So, we disconnected my responsibility and I really performing a role I should not have been performing except necessity called for it. I am a board member; I should not be involved in operations stuff.

Should not be there doing day-to-day.

Yeah. So, I told that to Charles, I said, "So, rather than turning it over to the International Business Committee, let's plug it into Gene." So, we plugged into Gene, it was up and running and I told the guy, I said, "I am there to help, advise, whatever but I am not here on a daily basis anymore." And I asked Charles, "What else to you want?" So, I started working on what we call IT refresh set, they have a 20-year-old infrastructure there for networks, communications, hardware sites, just awful. That was sort of my niche and Charles wanted me to get involved with Building Committee, so came in as the vice chairman then I was the chair last year. We forced a number of issues. That is what I am, I am the change agent and if I see something that needs changed I agitate simply to get discussion, debate and generally we get change.

You have actually touched on a lot of the variables and factors that I have identified in my literature research and in other formal interviews with people as important to technology-based economic development. I did not know the latter of that part about your background. We

cross over a lot of boards; I am on loyalist board and UNO's board and a lot of mutual contacts. I will tell you more about our company, the new one and the one that I have built and sold later once we are not in the interview, but I did not realize you had done the venture capital part or how much work you did after Katrina on economics to help put this place back together from an economic standpoint.

Probably 25 hours a week for three years.

You have a lot of the basic variables, leadership and marketing and other such things, the social issues that I have identified from other literature. I am glad you went through that because it validates a lot of things that I think I seen elsewhere. Let me keep moving through this if you do not mind. You are welcome to follow along. You hit question 2, your own knowledge of economic growth and development.

It is more of an average. I am not an expert.

Way more than average. I am not looking for experts, I am looking for people with the type of experience you have had. There is too much academic information and not enough real practical information out on the street right now with people who have lived it and that is what I am trying to get to the people who have lived it who can say, "Well, yeah, the academicians say this but that is not quite right." Or they say that and yeah that is important. If you do not know it from practice, you miss it.

Correct.

(2) Do you think economic growth is predictable?

With the things you have just described, do you think the economic growth; economic growth in general, is predictable? And what regional economic-growth, when you are concentrating on a region, a contiguous region or it does not have to be contiguous, it can be a community and I am specifically trying to get down the technology-based economic growth. Do you think it is predictable?

I think largely it is and there are controllable and uncontrollable factors in there. I think on the uncontrollable factors some are predictable and some are not. The predictable ones, I think they certainly are I would say it is a mix. I would say generally economic development is predictable, particularly in relationship to other economic development initiatives; some will perform better than others.

(3) What factors do you think impact technology-based economic development? Please think about and try to describe both quantitative and qualitative factors. Can these factors be measured?

That is a good answer. And you obviously, I am sure, know where I am going with a lot of this but one of the core issues with this is getting people to quantitative and qualitative factors that effect economic development. Without looking at the details of my research, what factors to you think effect economic development, quantitative or qualitative, regional technology-based economic development?

Well, first of all I think it starts with a vision and you need three components of the vision. You need an element, a champion for the vision and that champion cannot just be a visionary, it has to be somebody who has got the ability to make or most of this happen or cause

it to happen. In case and point, I did my graduate work up at Duke University and had a chance to see the Triangle Research Park very, very close, worked up there for about four years and worked with then Governor Jim Hunt. Jim was not the visionary but he was an executioner, Terry Sanford who was the governor back in the '60s had the vision for the research triangle park. His first strategic perspective was that if you can knit the academic community together and make it stronger than it is separately, in other words, getting universities to coordinate, share resources, leverage infrastructure, you can move economic development, particularly when it comes to technology driven economic opportunities which he believed, that was one of his assumption, was the future of economic development.

He did not look at the United States as being long-term or as being an agricultural contributor to the world, although we do some, we are a manufacturing center to the world but only manufacturing as it related to implementation of technologies that were developed. He believed, I would say I subscribe to this and I should for disclosure purposes, Terry Sanford went to the U.S. Senate and then he came back and he was the chancellor at Duke University and then he retired and about six, eight months after he retired he died but he was a tremendous individual, well known in North Carolina, probably not that well known outside.

So, what he did was he said, "Well, the four strongest universities in the state, well the five from the east to west, East Carolina," the research triangle area, it was a triangle area is what they called it they did not call it research triangle area, "you have North Carolina State University in Raleigh, Duke and Durham and University of North Carolina Chapel Hill." They were all, the three here were about 18, 20 miles apart and you had Wake Forest over to the west of that, he said, "Well, cannot really put the infrastructure together," because and infrastructure

in the late '60s involved physical things, they said, "Well, knit them together." So, he knit the three universities together then they spun out, then they got the junior colleges then they got the high schools plugged into it and they shared resources like libraries, research, and computers. Then he had this idea of putting together a research triangle park, which is a 5,000-acre park with some really interesting stuff. The first that he put in there was he went out and raised money through something called a research triangle foundation for something called TUCC and that is the Triangle University Compensation Center that today has a bank of Crays, second highest computing power in the world second only to the NSA and it is a Fort Knox organization.

They were actually launching some commercial businesses, which I bought out of that organization into a company I started here and moved to the Research Triangle Park later. So, you had TUCCs as a core and there was a question of just netting everybody up and these were pre-fiber optic cable days so you were pretty much talking twisting copper for communications, he said, "Okay, go to a Junior College and you get acceptable degrees there assuming that you get the Junior College up to an aptitude level where they are kicking out 2-year graduates that are confident, we will guarantee that will get accepted to one of the state universities." That as novel back in the '60s and it really meant that Junior Colleges had a really kick up but that meant that they also had a better product so they are attracting kids there that could not afford to go. So, he was kind of breaking some and paradigms were replaced with that. He was very good at paradigmging universities compete with each other. He broke part of that because they actually started cooperating.

One of the things that he also did here was that North Carolina had a medical school that was kind of floundering around a little bit, you had East Carolina which was the other major state

university that had a medical school and he said, “Listen, you guys are trying to do the same things here. University of North Carolina Chapel Hill, you are closer to the urban areas you focus on these kinds of things. East Carolina, you focus on things like telemedicine.” And so telemedicine in the United States grew out of East Carolina University and all those three founders of the American Telemedicine Association, the guy who had the original idea, David Balch, worked out there. I remember seeing the first doc-in-a-box which was a pretty crewed piece of equipment and the first model was the North Carolina penal system where they were now able to extract teeth without bringing somebody from the western part of the state in to Raleigh with a bus, two drivers, four guards because they were guaranteed that by state law.

So, he had that and the second thing was what Terry had, Terry was sort of like Jim Bob Mophit was in this town but in politics. He was not bipolar; he was a very strong and a very charismatic person. So, he would walk into a room and his ability through leadership and his presence got people to do things, the legislature, the business community, and the local politicians, to work together in ways that they had not worked before. I think they were also looking for an answer because back in the ‘60s North Carolina was a red-clay, redneck, tobacco chewing state and now it has more Ph.D.’s per capita in the United States, you have bio-medical research foundation of the world is there, you have got the nano-technology center is there. These people, they morphed around.

The next thing that Terry did was he said, “Listen, technology is technology and everything has got a curve. Early life, acceleration, later life and last life.” So, he said, “When we design this park here we have to design it so that it impacts more of the state because even though it is in the research triangle park, everybody has to benefit.” So, there has to be the

concepts of campuses and he did not really have virtual campuses in mind in the '60s but that eventually evolve out of there because there was a natural outgrowth of these technologies that created the ability to have a personal campus. The second thing he says, "You have to have an environment and a mandate to continually evolve."

And so the first work that the North Carolina that the research triangle park carved out was to focus on growing what they had and they were an agricultural state. They grew tobacco in the east and cotton towards the west and those were basically the crops that the state had. There was a little corn grown there but there is not much at all but it is really good for tobacco, though. So, they focused on fertilizer, so you had companies like Monsanto and Roman Haus coming in and they said, "Well, we will do some of our research work in the Research Triangle Park," and he said, "if you are going to be in the Research Triangle Park at least 50% of your budget has to go to pure research." And they have another 25,000 acres around where people could do additional manufacturing. He would make it easy for them to do that.

Here is what happened, we took the Monsanto model. Monsanto XXX comes in and they start doing, in the early '70s, they start doing agricultural chemical research, well that was their business in the late '60s and early '70s. So, they started looking at their own processes and they said, "Well, instead of doing our research work in St. Louis, let's start doing it over here since we have invested the money." So, they got into some things like hollow fiber for separation of hydrogen and nitrogen to make ammonia or to separate CO₂ from waste streams off ammonia plants.

They had bought Envirochem, which was second to Kellogg, the biggest builder of ammonia plants in the world. So, that was in their bailiwicks. They are looking for ways for

improving the recovery and putting through waste products, they use to put them into the air in those days so they developed hollow fiber technology. Well, some of the people who were working on hollow fiber said, "If you can do it for that, why can't you do it for other things?" Monsanto said, "That is fine but we do not want to do that." So a couple of them left and I was working for Air Products at the time, air products was looking for new technologies for separating air that were non-cryogenic, equals, high energy cost and they said, "Well, not everybody needs 99.995% oxygen or 99.999% nitrogen. A lot of people just need 99 or 99.1 or 99.2 or 99.5 purity and you can get that off of hollow fiber at one-third of the cost. Now it is a generator so it is pretty steady. So, why do you not put that plus a cryogenic lipid tank for peak shaving?"

So, they built hybrid systems and that is the way the industry works right now but they hired two people who worked at Monsanto who had this idea and they came to Air Products, Air Products says, "Well, we will hire you." I worked down there when Jack Welch was the division manager for GE. Met him, he had just came in, they had bought their first semi-conductor plant in the west coast and our goal which was a brilliant thing with Jim Hunt's because the second morph went from agricultural chemicals to plastics because back in the days of the world the synthetic fibers were, Doe, they were DuPont, they were Monsanto got into it, Roman Haus got into it and so they got into the technology for developing more cost effective ways of making rayon and nylons and those sorts of things. The interesting thing about that was the research was done at the park and now these companies were putting plants, because they wanted to be close to their research, close to where it made sense economically, shipping utility costs, access to raw materials but in the state so Wilmington, North Carolina got it.

Well, in the expertise of fiber business in the park lead to the first fiber optic plant company which was Corning and it built a research facility, it built its first plant down in the Wilmington area. You can see how the evolution comes here from one to the next, to the next and in the meantime we are working with atmosphere, high purity atmosphere because the semiconductor industry is looking and this is back to the '70s and early '80s, that was the growth industry, it was a clean industry, we know it is not clean now but it was clean then. We felt phosgene and arsine were clean back then but we understand that they are not now.

That was a big opportunity for me because I was the Air Products guys and we and Fairchild Industries were the first two companies in Silicon Valley. Fairchild is across the street, we piped high purity gases under the road and today Air Products probably has 70-80 miles worth of pipelines, maybe more, I do not even know. So, I went up to a guy who was our sales manager, the chair CEO president, invested in a couple of my companies, I still keep in touch with him, told him, I said, "You know what, I think you ought to take a chance here. We have to step up and take some risk here because this is where the state wants to go and if you go out there..." And I was traveling occasionally out to the Silicon Valley, even back in the mid-70s, late-70s; it was not a place that I wanted to work. It was just one, one-story building concrete, flat roof, after another and people who would drive a half mile to work would take 30-45 minutes to get to work. I said, "That is not it." The one thing North Carolina has was that it is a really beautiful state. It was the mid-south climate, it had, like California, a little more distance, it had ocean and mountains, they were not as close together but you could offer that and the education system was getting better and better.

That is one of the things that were really important, that Jim Hunt saw. He took Terry Sanford's vision to the next level. He said, "The brightest people in the world are going to work where they want to work. So it is more than just work, it has got to be safe, it has got to be clean, there has to be things to do after work and the education system has to be sound." He started focusing on the eight years he was the governor and he was a democrat in a state that did not have a republican party but today he would be considered a moderate conservative republican.

He was a fiscal conservative but he was a business oriented lawyer from a little town about an hour east of Raleigh called Wilson. He started putting these components together, he said, "Okay, quality of life." He did the little things, he started the highway beautification program and if you ever drive through the Research Triangle Park in the spring or early summer, anywhere you drive they have a Wildflower Program.

Here we look at Popeye's bags and bones, they look at color but that is part of an educated community. They do not have political transparency problems like we have down here, which makes the papers everyday including today. They do not have the political problems with corruption because educated do not stand for that. The most competition that you see for any university in the state of North Carolina's head university is North Carolina is because it is an excellent state university, it really is.

My son has applied to UNC, Wake Forest, Clemson, NCC; he wants to be in that area. He wants to go into genetics and that is the best industry in the country maybe in the world and that is where he wants to go. It attracts more people.

My daughter went to school up in Sweetbriar, Virginia. Virginia and North Carolina, to me, I think are the best places for kids to go to school. I think you go to a more rural or non-high urban concentration for undergraduate and do your research works in an urban area. I think that is the best colleges that work. I did mine the other way around but I am not suggesting that is the right way of doing it. So, I went to college in North Carolina, I went to Elon University which gets country in there. My daughter, this morning she called and told me she finished her master's thesis and it's going to the editor. At 31 going to be 32 here in a couple days, she is the assistant to the dean at business school, which is number five-business school in the country. My son-in-law went to Duke, he went to Elon undergraduate, Duke for his executive MBA and he got a medical industry certification, which is another nine hours.

My son, who went to Elon, now is in Miami still talks about to Duke business school not because dad went there or his brother-in-law got his MBA there or his sister got her masters there, it is because I think they do understand the states that really put emphasis and can afford it because California had a good education system which I think really started falling apart in the '80s. Now it is going to be close to bankruptcy. North Carolina is not in that situation because they have just a very different program.

So, that is kind of a round about way here, I think you have to have leadership and leadership comes from a lot of corners but you need leadership coming from a champion, you need a champion who understand business who is not threatening to business, not threatening in academia, not threatening to the political world and that took a long time getting around to the three components I think are the most important things. I think we have gotten there yet. Economic development happens because you have got business and academia coming together.

We are talking theory or if that is just going too practiced their execution and government facilitates it, it is not created by government. Some R&D is but not much. There are products that come out of R&D programs with the government but not much. You have to have those three things together and you have them understand that is the role. Some of it has to be confidential but the process has to be transparent. If you do not trust the process, you are an academic and most academics are not going to make their livelihood running or starting businesses like you and I have started there. They are going to do it teaching and they may make some money consulting or they may have an idea. It is just a different skill set, different skill set. Difference experiences, different skills, different personalities, different interests, they are just not interested in it. They are interested in it happening, they are just not interested in making it happen. But government's role in this is something that Terry Sanford understood. I do not know yet if Jindal or Ray understands this yet but they may, I just do not know enough. Nothing judgmental I just do not know I am ignorant.

I will look at Mr. Sanford, is it S-A-N-F-O-R-D?

S-A, N like Nancy, F-O-R-D. It is Terry Sanford and the Research Triangle Park.

I remember his name.

He ran for president in 1968.

That might be why I remember his name but it might have been in my research, too. I think I captured most of what you were saying were the factors and they were good and some of these I missed to be bluntly honest with you. When I was meeting with Sandy Baruah, I realized that I did not explicitly call out leadership, which is probably the most important factor I could

have. Then it is not explicitly called out in literature. It is just not, I do not know why looking back, as you have explained very well; it is probably the most important factor. Most of the literature missed it.

This is not my first thought on this, about 20 years I have been talking about when I go to Loyola before Ryan was there when Randy Newman (??) was there and Terry Dotry is in his teaching spot there, I go in to talk about situations, this is what management can do, people who have worked in the real world can do. You can go in there and say, "Let me give you an example when you need management, let me give you an example of when you need leadership." They are not the same thing, you need both and there are different kinds of leadership and there are different kinds of management. Different situations call for different mixes and this is sort of a permutation of mixing the better people are the ones who understand it and can note it and adapt to it. Now, the good thing about a lot of leadership and all of management is you are not born with it, it is a skill, and you just get better by doing it.

I agree.

It is like getting on the driving range and hitting golf balls or shooting hoops, some people get it faster than others but everybody can get there and that is what I tell students.

I tell people the same thing about entrepreneurship when I have been asked to talk in different places about it. You can teach the basic elements of entrepreneurship, you can teach the nuts and bolts of it but then to actually go out and do it, there is a lot of blood, sweat and tears for one thing but you also just have to have the knack. It is more of an art form. You are

artesian if you are doing entrepreneurship and that part of it you cannot teach to people, you can teach them all the basics but they have to take it from there.

I went and started up my first company when I was 49. I did I because I had made a lot of money with Freeport, I trusted up both my kids, if anything happened to me they were going to get through college, through graduate school and have money to get started on their first house which was more than I got when my dad kicked me out of the house when I was 18 and a lot more than my wife had. She came from a lower-middle income family and has a work ethic similar to mine. I had good education, terrific experiences with the top of two companies, I started as the Vice President of Corporate Development for Freeport doing mergers and acquisitions, I came back as their EVP of international, I was running a 17,000 person organization with a five billion dollar revenue stream out of Indonesia and I thought, well I can really minimize that risk.

Eighty-five percent of the problems I saw started in companies I had never seen before in my life. What I did have was the confidence that I had enough intellect that I could work my way through the problems. Somebody whose name is Graham Perry works for Sass Institute, statistical analytical systems with is the largest private held software company in the world, its founder is a fraternity brother of mine, name of Tim Goodnight but Graham came to me from IBM, he was with Nortel then with IBM, he was the storage advisor to Lou Gershner. Graham came to me one time, we were having a really hard time with the company Arsenal Digital Solutions and he and I were the only two strategic thinkers in the company. I had guys that were really but I could not get a strategic thought if it thumped them over the back of the head.

Grahamm was not an executer, he would tell you, he said, "Do not give me any work to do," he said, "but if you want..." there was a value to me for I needed that.

We were out of cash, it was Saturday morning and the bank was doing a payroll draw and we did not have enough to cover it and the whole company is just going told-up on Sunday morning and we were in there trying to work through solutions. As you know, when you start a company like this, I had about a million one, million two of my own invested in this which is a lot of money for me, I am talk to Graham, Graham stepped back and he said, "Listen, all your employees, your directors, your customers, your strategic partners, your suppliers, you investors, all they want to know, let me tell you what they do not want to know is, what they are not going to be concerned about is that your are having problems. Everybody has problems. They just want to know, not as problem solving, are you in control or are you out of control?" It is that simple.

You do not have to have the solution but they want to know, are you in control? So, I borrowed that back in 1999 and I have used that... that is where leadership comes in. I called my team in on Monday morning and everybody in the office knew because we have a floor in the building, we went from employee number one to 186 employees in 18 months and we had cubicles that were about this big, you could put a phone in there or a laptop but not both. That is how I described it.

I could leave the office at nine or 10 at night and say one-quarter to one-third of the employees were still working there, we never asked anybody to work a day late. We had a downturn in 2000, had to lay people off we had people crying in the door saying, "Listen, call us when you get back. We want to come back." It was one of the most rewarding, wonderful

experiences of my entire life. So, I called the management team in and I said, "Listen, here is our problem." And our CFO was brilliant, he was a Wake Forest undergraduate, he was an NCAA scholar athlete, he was one of the top pitchers in the United States, great guy, smart but he just wore his emotions on his face. I came in there and I said, "Okay, here is what we are going to do. We have two things that we have to worry about, one is we have to execute our plan and the second thing is we have to raise money."

So am going to take the CFO, myself and this one person from accounting and we are going to focus on raising money and we are going to realign responsibilities for the interim here so that you are going to this, you are going to do this. Any questions how this works?" A couple questions came up and I said, "Are you comfortable that we can get through this, do you believe we can get through this thing or do you believe that we have a really good shot at getting through this thing?" One guy said, "Well, we are not leaving here." I said, "First of all, everybody who is in the room here knows that something is going on." And they know the door is closed so they know that something bad is going on. So, I am not letting everybody out of here until we look good. The CFO was staring like this, so we start jumping on his ass that was our way of doing it. We were very irreverent, mutual abusive group of people who had a lot of fun and just foul mouth as anything, joking around a little bit. Finally I got him to loosen up a little bit and said, "Okay, listen, you have to go out of here looking optimistic and laugh."

With a joke like that, they are laughing when we open the door and they walk out, everybody came out and you could just feel the tension drop. I just called out because you could do this, I said, "All right, everybody listen. Come on up here, I have something I want to share with you." So everybody came on up and I said, "Listen, here is our situation. I just want to tell

you we have a plan. Let me go through what I got to tell you what the plan is.” I use to manage Moffet like this, we would have problems and people would come to me and say, “Would you take this problem to Moffet?” I became a letter carrier. I need five minutes but let me go from A to Z.

We have a problem, there is a solution, I am on top of it, you do not want to worry about it but I want to tell you what is going on. I said, “This is it.” I said, “Steven and I are going to focus on raising money and we are going to realign operations here so that some of the things I am doing and some of the other stuff over here is now going to report to here and this is the way things will work and we believe we are going to do this because we believe we can get through this.” And I said, “Are there any questions?” There was silence and one guy raised up he said, “What do you want us to do?” And I said, “The best thing you can do is just execute. Just do not make any mistakes because we do not have anything to fix the mistakes right now and let us get this.” I said, “Are there any other questions?” There was silence.

Somebody else raised their hand and they said, “Are you sure there is nothing else we can do to help you?” And I said, “No, thanks very much but let me just share,” I said, “This is not going to be easy. I think we can get through it. If you do not want to go on this ride, please tell us now not later so we can make adjustments internally here.” Nobody left everybody went back to work. I went to the bank. I told them the story and I had taken over some debt when I acquired a company that moved us from here up to North Carolina, which was way in the fall. We had made every payment to the point and that morning by about 11:00, I got them convinced to lend us more money just based on, we had a plan, and we were in control. We got our payment back and we got our way through it.

You cannot teach that. How did I know it? I got a little guidance from Graham Perry and the rest of it just seemed I will use the word, intuitive. I had no other option but to go back to the people who had lent me money as irrational as this sounded with nothing else and say, “Not only can I not pay you, I cannot pay everybody else but I want you to lend me more money so I can pay everybody else and then I will get back on based solely on, I am the guy that can execute, I have a team in place, we have a never thought about that on Saturday morning.

I will share some of my own experiences on that after we finish the little part of this interview but I could not agree with you more. You have hit on a lot of variables that in my studies and just in life that I have seen. A few of the things I am using, as analogies to technology-based economic development within a region are corporate development, which you have aptly described, and product development, which you also described. I actually have a little diagram showing a series of product development activities. If you apply those same concepts to a regional technology-based economic development initiative and all of the other variables you have identified like environment and leadership, they are things you can measure and there are things you cannot measure. It is not unlike building a company. The things that you have described in Research Triangle Park, if you said, “Okay, my company is Research Triangle Park, Inc., how do I build it?” Well, I need venture capital, I need capital and you put it together and go to the bank but then you have to execute. Let me ask you to do an exercise for me.

Okay.

(4) The next six questions list and describe factors that may affect regional technology-based economic development in an attempt to identify the population of variables that impact regional technology-based economic growth. For each handout, please review

each factor and the variables listed that comprise and describe each factor, and answer the following questions for each.

Open the document that you have there to page 6 and then we are going to go through, this is kind of the meat of what I am trying to get to in this part of the interview, the six factors that I think are distinct in qualitative and quantitative are distinct factors that effect whether or not a region can develop a technology-based economy. Not exclusive of everything else, maybe in addition to, it can be a region like New Orleans. I find regions are either neophyte, adolescent or mature. Neophyte, like New Orleans, just some really good things, some really bad things but have not gotten it together yet. Adolescent is more like Huntsville, you know, Huntsville has an extraordinary Aerospace community, 25,000 jobs there directly because of Huntsville space center and missile defense but if you pull those two government entities out of there, Huntsville is an agricultural community that does not have any technology. They are extraordinary but they are so dependent upon one item, they have not matured enough.

Then there are places like Sophia Antipolis, I am sure some of the places you have been, the things you sent me about areas you saw in Arabia, Research Triangle Park, Silicon Valley, that are mature economies from the standpoint of they have become self-refueling, they have become self-sufficient. It may have taken 30 or 40 years to get there but they are. You pull any one thing out; they continue to stand, not like taking one leg of a stool off. With that background, what I am trying to have you do is look through the six following pages, look at those variables and factors that I have. Are they good, is anything missing, should some be eliminated? And then if you can, grade them, either by putting number grade or an A through an F and what I am trying to do is add them up to 100 on each one but it does not have to.

When I did Bob Fudickar, his stuff added up to like 170 on one and 90 on the other and I am going to go through all of that. If you do not mind, let's run through these pages. By the way, I will not tell you that shuffling papers blocked voices] are leadership and marketing that you pointed out and everybody else that I have talked to has pointed out as well.

First factor, environment. The environmental factors you have mentioned some of those such as the quality of the education system K-12 and then the undergraduate, graduate and post-graduate programs, regional university system, we talked about, of these items, these 10 items that are on here under the environmental factor, can you grade those?

Let me grade them. That will be easier than putting a numeric that adds up to 100; I will let you do that. Quality of life I think is extremely important so I would give that an A. I will use the A through F thing. Support for technology initiatives is an A. Availability of technology savvy investors is thinking is probably a B-. Technology population... I actually focused on that this morning, I would put that as a C only because I think almost everybody has it so it is sort of, and it is not the differentiator here. Non-economically disadvantaged workforce... I give that a D. Non-technology infrastructure that is a C. Talented educated workforce is probably an A-. K-12 is an A-. Nine is an A+. And regional university system I would say, if it is integrated, is a B+ if it is not integrated I would say C because I think they all got strong regional's so that would disqualify those.

Okay.

Environmental I assume is like infrastructure.

The environment of the area.

There is an element here that I have only recently the last couple of years focused on here and that is weather because depending on the industry, I have people tell me that they need to make 10% more money here because of the lost productivity when people have to evacuate. So, you either adapt to that by being virtual or you have to build in a cost to that.

I agree. I have found the same thing, I have people who I have tried to hire, they will not move here for that reason.

The second factor is rarely called out in literature or by individuals, and that is inflow. I simply think of it as a balloon. If there is more air going into a balloon than is going out it is going to expand. If there is a hole in it, it is not going to expand, it is going to contract and regional economy seems to behave in a similar way. Maybe worldwide economy, we are pumping more money into the worldwide economy in an attempt to get it to expand more. This is thinking regional and thinking technology-based, these are inflow factors.

I would say equity capital, other words, financing, equity or debt financing, the capital structure, I could say is a B- because I think money is spongable, money will chase deals, deals do not chase money. Inflow of talent, I would say that is probably an A or A- somewhere in there. Inflow of ideas and innovation, I think that follows talent. An R&D grant is a B+. I do not understand revenue outside the region. What does that mean?

In other words, take Freeport McMoran, headquartered here, operations all over the world, a lot of that money flows back into the company and then flows out into the community.

I would put that as a C because the excess usually goes to the stockholders who are wherever there. Science and technology funding I think is very important, I would say that is an

A+. Private funding I would put as B. Retention of capital... that has got to be a B+. R&D expenditures...

Previously we had the private R&D expenditures; this is university R&D expenditures.

That certainly important, I would say that is a B+. IDO funds for... I would say that is a C.

A lot of these factors are measured in government reports and I think a lot of it is because they can be measured. So, they measure what they can measure. Not necessarily what draws the outcome.

Attitude, and again, this is rarely identified specifically as an attitudinal factor although the sub variables are such as tolerance for entrepreneurship risk.

I think that is an A+ and I would take tolerance and change it to maybe encouraging entrepreneur risk. There is a great study at another time to look and see back when Jim Clark before he started Netscape, look at his experience with the University of Illinois and look at his experience with Stanford. The quick answer is the universities tried to grab too much and so he walked away from University of Illinois, which had developed mosaic at the time, which was the first browser. He hired six engineers who developed it and they developed Netscape and the University of Illinois had it in it nothing. He made a whole bunch of money and gave it back to Stanford. That was the second billion-dollar idea. I think that is important. Willingness to collaborate has got to be an A. I do not think entrepreneurs and I really do not think research scientists at universities like to waste their time competing with each other. They would rather be doing, so I think that is important. Image of creativity and value creation and even value

sharing I think is very important, that has got to be an A. Value placed on human... I hate, this is going to go over 100% that is very important. The human capital, when I say human capital I would include educated human capital. Responsiveness to innovative investors that is certainly a B maybe higher. Active promotion of the technologies sector, this may sound surprising, I would actually say that there is a lump on that. If you change your business by offering the state to become a more entrepreneurial technology driven economy, there is clearly the getting the word out period of time but after that, I think that can become self-sustaining so I do not think it is that important in the long term, people know that, you do not have to promote it.

You are right. I completely agree with that.

I would say C; I would place that as a C+. I would place number 8 as a C; I think if it makes business sense then the investors will chase the deals. I think that number 9 is an A.

In number 10, these are just quantitative metrics that are captured typically for a region. I put technology fast 50 because I had made the technology fast 50 once but there are a number of different lists like that. You do not have to do the break down of A through D; I am just trying to show what I meant by entrepreneurial focus.

I guess I do not understand what we are looking for here. Sorry.

Well, the importance of, realistically the importance of these four sub-factors A, B, C and D tied together. These are the things that the government specifically measures and uses as a metric and an indicator of the technology potential of a region. Again, it is something that if it can be measured, it does not mean that it is right, it may be unimportant.

I think A is a B. B is a B+. C for that or comparable I think is probably a B. D which is measurable I think is, I would put that as an A, that is sort of a bottom line end game.

I have only put five items under the policy factor because you could actually put 100 things here but I am trying to get these major categories. This is where the government does something. They do not necessarily do things right but they do something. You mentioned the word facilitates, a lot of them try to do a lot more than facilitate and a lot of them do not even do facilitation. Of these five items, I guess the overall questions is, how important is government policy in general but of these five items, I would like to rate those and see if there is any major thing that you think is left out.

Well, I think a business friendly tax structure is extremely important, so I would A that one. Tax breaks I think is a B. Let me think about number 3... that is probably a B. I think 4 is a C. Number 5 probably is a B+.

Okay.

Knowledge, now I covered some knowledge items in environment, K-12 education but that creates an environment that does not necessarily create a technology-based economy. Knowledge factors though, I am not going to be prejudice, you tell me.

I am assuming that K-12 is reading, writing, arithmetic, fundamental skills and this is now more specifically focused on as technology.

Creating a technology environment.

A+ is number 1. A is number 2. B for 3. Collaboration, would that include informal things like meeting at the Bridge Lounge?

No, that is under social.

Okay.

This would be Loyola University look at putting an entrepreneurship center which is more of that leadership which I did not want to fund but they had originally come up with the idea of coming up with an entrepreneurship center.

No, Aldon, it was... it was under Terry Dotry but I cannot remember the professor's name and when Bill Locander came in, he kind of changed it into a leadership institute and I do not have any interest in a leadership institute.

This is a formal training as opposed to informal, social networking, right?

It is a formal effort to do training and collaboration.

I think that is probably a B-. I would put number 5 as a C. I would make number 6, A. Number 7 is an A+. I have to break these all up because they are all very important so you are going to normalize me. Eight, I would put it certainly as an A. Number 9 is also extremely important, A. Ten would be probably a B+. Eleven I would have as a B+. Twelve I would have it as an A-. I might even lower the twelve and the reason is I think that follows the success rather than leads the success.

Social factor is the last of the six and I have broken all these variables up into, this really is, when you talk about people getting together after work type of thing.

I think that is an A. And change I assume embraces risk, culture of... risk acceptance or even encouragement so I would put that as an A+. Dense social networks I put as probably a B+. Collective learning probably a B. Geographically clustered technology base... how does that fit into a social?

What people can interact with one another? In other words, how important is geography versus a virtual cluster?

I think it is probably an A-. That has got to be an A for number 6. I would put 7 as a B because I think that happens after success. Collective identity is a B. And number 9 I would call an A+++.

Good.

Having looked at all of those, these are the factors that can be identified. A lot are measured because they can be measured; they do not necessarily measure things that they do not know how to measure. That might be more important and that is kind of what I am trying to get

to is the qualitative effective variables and most of the quantifiable variables. Looking at those things, do you think they actually affect technology-based economic development or are we just doing things and measuring things because that is what we can do and measure?

I think they do. I moved two companies to Research Triangle Park and two to Denver, one software and one telecom company went to Denver because that had more than enough code-writers and it had telecom infrastructure out there. I moved two companies from here to Research Triangle Park, one of which was because the industry we were chasing with the software company which was the health care sector, was stronger there than it was here and I knew the infrastructure there. Second was I acquired a company out at the Research Triangle Park with a data storage company and the choices were stay here or go up there. We left an office here and moved there and it was easier to hire people.

Given that experience, which is outstanding, these six factors, environmental, inflow, attitudinal, of the six, do you think some or more important than other or some or much less important than others? Think in terms of why you moved the companies where you did.

I actually think that... do I look for the six on the same page?

Right. Go to page 7, these are the ones that were in the break downs.

I think attitudinal and social are at the top of the list, right behind it with the knowledge factor, the environmental factor. I have given you social? That was on top right?

The last two are inflow and policy.

My next ranking would be policy and then inflow because I think they happen in that order.

As I mentioned in the beginning, I know I left out marketing and leadership as specifically called out elements, any other major elements you think we have missed in this discussion?

We may have picked this up. I do think this... the widespread belief or impression of political climate here is something that bothers outsiders but not insiders. So, if you are going to bring... if inflow is an issue that is going to get some level of consideration. When I talk about leadership, I think there is leadership at the macro sense of the state but it is really, I think you want to get leader managers here as part of the inflow. We have sort of what the Australians call the tall poppies syndrome and unfortunately I think our country is moving towards that. It is more of a socialist government orientation where we, if one poppies rises above the field, they cut it off. Here, for so many years, the culture, the best job you could get, would be get a job working for one of the chemical plants on the river. Secure, solid, minimum wage, protected by the union, get your time off, it was done pretty well here.

We do not celebrate knowledge; we do not celebrate survival. We have agents who come into this community, I lived in Asia, there is a deeply imbedded belief in Asian cultures, generally, because every Asian country is different in their cultures and sub-cultures that education is the ticket out. Wherever you are, you are out. I use to tell people that life is too easy here. If it is really difficult, people tend to do more like if you play your best game against your best team, if it is too easy your best game is not there, you do enough to win but not performing at your best.

There is a reason why people on the equator do not have the same concept of time as the people in northern Europe because they can harvest bananas or papayas or whatever, rice, two or three times a year, in northern Europe if you do not plant in the spring and grow in the summer, harvest in the fall, you starve in the winter. There is a reason why most Asians and Indian subcontinent people work harder over here for education that is because, in this country we have an environment that risk taking and failure is not only acceptable but maybe desirable. Walt Disney wrote that so many times on his sleeves. The fundamental thing on an international sense is most people believe that in America, the reason they are attracted here is that we have more opportunities than we have people chasing them. The rest of the world believes that there are more people chasing fewer opportunities and when you take a look at how they even do business and I think that can be collaborated.

We look here and our goal is to minimize the number of people between the person who is actually manufacturing that and the person who is buying it. The Internet has changed that; we have stripped the middleman out and saved all this money. Go to Asia it is exactly the opposite because what they do is they say, "Well, because there are not that many opportunities and we have these family obligations which we lose as a county of immigrants." When you came over here you moved away from your nuclear family so those bonds get weaker and weaker and they are broken down to the point that in some cases we do not have either parent in the family with the child.

The Asians squeeze as many people in between because there is an obligation between those who have some and those who do not have some and also diversifies their risk, they do not get as much but they get something. If you go and stand in line at the airport in Taiwan, nobody

stands in a straight cue, they all rush up to the counter, if you go out to the taxi stand or the bus station they all come out and the reason is, the mentality actually carries over subconsciously that if they do not get on that bus there may never be another bus. So, they all rush up, we all stand in line and get pissed off, in America we say, "Wait a minute, we stand in line in our country." Well, they do not do that.

I laugh because the first time my wife and I went overseas she was commenting about the same thing and now it is just kind of old habit but here we got in line but it went to the first person. Now, I went to China for a few weeks with Jay Bennet Johnston and it is the same thing. You are absolutely correct, I had not even thought about it.

Red light, you pull all the cars up here, all the little mopeds fill in between. It carries everywhere and the whole thing is that you have to get the opportunity while you can get the opportunity and we say, "Well, it is undisciplined, it is offensive, it is not polite, it is rude." It is not, it has nothing to do with that. If you understand... people talk about the Chinese and the Indians who will not be like American oil men who shake their hands, do not even need a contract to do something, they keep negotiating, renegotiating after you got a contract they keep renegotiating, renegotiating, renegotiating. That all grows on the same mentality that they continually try to improve their situation because they just do not know when they are going to get another chance. We look and say, "Wait a minute here, we are just not your honor" That is a cultural value we have is that you have to basically set aside and go work over there. You work with the Japanese, their process is very different. They are risk averse because there are fewer opportunities, there are more people than there are opportunities, they do not have any natural resources so what they do they have to do correctly. So, they spend all this time on the

front of a negotiation making sure there is absolutely nothing going to go wrong when you do the business deal. When they want it done they are off to the races. The Saudis are very much like that as well. Saudis have a different culture because they know they have oil and money, oil equals money over there, and every scam in the world has been tried on the middle easterners. So, they will bring in, I am working a deal right now, they are bringing in Morgan Stanley, Morgan Stanley is not adding any value in this whole process, he is another investment banker, except that the Saudis who are investing trust Morgan Stanley not to cheat them. That is a cultural thing.

That is interesting because growing up in Bayou Lafourche, a town of 500 people where things have not changed in 100 years, 80% of the people I went to high school with went to work in the oil field or on the river at a plant, could not believe I was going to college. Made fun of me when I got out with a masters and I was making half of what they were making. They could not believe I had wasted that much of my life going to get educated and then I hired one of the guys as a security engineer that I had grown up with and I had worked 80 hours a week. I asked him one time whether he could come in on a Friday afternoon, he said, "Well, I am going fishing." He said, "I already put in my 40 hours." I said, "Johnny, I work 80 hours a week." He said, "Well, Bobby, you can do that if you want to but I am going fishing and we are going to have a crawfish boil this weekend, you want to come by?" It was just the laissez-faire attitude in Louisiana and I love it, love that culture, grew-up in that culture but it is conducive to entrepreneurship. It is not conducive to economic growth.

You cannot have your whole state based on that. My wife was told she went to a catholic girl's high school and the nuns told her she was not smart enough to go to college. Well, my

wife went to Nowling University but in those days you got an LPN after two years, an RN after three and there were a couple of programs around the country that had RN's with a bachelors of science so you got a BSN and she went to DePaul University in Chicago where she got a BSN. She went and got her masters degree and actually graduated the day before my daughter graduated from college. I talked to my wife, I said, "How many people never ever even tried to get to their potential because some, perhaps well intended person said, you know you do not fit the model that we see as going to college so you ought to be looking at a skill, you need a trade, do not be thinking DePaul University, be thinking Delgado, be thinking welding and go out by the river and if you want to go there well work as a secretary because you could probably do that, we think you could do that." Well, she graduated with like a 3.85 average from college and she graduated somewhat straight A's with her masters but she was not smart enough to go to college. I think we celebrate some of the wrong things, we celebrate poor grammar, we celebrate poor politics, and we celebrate the wrong things here. We do not celebrate the successes of people like you who broke the paradigms. Not enough because...

We celebrate life in a lot of ways but we do celebrate some things that make us unique that are negative perceptions to the outside world and I have told this story one thousand times, having grown up on a bayou, having a degree from LSU and from Loyola in New Orleans and local schools and having an accent, I have lost most of it but I still have some, I have to go prove to people on the east coast and California and in the northeast that I am not too dumb to do business with them or too crooked to do business with them whenever I leave because of being from Louisiana, having a Cajun accent, having poor grammar because I never learned it, I never had a grammar course. You have to prove differently and I do not think most people in Louisiana recognize what our celebration of life does to our image elsewhere, it hurts us, and

again in the technology field, but it hurts us in those fields. At the same time there are a lot of people playing it just the way it is.

I think the question is balance; we do not have the balance.

That is a very good point.

I think actually, you work a lot of hours, I work a lot of hours and actually we work too many hours. Retrospectively, do you know where your kids are? No, I do not have balance in my life. Now that my kids are gone so I just put more into work. My wife does not get anymore, my golf game should but maybe it should not but it does not get anymore time and I have not had a vacation in years and this is the way I go but I really do enjoy doing what I do.

But you love what you are doing; I love what I do.

First of all, you cannot work 80-hour weeks and not love what you do. It will become really tedious and it will be painful so you cannot do that. I think the thing that we have to do is we have to celebrate not something at the expense of something because we needed it because we are hard at work we celebrate all these things. We have to celebrate our festivals, we do, one of the things I love about living down here is pretty much March through November you can go one, two, three, four places on a weekend within a driving distance and be at a festival somewhere and have a really nice day. The other thing I love is the fact that we have old homes; there are lots of bed and breakfast around here. My wife and I do that all of the time. Especially since the kids are gone. To go out we will go to Naches is a place we go to regularly, we go to New Roads, we go to Natchez we go up to Vicksburg, we go to St. Martinsville, we love it.

It is the great quality.

But what we do not have, we have what you can do after school and after work, we do not have school and we do not have work.

Good point. Very good point.

The way to do it is, there are people who are risk takers in life, like you and me, is we lost some of our own things so we can do work and then we pay fifteen grand a year to put our kids into Country Day...

Because we want the lifestyle but you are right, it makes it much harder.

Sure. You go to North Carolina you can live, you pay more taxes but you can live for less money.

Because you are not paying for a lot of things that we pay for.

Exactly.

Let me ask you one more because I know we are about out of time and you have been very kind to give me this much time.

I am sorry.

No, no, I am learning every time you say something. Look at question 8 on page 14, I am going to ask you to do something a little different than when I asked regular people I am interviewing because you know a lot of regions. If you look at some of the regions you know, can you tell me some example regions for these different categorizations and just thinking globally of these 6 factors and the other items you have mentioned, what regions have performed

at minimally and really what I mean is poorly or average and I clearly put Huntsville in the adolescent areas or really done well at it and now you see a technology-based economy booming.

Let me start from number 5, there are several I think the Research Triangle Park does it very well, I think Ontario Center of excellence does a very good job I love their model. Singapore Technology Park does a very, very good job. The Wiseman Institute in Israel, their technology is a great one. They are mature but they have done well. Performing well, I would say the Silicon Valley and I would not put it in excellent and the reason I put Silicon Valley is I think it jumped out without understanding some of its environmental impacts. Performed average, Huntsville is clearly one; I am trying to think of where that Mercedes plant is...

Outside of Birmingham?

When you take interstate from Mobile up?

The big Mercedes plant outside of Birmingham. Birmingham, I had not thought about Birmingham but they have a great medical community and they have several plants that around. I will think about Birmingham, I had not though about them.

I do not think it is not quite in Birmingham though it is south of Montgomery I think.

I think of that as Birmingham region.

Performed well I would put Houston.

What about Austin, know much about Austin?

A fair amount. Austin performs well. I think San Antonio performs average especially has done a pretty good job at reinventing itself a couple times. Performed modestly I would throw in Mobile. Performed average I would put Atlanta. I actually think Atlanta is starting to decline. Performed minimally has got to be south Louisiana, I see no break out in any of the cities here. I would put Mobile in there; I think there are too minimal things there. On a global basis, I would, as number 4, I would have to do it by sector here, is the airline manufacturing sector in Brazil which is basically one company but that was a 40 year commitment of government that did not start making money for 20 something years. In terms of countries that perform well, Chile performs extremely well. Singapore performs very well. Mumbai, India performs very well. Bangalore also does the same thing. I think Sidney, Melbourne perform modestly. Darwin, which is a small city, actually performs well but there is a certain threat and isolation that they have to... so I think Shanghai performs excellent.

Do you know much about Limerick, Ireland?

The 1990's someone totally reinvented it. I just do not know about it.

Let's finish out with two quick questions and you have answered a lot of this stuff. Look at a page 19.

Your model?

That is a very simple diagram, overly simple. I can actually take the information I have gotten from you and others and my own research and I can put it into mathematical formula. Now, I know a mathematical formula does not tell you what to do in a region but we could actually make it statistically significant but I am not trying to do that. What I am trying to do is

have a starting point for people to look at the way they do things and say, “Oh, I am not doing this, I am not doing this, I am really weak at these, I am really great at this. Now I understand if I just address these two factors and address them with all my might, I am not necessarily going to get there because of these other things.” For instance, if Louisiana would just clean up the litter, we cannot do a lot of other things we could do, that image is so critically important, you have mentioned image a few times. With that said, do you think it is even remotely feasible to model technology-based economic development and at some future point, people smarter than me determine the type of things that could affect all these different variables?

Absolutely. Let me give you an example. The businesses that are here have to be here. We are here because we have oil, we have gas, and we have a river. Those are kind of the drivers that I see that we have for our economies down here. People say, “Well, why don’t we have more manufacturing?” Because it is logical to have manufacturing here but let’s take natural gas, which is our largest natural resource down here, comes on shore and it goes one of a couple directions. It goes up pipelines across networks the United States where people use it for its lowest value, which is consumption as a fuel. It goes somewhere else where they manufacture a monomer, a polymer, a plastic or it stays here where it is made into a monomer or a polymer and then the monomer/polymer is then shipped out.

We say, “Well, why aren’t we extruding more plastics here?” Well, I think that the problem we have with some of the people who look at development is they do not understand the full life cycle of what we have here. For instance, if you take... this is a horrible Louisiana and our river comes down here... if you take natural gas, come on shore here to a processing plant

that make monomer and polymers, we then ship by rail usually, by barge and some by truck out to the United States.

What we need to do is add on here we need a manufacturing plant that makes plastic buttons but the reality is, we have a situation where we actually have a very low cost of energy here, most of the plastics excursion is done over in Los Angeles which is the second or third highest cost and energy in the states, Hawaii, Alaska, California, I think have the three highest costs of energy. It is a major component with the product. The monomers and polymers are not made here; they are made over here.

So, I would say that if you look and say, well this is what we need here... then this has little products that come off of this, okay, and they go out to the markets and then when the products are through, they go to landfill. Well, we have an opportunity here which I still think is available to us and I use it as this market here, the plastics go out to the market, now we have plastic trash, it is all mixed. Two things have to be done, it has to be cleaned, it has to be sorted because plastic does not equal plastic you can do some things with some.

About three years ago, Kerr-McGee which a big oil and gas company had a division. Their division was they actually creosote treated timbers for railroad ties and they said, "Whoa, the environmental liability of putting carcinogens into the ground around here has far less value than it is to stay in the business." So, what we are going to do is get another business and gave their industry basically less than a year notice. Kerr-McGee produce 85% of the creosote treated timbers for railroad ties in the United States.

So, let's look at what creosote treated timbers are, they are variable length timbers, if you have a big switch yard, you need a really big freaking tree to get a timber that long because they do not put them in pieces like this, if you could take the plastics that go out, the big consuming areas up in the northeast, primarily the New Jersey, New York corridor there and get on this network of one of our assets which is the river, you barge monomers/polymers up, you bring scrap back here. You take these lower educated people, wash it, separate it, and then get into a recycling business, starting with timbers; we have a rebuilding issue down here. One of the things in traditionally built homes down here is treated yellow pine for 2 x 4's which last x number of years. Plastic timber holds a nail better, lasts longer, can flood, does not mildew, does not rot, big problems we have.

So, you use the river to come back here, you take a low-educated force here, a low-skill, low-salary thing, get them the low-end work there, now go work with the universities. Find more things you can do with these different plastics, changing colors, extracting colors, do it in an environmentally clean way here. What you do is, what I have done here is I am shipping, let's just say that the products go to Los Angeles over here and then they go out the door then they go to New York and they come back here. If you can secure this and you have this here, it is a lot easier then in your strategy, I think, to go back and say, "Our cost advantage now is we have recycled stuff coming back here. Well, you can establish a manufacturing base here." If you can establish it for recycled stuff then you can go after and get this stuff because it is a lot of the same equipment, a lot of the same skills. I just do not think we have people who think through what we do in the full life cycle of that.

The whole life cycle. How do we get the next two phases and the end point?

You take a look here, another industry we have in the state here because we have pine trees is we have a pulp and paper and we have a timber processing, we make boards, plywood, particle board. So, we know what that market is those people sell to a market. If we are not going to use timber to do that but use an extruded timber from recycled plastic to it, those people who have never worked with the plastics industry ought to be working with the plastics industry because they have the infrastructure of getting to market. These people do not need to set that up, it already exists. There is only going to be more and more environmental pressure especially down here with all of our high level of moisture to reduce that. I think you need to take case, by case, by case. The people who ought to be working with Detroit on an engine that does not use a hydrocarbon for combustion are here. Why because it is going to go away here.

What we ought to be doing is putting out research and development work not improving combustions because that is the worst value other than asphalt for road, the worst value you can extract from a hydrocarbon. This is not a great wind state but we do have tides so in terms of energy, we are in the energy business and I work frustratingly with GNOA from time to time on their energy policy and I understand they are protecting the people who write them checks because that is what economic development here has been at a local basis. If I am Chevron and I write you a check for \$30,000.00 for GNOA your energy plant better be protecting me because they look at them as sort of an advocacy group rather than an economic development but that unfortunately ...

That's what they are basically...

I think that what has to be done here is that there needs to be a think tank of I would say, you need 12-15 people who have done a lot of different things, who sit in a room and it cannot

just be the creative people because I have a very close friend in my Cerato Geocarto who works in the Geocoto container he does Marti Graus beads and cups and candle sticks and all that kind of stuff, he does that, he invents lots of that stuff. Gercato a prolific idea guy, what he breaks down is execution and you say, "Ceroto, it is fine, go to do it." "Well, no, will you help me?" He takes his ideas, he goes out to his draftsman there and said, "Make me a cup out of PVC and put this on it."

I know a lot of people like that. Great idea guys, I have people coming in all the time, Bobby, I have this great idea, and want me to fund or back something and 99 out of 100 of them are going to go no where and the follow through, the execution just is not there. It is hard to tell people that. I will be honest with you; there are very few people who think the way you are thinking. There are a lot of smart guys out there and lot of them who do, cannot implement, they cannot execute. The people who have the vision to see the pieces of the puzzle and I am taking a systems engineering approach to this whole study which means you look at the whole life cycle of everything, that is the natural outgrowth of the systems engineering and people, for the most part, do not think in those terms. They think, well, all of that is great but my customer wants this so I am going to go do that and somebody else will worry about the vision and the execution.

Do you have any male children?

Yes, I have two.

Okay, I have one and the one gap and fortunately my daughter who is five years older than my son probably, even today, has probably a 10-year maturity gap because the hard things for boys to understand, generally I mean not your kids but certainly for my son, is to say that an

action has a consequence to it. If we could just walk through, I have called them decision gates, I have not called them decision trees, gates because you know, open close, open close, I think in simple terms... if we do this what happens, if we do not do it this is what happens? In action is a decision and every decision has a consequence and that is what I drill into people that in action is a decision. Doing nothing is a decision, every decision has a consequence.

What we need to do is get involved in here and if we cannot get and disrupt this infrastructure over here, what we need to do is find a new industry, ride the environmental trend, ride the recycling trend, ride the low-income trend here and then start adding value to that. Do not displace those people, put them to work in the process, attract, go back to some of the universities around here and set up the paradigms where universities do not compete, that they collaborate and maybe it is outside the state but it should be inside the state, like IPERK is with the five universities here, they said, "Well, we will all work on these energy related things here but we are not going to step on each other." And UNO I think is extraordinarily positioned for a break through.

I am working right now with West Texas and this is not confidential but he has investors and they are going to put a Green Technology Park up there. One will be on the campus of west Texas, one is a 2,000 acre tract that has already been secured just north of Amarillo and I am doing the strategic plan for them right now. Only because I have the experience in big/small business, I have had global relationships, I have done green tech and I know how to strategically plan and I am a friend of his, I was the first place he called. That could be done anywhere.

West Texas has nothing up there, nothing. You fly to Amarillo but then you have to drive 20 miles to get to his campus which there is nothing up there. And they have a unique idea, they

are seeing great technologies in Israel right now, they would really add a lot of value, people make a lot of money in the middle east except it has that Israeli taint on it and it is barred from end use over there so they are going to take this stuff up there, wash it, all the joint venture companies up there, American companies put the American brand on it which they like, they understand the process. We do not really understand it but this is what we need to do... I do not know Steven Morrey that well but I have only heard him speak a couple times when he was with Baton Rouge Chamber but he seems to be a guy who has a bit of a vision and if he can let go of his role of Secretary of Economic Development up there and sit down on an equal basis with 10 or 12 other people in the room and you had an outside facilitator, you could probably lock people down for two 12-hour days and come out with a comprehensive, executable, credible strategic plan for this state. They could meet all your tests. In fact, the rule ought to be, since you will be the expert on the metrics at this point because we are not really doing that, is that as we put these things down here...

I do this all the time, there are not many unique ideas out here but if you go to my website there is a strategic planning process on a PowerPoint slide that I use there. I want to start with vision, then the mission purpose, then I set the goals and objectives out there, then I put the strategy, then I have the tactics and then I put the metrics and then I have a feedback loop because everything changes. We need those skills in a room. This is not rocket science work, this is work that people have done before, and we have the smart enough people here. You started two companies?

Four, actually, but two big ones.

Okay, two big ones. You have been there, I have done four, two worked really good, one was breaky and one is okay. The key is there are people who have done this in the state, you have to get to them and you have to get to somebody who is going to commit 24-hours of their life and there will probably be an after life to this. There comes some responsibility once you develop this.

I am convinced it could be done. I agree with you. It could be done here.

Political will, leadership, you need a champion to do this, maybe that is what Steve wants to do.

I hope he does. Let me end the interview so we can just visit some more. One last question, do you have any suggestions for improving this interview process?

Probably putting more discipline on people like me who so they do not wander too much.

I enjoy the wandering because there are a lot of great tidbits in there.

Dissertation Interview Questionnaire – Vijaya Gopu 02/18/2009

(1) Please describe briefly your current position and role within your organization and community.

My current position is Edward Schluder Endowed Chair and Civil Engineering at UNO. Concurrent with this I also hold the position of Associate Director for External Programs at the Louisiana Transportation Research Center. That is essentially similar to a position, what you call an intergovernmental position which I held with the National Science Foundation. Somewhat similar to that what the LTRC, which is the Louisiana Transportation Research Center does is essentially buys my time from UNO on an arranged basis. It is not 100% of the time but a significant portion of my time.

That you out in the community.

Yes. So this enables me to interact with all the Universities and the State because I am kind of a coordinator for all external research remotely related to transportation and other related alias for the state. That is a very unique position.

That is a highly unique position.

Actually, the fact that you are coordinating from multiple Universities is a critical element of economic development because our Universities compete with each other too much.

No, actually, it is more than that. I think that when the Universities compete, the position is more unique in the sense that this is the only one of its kind in the entire country. Where the state has invested in one senior person in both research and administrative experience to coordinate efforts, we are competing at national levels.

Good.

So, I put together collaborative teams from across the various campuses. Right now we have a proposal with NSF for half a million dollars which is more than likely going to be funded from what I hear and then we are going after some very large center funding but this is rare we put together a team and then LTRC contributes money and my team. They are paying for my time. And then I coordinate these teams and then we also put in hard dollars through the state's planning and research funding.

So, this is a tremendous resource for the state and it is all coordinated by LTRC. LTRC acts as the coordinating agency and then I help LTRC do that. Once the funding comes through LTRC then we give tax dollars to the various Universities.

Oh, that is great.

So, the Universities do not feel that they have a boss. That LSU is the lead university on one and the subservient on another, nobody feels secondary because everybody is an equal player.

That is a great thing to do. It is very needed in this state.

Correct. That is basically my role which is pretty unique in the country. No other state has this Associate Director of External Programs at the state level. So, I am very happy that we are trying to catch our share of dollars.

And we need it; we need more than our share.

So, that is my joint role and my role to him is more of an advisory role.

(2) Do you consider yourself knowledgeable about economic growth and development?

How about technology-based economic development? Please provide a brief discussion of your background related to economic issues.

In that type of role, do you consider yourself knowledgeable about economic growth and development?

Yes. Absolutely because it is very important to us. For example, look at the stimulus bill, I was just talking on the way up here to a person who is putting together a package for energy. Then our share of the stimulus bill for energy should have a billion dollars. Is there anybody in the state who is coordinating it? I do not know. So, what we are trying to do is to find out who is handling it and how we can go after this guy with some ideas. I am assisting him, but does he need a university-based faculty team? Does he use an industrial partner and how do we go to the feds to see if we can get our share? Unless we put a proposal out there, we are not going to get it.

The biggest fear I have is we might be leaving this money on the table.

Right. I have the same fear.

At the federal level.

(3) Do you think economic growth is predictable?

Based on what you have seen and also your experience back home in India, do you think that economic growth is predictable? I am specifically trying to target regional technology-based economic growth, do you think it is predictable?

The growth is predictable based on, I mean, specific factors here I am looking at.

Right.

Not being an economist, I am looking at the factors that you would use to predict growth. Economy growth is a function of so many factors but economic growth in a developing country is somewhat predictable because it depends upon the human capital that they have.

That is what I am trying to focus on is, I am taking a systems engineering approach; being an engineer, approaching things logically, I view a regional technology-based economy as a system, with inputs and outputs. If you break down the problem using systems engineering principles, we can identify six major factors that I believe impact economic growth. We will walk through all of those. I am glad you said that because people seem to think growth is predictable, but I am not sure why or how it is. I am not an economist; I am doing this just as an engineering process.

Correct, correct. That is why I think that growth is a pretty serious step, because it depends upon so many factors but it must have the key ingredients in order to take advantage of those factors. One of the things that I see; in India, one advantage they have is not only the large number of scientists and engineers that the country produces but their language skill.

Right.

It is a huge asset and that has contributed a lot to the growth that we have seen in the last one and a half decades in India. It is being able to participate in the global economy very effectively. But one thing that they have not mastered is, we do not have cheap labor because it is not a communist country. We have no direct control, so the labor is significantly more

expensive, and the cost is more expensive than China. So you cannot compete in manufacturing like China does because you do not have that very, very low labor cost, artificially low labor cost. You do not have that in India. So, when you go to any of the stores you would find a lot of products from China but not from India.

Right. No, India does not do the manufacturing and now China is competing with Indonesia and Vietnam and they are losing a little bit more to them but India did a great job of looking at the technology jobs, numerous graduates and very intelligent people. They used to have a great arbitrage between salaries here and salaries there to start, but now they get the work because of their performance not just the salaries.

Correct. They have a large pool and also they have done a good job. Some states, I will not say all the regions, only three states in particular which have done great jobs. That is Karnataka which is where Bangalore is which is Silicon Valley of the country and another one is Andhra Pradesh where Hyderabad is, which is the cyber city. They have invested resources to create the infrastructure and provide the capabilities to be successful in the environment. You must have infrastructure, you must have the power, you must have the water, you must have satellite communications and all of that infrastructure. Both Bangalore and Hyderabad are providing. That is why they are so successful. And another one, which is kind of a silent one which is actually larger than both of these, is Chennai.

I am not familiar with...

Chennai is in Madras, the old Madras. That is a huge player in IT, but nobody knows about it because it is, so are the words, you do have the big players but they do a lot of service.

I did not know that. I will see what I can find out. How do you spell it?

C-H-E-N-N-A-I. Chennai and that is a big player. As a matter of fact, it has more IT jobs than either of the cities but they do not have those big names like Microsoft and all these huge companies are not situated in Chennai. So, they are more independent people but a big player.

A lot of international?

A lot of international, all over the country, in Pune, I do not know if you know, P-U-N-E. Pune, is another huge city in the state of Maharashtra which is where Mumbai is, that is a big player. They have a lot of international up there. And addressing Mumbai it is not an IT capital. Mumbai is a commercial captiol. Mumbai is a stock exchange and all that but it is not an IT.

More like New York City.

New York City, is not a Silicon Valley, it is New York City. It is great at trading and stock exchange, and all the corporate headquarters are located in Mumbai, but the IT is concentrated in Bangalore, Hyderabad, Pune, Chennai. Other cities are trying to capture it but these cities have been much more successful. And you also have to look at India as two parts; South India is where most of the IT power is because that is the highly literate part of the country.

Let me ask you about that. It has been the companies' focus on growing these jobs and increasing the economy. What are the factors that have made Bangalore and others like that successful and then some of the other regions are not?

First of all, Bangalore, the climate is fantastic, more like San Francisco, I mean for India. The climate is very attractive and that brought in a lot of people and two, they have access to a very large pool of highly educated or well educated engineers. It is the home of the University of Science, which one of the advanced education center in the country. That is where the Nobel Prize winners worked and so Bangalore created in the environment, had the climate and also the pool of scientists and engineers needed. So remember, all this evolution took place in the last two decades and Bangalore was an early one to recognize the opportunity and then capture it. Then it also became very visible because some of the internationals first started in Bangalore, and that was copied by Hyderabad very successfully. They had a chief minister who is like a governor, who is an elected official. He recognized the potential and then he started building the cyber city, that is what they call Hyderabad, and if you go there you almost feel like you are in the United States. The whole city is like the U.S., the buildings are like in the U.S. and the infrastructure is like in the U.S. Everything is very well designed and the power supply is guaranteed. So, there are so many features, so many capabilities that the state provided for the centers to be successful. That is why they were able to draw IBM. Matter of fact Alcoa is think tank is in Hyderabad. There are more than 10,000 people working on it. So, they have large number of jobs. All of these, Bell, ATT, so many airline companies, all have their back offices all in India. And then you could expand it. First it was IT, then it expanded to call centers, then expanded to back offices, legal profession, architecture, design, so it is now kind of spread into all service areas.

You have doctors reviewing X-rays over there.

Correct.

Transcription and the services which are possible because of the relatively lower cost of labor or well educated group of people, relatively low cost of these. That has actually helped the economy grow because of ripple effect.

I am fascinated by that too. The more I read about what India did, the more fascinated I am because Silicon Valley developed kind of naturally as did some other areas but India made a conscious effort to put in the vision, the execution, had the climate and access to the labor pool, state support to attract and create an extraordinary economy by doing that. Kind of hit it artificially and hit it by design not by accident.

Yeah, quite a bit was by design because the economy was liberalized during this time, in the early '90s, '91, '92, until then it was like a soviet style economy.

In '92 it became a free economy with the airlines, everything got opened, the whole thing got opened up and the government withdrew from all the businesses. They said, we are not going to be running state-owned everything. So, that helped.

The government facilitated getting it going but then got out and let it happen.

Yeah, they established it but they were not in the business of running state-owned IT companies.

I agree.

Which they did in airlines so it was, Indian Airlines, in Indian, they are state-owned. And they said, okay, we will have those but we also license people to run the new airlines so we have some of the best airlines in the world. Jet Airways, for example, after Singapore Airlines, this is

the second best airline in the world. So, that started and then Kingfisher, so many airlines came here because there were twelve airlines in India, now.

I did not know that.

They privatized it and so they said we are going to liberalize all of this economy. They did not get into this sector at all. Government has no business; India does not have government controlled businesses in the IT sector.

Such an interesting model because there are regions that have done that, like Sofia Antipolis, France and Limerick, Ireland, and Research Triangle Park here but a whole country to do it with nine hundred million people, over a billion now I guess, it is just fascinating that they were able to do that.

But it was not done really at a central level, it was done at the regional level.

Okay, so it was done at the regional level. So, the regional governments did that?

Correct. The regional governments did that. They had the region and then they pursued development because they realized that the economy would flourish. There is only a few states which have been extremely successful in that thing, not all the states. First of all, all of the states do not have a capacity to do it. They need the man power, they need people and so that is much more prevalent in South India than in North India.

Okay.

People talk about IT boom they are really talking about South India.

Okay.

So you do not see IT boom in North India, it is very limited.

Because of the issues you talked about, climate...

Climate and the literacy rate and not enough engineers produced. If you look at international students from India, I would say 75% are from South India, they are not from North India. So, there is a lot more emphasis on education in the Southern part of India. A lot more than in the north.

Obviously, the education focus made a big difference in India and should make a big difference here. We do not always do it as well.

That made a big difference in India because the education focus in the south is very high. The state of Kerala which is one third Christian, one third Muslim, and one third Hindu, has a 98% literacy rate, which is comparable to the literacy rate in the west? We do not have a single state in the north which even comes close.

Really?

The literacy rate in the north is actually on the other end. It is maybe 60% literacy there but it is 98% literacy rate in the southern part of India. So, as you can see, as you move further up north the literacy rate drops. There is no question but that is what happens in India.

Yeah, that makes a big difference. You have a baseline to start with.

Correct. You have a large pool of educated people, it makes a big difference.

Let me ask you to look at, I think we will see some of that in here, go to page 7, it covers the questions leading up to this. What I did was break down what I believe the factors that effect regional technology-based economic development are into six factors. Then I broke those down into variables that make up the factors. What I would like to ask you to do, and this is just opinion based upon your knowledge over the years, is look at this and grade them. Take the environmental factor for example, let's look at these variables that I think make up the environmental factors.

I am trying to kind of grade these. Most people have done it just, A, B, C, D, F, rather than a number grade, but which of these do you think are more important, less important, totally unimportant and should not be there, and has anything been missed?

Environmental factors from which perspective? From, in general or is it for India you are talking about?

No, no. I am specifically talking India, but if you see a difference between India and other places, I would like to hear about that, too.

I think the quality of life, safety/relatively low crime environment, an Indian environment, that factor; the quality of life factor would be a B. It might be an A in the United States but not in India. Support for technology and institutional support for technology transfer and commercialization, that is really important in India to be successful, that is A. Available technology-savvy investors.

The start-up of money that helped things get going.

See, India is one of the few countries which does not have angel investors. They do not have this range of capitalists, the capitalists that we have in this...

Where does the capital come from?

The capital comes from generally some big businesses. Like for example, if you take Tata they make from motorcycles to trucks, they have an IT company, they are all over the place, they make cabinets, you name it, they are spread out, they make pharmaceuticals, they are Proctor and Gamble here. Plus everything else too, so you have companies like that which are started by families which have now become very large corporations which are publically traded but every one is run by families. Those are actually the biggest capital.

Investors, as we think of them here, angel investors or venture capitalists are not important?

That is not very important and actually that is a very small source of money. So, if I have an idea, I come to you and you are a rich man and you run an Indian investment, you are a rich man who is interested in that business so you participate. You do not just invest in it and get out. So, that culture does not exist so much. So I would say tech-savvy investors that is not an important factor. For the technology population, that is important to have access to that. I would say that is an A. I think this non-economically disadvantaged workforce... that is not normally a factor. Okay, 6 non-technology infrastructure, okay, this is important, I would say particularly... I would say most of the places I talk about they are very good airline connections or train or something like that, so that is an important factor, I would say that is an A. A talented, educated workforce, A. Quality of K-12 education systems, this one is kind of strange

because that system exists throughout India, so I would consider that, well, do I have quality K-12 education so you have it everywhere. You have to have it so I would consider it; well do I want to locate to Bangalore because they do not have K-12, no. I would put them in any town in India and I will be okay, so that is not really a factor. Undergraduate, graduate, post-graduate in technology including science and engineering, this one is not a factor in India because there are so many schools in almost every big town. So, I will not consider that a factor, I would be concerned about it if it were locating in a country where there is a limited number of technology schools. There are some towns with 15 engineering schools.

Wow. In one area?

One city.

We have one.

We have one. Then we kill the other one. A city with one million people, like New Orleans, in India on average would have at least 15 engineering schools.

That is incredible.

Not all of them are a level of UNO, but they are smaller...

But they are engineering schools.

They may be a lower caliber engineering school but never the less an engineering degree and it is controlled by a university. They all belong; they must be affiliated to a university. They cannot be exempt, so they are all controlled by universities so they are colleges but where the

final examinations and all that are monitored by university, so they are afflicted with the university. That is not an issue.

That would kind of tie-in to number 10, do you have a strong regional university system, you actually tie-in to the colleges.

Yeah. I think that exists almost everywhere which we are talking about. So, for example, if I am an investor, if I am looking at the factors that would not be a big issue for me. Number 9 will not be a big issue; number 8 will not be a big issue. Seven would be an issue because this work force that is coming out is it talented that would be an issue. I want to know that. I do not want all these people from junk colleges so I will not put up in a town that has 10 colleges but none of them worth a darn so I would not locate them there. I would be looking at 7 as a, when I look at 7, I have already looked at 8, 9 and 10 indirectly. I think I have answered all of them, right?

Yep. Let me get you to go to the next page, then.

Do the same thing with some of the other factors. One of the things that I have identified in some regions, not all of them, is inflow. Inflow of equity capital and debt financing, inflow of talent, inflow of ideas and innovation. Do you think the inflow side of this is important?

I think inflow of equity capital and debt financing. The equity capital is very important, that is important, that is an important factor because even if I link myself with you as a GM but I need to be sure that I have the back capital to kick-start this thing. So, that is really critical, you can call it debt financing in a sense, but that is important for whatever companies we are talking about. Even in that environment. Inflow of talent, yes that would also be important. Inflow of

ideas and innovation, okay, this is where, it is a little bit blurry because in India set-up they are not doing a lot of innovation like we here are constantly innovating. We are looking for break-through technologies. I do not see that happening there. So, the inflow of ideas and innovation to their business is okay but not something which could be commercialized. Break-through technologies, I do not see that happening.

The business model, the innovation in the business model...

In the business model, the service and all that is okay, but nothing break-through technology. There is a slight difference in ideas and innovation in their business and ideas and innovation to create break-through technologies which we do. Like nano-technology, bio-technology, all of the technologies which we are working on we are holding workshops. How do we create the new industry based on better solar energy, better whatever, right? I do not care what it is but we are constantly looking for new technologies in this country. There, I do not see that emphasis; I do not see the culture. I see, okay, what is a great idea you have, maybe I can set up a company to do something, new materials for engines, lightweight engines, all this which we are constantly looking for this country. This county is built on innovation. That is not because there is so much tied to service.

It is all service and it is a business model instead of technology.

It is a business model, so how do I deal with better service? Can I use something instead of something else or these types of things? Or, okay, how can I streamline and build you a better website, yes there is innovation there but not break-through. If you want a beautiful website, I can get that done for you but the people who are actually building the engine for all of this, the

job and all that comes from here. Not the break-through technology, not break-through application technology or new materials. That is not happening there, that is the problem. Ideas and innovation are only for improving business.

Okay. What about government sponsored research and development grants?

There are R and D grants, but I have not seen those showcased like here. For example, the National Transport Foundation, gave me one million dollars, and we gave a half a million dollars to Symantec. Then investment of NSF was crucial for the company to get off the ground. Now, it is a billion dollar industry. Okay, that type of R and D we can brag about, I gave so-and-so this much money and look at the technology. One nugget would actually pay for the entire bill for the National Science Foundation, for the year. The taxes the industry pays covers all the bills. So, maybe that investment is only one in ten is a success story, but the one pays for everything else. So, we are investing money that I do not see the government R and D as strategically investment because we are built on innovation; we invest strategically on innovation, but I think that culture has not come to either India or China or even to Japan. Japan does a great job taking our ideas.

Yeah, taking someone else's idea and building on it. They do a great job of that.

We build a car and then they build a Lexus, but where is the innovation? There is no innovation they are building a much finer car. So, I do not consider, I never go to Japan and say, oh where is the break-through technology, nothing comes from Japan as a break-through technology, I am sorry to say that but their break-through is improving on technology.

They concentrate on the methods.

They concentrate on methods, manufacturing and perfection, things which we may not be very good at. So, there I do not see the government R and D, first of all the government R and D is not that big and two, I do not think it is as strategically managed. It might be but I do not see that. Inflow of revenue from outside the region, this is very important. Basically everything is outside the region, outside the country as a matter of fact.

I look at that kind of like a balloon, you blow air into a balloon, it expands, you have a hole in it, it contracts and it seems like revenue, fund, things coming in from outside of the region is similar.

Correct. And that is what actually happened, I think it is outside. Inflow of S and T funding...

That would kind of go with what you just said.

That is not that much. Actually, there S and T funding for the infrastructure, they are done. So, the government has invested in S and T funding for creating the infrastructure, utilities, power, I mean these are priced commodities in India. So, S and T funding may not directly science and technology but the infrastructure. That is really critically, otherwise you will not have that, I will put that as an A. Inflow of private funding for research and development, that is important depending upon the business. If it is IBM, everything is R and D, so that is really important but it depends on the type of business you are working with. It is not totally dependant on R and D. Retention of capital within the region, if it has to grow, then there is capital retention, so I would say that is critical. R and D expenditures within the region by universities I

would say those are relevant. The IPO funds raised by companies in the regions, we are weak in that. India is very weak in IPO because the control is by the big corporations.

The lack of IPO funds has not done anything to slow India down, then.

No. Actually, that is one area where it has a lot of potential.

There is another area to expand in, that can be the next phase of growth.

Next phase of growth, but to have an IPO that means you must have trust in the market.

Right, which nobody has right now.

We do not have it even here.

The next major factor is, I called it attitudinal and it really is the things like the value placed on human capital, the image, collaboration...

Okay, you want me to go through one through... tolerance for entrepreneurial risks, is medium. Willingness to collaborate for mutual success technology...

The group you are running right now is a good example of that where you have the universities collaborating with the state. To go after more funding for the area.

Yeah, because we bring the dollars into the state. I think that is there though, the willingness to collaborate. Image of creativity and valued creation, that is a little bit lacking but I tell you this is also changing as the generation is changing. The younger generation is being more creative, they have been exposed to more of this internet world so that is a major... valued creation, I would say I would put medium. Value placed on human capital is very high, number

4. And responsiveness to innovative investors is also high. Active promotion of the technology sector is high. Attitude of grow your own versus focusing funding, what does that...

This is more thinking in term of the states within the United States. A lot of states in this country try to go out and get a business to move here, ya know, we are trying to attract a steal plant which means it is moving from somewhere else to here as opposed to trying to invest money in local businesses that might do just as well. Look at the Shaw Group, Shore group built a giant seven billion dollar company and built it organically. There are pros and cons to this either way.

But, see, in the states in India, the government does not take a role. In the IT area I would say in the technology area, they are really aggressive. They want Microsoft to locate in Bangalore versus China, right? So, there is a competition there. So, attitude of grow your own, I would say that attitude... I do not think they go on this grow your own thing, they go after and try to get people to establish in their neighborhood.

It might be the best approach.

Willingness of technology investments, that is high because there are a lot of investors, big companies who should invest. Belief of business and education communities' importance of technology transfer and... that is in the belief of business communities, correct? Education, I think that is fairly high. Entrepreneurial focus of the population, number of new businesses started.

Correct. Our government in the U.S. collects metrics on these items, A through D, and you do not have to grade each one of them, I am looking at them as a roll-up and they call that

the entrepreneurial focus of the population. So, I do not know if we do not measure this just because we can measure it and it may not have any impact.

See, these numbers I do not know. Number of new business started in the technology sectors, we can find out, though.

I am not asking for the numbers, it is a matter of, if we collect those metrics and we use that to gauge people, are those metrics even important? We may be collecting metrics that do not matter.

Correct. The number of businesses started, new businesses started in technology sector, I think this we can figure out but I do not know if whether that would really impact the results of your study. I am saying that is important numbers to have but I do not know if it would really impact what you are going at.

Let me keep going.

Policy factor, business friendly...

Government policy, and there is a lot of elements of government policy, I am only trying to grab a few of them. As you said, the government in India facilitated the infrastructure but it did not really get directly involved. Our government here tries to do as much as they can in their department of economic development and they are out spending money.

I think they are somewhat like that but we go a step, I would say, even though the government is looking for the steel mill for example they are trying to get the land, giving a tax break, investing three or four hundred million dollars or whatever, I mean, throwing at them to

attract them. There I would say that most of the investment would be in infrastructure road, lands and getting the water, electricity and all of that. Microsoft can come and build a structure. Here is a piece of land you can build your structure and we will provide all of the services. Then, they have a tax friendly structure. If it is all export, it is an export zone. So, you are not subject to any taxation. So, it is a business friendly tax structure for sure.

So, that is important subject to the investment and infrastructure. If there was no infrastructure it does not necessarily matter.

Correct. If you have a business friendly tax structure but you have no infrastructure it will not work. So, there is definitely a business friendly tax structure, I know that, tax breaks for R and D, angel investments and start-ups, I think that is also there and that is really important. State and local support for workforce training, I think that is fairly limited. What happens is because of the large workforce that is available, so you have to almost train some of them. It is not that expensive for you to train them. The state making a big effort training them does not exist. Simplified application process for new business that exists also. That is there, that is important. Establishment of business incubators and tech parks, not so much business incubators there is more focus on technology parks that is what I was talking about. You build a park and then you have these people move in.

Got it. That is what Sophia Antipolis in France did; and they did a great job.

We have just two more to go through and that is the Knowledge Factors and then the Social Factors. Knowledge is sharing of ideas, entrepreneurship, training, tech transfer and commercialization strategies.

Applicable university R & D, see the university R and D supports its industry but how big a role it plays in the actual business, I do not think it is very high; I would put it more as medium.

Item 2, the tech transfer...

Yeah, that is there, through. In the universities and industry, there is a lot of collaboration. That is there.

That is what Stanford did and Silicon Valley that made such a big difference but the other places did not.

Correct. And that is there in India, particularly between the ITs and some of these other industries. Depth of technology initiatives and targets including existence of technology/business.

Which I mention business incubators on the policy factor this is more in the creation of a knowledgeable workforce.

This is a medium. Entrepreneurship training collaboration, this is fairly high. Collaboration idea sharing between firms; that is limited because of the competitiveness that is very limited. The strategies for creating knowledgeable workers is also limited. I will say limited; it is dependent on each company. What the companies do is, actually they hire these people and train them themselves so if they have a defined strategy for the workers for future workers, I do not think they have a strategy. There is a big difference between the workers they hire and the future workers. I do not think they have a future workers strategy.

Technology/commercialization support, support from the government agencies?

Or support from a university to a company for them to commercialize technology but it sounds like from what you have said they invest in the business model, the business process but not the technology.

Okay. Commercialization support that should be a part of the business thing. I would say it is best we leave that separate. Strategies for regional cohesion in technology transfer and commercialization, that is low. Economic development organization with knowledge and charter to focus on technology, I think this is high. This is how they have been successful. College of Business with focus on Entrepreneurship, no, that is low. Educated workforce, okay, here the percentage of workforce with bachelor and master degrees in science and engineering, it is not the percentage of workforce, it is a gross number because the population is so large, I would not put it at percentage, percentage might be small much smaller than U.S. but then you are talking about a larger population. So, in the sheer numbers it is a very large, I would say it is a very significant number of especially bachelors. Advanced education, being in science and engineering, that is low, they have a large pool of engineers but the percentage which has the advanced degree is small. I would say it is as small as in the U.S. or even smaller.

That is fair because what I am finding from a lot of people is that the Ph.D. is only as important as a bachelor or masters in engineering.

Correct. There are a lot of bachelors and then a few masters.

This should be interesting, the Social Factor, this matters a lot in Silicon Valley, it may or may not matter in India at all.

Culture and collaboration, I do not see that, you do not see that because and all that, they do not collaborate. Because of the nature of the business they have, it is competitive so that collaboration because they are not teaming up together to provide new technology, so there is no end product. That collaboration is small. The culture of change is very high. Dense social networks, very high. Collective learning is also very high. Geographical cluster, technology-based is high. Grow your own and attract versus focus on others and establish...

India does the second one.

Second one, much better than the first because of the lack of investors. Investible capital and entrepreneurial focus is very high in India but it is limited to these big companies, so it is very high. They are very successful.

And that is okay.

That is very high but it is not exactly the same as here but it is high in a different way.

We tend to focus on the smaller companies, the mom and pop shops.

Yes. Collective identity is high. Openness risk taking and experimentation, is also high in this technology with investing.

(4) Having considered the six factors that may affect technology-based economic growth - Environmental Variables, Inflow Variables, Attitudinal Variables, Policy Variables, Knowledge Variables and Social Variables, Do you think these factors actually affect technology-based economic development?

I just wanted to walk through all of that and a little bit painful; do you think that these factors can actually effect regional technology-based economic development?

I think so; I think you have covered the very important factors. Environment, inflow, attitude, policy, knowledge, I think some of them might be more critical than the others. If you do not have the proper infrastructure, if you do not have the proper policies you could cripple everything. So, I say you have covered the critical components. This is what I am saying; it is so difficult to talk about growth without looking at all these factors.

Right.

So, it is difficult to say what would be the growth, what happens if the policies change? So, then it impacts the growth.

We spend a lot of money in this country trying to affect the things that we can affect rather than looking at some of the qualitative effective variables that may need to exist that we cannot impact as much.

Correct.

We have covered most of the questions but let me ask you just a couple more. On page 14, looking at these six factors, thinking in terms of the region that you have been talking about like Bangalore and some of the others, I have been able to categorize regions as neophyte, adolescent or mature based upon how well they have done on these factors. Silicon Valley is obviously mature, Huntsville, Alabama where would be adolescent because it is a great technology community but if you take out NASA and the missile defense work that is an agriculture community it goes right back the way it was. Then some places, like New Orleans, have been here for hundreds of years but it is a real neophyte technology community because we

do not do a lot of the things that are on this list. Where do you think that some of the places like Bangalore and other would fall?

I would say Bangalore and Hyderabad which I am talking back, they are mature and they perform well, I would say and some regions might have performed minimally but those clusters which we are talking about, they performed well. They are not on the level on Silicon Valley but they have performed well.

They have added hundreds of thousands of jobs.

And if you go there tomorrow and you and I have an idea to do something we can hire a thousand engineers. So, that capacity these people have generated. So, I am not saying they have infrastructure, they have some problems, too, I am not saying everything is hunky dory but they have done very well under the circumstances. I will not say they are average; you cannot take out IBM and say the whole thing is going to collapse, no.

That is what a mature economy can do; take out one leg of the stool it does not fall down.

Correct. Because it is not a three-legged stool. So, that advantage you here, they performed well I would say because look at all the down turn, I was there recently for recruiting students and all that, I was there and then you see the impact on the tourism but if you look at the cities they are still running pretty good despite the collapse of the computers, the fiasco, but the other companies are running fine. Here if a major player collapses, nothing happens.

And that is a good example, they collapse and the economy of the area stays strong.

Stays strong because other companies are actually trying to buy this, so it is not like Huntsville and it is not like Silicon, it is somewhere between I would say. I have performed well even the infrastructure that they have. It definitely is not minimal, they are definitely not adolescent, and they are having performed well. I would put them under 4.

(5) Having considered the factors and variables that might impact regional technology-based economic development, do you think these factors and/or the process of regional technology-based economic development can be modeled?

Let me ask you to look at page 19. We have covered most of these questions but I just drew up a simple as an engineer would draw. Looking at these different variables and the factors, I can actually develop a mathematical formula and maybe put it into something like a simulation or neuro network model that would represent the impact of these factors on value added processes and should either the economy can be self-refueling, depreciating or it can be just plain stagnant. Do you think that it is possible to represent in some type of mathematical model the development of a regional technology-based economy? And the add-on to that is doing you know any modeling tools that you think can do such a thing?

I do not know the tools but I am just taking a look at what you have here... knowledge variables, inflow variables, attitudinal variables... So, with this model what are you trying to absolutely predict the how regional economy would respond?

Without any type of interventional change. What i would like to be able to do is be able to say, okay, let's go out and evaluate a region, evaluate New Orleans, or the southeast Louisiana, southwest Mississippi region, how are we doing against all these different variables and if we do not reach a certain score, then we know we need improvement.

Correct.

And it is going to be somewhat unique to every area. Maybe here we need to invest in politicians that do not rob us and a better image in marketing and leadership, in these other areas maybe you need to invest in infrastructure but the bottom line is if we are going to spend billions of dollars of tax payer dollars, let's see if whether or not the way we are spending them has any impact.

There are a lot of things that we do in this state, we spend many millions of dollars every year on economic development and I do not know if it does any good.

Yeah but it is producing the results. I think it is a great idea because the problem is nobody looks at this in a holistic fashion. They look at it, okay, I am putting three hundred million dollars for this steel plant, they really do not know if that is going to provide what you are looking for, is economic growth or is it going to be a one shot deal? Is it going to produce any growth or is it actually the right investment? So, I think it would be nice to be able to have this model in my opinion. It is nice because you are taking into account all these factors and some of these factors might be critical factors, so critical that it would deal with economic growth or it would support economic growth. So, what you are saying is when we make this investment are we really contributing the to... or putting a system in place that would contribute economically?

Is the balloon getting bigger?

Yeah.

Maybe we need to deal with certain factors that we are very poor in that we have a zero score in as opposed to some other factors that we are pretty decent at but not good enough. If you have a couple of holes in the balloon it does not matter how much air you blow in it is not going to inflate.

And I think by you looking at these various regions, you are able to get some common aspects identified which are contributing to this growth.

That is what I am trying to do.

Some of these if they are missing it is not possible. So, then those should be flagged as critical components.

It is like multiplying by zero. Does not matter how big of a number you have, if you multiply by zero it is zero.

Zero, that is correct.

If we have zero on some of these factors it may not matter.

Exactly. Whether they are an additive number or a multiplying number that is a key thing.

So, it can be any number, who cares, the balloon is going to be bigger by Delta X. I do not really care but if there is no balloon at all because it is a multiplying factor then that would be very important. I think actually our investments are never looked at the way you are looking at. We look at an investment from a very slanted perspective, like you said, Office of Economic Development, they are smart people but they are not looking at it as a bigger picture. Maybe the three hundred million dollars should be invested in something and that could be fatal in the state.

That is exactly correct. That is what I am trying to get to the bottom of and we can look at them, and your analogy is perfect, is it additive or is it multiplicative? If it is a multiplier affect sometimes you have to address the zeros.

If your multiplier has zero in it then you are in trouble.

Then you can do other good things. Until Louisiana cleans up its infrastructure and little simple things like litter on the roadways, you go to North Carolina everything is clean. The NASA guys that I am working with have complained that everything outside the gate is trashed. Who wants to put more jobs there unless you address and it is a simple thing. For two hundred thousand dollars we could clean it all up but instead we are going to put one hundred million dollars into new machinery on site where as NASA still has a bad impression because we have never cleaned up the things outside the gate.

I think that is a problem though I think you are saying that the zeros that we are getting are killing us and the whole much you put in, ya know you are constantly suffering with these zeros.

None of the state agencies are looking at the zeros which you have perhaps starting zeroing in on.

I hope so. I ...

(6) As a final question, do you have any suggestions to improve this interview process?

I am going to need to run out to Mississippi but let me ask you do you have any suggestions about how to improve this interview process?

No, I think you have all this information you are flagging and I think the thing is to synthesize this and find the critical parameters that would contribute to the economic growth and when I say critical I am looking at the ones which could be at zero. Those are very important and I think nobody has looked at this holistically and I think you are perhaps looking at it for the first time in a very holistic fashion and say, folks, you can invest a billion dollars but nothing is going to change in the state if we still are not addressing the zeros. I think the crime issues, the education issues, the quality of K-n12, if these things are not improved people are not going to be moving into an areour job; our growth do not even exist yet. As much as I want my children to be near-by, the jobs and opportunities are simply not here. They live in Fort Worth and it has excellent schools. She says, dad, I do not want to leave so my daughter does not have to go to a private school.

That is a huge step to take. When I brought in young executives with children in my previous company, I hired one thousand people; to get them to move here with the skill I needed I had to pay them extra so they could pay the private tuition for their children because they do not want to send them to public schools.

Yes, see that image has to be addressed. I think that is one of the things that are very critical for us. That is what I think these people are missing; this economic growth is not going to occur when some of the basic things are not addressed.

Dissertation Interview Questionnaire – Steven Moret 02/25/2009

(1) Please describe briefly your current position and role within your organization and community.

I have your file so we don't have to do a lot of details on background and so on, and I know your current role, but if you would like to add any notes on your current role and what makes you knowledgeable about economic growth and specifically technology-based economic development, I would love to capture that.

Well, economic development is a topic that has been of great interest to me for a long time, probably 16 years, back to undergrad when I sat on the statewide reform group Secure. Do you remember that group?

I remember that.

I was a student member.

Were you really?

Yeah. That was my introduction to public policy in Louisiana. It was the first time that I really started thinking about issues of growth and how they impacted the development of our state or the lack thereof. The root cause of our primary driver at least the top on driver of our out migration has been a differential in economic opportunity between here and other states, not the only reason but it's the dominant reason why people left. I would say there probably is no definitive knowledge base in economic development. First of all, if you have to ask yourself the question, what do you mean by economic development? There is a lot of different ways to

define it, but if you think of it as activities designed to create jobs, attract capital investment, increase wages and diversify the economy then you are talking about a broad swath of activity. In fact, you are talking about most of what government does as the director and direct relation. What I bring to it is a background from several different perspectives. Certainly as an environmental consultant to industry as an engineer; understanding how companies are looking for predictability and speed in the regulatory environment. Certainly I've done a lot of public policy research and economic development at the Public Affairs Research Council, and authored a chapter in a recent book called *Retooling for Growth* by the Brookings Institution. You should get it actually.

I will.

A lot of much smarter guys participated in that. It's called *Retooling for Growth*. It's like an edited volume with economic development experts around the country contributing to it. It came out last year, I think.

I will make a point of getting that.

I had done research with the Public Affairs Research Council on higher education and economic development on deal closing funds. The higher education piece actually got the top research award in the country by the Governmental Research Association, GRA, did some economic development research when I was doing my graduate work at Harvard at the business school. Obviously, got the MBA; there is a lot of, sort of, conceptual knowledge there, was a consultant with McKinzie and Company, between my work as an engineering consultant. Then later as a management consultant, I worked with a bunch of different types of industries sectors

and got a sense of the private sector both from working in the private sector, consulting the private sector, working at the intersection of private sectoring and government as an engineering consulting and my current role working as the assistant chancellor at the university. So, I have kind of come at it from a bunch of different directions.

That's a great background.

Having said that, I do not know that there is any ideal background. I think that the reality is that there are so many inputs to economic growth that go into creating economic growth that I think you could be a person that was really focused in one area and bring something to the table. You could be a person like me that has maybe touched less extensively on a lot of different areas. I don't know if I answered your question.

No, you gave a great answer, in fact. The more I have learned about economic growth, the more I realize how little I know about it and my background being mainly business and engineering, similar to yours but probably not as much of the consulting or government side of it. I found a lot of really smart people who have different perspectives. I have taken sort of a systems engineering approach to this which you would recognize and understand. Trying to coalesce much as that information as I can which I think I have been able to identify a group of factors that drive technology based economic development. More than anything I agree with what you just said there, there is no such thing as an expert. People bring different perspectives and I've enjoyed actually capturing a lot of that.

Yeah, they may be experts, but different elements.

Right.

It is kind of like the more I read, one thing that sort of becomes obvious fairly quickly is once you have read enough research papers, enough case studies, once you have dealt with enough of it yourself, you realize that when you really think about the big picture of what we are trying to do, like in the state of Louisiana, to go from a state which is heavily mired in shrinking industries. In fact, I am going to show you a couple charts on that. To go from a state that is heavily mired in industries that are shrinking to becoming a state that is creating jobs. Sorry it is so small, but these four charts. Chemical manufacturing, paper manufacturing, farming, or gas. The last thirty years, absolute employment levels have declined dramatically in all four in Louisiana and around the country. We are declining right in line with the other places; so what's driving outmigration is the fact that other places are creating more jobs; they are creating more jobs because they have industries that are growing. IT stuff, R&D, hardware, technology-based economic development; actually that is what this stuff is all about.

Right. That's exactly what it is. And we have not.

And we have not. And there are a lot of reasons for that but there is no... you could sort of say education is the silver bullet and that would be true except that no one has actually never figured out how to fix education.

And education by itself will not do it.

Right.

It is important, but it is one factor out of a bunch of factors.

Right. The truth is, I believe, if you actually could sort of fix it that it would be a silver bullet. The problem is that no one has ever achieved that; and when I look at, say state level

economic development, you can look around the country I think and point to people and say, “Boy, like Alabama, they had very successful business development. They won some big projects.” But you would not necessarily say, “I do not think, at this point, I think the jury would be out on whether or not Alabama is a complete success story or whether they have just won a few big projects.”

They have won a few big projects. I have studied Huntsville more than any of the others, but I have also looked at Birmingham, and it is an interesting mix. People look at Huntsville and think, of course; they have so many NASA jobs and they are the cornerstone of the space industry but Huntsville is an adolescent economy at best when it comes to technology.

Well, and when you really look at it, when you really look at how the country is broken down, there are relatively few economic powerhouse regions. Not even states but regions. Like even you look at Georgia, it is not Georgia, it is Atlanta. And same thing in North Carolina - it is the Research Triangle Park area. It is a relatively small number of places that have become cauldrons of economic development, just incredible amounts of activity and to the extent that they are generating a huge portion of the country’s total growth with jobs and GDP and all that; and have attracted disproportionate talent and capital, and it just feeds on itself.

Exactly Right.

One of the most interesting things I realized at Harvard was that Harvard partially is Harvard because it is Harvard. When you’re at the top, you are the place that people think, “Oh, if I am a smart, talented person, that’s where I should go. If I’m a professor, if I’m a student, if I am somebody who wants to get research done. And it just feeds on itself.

It becomes self-refueling.

You look at the places that people... what are the two best examples of technology, sort of, true technology-based economic development successes from a geographical perspective? You would say Silicon Valley and Route 128 in Boston, the biggest two examples in the country. But what was the real root? The real root of their success was not really an economic development plan or an economic development leader or anything like that. It was massive amounts of federally funded R and D, that started after World War II and just, it almost could not help but generate other stuff that when you have all this intellectual, in fact, I think that is one of the things, I think, that, and I am sorry I am not quite following the script, but when I think about Louisiana, we a lot of time think about, "Well, gosh, we need to do more technology transfer, more commercialization or university IP." And we do and we have missed out on opportunities because of that but that has not really been the limiting factor. You are talking about, you know, if we get exceptionally good at that stuff, we get a modest bump, I think, in economic development. The issue is the core IP itself. Like, what is the real, what are we doing here that is truly exceptional? And the truth is that our very best public research university, we sort of bragged that it made the top tier for the first time, but when you consider that there are only really 100 to 125 real research universities; when you actually say that, we are not even in the top half.

Right. We are a celebrating mediocrity.

Yeah, it is true. To get to the bottom in tier one is not something we should be proud of, that we finally got there; but we should not be proud in an absolute sense. In other words, that is a sign of momentum; it is not a sign of success in the way I would think about it.

And it is not going to generate technology-based economic growth because we have made it into a tier that a lot of other people exceed and they have many more of the factors that would generate economic growth that we do not yet have.

Right.

Not that we could not, just do not. You have answered some of this. I appreciate the way you are doing it. It is actually very helpful.

(2) Do you think economic growth is predictable?

Do you think technology-based economic development is predictable?

Absolutely not. I do not think it is predictable. Well, in the sense that, I think the genius, I mean, the ultimate root of economic growth is gains in productivity and new product offerings and so forth. And I do not think there is any way to predict, certainly not as a state government, I mean, one of the things that I think is the most important things that government has to remember about itself is that it is not the main player in the private sector. And so, as the government, even if you take people that have even deep industry experience, as soon as they make the transition, they are cutting off that, I mean, they may read the periodicals, they may sort of stay in touch but there is only so far, you know. I mean, you know this from your experience that most, I think, most innovation in the private sectors certainly most successful like venture capital funded start-ups were based off of not so much like ideas developed in the vacuum but ideas developed based on seeing how an industry was actually operating on the inside. Seeing inefficiencies, seeing market gaps, seeing something that maybe a company did not want to develop because it would cannibalize its own product line and you could sort of split

out and do that. I am sure you have seen like the innovators dilemma. The root of it is innovation, and sometimes the little things that people in isolation would not think would be a big deal can transform an entire industry. And I cannot think of ideas off the top of my head but I am sure you can think of some.

No, I agree with you.

So, a lot of what I think a state needs to do, if you sort of ask the questions, you know, what is a state like, and I hope this is one of your questions, you know, what is the right way for a state to think about technology-based economic development?

That was one of my later questions, so that's good.

I think that the first and in some ways most important thing I think is that technology-based economic development does not happen in a vacuum, it happens in a context, it happens in an operating environment. And so I think of economic development as kind of a pyramid where, you know, the base of the pyramid is kind of the fundamentals of the operating environment, the quality of talent. And, in fact, really, if you had to boil it down to a single thing, if I could only have one silver bullet, I would say give me the best talent, because out of the best talent I can get everything else. So, the public education and private education pipeline, I mean, well, to put it more directly, what you actually have is the first and most significant driver both in terms of your existing industry base and your talent base can tell you a lot about where you are going to be in the next few years. If you were going to predict a growth rate of the state, probably the most practical way to do that would be to say, "Well, let me look at the breakdown of their economy, pick out all the retail, take out all the real estate, banking, I just want to look at

headquarters and the economic driver industry and what proportions they make up.” And then I am going to look at, nationally, what the growth rates are, most likely, for each of those sectors. Blend that all together, adjust it up for population, and that is probably not a bad prediction of where it is going to go. You look at a state like Louisiana, if you run that analysis; it would say that we are going to shrink most likely. And that creates this real sense of urgency in our state that we have to be thinking about, we have to first accept where we’re really at, and then think about what it takes to change.

But going back to that pyramid, the notion is that things do not happen in vacuums so the talent pipeline is the most important thing, by far, I think, at every level. Pre-K through 12, community technical colleges, I think definitely have a role to play in technology-based economic development and universities and all the research, that whole continuum of talent development and then the research universities also the intellectual property development as well is a critical growth factor, probably the most important single factor. After that you look at things like the tax environment, the regulatory environment, the workforce development systems, the proximity to key customers and supplies, all these different things kind of factor into, I think, the potential of a place to develop those things. The other sort of primary thing - and this is maybe kind of obvious but it is important to consider for a state like ours versus a state like, say, North Carolina or Georgia - is that it has an awful lot to do with what is already there. So, one of our probably our greatest... I use to say our greatest challenge as a state was the poverty here because the poverty, I mean say what you want about education, but poverty numbers are directly correlated to student achievement levels and crime and health care challenges and all that. We are ranked 49th in health care, we are going to make all kinds of improvements but until the poverty numbers get better we are still going to be ranked pretty low.

Right.

But the other thing I've realized over time is that there is really a second huge challenge, and it possibly is even bigger than the first, and that is the current makeup of the economy, because ultimately we are in a market system. You do not just get to decide, well, we want biotech and we want headquarters and we want all kinds of paying jobs. You do not really get to decide that as a state. You get to control some of the levers that have a modest impact on how things go, but fundamentally the biggest driver of job creation on a year-to-year basis is the health and trajectory of what is already there. So, if we have industries that are shrinking and we want to be in more of a growing environment, it means we have to have sort of this dual strategy of doing all the things we can to protect and improve the competitiveness of our current industries which are likely to be stagnant, it is a negative from a job perspective. They may actually grow from an output perspective, from a capital investor perspective, but from a job perspective, they are more likely to get smaller than grow. The second big opportunity that we are going to pursue is identifying newer growth opportunities. And I am sorry this is not more structured.

Keep going, keep going. I'm loving this.

I kind of think of it as there is three major sectors that we could pursue to grow or major types of opportunities we could pursue to grow. Type A is opportunities to leverage and go off our existing industry base. And certainly that has got to be the first priority, even knowing that those are more likely to shrink than grow just because that is what we already have. That is what our people are trained to do, that is our dominant economic driver. So we have to do everything; that is the whole business retention and expansion piece. The second potential opportunity and

the one that we are not going to pursue is to try to go after those industries that are growing and have been growing dramatically for the last two to three decades. When I look at Austin and Raleigh and Atlanta and some of the other southern markets, one of the things I see is not only that they have thousands and thousands of those jobs, just high paying professional jobs in the technology areas but they have had them for a long time. They have deep imbedded competitive advantages. And I think that we could spend huge amounts of money and a lot of time and effort and not make a dent in that. And, so, we are not going to pursue that.

Right.

We are going to do this first thing of the business and expansion we are going to skip the second piece and we are going to focus the other half of our attention on this third opportunity which is identifying and cultivating new growth industries. In the same way that some companies get caught up in their existing business model and so, for example, maybe a bookseller didn't want to do an internet channel because we cannibalize, you know, you can think of all kinds of examples. We want to say, "You know what, there are certain areas where we are just three decades behind. We are probably not going to catch up." So, let's start to see what the next growth opportunities are and are there any of those that we have potentially some strength and legitimate strengths that we can leverage into that. Nuclear energy, for example, is kind of the top of list for me. I think we could create 10,000 jobs or more...

I think we could too.

...in this state in that sector. We got the Westinghouse/Shaw Project, 1,400 jobs in Lake Charles, first one in the country, I am hoping to get the second one in the country, a different

company, trying to venture for that. Visual media, even though it is certainly more mature, it is still a growth industry and it is one that is really focused, really largely, just on talent, it is a creative talent type thing and I think that is a place where we are going to be able to compete in the EA, I think that is a good example of that. I think alternative energy, partly the producing assets but partly building the stuff that goes into those assets, like solar, wind, bio-fuel, some of it we will build the facilities, in other cases like solar and wind, we are not really a good state for solar and wind but we can build the towers, we can build the turbines, we can build the stuff that goes into them, we are actually perusing those projects, now. One of the most important things I am going to do as secretly is we are going to kick-off a project this year focused on identifying, if you read this book called *Blue Ocean*, it is actually a fairly popular managing book, you might be interested in it. If you go to Amazon, just type in *Blue Ocean*, I am not sure if that is what it is called, but the notion was about Blue Ocean and industry opportunities. I have not even read the book but I think the basic notion is rather than trying to compete in the same playing field of your competitors, try to create a new space. One of the examples they talk about is Yellow Tail, I think - wine.

Yellow Tail Wine?

Yeah. They created a whole new segment where it was like high quality but low cost, something like that, I forget what it was but the point is we have to really take a candid look at ourselves, where we are really at and at the same time, this is kind of like a parallel strategy so we talked about the education pipeline being the most important thing, well guess what, you cannot turn that around in a year. That is going to take a couple decades probably to get where

we want to get. So, while we are focused on taking that to the next level, we are going to focus our industry development efforts on what we can successfully compete at today.

And that is a combination of our existing industries, where there are going to be target opportunities here and there just like, you know, main frame computers 15 years ago when everybody said, well they are going to die. Well, the truth was, there continued to be lots of work, even to this day, probably.

So, you do not want to reject that, especially if you are really good at mainframes. We are really good at gas and petrochem and some of these other areas, there are going to be some target opportunities there and we want to get our disproportioned share of those. But where we are really going to have the opportunity as an economic development agency to turn things around for the future is to identify and cultivate these new, sort of blue ocean target industries. And once we identify each one we are going to have a whole game plan that goes around it. We are going to say, our business development plan, who the premiere players in that space. So, like in nuclear, we knew Westinghouse and Shaw were among the top five; and alternative energy like Siemens and different things like that. And we are going to try to start at the very top and cultivate those top guys to build on those. We are going to have a marketing effort that goes on with that, we are going to have a workforce development effort that goes on for that, we are going to have specialized incentives that along with that and anytime we got a chance to go for something that would really be like those two projects I mentioned, a real anchor in a space, we are going to go real strong. And if we have to outbid the other guys, we will outbid them because we want to create these anchor points to help, you know, sort of build around.

As a business owner in Louisiana, and as someone who has been researching this, I could not agree with you more, because we are so far behind in the traditional job-creating industries that are technology-related that we cannot catch up. I have looked at Dr. Shapiro's work; you mentioned Atlanta and the Second Cities Initiative in Georgia, which is going nowhere; and if you look at a lot of the efforts around the world to create technology-based regional economies, most of them just go nowhere because they are not natural outgrowths of the economic capabilities of that region.

Of what's there.

Sofia Antipolis worked well, Limerick worked well in an unusual situation. Huntsville has gotten to be an adolescent economy but that is because of all the federal money coming in.

Right, which was a true driver, something they could build off of.

It is a great model to look at Huntsville as to why they did not go further than they did. That is the real lesson in Huntsville but I could not agree with you more because we could spend a lot of time, effort and money trying to be, and also ran in industries that we just simply cannot compete in or pick the ones as you did that are natural outgrowths of our capability; energy, alternative energy, the . . .

Nuclear builds off one of our top strengths, which is our fabrication of that.

Absolutely, that's a great idea. I couldn't agree with you more.

So, that is going to be a big part of it.

I have identified six different factors that affect technology-based economic development and I actually have in here, we may time to get to this...

By the way, the work that I have to do is, I think the idea is right, but we need to identify three to five more big players.

Oh, I agree.

So that we have sort of a portfolio that we are going after.

That way you have some diversity.

Yeah; we are not going to be successful in all of them, and not all of them are going to ultimately even be successful as industries, so we want to have at least five to seven, ideally ten, that we can put some real muscle behind and have, hopefully at the end of the day, two or three of them end up being huge. So that 15 years from now we start to describe our economy as traditional strengths, oil and gas, chemical, agriculture, shipbuilding, and now we have these three new sectors that are four-figure numbers of jobs each.

Right. AnnaLee Saxenian has a good book about regional advantage that compares Route 128 and Silicon Valley and talks about the diversification and...

I think I have read the book.

It is a good book.

It is called, it is mainly about...

A regional advantage, and it is a comparison of those two.

Yeah, I have read it.

Yeah, it is a good book and it talks about diversification. So, if you add sufficient diversity...

But the biggest, what I took away about those was just like that, you know, it is a lot like that joke about how do you make a million dollars? Well first you start with a million dollars.

Exactly.

It is like, you know, how do you create, how do we replicate the success of Silicon Valley and Boston's Route 128? Well, give me a few billion dollars worth of R&D applying to the federal government for the next 20 years. Look at Research Triangle Park and you say, "Well, okay, start with a couple really strong research universities and now put in 30 years of focus on one geographic area." Again, it is like they are starting with something that is fertile that you can build off of.

And it took them years.

And even then you are talking 30 years. Yeah.

People want it now in four years.

Yeah, or less.

They want it by the next election. It doesn't happen that way.

Absolutely. This is the first job that I have accepted in my career where I literally kind of felt sick to my stomach after I accepted it. Not because I was not excited about working with the

governor; I was extremely honored and remained excited, but because I knew enough to know what I was really taking about. And I knew that one of the greatest challenges, if you will, as kind of a blue-collar angle to it, but as someone really trying to lead in that space, you recognize that there is just a massive gap between expectations and what it actually takes to deliver. And same thing about the Baton Rouge Area Chamber, one of the most important things that I did, really tough in the beginning, was to kind of reset expectations so that you could get expectations to a point that you could exceed them. That the state's 64 parishes and the politics and everything and I knew that there is a great chance of doing an exceptional job but not necessarily being viewed as exceptional.

Absolutely.

If you do what needs to be done, you will be looked upon as a failure by most people. So the answer to that is it is the only way to do it is we have to basically have a short term and long-term strategy. The short term is all about business development, the long term is all about product development. I like to say for example, Georgia, North Carolina and Texas can shut down their equivalence to LED, and they would still grow for the next 20 years, because they now have got all the factors in play. It is not perfect but, I mean, compared to Louisiana, compared to most other states, they have got all the different keys in place to cultivate that growth. In other words, as state, one of the tests to know whether not we have gotten to the point that we have really succeeded in technology-based economic development will be the day when we no longer think of the secretary of economic development as the key to winning a project.

I agree.

Because all that tells us is we do not have a strong enough product, you do not have a strong enough existing industry base; that we are counting on someone like me to sort of bring in the bank and I mean, real economies, you know, the market works on its own. Route 128 and Silicon Valley was not like some economic development secretary . . . when I think about models, I do think you can look to places like Austin as more just beneficiaries of a federal government research policy. I am sure they did things to help maximize the benefit, but for the most part I look at them as the result of great leadership and their higher education institutions. Not even really focused on economic development, but just focused on great research and ended up with all this other great stuff. When you look at Austin, Austin does actually feel to me like a place that there was some directive effort, there was clearly an effort back in like the early '70s, the business community, the university leadership, they went after, I cannot remember the name, but there was a very important semi-conductor, MCC or something like that, I was like an industry organization. There is a great Harvard business school case study, by the way, I think it is publically available, I think you should download it - it would be great for your project. But it is kind of a profile of the last 30, 40 years in Austin but even then, even though they had this notion of vision, they were starting with IBM and they had the materials or something, they had like two or three big players already there. So, again, it kind of goes back to building off what you have. Show me the region, show me the state anywhere in the U.S. that started with what we have, that went from there to a more vibrant place and I think maybe the closest would be North Carolina because of their industrial make up with tobacco and I think furniture and textiles, maybe, 40 years ago and if you had to name the single most important factor, it was the investment in their higher education. I hate to sound like a broken record but I really do think that is a big part of it. I am sorry.

That's okay. You are actually addressing a lot of what I wanted to talk about but what I did, I started this trying, not even thinking of the dissertation, just thinking that I wanted to identify why Louisiana was lagging so much, and so I looked at it and said, "What are we missing?" So, the more I did that, the more I studied other regions and the more I realized that there was some similarity as to why certain areas succeeded and others did not. And then I compared that to Louisiana; and one of the main reasons for these interviews is that I found six specific factors that are types of variables that are present in successful technology-based regional economies and tend to be lacking in those that are not, and the ones that are - even the ones that have done well but have not diversified, like Huntsville - are missing certain variables that are key. I put that into a very simple model that I asked you to describe mathematically; that is the engineer in me. But more importantly, I tried to break down all of those factors into the specific variables they are comprised of. For example, the environmental factor, issues such as quality of life, and I know you are familiar with that, if you look at the discussions by Dr. Saxenian on quality of life or Richard Florida or anyone like that and break down environmental factors, some are within peoples' control, some are not. And then from there, if you look at, one of the things that is not stated in any of the books I read but that I thought was important was inflow. They talked about the beginning of Silicon Valley...

Capital is hugely important.

... and it is inflow of ideas as well as capital.

Have you see the research on absorption capacity?

I have seen some research on it.

This would really help, I am not sure what the particular paper was but it relates to directly what you are talking about. The notion is that if you look at the IP flows from universities to where, like the stuff actually gets commercialized, what there is a significant, I say significant, there is at least some research out there that at least talks about, there is disconnect between where the IP is developed and where it actually get, I'm sorry, where the IP is created and where it actually gets commercialized. And it has to do with this notion of absorption capacity and it is a lot like the situation here. It relates to your capital point. A lot of time, not a lot of times, there has been some occasions in the past when neat ideas have started in Louisiana where they have been developed elsewhere because we did not have the venture capital, range of source here, the capital sources like to be close to their things they are investing in. But then there are just all the other things that go around it. If you are a venture funded start-up type thing, you need venture capital; you need legal support that understands how to do those types of transactions, that is part of the creation which we do not have.

An environment that needs to be created which we do not have.

You need legal support on the patent stuff which also, again, we have some. Then you have the talent pool. The Pete Stewart story. I am trying to hire technology guys, I can convince them to come to Baton Rouge. I can get them over the hurdle of coming to Louisiana but the challenge is they say, "Well, I am not going to be with you forever, where am I going to go after that?" So much easier to go to Austin or Atlanta or somewhere that has lots to offer, both in terms of having more applicants. We even saw this in food. The situation with Raising Cane's. Raising Cane's wanted to be here, loved it here, but he needed to get to the next level, he needed high-end, experienced, restaurant chain executive talent. And in the whole state of Louisiana, we

have maybe one or two real national chains. He could go to Dallas and they have got literally like 150 or 200, literally national restaurant chains based there. He said, “We are able to fill all our positions in two weeks.” Not even like breaking a sweat, and I was working on it here for three years; and the interesting thing was, it was not like the people did not like Louisiana, it was just they had the critical mass and we did not.

People love Louisiana. I'll tell you a personal story, but when we were hiring people at SEA and trying to build a big IT staff here, first thing I had to do was convince people that it was safe and that you could educate your kids and had to usually pay them extra to send their kids to private schools. Then the issue that you just mentioned came up every time with senior technical people, if it does not work out with you, then what? Nobody else in Louisiana is hiring the type of talent that you are hiring. So, if it does not work out, I have to move back out of Louisiana. And it was, many times, I could not overcome that hurdle. A lot of people we tried to get that we would have paid good money to, they were looking at that. The education system was a big part of it for their children; image was a big part of it. Just from my own experience, I tried to capture those things as well as I have read a lot about them and it is absolute a big problem for us. When being from Louisiana, having local digress, having a Cajun accent, when I go to the east coast, I have to prove to people I am not too dumb to do business with. And it is a given.

We have a guy, one of the most important things that we are doing from a talent perspective is Louisiana Fast Start.

I'm not familiar with it.

Georgia has something called Georgia Quick Start, you should check it out.

I am familiar with that one.

So, georgiaquickstart.org, their program in the last 10 years been rated number one or two in the country, every year.

Georgia made a big run at getting us to move SEA to Georgia.

Is that right?

Oh, yeah, they made a big run at that.

Well, what they tell companies is, “Look, Atlanta is one thing but if you are in rural Georgia, how do you get confidence you can get the workforce you need, get them trained and everything?” I say, “We are going to deliver that for you, we are going to do it a no cost. It is a great program.” Completely customized from recruitment, screening, development of customized training, delivery of that training, all at no cost to the company. We are copying that. So, you heard about the governors workforce development reform plan, you heard about the labor department and all that but one of the most important parts people did not talk about much is our part, we are copying Georgia Quick Start and we are going to call it, I say copying it, don’t say we are copying it, but we are using that as inspiration. It is going to be called Louisiana Fast Start. We hired one of the top people there, who is fantastic. He has done Ikea and all kinds of companies. Hired him to run it and we have hired several of their top people to come here and help execute it. It is not a silver bullet but if you think about the public education challenges, you as a company looking to staff, you look at public education as a proxy for workforce but ultimately you want to know your assessment workforce. Fast Start is going to help us convince people because we are going to do it again and again, they can ramp up and be successful from a

workforce perspective. It is going to help us transcend to some extent the public education challenges.

That is a huge challenge just trying to get big projects into the state. When we try to bring in big federal projects, that is one of the issues that always comes up. Can you staff it? Can you staff it long term? Can you staff it with local people?

Absolutely.

One of the first things I did when I started this line of research was go talk to Dr. Philip Shapiro at Georgia Tech who has written a lot about their education system and studied it and they have some good programs. I am glad you are learning from those and copying them but bringing in what you can. Let me, I am going to ask you to focus on this if you do not mind. I love this conversation. But I know we have limited time. These are the factors that I found; attitude, inflow, policy which is the one you can effect but it is minimal, frankly policy is one of the least important items, knowledge is and...

To me the policy one is more about, it is not so much a differentiator as it is you do not want it to be an obstacle.

Right. You are Right. It cannot be an obstacle. You have to be as good as everybody else. I like the angel investment program that you have. We used it when we bought Diamond David, but when you look at other places, five million dollars a year of angel investment is nothing. I know that you do not want to replace venture capital. You shouldn't be replacing venture capital or angel capital but...

Do you need to run?

Yeah, how much time do you think we need to get to your key stuff?

You can, we are at it and you can go ahead and leave whenever you need to. I might give you a homework assignment.

Okay. Well, can you run me over there? I will get my homework and I will be there in just a second.

I am going to actually give you this and then I am going to write a note on it. I am just going to do this, leadership. One of the things that Sandy very eloquently pointed as you would expect was one thing I missed and I just kind of over looked it as being overt and just figured it was a given was leadership. Nowhere in here do I specifically call out leadership which you have clearly shown from the discussion how important leadership is in this state and I think everywhere else. That is one thing I noticed about Sofia Antipolis is the leadership of Senator Lafayette starting 40 years ago was critical to the formation of Sofia Antipolis which interestingly failed when it first started and then learned and moved on. That is an interesting model. These factors, these six factors, I can actually wait and put into a mathematical formula just based on the 20 or 30 books and the hundred articles that I have read but also based on the interviews that I have had with these. What I have done is I have asked people to look at these and to grade them as to how important do they think they are. And I have graded them in two ways. How well do you think the local area that you are working with has done but more importantly is how important do you think it is? In other words, let's say environmental is one of six factors; it is made up of these ten variables. How important are each one of these? Quality of life, is that an A or an F.

Can you email these to me?

Yeah, I will email it to you.

It is easier for me to get back.

If you get time and I know that is impossible to ask, Steve, but if you get time, look at this.

Yeah, I can do that. You want me to just basically kind of score?

Grade A through F. Whatever you think, either number or grade.

Okay.

Some people have preferred to put numbers. And tell me if I missed anything.

Awesome. I would be happy to do that.

And the whole idea here is to be able to gauge these against 20 or 30 different places in the world.

I am going to get something for you before I go.

Okay. But then what I want to be able to do is simply identify to people, here are all the factors and if you do an honest evaluation against these factors, you can give yourself a grade as to where you are on this scale of development. And if you want to move to the next level, you know what you have to address. Realistically, it is that simple. Then I am going to put it into a neural network model so it can actually learn from itself and generate a mathematical model.

Awesome.

Same here, I am sorry to have been late and pressed you for time. I know you've given me a half hour longer than I had scheduled, and I appreciate that.

Dissertation Interview Questionnaire – Tim Ryan 02/26/2009

(1) Please describe briefly your current position and role within your organization and community.

I will give you a copy of the question and then just kind of walk through these. We do not have to be real diligent in staying on target.

Now, I am talking to you more as a professor of economics than I am as a chancellor of UNO, however, obviously, both come into play.

What I would like you to do, if you do not mind, at first is tell me a little bit about your role and how that impacts the organization and the community and then we will talk more specifically about economic development.

Well, obviously, I am the chancellor at the University of New Orleans. My role is to guide the organization as for my mission of teaching research service for the New Orleans community. Because of my background I have also been the, sort of, Chief Economic Development spokesperson for this community and I have spent a lot of time as chancellor trying to bring some of the resources that we have, here at the University, in conjunction with economic development efforts of the community, serving on your GNO, Inc. which is your major regional economic development, the local chamber which does not do economic development but at some point, I think, would like to.

The Idea Village, which is an entrepreneurship organization, when I was Dean at McCully Business, had a formal relationship with them that they were going to do business

incubation and so forth for the University to take some of the ideas that had come out of University Patterson and so forth, University research to commercialize it. Now, it never worked out so we, I am still on the board and the executive community, it has never worked out really to the extent that I hoped it would. So, I still support the organization and think it is a good effort but we no longer are having that, sort of, formal relationship with them. And, matter of fact, I am going Saturday of all things to a tech, I have been asked to serve on a tech study community, public finance and economic development are two of my fields that I took in graduate school in economics and, obviously, in Louisiana, they are closely related. So, there is a tax study community, and I have probably served on four or five of these, either at the state level, and a couple at the local level over my 32 years here in New Orleans to try to make recommendations about what we need to do to restructure our tax system so that it is conducive to economic development. We have a tax system that has some aspects of it that are particularly burdensome to the investment process which is just the opposite of the way you want to have a tax system so we have been trying for years to try to make some significant changes in the tax structure.

Actually, we had made some progress in that direction, but I think some of that progress has been undone with the elimination of the Stelly Plan. The Stelly and the income tax are the ways to solve some of these issues, because you then move the tax structure towards individuals and broaden it out so that service business, which basically go untaxed under the system, are heavily taxed. Manufacturing and commercial, hospitality and service businesses we do not. We are at a relatively modest rate, to get some revenue, which is the growing part of the economy, but they undid that. But, they did some other good things with respect to sales taxes on

machinery and equipment, which is probably one of the stupidest taxes you could have because it taxes the actual act of investment so if a company...

Which I do not understand why.

No, it is absolutely stupid. If I am going to spend ten million dollars in putting equipment here in Louisiana or ten million putting into Mississippi, well, on top of that ten million, got to pay 5% tax to, 4% tax to state and 5% tax to local governments, 9% tax on average on that and I pay zero tax over here, it is so silly, the last thing you want to do is tax investment.

Right.

It is okay to tax the returns for investment under an income tax or something. And then we have the corporate franchise tax on that which is also, so when a corporation borrows money, again, for investment purposes, they have to pay tax on it which very few states do. So, those are some and some of those initiatives were part of our original, going back to the '80s push on physical reform which have ended up being changed and the Jindal Administration sort of put the final touches on that in terms of phasing those taxes out but I think the elimination of the Stelly Plan was a move backward. So, there is another tax study so I try to use my training as an economist but also the position at the University to make sure that we, one, understand the thrust of what we, meaning the University, understand this thrust of economic development initiative so that we can build that information into our academic and strategic planning. And also, the economic development community, the business community knows the assets the University has.

Good. That also answers my first couple questions and will fit well when we get to some of the specific variables that we are studying and putting in a model.

On question three, page three, this is a good question for you. Do you think economic growth is predictable? And more specifically regional economic growth and within that technology-based economic growth in a region?

Okay. There is a real distinction between economic growth and economic development.

And so talking about economic growth now, the answer is, is it predictable, anything is predictable that follows historical patterns. So, if we have normal situations we know that we are going to have certain economic reactions so if the price of oil goes up and we are in an oil-based economy, we pretty much know what is going to happen as a result of that. And most things in economic world do follow historical patterns. So, is economic growth predictable? Sure, to an extent. Can you predict it to 99.9% competence level? No. Our model, and the thing is regional economic growth predictable, it is the same thing, again, depending on the region that you are talking about. For instance, let's say, the New Orleans region versus the Baton Rouge region, it is way easier to predict the Baton Rouge region because the Baton Rouge, their economy is anchored by some very, very stable forces, state government and Universities. They are very predictable, they grow a little bit every year, they never grow by a lot, they never shrink and they very seldom ever stay stagnant so they grow a little bit every year. And then so you have the rest of the economy that you are predicting which is going to make the ultimate difference as to whether you have, 5% employment growth or 7% or 2% or minus three or whatever, it becomes a smaller percentage of that pie so you are going to be more accurate. When you look at New Orleans, New Orleans has a very unstable economic base. Our economic

base is in areas like oil and gas industry which has been very volatile over the years and declining, at least in terms of the employment. The port and tourism with the port, let's talk about the port which, again, has been declining over the years and is relatively unstable because you have so many factors, worldwide economic recession, economic growth, exchange rate fluctuations import/export factors, we are basically an export port and so forth and so on. And then you have tourism which, again, is subject to... so we do not have a very stable economic base so when we do experience economic growth in this region, it is usually because our base is growing and people assume that means New Orleans economy never grows. So, you look for instance, between the period of, let's say, 1982 and before Katrina, Katrina obviously complicated things, but up to 2005 the average rate of growth of employment, which is the best measure at the regional level, was very low maybe 1% where people look at other nationally it was probably about 2% per year. What would happen is we had an economy who was producing new jobs but what was happening was our economic base was shrinking and so we were losing jobs so part of the new jobs we were created would just offset the loss.

Right.

If you had a stable economic base, all of those new jobs would have shown up as new jobs, as net new jobs. So, yeah, I think economic growth is predictable, obviously, within a range and some economies tend to be more stable so they are more easily predictable, some economies are very unstable but sometimes unstable in a predictable way.

Would it be accurate to say that given certain variable inputs that the outcome of economic growth or lack of economic growth would be predictable?

Generally, yes. Generally, yes. Now, and that gets to your last question here, can regional technology growth be predicted; well, because that is generally we think of technology growth as new technology. Some kind of implementation or creation of new technology and that is probably the most difficult thing to predict because you cannot base it on historical information. I mean, you can sort of get a feel and you see these studies all the time and they talk about new technology gets created at a rate of so much and how fast it goes and so forth but we do not know is, I am trying to think if a good example will jump into my mind, but technology is, especially technology related economic growth, is something that is very difficult to predict because of so many factors that have to come together to make it work and to actually generate any local economic growth or development as a result of that. You do not know when the technology, is the technology applied to the right industry, is it a technology that has job creation in and of itself, is it just an industry pop-up around that technology or is it just the implementation of technology in an existing industry; most, in this country, most technology as you look at the impact of technology on other businesses, so you look at manufacturing, well obviously, manufacturing have employed technology in all kinds of different ways. Most of those tend to be labor saving. The reason why we are developing the technology is to economize on our most extensive input or resource, which is labor, so you save and that maybe good for the bottom line of the company but it is not necessarily good for the region, so you get a decline in, actually sometimes, economic growth as a result of that. But, overall economy, you get a growth in output. So, yeah, technology-based economic growth is, and again, anything can be predicted but it is much more difficult to predict because you have got many more variables and sometimes those variables are not based; if you truly have a new technology, you do not have that history to go on. So, we were predicting, for instance, that everybody was going to be, once computers

became, everybody is going to work from home, that was the big thing. So, there were all these implications of what this meant so development was going to come to a crash because we did not need office buildings to house people, everybody is going to work at home and roads were going to be all of these things and then all of the sudden what they realized is, well, there is a social aspect to work, people do not want to be sitting at home in their pajamas at the computer, some people do okay in that but most people need to socialize and so it ended up being that technology had a much different impact than anybody could have predicted because we did not have a past history to base that on.

It does not have to... I am not just asking about new technology. It can just be the employment of technology. Silicon Valley was not so much about creating new technology as it was about the business model that employed those technologies and created jobs.

Well, that is generally where you get growth. That is where you get jobs, is you get jobs when you take a technology and apply it to something that we did not apply it to before.

Right.

So, for instance, these things, this is probably the fastest growing manufacturing sector because we took a technology that was out there, computer technology and applied it to something that we had never applied to before.

Right.

So, absolutely, and that is, that is very difficult, that is what real entrepreneurs and real innovators are about is figuring out those ideas. Henry Ford had never invented anything in his

life, he figured out a way to take a process, and this more but you can call it a technology, but a process and apply it the production of automobiles that nobody had figured out.

That is a good example, actually, that is exactly what I am talking about. At that time, that was a technology or a process whatever.

That is right.

What, just off the top of your head, now I am getting to specific factors that I have identified later, but what factors do you think drive or impact technology-based economic development, both quantitative and qualitative. I have spent a lot of time trying to identify those factors and the variables that make them up, that is a big part of why we are doing these interviews. There is a certain amount you can learn from literature research and there is a certain amount that you have to learn from going and talk to people.

Well, it is an interesting, it is an interesting question. Because when you think about it, if you think about, again, there are so many different aspects or there could be so many different aspects, you think about the application of technology in a field that perhaps that technology had not been applied before. If you are talking about that and then what that would create. If we figure out a better way to do something or to use the technology in something, we are going to generate a larger market share, because our costs are going to be lower, quality will be higher, or one of those factors. It takes, interesting, it takes a very, I think, a corporate or business, the business does not have to be corporate but the culture within the business has to be flexible and innovative. People have to realize that maybe there is a different way to do things. In every business that I have ever been involved in, including Universities and other things, and you ask

people, why do you do something, I always went why, why do you do it this way, why is this and when you get the answer, well 'cause we have always done it that way, then you know that that business, in fact, it might be a profitable business but it is certainly not, I would not take that business long, I would not invest in them over the long-term because I do not think they are going to be successful. So, you need a climate that, within the business, that says, "All right. Let's try and see if this will work for us. Let's see if we can make it work." Because if it is an existing business, quite often, there is the fear that, well, we will screw something up that we have working for us, this business has been around for how many years so I think you really need a climate of true risk taking. I think in many ways that is a bigger risk for a business person to take than somebody who comes in and starts their own business.

Right.

Because it is hard to mess with something that is working but maybe it will work better and that is really where I see, you see a lot of real innovation is when you do that and say "We can take this process and make it work better by applying some technology."

Yeah, the executive in various businesses, I would agree with that. If you could just start a new business and start from scratch.

Yeah, absolutely.

We will go on to do these specific things in a moment but I just want, and I am on page five, specific quantitative factors or variables you believe that can be measured. Again, this is not so much to solve things, I do want to ask you about qualitative as well, but things that are measured or can be measure, I should say, there are a lot of reports put out by our government

that measure variables theoretically that measure technology-based economic development and I have found most of them are measured because they can be measured. And the things that may really impact that are not measured because they are hard to measure but what specific things do you know of that can be, could be measured, that might actually effect... you had mentioned taxes earlier, the tax structure in the state of Louisiana compared to other states. That is a clear, quantitative variable that there is a policy matter than can be measured.

Right.

What others?

Well, I think one of the things, again, if we are talking about sort of existing businesses, one of the things that you look at is the age of the capital stock. In other words, that you are going to employ a different technology in producing whatever your product is, it might be service or it might not be a manufacturing process, it might be a service, but that if you have a capital stock, so you have equipment that is relatively recent, it is going to be very difficult and it sounds like a silly thing but, again, businesses do not; they look at that and say, "No, I have got another three years or another five years on this, so I am going to wait until the end of that period." Instead of maybe you can change out the capital stock with new technology and then really increase economic or business development or business growth but very hesitant to do it.

I had not thought about that but you are right.

Yeah, just think about how often people are going and they are doing something and even if it is a silly example like, oh we are using this software, and I say, "Well, Jesus, is that doing, is

the best for doing what you...” No, they got this new software, I say, “Well, why don't you buy...” “Well, geez, we just bought this software.”

They look at the sum cost not the opportunity cost.

That is right.

That is one I had not thought of.

And sometimes that is not, but at least it is measurable. I mean it may not be government statistics on that.

Right.

But certainly, it is potentially measurable. But I find things like that because people make change over in equipment or software, whatever it is, that is an opportunity to infuse new technology into the process.

That is a real good thought. Of the various things that I have looked at, I have not thought of that.

I mean, I will give you an example of when did, if you look at, let's say the NASDAQ because it has a lot of tech stocks in it, when was the fastest growing period of the NASDAQ? Going back when NASDAQ was created with it in the '50s I think but look at the whole...

I would expect it would be the early 2000's.

No, just the opposite.

Really?

Late '90s.

It was not before the dot com crash in 2000?

No.

Really?

But, it was between '96-7 and 2000. And it spiked.

I remember the spike.

Unbelievable spike.

When was the dot com bust, 2002?

No, it was really before 2000, it was like 2001.

Okay, so 2001, right, so prior to that.

Okay. But why did it happen? Do you have any idea?

No, I am interviewing you, you are not asking me... no I am just kidding.

You are the student remember? No. The reason why it happened was because everybody was replacing, nobody believed, they were not sure about Y2K.

Right.

But they heard this dooms day scenario, oh my God, Y2K, so what happened was they decided to change out all their computer-related hardware and software at that time because they were anticipating...

Right.

... that their existing equipment might not work. Now, what went through their processes is, well I am really going to probably change this out, let's say 2003, 2004, anyway.

Right.

But, if I get caught in this Y2K think I will lose a fortune so let me go do it, it is not like I am never going to do it, let me do it now and so what happened was it just had a tremendous impact, the whole economy was just roaring and that is what caused the economic slow down afterwards is, people that bought all their stuff

Right.

... they did not need to buy anymore stuff for a while.

I did not even think about that. SEA boomed right before 2000 for exactly that reason. We hired 100 people to deal with Y2K and we were business afterwards that kept them employed but I should have thought about that. That is a real good example.

That is an example of that kind of thing. So, that is one that measurable, thing that can be measured. What else can we measure? I mean, I do not know, that is a good question. It is so difficult to find measurement for a lot of business factors.

Very tough.

It really is. We have a lot of business faculty members and other PhD's who research on business phenomena who do not necessarily have data so they would do this kind of thing. They would have interview data. But, what other kind of things can we measure? I mean, it would be interesting, you can measure, I think, and this may not be the right term, sort of the rate of penetration of technology in a business compared to, let's say, the market. What, if you look at that business for a certain output, what is their technology investment? Now, the interesting thing would be, would that be a predictor of technology-based economic growth or not? In other words, it might be just the opposite, it might be that the ones who do not have much of an investment in technology are maybe the ones because they are sort of playing catch-up, I do not know.

Actually, that is a real good point because what I am finding is that there are regions, there are variables within regions that, if you do not have them, it is like multiplying by zero, you are never going to get there. But, if you do, it is necessary but no sufficient to generate growth and unfortunately, that is what a lot of people measure or focus on in their economic development activities. I got a real good talk with Steven Moret yesterday about where they are focusing Louisiana's efforts. Contrary to what our previous administration did, they are not looking at what people think of as technology fields that we ought to put money into, IT for example. We are not Austin, we are not Huntsville, we are not Limerick, we are not a lot of places and if we become an also ran and try to catch-up with everybody in those areas, we probably will not make it by the time that boom is done; maybe, maybe not.

Right, right.

But, we certainly do not want to turn out back on it.

Right.

But, what he wants to focus Louisiana on are the next growth areas. What is going to happen in five years that will be a growth area that we can preposition? Now, that is a real hard thing to do.

That is a real, and it is a hard thing and it is a very, very risky thing. The logic is very simple.

The logic is simple. In practice, it is going to be real tough.

Right. You are trying to catch a growing pie.

Right.

And if you take your slice, whatever that slice is of a growing pie, your slice gets bigger and bigger. If you take a slice in order to achieve economic growth or economic development and the pie is shrinking, you have got to get a bigger and bigger slice of that pie.

Right.

And that is really hard. And that is what we have done historically, chasing steel mills and things like that. Now, there are big victories for politicians, they get the big ribbon cutting and there is a thousand jobs or whatever the hell it is but it is not really sustainable in the long run because they are not growing industries. The problem is that those and whether that is measurable or not, I think we could do it and this would be a great study for somebody to try to

do quantitatively. If we look at, we are now talking about regions instead of individual businesses but if we look at regions and say, "Let's try to figure out which regions have jumped on and gotten a head start on certain areas before others." So, for instance, if you look at the biotechnology and you look at San Diego, as a matter of fact, one of our graduates is, we just went and visited him, he is in a biotechnology company in San Diego. Very interesting guy, I do not know if you remember but Bernard Foods?

Yeah.

He is Bob Bernard and he formed Bernard Foods, his company, his family owned Fry Meats, it is a local, you remember Fry Meats.

I remember them, too.

And so he decided he wanted to do that but it did not work out so he went and bought Bernard Foods but he used his engineering background because he had innovation of the way he could, he did... I use to buy them because I love food and I am a cook but for something quick it was the best quality that I had ever had. So, you could get a gumbo or shrimp etouffee m, a crawfish etouffee or something, I do not think it was frozen, but whatever process he did it tasted really good, it was almost like you had done it yourself and he ended up selling it to, I think Swanson, not Swanson, Stouffer. Then went out to San Diego and started, now, a biotech and he has got, he owns almost the whole company and he got 27 SBIR grants.

Wow.

Which is incredible, one person or one company.

Wow, that is a lot.

Oh, it really is. It basically funded the development and now he is in biotech, he is out of the food area. Fascinating guy, fascinating story. But, again, you look at San Diego and what was it San Diego jumped on that biotech thing probably to a larger extent before everybody else, what is it they did or what did they see, what allowed them to do it? They did not just make a policy decision saying, "Well, we have got to," I do not think that tax structure as an issue but, "we got to invest in the Universities to create this."

Right.

Or, "We have got to create." And it was not a tax incentive program, although I do not think that California is big on tax incentive programs. Or, "We have got to do this or that." I do not know if it was a policy decision but it would be interesting to see, to do a study of those regions that have jumped on certain industries and really gotten a foot before one of the interesting things is we know Silicon Valley, obviously, we know why Silicon Valley happened because of Stanford and Caltech and Berkley and so forth and so on. But the Salt Lake City area, and you talk to, an again, a UNO graduate and I will not, since the tape recorder is one politically correct, but anyway, Jim Clark who founded Netscape and so forth and so on.

I will edit all that stuff, by the way.

All right. But, Jim, one thing he said at University of Utah, he left here he got his masters in physics from us, both his undergraduate and his matters degree and then went to Utah to get a Ph. D. in computer science, this was back in the '70s and what he said was he learned at Utah is what you do is you hire the Indian engineers.

Right.

And so in Utah they really had this, now that is when he went to California, to Stanford to teach, but it would be interesting to see because they really did have a high-tech industry before most other communities did in Salt Lake City. Why Salt Lake City? So it is an interesting, I do not know the answer to that question. I mean, I do not know if there is something measurable there but I think it would be fascinating to look at.

Let me help you out. That is exactly what, in much less words and less eloquently, that is what I am doing. I have looked at Silicon Valley and the names that people know; Silicon Valley, Route 128, Austin, and then I have looked at a lot of areas that are not necessarily names you think of like Huntsville. Huntsville is an adolescent technology economy because they are dependent upon one source of inflow, the federal government.

Right, right.

But the whole purpose of these interviews that I am doing and 90% of the study that I have done is to look at these different regions all over the world, France, Ireland, Bangalore, Dubai, some of the economic cities initiatives in Saudi Arabia where they are trying to create a technology environment of something that did not exist. But then I am comparing that to the U.S., to Austin, to Route 128, I am comparing Tucson and Phoenix, looking at places like Huntsville. So, I have about 20 regions. I would love to study 200 but you cannot do that in time for my Ph. D., so.

Maybe in time before you die, I mean, that is a long time.

That is a life's work.

It really is.

I am going to ask you to do an exercise for me. What I did was identify, and this is from my literature research, and I am validating this for the most part, two-step validation, second part I will not get to by May. But, the first step is the interviews, the second step is going to be a much broader survey. But I have identified six factors that I believe effect technology-based economic development in a region, not for the whole world but within a region and then within those six factors, there are anywhere from a half a dozen to two dozen variables that make up those factors. And, as an example, the first one is the environment. We talked a little bit about that. Quality of life, which you cannot necessarily...

Very difficult to measure.

Right. But there are a number of other ones that you can measure.

Right.

What I have asked people to do is to look at these and just based on their considered opinion either grade them or rank them or put a number on them that I can then consolidate and synthesize the results of peoples grading. And it is interesting because different people have very different perspectives but it is interesting how they have come out with similar results. One of the things that was pointed out to me that I just plain overlooked was leadership. All of this stuff does not matter without the right leadership and Sandy Baruah pointed that out to me, it was certainly implicit but it was not explicit in what I have written. But, if you are willing to take the time, what I would like you to do it rank these or grade them or do whatever. Sandy did an A through F grading system, Bob Fudicker did a number system, does not matter to me, and just try

to look at the relative importance. And what you will notice is that there is environmental, there is inflow, which is not identified in anyone's literature but something that I wanted to break out, inflow of talent, inflow of money, that is extremely important because it allows you to look at the diversification of a region, Huntsville is another good example, great inflow from the federal government but no diversification.

Right.

And without diversification it cannot stand. Attitude, something that is very difficult to measure but there are some interesting metrics. Politics which you talked about the tax issues and knowledge, that is where the Universities come in. To make some work on that by Dr. Philip Schapiro from Georgia Tech. Would you be willing to sit down and walk through some of those?

Do you want to do this now or do you want me to do it...?

You can do it...

I mean, it just depends on how you have the time structured because to think about these will take a long time. It is going to take a while.

If you would like to take that as a homework assignment, I am more than happy to give it to you as a homework assignment.

Yeah, I would think that...

Secretary Moret did it that way. Yes, I think that would be better use of your time than we sit here while I am thinking while you are busy. I will be glad to just fill it out.

Well, why don't you do that, why don't you fill it out. I hand wrote in leadership just because I did not want to lose that and I will actually type it in.

Okay.

Now, why don't you just take your time to look at it, if you do not mind doing that.

I will be glad to.

As you pointed out, I am a student, so my time is your time. I am not Bobby Savoie, business man, here. Why don't we move on, then and talk about some of the others.

I would be glad, let me ask this, so you are talking about what, these are the factors that inflow and positive economic development and you want to know what are more important than others. So, it does not have to be add to 100 points but you could do it...

However you want to do it.

Some kind of scale.

Again, Sandy did it by doing A through F.

A being most important?

A being most important, F being unimportant.

Okay. All right.

I will leave you that page but look here at page 19 and I will show you why I am doing that.

Okay.

If I can identify those factors and I can actually grade them and come up with grades for economies that are neophyte, adolescent or mature from technology standpoint and what I have found is that the different factors effect different parts of an economies growth and the analogy that is use is just like a balloon, you are blowing up a balloon if the air coming in is more than the air coming out it is going to expand.

Right.

That is actually a reasonable analogy for a regional economy.

Sure.

If I can grade them then I can put them into a mathematical formula, feed that into a neural network model and it actually can be set up to learn from itself. So, if we do it with 20 people plus all the literature research on the different regions, that is a starting point. Add in the survey results it is going to get better and then make it available in an open source model for people to use and make it better. It is not intended to be all, end all. It does not have what the solution is, it is intended to make people think in terms of, if I am going to spend money on technology-based economic development or to support my region where do I need to spend it. If my school system is really bad, as ours is, does it matter if I go spend money in improving the IP infrastructure because the school system is bad.

Right.

Is that a multiply by zero or an add zero?

Well, that is an interesting question because when I look at this in my history with economic development and history of the economy and so forth. You look at, and I will give you a perfect example of that, in the '60s when Research Triangle Park was first developed in North Carolina, the governor of the state at the time, Terry Sanford, looked very far out which is very unusual for any elected official because the horizon of most elected officials is whatever their term of office is, four years, eight years.

Right. Whatever it is. It is like okay. I have actually had some tell me that, why should I care? Well, because it matters to the people who you are governing. Well, you cannot be in office. But, anyway, Terry Sanford, who was governor of North Carolina, did he recognize in his writings, and you read somewhere, he said he realized that this was the most long-term kind of investment but that it was the right one. And basically it was investment, creating the vehicle Research Triangle Park, funding the Universities because the two of the three anchors to that were state Universities which he had control over the funding of Duke was the third but he figured Duke is always going to have money and so he did not have to worry about them. The most important thing or the most difficult thing that he probably had to do was to take that land from the shopping center developers and the residential developers who just looked at these beautiful, gorgeous hills and said, "Man, boy, this shopping center would be beautiful there." But now you cannot do it... but at that time, North Carolina had one of the worst K-12 education systems in the country, they were down there with South Carolina and Louisiana and Mississippi and Alabama and Arkansas they were in that bottom group. And, yet, his strategy, now, you look at them and their K-12 education system is certainly not California or New York but it is certainly...

But it is good. Not negative.

...much better. Right. It is not a negative at all. But it did not seem to prevent the economic development of that state over a long period of years, I mean, 20, 30 years that they have been very, very successful. But yet we, in Louisiana, we would ask us well why our New Orleans area, or whatever the specific region we are talking about, why haven't we been as successful in economic development or we look at, and the first thing that comes to mind is, well, it is K-12 education. We do not have a good education system so therefore we are producing a workforce that perhaps is trainable. John Kelly, always use to say and he retired, the graduates of the public schools in Orleans Parish and St. Bernard Parish, he said, "Well, they are trainable, they will, they are not, they do not come in with job skills." But that he never found a problem with getting people who were capable of being trained and then doing a good job on the job once they were trained. So, but yet, that would be the first answer that anybody would give to the question of why haven't we achieved, not only technology-economic development, but any kind of economic development is because we do not have the K-12 education system but yet there are other states who manage to accomplish that without K-12.

But their image, I have gone around...

And maybe it is all perception.

... I have gone around with myself with that 100 times, image, perception, attitude.

Louisiana has a better worth ethic, the people here, than most any place I have ever gone and in all the different states that we work in, the people in Louisiana are more hard working and they

also play hard but our image is not conducive to any type of technology development. So, does the image effect the image the education or does the education effect the image?

No, the other way around.

And I find that with a lot of these variables and I have used four analogies in my dissertation, one of which is the product development lifestyle and a series of product development life cycles.

Sure, sure.

And a big part of that growth phase is to set the environment but then you have to have the image. My son Matthew is graduating this year from High School, he wants to go into genetics, five the schools he has applied to are in North Carolina, South Carolina because they have a great genetics program.

Yeah.

Well, they did not start out that way.

Right.

They had the image and they built on it. It was not so much about the existence of technology that they created education, they created the environment, they created the image, that is what Sophia Antipolis in France has done, interestingly, they failed on their first attempt, the original vision by Senator Landrieu, when they rolled it out, it failed miserably.

You know, it is interesting, when you talk about, especially the technology area, when you talk about the areas that have succeeded, that we can look back here in 2009 and look over the last whatever I guess we talk about 30 years, obviously, Silicon Valley, Boston, Austin, and what all of those places have in common is great Universities.

Right.

All of them.

And Universities that interact with the businesses.

Right. And I think the key there is that not only having very good Universities but having very good Universities that are encouraged and there is proper incentives to not only engage in research that will facilitate this process but also to work with businesses either to transfer that research or commercialize it themselves. I mean, that is when you look at what started Silicon Valley. Why did it start there? Because Mr. Hewlett and Mr. Packard.

Right.

I mean, just two guys, one of them, I think, was a math professor of all things but to start their own business. And you see those kinds of patterns, again, Jim Clark, Jim Clark was a professor at Stanford and then he created his own business. So, having entrepreneurial faculty is something, and I do not know how you measure that but there is a lot of institutions that are well funded institutions, I mean, that has been part of the problem here in Louisiana is we have never funded our...

It is a big part.

...institutions of higher education so that we can attract to the level and we can do it in a few cases but we cannot attract the level of academic superstars who are going to be able to move the needle in terms of economic development. But, they have never created system that gives the faculty the proper incentives as some other stats have done. So, in addition to the funding, I think it is beyond the funding issue.

You know I like that because one of the things I have studied over my career but as a part of this dissertation as well is the abject failure of our national nuclear laboratories to commercialize anything despite billions of dollars. Remember when the Department of Energy first rolled out its work for others and tech transfer programs, at that time we spent probably two billions dollars, look at Albuquerque, the International Lab gets two billion a year, has not produced any reasonable commercialized technology despite a lot of money.

It is not all about money, I mean obviously, money is necessary.

It is important, you have to have it but they lack any incentives to do it and frankly the vision and knowledge to do it.

That is, again, that would be probably very difficult to measure but it just seems to me that there is a climate that is established at these institutions that really facilitates that and makes it occur around, and then once you develop it. I remember a quote from Paul Samuelson, obviously a great economist, and he was talking about something, he was comparing the United States to something and Paul, he said, "Well, you cannot beat compound interest." And his point was that once you establish something and then that grows, that becomes a Juggernaut.

It keeps growing.

It keeps growing, even if it is a relatively small percentage, it is on such a big base that it looks like, and that has been something that I think is critical and you find quite often in these regions that have that, grow on it and develop other initiatives and to come in and break into that region, I mean, into that game so for a place like New Orleans or even Huntsville. Now, Huntsville, obviously, had the boots by the federal but to break into that game is very difficult. But, I do not know, it is an interesting question because having great Universities seems to be very important but it is not the be all and end all.

Right.

And then you can have some places that can thrive and really prosper who do not necessarily have great Universities and that is probably not as many examples.

But that is the exception of the rule and it is interesting to try to figure out why. Why? Why did they grow without the Universities? It is clearly not multiplicative by zero because they have grown but that is an import factor. But, what I have tried to do is take these six factors and the variables and look at these different regions and categorize them as neophyte, adolescent, or mature based upon a number of different factors. And, it has actually come out fairly well. If you look at Huntsville, why haven't they diversified at all? They are a great success in aerospace and nothing else. They love the fact that they can talk about the Cummings Research Park and it has got 25,000 people working in it but you take away the federal dollars, they are an agriculture community. So, let me ask you this.

Okay.

I am going to move onto.

But, I will fill this out, this discussion helps because I think I see and can help me focus on my own thoughts but I will fill it out and get it back to you.

Thinking in terms of these factors and these are the factors, let's talk about New Orleans specifically. One of the things I am looking at is ranking these different areas so they can kind of get a feel for where they need to go next. If you had to rank New Orleans on each of these six factors and do not look at all the variables and all that.

Right.

Would you rank New Orleans as neophyte, i.e. of one out of five, or adolescent, a three out of five, or mature, five out of five?

Well, I would have to say.

I do not want you to over think that, either.

But, I have to say, on these kinds of things, I would have to rank us at the lowest level on almost everything. When you look at the factors that make up the environmental or the variables that make it, we have some investors to technology, any kind of investors and that has been our big problem. We had investors but they all lost their shirt in the oil bust.

Right.

I mean, they were so heavily, if you want to show an example of why you do need to diversify, why you do not want to leave all your eggs in one basket, New Orleans is a good example and so all of the real wealth in this community went away. But in some other communities, I mean, the story about, and I may have gotten it wrong, Michael Dell, who I think

was from Houston, had to go to Dallas to get his venture capital or seat capital money to start Dell computer. He had this idea that I can compete with IBM and beat them at their own game and everybody who looked at him just said, "You must be nuts." So, here is Houston which at the time was probably blowing and going because it was oil money, he could not find anybody to invest.

Right.

And he had to go to Dallas. But, we do not have any kind of investors.

In 1987 I tried to get a \$20,000.00 line of credit against receivables on our, at the time, nuclear engineering work and I could not get a bank here to talk to me. The same banks that offered us 20 million dollar line of credit unsecured at SEA after we had one hundred million dollars of revenue but I had receivables and these people said, "Uh, do you have any hard capital?"

Right.

I have receivables... but what are you worth personally?

Right, exactly. Let's see, who is your mother. So, environmental factor and obviously, our education, our workforce, strong University system, those things just do not exist. Inflow, New Orleans has got such a bad, I mean, the reality is bad but reputation is worse.

The image is worse.

The image is way worse than the reality and so people just shy away from us so I think we are certainly low on that. Now, attitudinal, we might do a little better in attitudinal,

although, I think it is a scatter shot. I think that is one thing this community does have is sort of have a tolerance for risk. It has been an entrepreneurial community, now, as I said, most of the entrepreneurs were targeted, focused on one industry that got clobbered and the typical reasons that industries, that businesses get clobbered, they take too much risk, they think that the trend is always going to be positive, they think that it is always going to keep going up and so they make bad business decisions based on that and when the bottom or when the turn around comes, do not even have to go all the way to the bottom, when the turn around comes then they are just over leveraged and they get killed. But, I always think that New Orleans has always been an entrepreneur community. Mutual success of technology advancement, that is probably one that we have not scored particularly good on because I do not think our business and civic and government leaders have ever had a real focus on what technology could mean for the community.

One of the issues I had with the business council, I am no longer on it but I was years ago, was that most of the people there were 70 years old, they had been great entrepreneurs, they had built their business but now it was more about holding onto the money rather than having new people come in. Regardless of what you may think about John Georges, he has been a good entrepreneur, he has created a lot of wealth. We do not have as much of that as we use to but his has been a very entrepreneurial community.

Absolutely. Historically...

But not in technology.

Not in technology. Value placed on human capital, it is interesting, I guess we get mixed results with that because our, I think people are import to New Orleans but they do not think of people in terms of human capital so they do not think it is something you need to invest in.

Yeah.

Innovative investors, you talk about the business council, I think one of the fascinating things was to see the way the business council, after Katrina, adopted and then just wholeheartedly just gave everything to Jay LaPare. Jay had not even been a member of the business council before, he had not even bothered, and that is a pretty successful company. And, so, he was, I guess, recruited by somebody, I do not know who it was but to come in after Katrina and run the business council and they really were very responsive to him and sort of that business goes back to the other leadership, really receptive. So, I think they were waiting for that leadership. I will tell you a story that probably, again, mixed results, there was a guy who use to be, his name was Joe White, and he use to be an economist for FNBC back in the old days, I am talking about, Joe White has probably been dead for close to 30 years or 25 years but he was an economist and oh, he knew everything about New Orleans and New Orleans business and so forth and Joe said, "I will tell you what is wrong with New Orleans." He said, "There was a guy, professor somewhere," Tulane, or wherever, it was before UNO ever existed so, and he was a sociology professor so he did a survey of all kinds of influential people in the community and said, "Name the top five," or whatever, "leaders. Just name the top five leaders." And people did the response the filled it out and so he did the top 10 names that appeared the most often and said, "Out of the top 10, nine," or something like that, "were elected officials." He said when he went in Dallas and in Atlanta and Houston and did that study that maybe half were

elected officials and half were business leaders. And, so we have too often looked at government as the answer and the solution for our problems instead of looking toward business leadership. But, I really do think that is starting to change now maybe it is starting to change slowly. But, so yes, attitudinal factor, I think we have some hope there but it is not one that we have scored very high, probably a one there, too. Policy factor.

You talked about that earlier.

Yeah, that is probably the worst. We just, our policies, our knowledge factors. We have some opportunities here, I think we have research at the Universities, we just have not done a particularly good job in nurturing that and the state has not done a particularly good job, one in funding it and two in creating the proper incentives as we were talking about before.

We are better in this than in a lot of the other areas, in fact, our brain drain issue is a good indicator. We train people, we train good people and we teach them well then they go creates things elsewhere.

Go somewhere else, yeah, because and that is the irony is it because of that quality of life or other issues, they are willing to come back if they feel that they will be able to do well here.

Right.

Unfortunately, not many think they can do well here and so, yeah, we really do have not only a brain drain but a creativity drain.

That is a good point.

I really do think that we have taken some real creative people. I have been concerned for some that we have known that everybody that looks at the demographics has known for sometime that this is, especially the city of New Orleans, but even the region is a very heavily afro-American population. So, should we look and say, "Oh, well that just makes a problem." Or should that be a real opportunity for strength and diversity and growth but yet what concern me is that the educated African-Americans think Atlanta is the holy grail.

Right.

If they get a chance, boy, they get out of New Orleans and go to Atlanta and educated ones and I have always wondered, why we do not have an environment that, Andrew Young could feel that he could thrive and prosper in New Orleans instead of in Atlanta. Somebody made a comment, and I do know, I know Andrew Young is a New Orleans native but somebody made a comment that New Orleans has produced two great mayors, unfortunately, both of them were mayor of Atlanta.

Mr. Jackson, they said was New Orleans native but I cannot swear to that but we do know Andrew Young... or Miami, when Miami took the Cuban community. Now, I have hired my Chief of Staff that I just hired a couple of months ago is Cuban and I can see why Cubans have been so aggressive and knowing her personality, she is a typical Cuban, I can see why Miami has done so well. But, took that and really made it the strength of their economic growth

And made it a strength and build on it. Yeah. And we have not, you are right.

Yeah. And we have not.

We have in the music industries, we just have not intelligently.

Exactly, even our very talented local musicians feels they have to go somewhere else to apply their trade.

That is right.

You look at the Marsalis and the Harry Connick, Jr. and Dr. John and all these folks who are very, very successful, I mean, the music business is a really hard business and these guys have done it. But, yet they do it out of New Orleans and they will go to Mardi Gras in New Orland and create parades and so forth but they do not live here or do not really, have not really turned this into that kind of industry center like Nashville. Country music and it is not centered in Nashville, so.

I can tell you from experience, it would have been a lot easier for me to build a business anywhere but here. I hate to be quite so negative about it, I live here because we love living here but from a business standpoint, being form Louisiana, speaking with a Cajun accent and having a business in New Orleans, I always had to prove to people we were not too dumb to do business with them or was not too crooked to do business with them before we could ever get through the door.

Yeah. So, I do not think we score well, unfortunately, in any of these, I think we are probably a one, we perform minimally in all of them.

I am going to ask just two questions more.

Sure.

Do you think that government policy can affect qualitative factors? Not the quantitative, not the tax, but the qualitative factor that we have just been talking about.

The answer is yes because I think that the government, through its policy, needs to sort of set the tone or help set the tone, I mean, they cannot do it by myself, I said, we need business leadership and private leadership but I think government can set the standard that we will see other individuals and businesses pick up on in terms of some of these qualitative; plus government policies are what are going to determine, in part, whether the kind of people who have those attitudes stay here or locate here or not.

That is a good point.

It is not independent of how many times have you, especially since Katrina, have gone out, travel somewhere, tell people you are from New Orleans and they sort of look at you, their eyes roll and they say, "Look it is a great place to be if it would not be for our elected officials or our politicians or our government." But we, for whatever reason, have decided that this is the place that we want to live and want to raise our families in so we stick it out and we take that deep breath on occasion and listen to the mayor or the governor or whatever it might be. And it is not the current mayor or the current governor, it is the whole history of governors and mayors and elected officials and representative and we just shake our heads. And so, yes, I think the government policies can impact that some of those qualitative factors because they impact, to some extent, who is here and what kind of private leadership you have and I think that that is important. People get a certain way of perceiving private, not government, business people and they think that well, our government is there, working in the direction that we think is the right direction to go then I am not only going to do my business and keep my business here but I am

going to figure out other ways to reinvest and make this area better. So, yeah, I think it can have an impact on that.

Okay. I showed you this diagram which is a simplistic portrayal of what I believe can be a reasonable model. Do you know of any models that gage technology-based economic development, or excuse me, regional? Even regional technology, either regional or economic development. I have looked at a lot of economic models and I have not found anything yet.

Nothing jumps, now, of course, I have to carryout that I have not looked at this literature in a long time, I have been an administrator for a long time, nothing jumps to mind. As I said, I am probably not the right person to ask, it would probably be somebody who is a little more active in the literature but I am not aware of anything.

Okay. That has covered pretty much everything I wanted to, we may not have covered it all in order but that is okay, just wanted to get the information down. Any recommendations for improving this interview process?

No, I think the interview process was a good one. As I said, I need some time to think about these so I want to do that. But, no, it is an interesting question, as I said, I do not and I have looked a lot at economic development and you always wonder why certain areas succeed. Pick another example, Birmingham was a steel pound, historically and when the steel mills started closing, Birmingham was sucking wind big time. Now, I do not want to say they got lucky but they had a U.S. Senator who made a huge investment of federal money in the medical technology and so forth.

Right.

But it caught on there.

It caught on, that is the difference.

In New Orleans, if you look at sort of combined with Two Lane and LSU Medical Centers do and you add the VA, people do not realize this but the only, and I do not think he is here anymore, but through most of my professional life the only Nobel Laureate we had who lived and worked in New Orleans was on the staff of the VA, Andrew Shivley he was not, now he had residency, I mean, a faculty position at Two Lane but he go this paycheck from the VA. We have, that is a fairly large conglomeration of dollars coming in, research dollars and other things in hospitals but it never took hold and now we are talking about 2009 about this biomedical and this is going to be our thing and everybody is hot on, well, all we have to do is build new hospitals and so and so forth.

Right.

Well, when we did our, now, maybe they are full of shit.

Twenty years ago that might have been right.

Well, that is the point, when GNO, Inc. hired Economics to do the marketing plan for the region and the first task was to identify the areas that we were going to focus on as a region in economic development and came up with the four areas, three of them which were things we had talked about for years, oil and gas and the petro-chemical industry, transportation and shipping, the third was advanced manufacturing which included NASA and what is going on in and then the fourth was a new industry which is sort of what they call creative media which includes digital media, the video game development and music and film and so forth. So, they went

through several sessions with board members and other folks and the area concerned are interested in economic development saying, "What do you think about?" Every meeting, and I attended many of these, at every meeting somebody would ask about biomedical, here we say the governor says his number one product is biomedical, development of a biomedical industry in New Orleans and this one and that and we got this and their answer was, "Look, basically, you have missed that boat."

Right.

Boat sailed a long time ago. You do not have to try to play catch up and develop an industry there, you have to steal from an Austin or Houston or San Diego, again, why should you do that? What is going to make a business...

Why would anyone want to do it here as opposed to...

... as opposed to there, they have got, again, compound interest. But we had an opportunity and people can point to all kinds of little things and say, Tulane and LSU would never talk to each other, it would never work together, they would always try to duplicate and butt heads. But whatever the reason is, it happened.

Right.

And even when legislature tried to put money into it they put some of the tobacco tax money and put it into this biomedical district in New Orleans, I think, Shreveport and Baton Rouge, Shreveport has theirs up and running and has been going for several years. We are just talking about building it now here in New Orleans, I mean, this was 10 years ago, so we cannot blame this totally on Katrina. So, Birmingham succeeded in that industry and making the

biomedical and medical industry really a key component of economic development of the region and we never did. Charlotte became a banking center.

Right.

We almost lost whatever banking, but we had some pretty large banking businesses, the FNBC, and Whitney and Hibernia.

Seventy years ago, New Orleans was the banking center of the south.

Yeah. And now we hardly have a local bank.

Right.

And we did not gain, I mean, the story of New Orleans is, I think, every time there was a... let me go back and start over again. If you look at the last 30 years, what one of the most significant factors in businesses going on is mergers and acquisitions. When Reagan finally, sort of, loosened government regulation on antitrust and other kinds of anti-merger prohibitions, that we saw American industry start realigning itself, becoming bigger, stronger, more efficient, so forth. Every time that happened, we had some major players but every time that happened, we lost. So, when Capital One bought Hibernia because they wanted a banking division, they were a credit card company, they did not have a banking division, they saw there was so much money in banking and they wanted to find a company that was not too large because they could not afford to buy it but that had a good solid banking operation. They came in, they saw Hibernia they bought Hibernia, well, guess, what they are somewhere else now.

Right.

We still have their retail presence here but we do not have that headquarters to any great extent here and that only happened, what, five or six years ago. When, not it did not happen because of whatever reasons, business reasons but when Entergy and Florida Power and Light were going to merge, they were about equal size companies.

Right.

But guess who was going to come out with the headquarters for that, Florida Power and Light, not Entergy. On and on and on, LL&E, my goodness, Louisiana Land and Exploration Company merged with, whatever it was, I forget the name of the company.

Yeah, I forget who they merged with but I remember the merge.

Everybody went to Houston.

Right.

Time and time again, whenever it has happened, we have lost and where other communities, and maybe not, you do not win them all but at least you win enough and I do not think we have won Other years are examples of the opposite, where mergers result in more jobs on the coast, but those seems to be the exception, not the rule.

But that is a whole different story and for different reasons.

And it is interesting and maybe your study will unearth some factors but when we look at all of these things, we tend to lose every time.

Right.

Every time and it is amazing. Another simple example, use to be that everybody had, every auto insurance company had its own claim stuff. Then they figured out, yak now, it is a lot cheaper to do this centralized and then we just send somebody out and we tell you to take pictures and send the thing and if it is a big thing we might send somebody down. So, all of these companies started consolidating claims offices and they were not national, generally they were regional, New Orleans did not get one of them.

Right.

They went to Houston, they went to Birmingham, they went to Jackson, not huge mega cities, not like they all went to Atlanta or something but New Orleans did not get one, not one of those regional claims centers. And then we lost many of our individual or almost all of our individual claims center. Interesting, maybe you will figure out exactly why that happened.

I can figure out some of them but not...

Well, the more information we have, the better off we are.

That is right. Well, thank you for your time.

Okay. I am glad to do it any time.

Dissertation Interview Questionnaire – Eileen Walker 03/04/2009

(1) Please describe briefly your current position and role within your organization and community.

Why don't we start by just having you tell me a little bit about your background and I am particularly trying to get to your background related to economic development.

My name is Eileen Walker and I am the CEO of the Association of the University of Research Parks. I have been involved with research parks for a number of years, probably around 11 or 12 years now and my background previously was in commercial real estate. I was involved, actually, first in residential subdivision development and then in commercial development. So, I then became Director of the Research Park at Arizona State University and did that for over six years. During that time, I became a member of the Board of the Association of University Research Parks and worked on a number of other different initiatives including the Arizona Biotechnology Association, we managed that out of our office at the Arizona State University Research Park. Then I started doing consulting with the association and working as doing different projects with them and that basically lead me to become Executive Director and then CEO.

(2) Do you consider yourself knowledgeable about economic growth and development?

How about technology-based economic development? Please provide a brief discussion of your background related to economic issues.

That is a great background. You are clearly knowledgeable about technology-based economic development, at least coming from the research park standpoint, but your stint with Angelou Economics is great.

Yes, I think that I have been doing this 24 hours a day for about 12 years. So, I have come across a few things. You know more than most. And you are more than welcome to follow along, or not, it does not matter.

(3) Do you think economic growth is predictable?

Based on that, do you think that economic growth is predictable? I am not so much talking about global economies; I am trying to get specifically to regional growth and more specifically to technology-based regional economic growth. Do you think it is predictable?

I think is predictable, but I think that several things have to be taken into account and one of the most important things is the educational situation in the community and that includes K-12 not just higher education. Yes, I think it is predictable.

Good. If it is predictable, do you have a feel for the qualitative and quantitative factors that would impact regional technology-based economic development?

Yes. Between quantitative and qualitative, I am a little unclear as to exactly how you are defining both of those things.

Quantitative could be the number of Ph. D's in the area, the number of undergraduate digress in engineering and science. Qualitative is more the social affective variables.

Okay.

And then I have a list of those. Later on, I will ask you to look them over.

Yes, definitely, let's see now, please think about and try to describe quantitative and qualitative factors.

These are just things that you think of that are really important. I will give you my take on that in a moment.

The absolute most important thing is the educational level, the attitude towards education in a community. The attitudes towards social factors whether folks have attitudes of community, I think that is a really important thing, too. On quantitative, if you want to quantify educational levels so you have a certain number of PhD's; what is your support for education in the community? I know that some of the states that we deal with have extremely low levels of support for education across the board, not just higher education and that is incredibly important.

The image of education in Louisiana is one of the things we struggle with greatly. I am talking about K-12, our K-12 education system ranks 49th or 50th in the U.S. every year. When you are trying to build a technology-based portion of the economy that is very hard. I do not know if you know my background, but I have built the largest technology company in that region and hired about 1,000 people, mostly IT, brought a lot of people into Louisiana and the biggest negative I had to overcome was people did not want to move their kids there and I actually had to pay some of my executive extra to put their kids in private schools because otherwise they would not come to Louisiana.

That is very interesting because, I am doing a study right now, not with the folks from Angelou, it is not Angelou, it is another organization called New Economy Strategies and is the person I work with at Angelou and I are doing, and another person, are doing a study for Baton Rouge, the Baton Rouge Area Chamber. That has been repeatedly remarked on as the number one reason that it is impeding economic development in Baton Rouge and I recently came across information that said the public school system in Baton Rouge, it is very much segregated.

It still is?

Yes, all the folks that move there and who have higher-level jobs; everybody puts their children in private schools.

It is a result of the way the school system developed. We have an extraordinarily strong parochial school system but the private school system in Louisiana is really good.

Yes.

My son goes to Isidore Newman and it is one of the best schools in the country. Because of that, the cream of the crop goes to the private schools, people who can afford it, people whose parents are more educated. This leaves the public schools lagging and by nature, because of the way the communities are set up, they tend to be mostly white or mostly black and it is not a healthy environment. But we tried for 50 years to change it and have not done so.

Yes, we have our own issues here.

I am going to skip question five because we kind of talked about that.

Okay.

Everybody, by the way, has their own issues. I am overly critical of my own state because I live there but, and have for 50 years. I want to talk about question six.

Okay.

I have identified six factors that I believe are highly important to regionally technology-based economic develop and can actually both be predictive and indicators of the progress of an area. And I classify them as neophyte, adolescent or mature and then I can break that down into areas that are self-refueling or depreciating, self-refueling and equilibrium. They are based on a number of factors. What I am trying to do is rank those factors there is no literature on ranking any of these factors. It can be my judgment but my judgment, but my judgment is one point. So, what I have done is ask people who, I believe, have information on technology-based economic

development, such as yourself. So, look at these factors, tell me whether you think they really have anything to do with technology-based growth. Do you think that I am missing some? Do you think there are others that should be and each factor is broken down into a number of variables? And then I would like to grade them. Some people have done a one to 100 scale, some have done A, B, C, D, others have just said which one is more important versus the others and I am going to normalize that and actually build that into a model. I am going to build that into a neural network model so that we can put it out and people can use it. And then it will, hopefully, learn from itself.

Yes, that sounds good.

Take a look at the next page, and scan what the six factors are, environmental, and this breaks down the variables that are identified to different regions. Inflow, which is not specifically identified in literature, but it, is the way I wanted to characterize things that I believe are important. Attitude, which you mentioned a moment ago, you mentioned it about education. Policy, which is what most people, work with because it is what they can impact and then knowledge. So, what I would like to do is go back to the beginning. Start with the environmental factor and in whatever way you are comfortable with tell me what you think about the variables under here.

Okay. So, we can rank them on, like I could do each one, let's say I have 10 and then I can do, what do I think this particular factor would be on a scale of one to 100.

That is fine or A, B, C, D, F; however you are comfortable doing it.

Quality of life, attractive leisure time and activities, safety, relatively low crime, I would say that is, I would give that an 85. Support for technology initiatives, institutional support for tech transfer and commercialization, I would give that like a 60. Availability of tech savvy

investors, a 90. Tech populations, households with a computer, households with, 95. Non-economically disadvantaged workforce, an 85. Non-technology infrastructure, transportation, air travel that is right, that is very interesting, I work with a company and that was the reason that they decided to pick when...

Really?

...Absolutely, they told me that. Well, the airport and they had the exact number of flights and the whole bit and they picked where, our spot instead of another town, but anyway. Talented educated workforce, 90. Quality of K-12, 95. I am doing a lot of 80's and 90's on this one.

That is okay. That is quite all right.

Undergrad, grad, and post-grad programs and tech sectors, including science and engineering. Well especially, I know for a fact that is very important, science and engineering thing, so I will have to give that another 90. Strong regional university system, I would give that probably an 85. Other, other, okay.

I cover that also under the knowledge factor. And it is okay that these ranked high, I would expect them to. In some places, like in India, some of these are a given. If you do not have it, you do not grow. And frankly, when you are doing a formula, some of these are you would add zero if it is not there and some of them you would multiply by zero and that is a huge difference. If you multiply by zero it is zero.

And the other thing is, looking at number 10, strong regional university system. Okay. I do not necessarily think that regional university system is all that important for a local community, maybe for a region to grow, the region would have to, but a town or a city does not have to worry about a regional system if they have their own thing right there.

That is a very valid answer and you are the second person that has pointed that out to me.

Oh, okay.

Not in those words, I like the way you said it because you are right. It does not have to be a regional system.

Yes.

Good, thank you.

Okay.

Inflow, just think of a balloon, you blow more air into a balloon it grows, if you have a hole in the other end and not enough air is coming in then the balloon shrinks. The economies, particularly regional economies, tend to behave similarly based on certain variables. That the more cash, for example, the more investment capital that is available for flows in, the better chance you have of succeeding. It does not cause you to succeed but it seems to be a necessary factor. So, I categorized a number of those as inflow variables.

Okay, so inflow of equity, capital and debt financing, I would say that is, I would say probably 70. I think that the reason I want to say that is because if you have something that is really terrific, you are going to get money anyway whether it is floating around, if it a terrific enough idea, somebody from San Jose will come and get you money. So, there is money out there in the whole world and if you can prove your worth you can find that money. Inflow of talent, that one is a little tricky, inflow of talent; I do not really quite understand what you mean.

I do not know if you have read any of the books that AnnaLee Saxenian has written about the brain recirculation relative to Silicon Valley. People who came in learned, brought ideas,

went back to ranges, particularly India and brought the ideas there. It is a transfer of ideas and talents of people, you can grow them yourself which may take 20 or 30 years, you can bring talented people in.

We did a big project in New Orleans and we did it in PeopleSoft. There was no PeopleSoft talent in New Orleans, I brought them all in. Well, now we have a PeopleSoft core capability in New Orleans. In fact, we bring projects in to do PeopleSoft work there.

Yes, I think what confused me a little bit about that question is what comes first. Arizona actually does, the folks who have college educations and are well, are highly trained in Arizona come from outside. And they come in here and the folks that are the natives in Arizona are not typically real concerned about education and those kinds of things that are important.

That is a good example.

Yes, I would say that would probably be an 80. Inflow of ideas and innovation.

You have to know a good example of an area that has an extremely attractive standard of living, environment and all of that which is covered under other variables so people want to live here. So, if they come in and they bring ideas and innovation and develop businesses here, if you have an attractive, if the policies are attractive, if you have an attractive tax environment, that can create business that otherwise would not be here. The question is how important is that in a regional development?

Yes, extremely important, so that would really be the ideas and the talent and the innovation are the same. To me that is the same thing. Those two things.

Okay.

Inflow of government research and development grants, 90. Inflow of revenue from outside the region, that could mean two things, one, equity capital and debit financing or could be revenue because you are exporting things and it is coming in.

Or, selling brain power.

Yeah, well you are exporting ideas.

My company does work where the money comes from NASA in Huntsville or the Navy that creates jobs in New Orleans.

Yes, exactly. So, that is really important, 85 on that one. Inflow of science and tech funding which is the same thing as government and research development grants. In a way, so that is important.

Okay.

Inflow of private funding for research and development, so that is equity capital, right?

Right, that is non-government, private sector.

Yes. I would give that, 75 because if you have an idea it is going to be 100, it is very important that someone will come with money to fund it, even if you are in North Dakota. Retention of capital within the region, I would give that an 80. R and D expenditures within the region by universities, I give that a 90. IPO funds raised by companies in the region, again, I am going to give that 75, because some things become funded when some value. Attitudinal factors,

tolerance for entrepreneurial risk that would be 80. Willingness to collaborate for mutual success, I would say that is 95. Image of creativity and value creation, I will give that a 70, basically because images can be changed so that is something that if you want to create this image you can just do something things than you were doing in the past. Value placed on human capital, 90. Responsiveness to innovative investors, I am not clear on that one.

People who have money and want to invest it. In Silicon Valley, people who were successful in the early days started venture capital groups and the ideas were there. And a lot of places, New Orleans, is an example, there is a lot of old oil and gas money, a lot of old trade money, people who are very wealthy but they do not invest in innovative ideas at all

That is true, that is the same thing here.

Is it?

Yes, it is not oil money it is real estate money.

Okay, and they do not invest in technology.

No, no. They do not understand it.

My first technology company, this is in 1986, we had cash flow and we had invoices and we were a little two-person company and I went to the bank to get a line of credit and they said, “Well, you do not have anything we can lend against. Do you have land, do you have drill pipe?” Well, the drill pipe is sitting out in the field rusting but I have invoices, we can do receivable financing? They said, “Oh, I do not know. You all just sell brains? How do we put a lien on that?” I could not get anybody to do it. Now, 20 years later, the banks were dying when

we were a two hundred million company, they could not wait to give us money. But when we tried to start up, there was nothing. That is what I mean by that.

Okay, that is very important so I would give that a 90. Active promotion of the tech sector, I think that is important but it goes with this image and creativity. This active promotion in a tech sector, I give that a 70 because that one I know.

Attitude of grow your own versus focusing funding on outside attraction, I would give that, 87, outside attraction is also important. Willingness of investors to consider tech investments, we did talk about that and I think that is really important and, again, though money and ideas will come together, so I would say, do you mean willingness of the investors within the region?

Right.

Okay. I would say 80 on that one. Belief of business and education communities and the importance of tech transfer and commercialization. I am dealing with that right now in Baton Rouge, I am going to say 75 on that. Because there are so many other things, other than tech transfer and commercialization, I think that affect this whole thing that is such a minor part of it. Entrepreneurial focus, number of new businesses started.

You do not have to rank all it A through D, I am just using those to give an example of what I am talking about.

Number of new businesses started could be good or bad because it could be that Motorola just laid off 1,000 engineers and now we have got 500 new businesses so that does mean that the place is great.

That is a real good point, I had not even thought about it that way.

Number of new businesses started in the tech sector, kind of the same thing.

Right.

Number of tech fast 50 companies, payroll of ongoing concern and tech, that is incredibly important whether they are big or small.

Okay.

So, that is the one thing that sticks out with me.

Good. That is good.

Policy, business friendly tax structure, a 70. Tax breaks for R and D, angel and start-ups, a 75. State and local support for workforce training, a 60. The reason I say that is because we have that in Arizona and we recruited all kinds of companies into Arizona and with all of them, we would say, "Oh, and there is this great workforce training stuff." We later found out that almost none of that was ever used. I know that Bob Jolus at Clemson University, he studied several different workforce-training states that did this and come to find out hardly any businesses use that incentive.

Right.

One of the things he did, though, he offered as a service tracking how a business could take advantage of it and then every year saying, "We tracked your numbers and you are eligible

for \$5,000.00 worth of workforce training money.” And that was something that he did as an add-on which I thought was interesting.

Did companies take advantage of it when he told them that?

Well, he did that for them, so they did.

Okay.

Yes, but they would not have had he not done it.

They would not have otherwise, right. That is interesting.

So, simplified app process for new businesses, a 75. Establishment a 75. I guess, I have been thinking about all this, with regard to the United States. If it takes one day to register your business or two, not a big deal; but, if it takes one day versus three months in India or three years, then of course that is huge.

Right, I understand.

I have not really, all of my answers; I have been basing on U.S., basically and not on U.S. versus India.

That is okay; I want you to base it on your point of reference.

Establishment of business incubators and tech parks, I would say that is probably, 87, because people with really good ideas are going to do that. Tech parks are really important, but they are important in many different way not always necessarily. And they do not get you anywhere by themselves.

Yes.

One of the glaring omissions on here that Sandy Baruah pointed out to me was leadership. I have great respect for Sandy. He did an interview with me a couple of weeks ago and he said, "Bobby, I know you know this, but leadership you have not put leadership anywhere on the..." I had not specifically called that out, it is kind of implied.

Yes.

So, I am going to actually modify this to include a policy in leadership, because leadership is much more important than policy at least that is what we are finding. I took a good look actually one thing that could be useful for you is to study the history of the Rensselaer Technology Park, because that is the best example of leadership with George Low.

Okay.

You would find, this guy was absolutely amazingly and terrific in how he led that community and University into doing something that really had huge benefits for them. The leadership factor is probably the prime example.

I will take a better look at it. I have read a little about it but not enough.

Knowledge factor, Applicable University R and D, 95. Tech transfer and tech collaboration between universities and industry including plans or strategies for targeting tech sectors, a 95. Depth of tech initiatives and targets including existence of incubators, the depth...

What I mean by that is, what I find our universities do is they will spend a million dollars on studying, modeling stimulation for NASA and it mainly so somebody can go write a paper, it

is not really getting to the point where we are working collaboratively with industry and we are going to go create some jobs in this area and see if we can build it into a cluster or we are tying to a cluster. We spend a lot of money that is really about writing academic papers; it does not create any jobs. That is what I meant by depth.

Yes, so let me just point that out. I understand that really well. I believe it is incredibly important for those academic papers to get written and I also believe that it is incredibly important for basic research. I think the role of the University, not be promoting Universities as job creation engines, even though they are, they are a whole lot more than that. They influence a community in many different ways and we cheapen ourselves and the role of the Universities when we say, "Universities exist to create jobs." They are not factories and that is something that is really one of my points.

I agree with that, by the way. I am looking at the job creation part of it and not disparaging the other part of it at all, that needs to exist and I like that line between academia and business in some cases. I think we need to have the freedom to do that.

I think people do need the freedom to do that and I think that while economic development is one function of a University, it is only one function and there are many other functions, so the depth of the tech initiatives, basic research versus applied research. Yes, it has to be really deep. You are going to come up with a lot of stuff out of basic research, but it is going to take a long time and it may not be where you think it is. I think that narrows your focus so much when you say, "We are going to decide that we are going to do this certain kind of biotechnology and we are only going to fund that and we are only going to measure our results by the amount of jobs we create." That is incredibly narrow.

I like that. It opens up a whole new area of thinking. Okay, thank you.

Entrepreneurship training and collaboration, a 85, I know that is really important with some of the folks down in Louisiana that we met with two weeks ago, had they not had entrepreneurship training, they would not be an entrepreneur. They would not be and we met with several of them. Collaboration and idea sharing between firms, a 95. Joint marketing, I do not think is, that is just a business technique, it might work, it might now. Define strategy for creating future knowledge workers, 98. Technology commercialization support, an 85. Again, how do you define support and you just cut it loose.

Right.

Strategies for regional cohesion in tech transfer and commercialization, I really have come to see that I think that is very important, the regional cohesion part of it, like collaboration between Universities, like State Universities, I give than an 85. Economic development organization with knowledge and charter to focus on technology, a 90. Again, depending on what economic development organization means. I would say it would be a local economic development organization like an economic development council or something, I would rate that, perhaps, lower, but when you include the knowledge and the charter to focus on technology then you get either a tech incubator or a research park and I think that I would rate that much higher, so that would be probably 90, 95. But there is another thing, too, in that the tech park has to have the right attitude. One of the things that some tech parks that I have seen and added to is that we exist because they are stuck packing our university and we are going to tech-commercialize that or at least try to. Sometimes that works and sometimes it does not work. If they have the idea that we our the knowledge hub of our region, everything that is going to

happen with knowledge and tech commercialization is going to happen, we are going to have a part of that. And I do not mean a financial part.

I know what you mean.

Yes, I mean that we are going to be the spot that people think of when they think about tech. We are going to be the place where the education about tech, where those entrepreneurs are primed and we are going to be involved in every single aspect of this whole idea. Then, that works beautifully, that is great, but when they only focus on we just are going to be the spot that maybe something from a university could land, then that does not work too well so we have to have a broad view of it.

College of business with focus on entrepreneurship, I think that is real important, with a focus not total focus so as entrepreneurship is one of the things that the businesses focus on, 90. Educated workforce, percentage with bachelors, masters in science or engineering.

That goes with the next question, which is the same question but related to Ph. D. What I am trying to understand there is how important are the PhD's versus bachelors and masters.

Yes and I would say that both of those things work together, I would not rate one versus the other, because when you get a Ph. D. he or she would have a focus that they want to do, but they need support staff, they need other people, they especially need folks with other skill sets.

Okay.

One of the things that maybe this question could be amended that having Ph. D's in engineering is important, but they would do nothing if they did not have people that were skilled

in marketing, skilled in business management and all the rest of the support services. All those things combine to make a company successful and not just the Ph. D.

Last one.

Culture of collaboration, I think that is very important, I give that a 90. However, I guess you could say culture. Sometimes you can have a culture and collaboration and you have actors in that culture that are not collaborative and so the culture does not really make a difference if the folks themselves do not believe in it personally. Culture of change, that is incredibly important, I think that Tucson is an example of that and that is not only people who are resistance to change, they have vested interests in making sure change does not happen. In economics, it is called a collection economic rent, is that somebody set something up and then after a while they start getting the milk from the cow and then they also become, at least here in Tucson, they become leaders of the community. So the leaders of the community have a vested interested in making sure nothing changes.

We have the same thing in New Orleans, the old money that does not want anything to change and regardless of who gets elected to what, they still run the city for their own money.

Exactly, and they stop things from happening.

Right.

Yes.

Is that the real difference between Tucson and Phoenix?

It is certainly one of them and it is huge, because in Phoenix, you have the culture of folks that are, what I call the old west. Phoenix is the true old west, because Phoenix is the place where all these people came when they want to change their life and they have all these ideas and they want to go out and running and gunning and doing things and they all move there. Where as Tucson, we have a bunch of people that have lived here forever and, again, old money people do not want things to change, it is a beautiful place and I can see their point. But that is why Phoenix does what it does and Tucson does what it does.

You know, I have wondered why the difference because the people outside of this area, Tucson, Phoenix, you know, you do not necessarily know the difference if you are from Baton Rouge or New Orleans, it is Louisiana. But within the same state, Phoenix has been very progressive and Tucson has not. They have the same tax structure; they are in the same state and relatively similar environments. So, I was wondering why the difference.

Yeah, well, that is it.

Well, that is good to know.

Dense social networks, that can be good and bad, dense social networks can be one, that is another thing that can stop things from happening but it is, social networking is really important, however; this social network stuff, let's just talk about that for a second. Down in Louisiana I have met with some people and they did not look like everybody else and they expressed to me that they felt like they were complete outsiders, they could not get into the flow of what was happening in the community. This happened to be someone from India. That just was not working but it was not working because it had that social network.

I am glad you pointed that out, because I had not thought about it in those terms. I thought in terms of Silicon Valley, everybody would hang out together after work and it did not matter what color you are, what gender you are or where you are from. You are right, in the south particularly; the social networks are mostly people that their grandfather went to school with you grandfather. That is interesting. That really could go either way. Good.

Collective learning, so what does that mean?

I can give an example better than I can define it. In New Orleans when we were building the Navy's IT systems, we had a lot of big companies that we had to do IT but we did not necessarily know, health information systems or payroll systems and when several companies came in to Louisiana and really kind of taught the local companies how to work with the federal government, this was 20 years ago, and my company emerged as kind of the leader amongst that. It was a collective learning amongst people in companies. Now, I do not know necessarily how I would apply that to other regions. But, that came more from my experience than from anything that I have read. Silicon Valley did a good job of collective learning, but no one has defined it that way.

Yes, I am a little unclear still on that, because as moving forward to the future, everybody is always going to be learning because that is what the future is change. So they will always have to be doing that. Right?

Now that I have tried to explain it, I realize that it is not that clear.

We can talk about that later if you want to. Geographical clustered tech base, yeah, that is huge, a 95. Grow your own and attract versus focus on money and establish industries. I

know in Phoenix we started with a grow your own and realized that probably was not working so decided to move to an attraction model and that worked really well versus focus on established industries, what do you mean?

Louisiana is focused on only gas.

Oh, I see, okay.

When Angelou Economics came in and did a study for New Orleans to identify the three clusters that we should focus on, one of them was oil and gas, now we can focus on the technology side of oil and gas, because we actually do very well in that area. But, just focusing on building what your core is as opposed to trying to grow into something different. One of the things they identified was advanced manufacturing, mainly because the work that we are doing out at Michoud, the Michoud Assembly Facility builds the shuttle tanks, we are going to be building the next Lunar and Mars program and I have been pushing us to do more composite manufacturing. In fact, we are putting in a 25-foot by 50-foot auto clave specifically to do that. That is a great area of growth that is not necessarily a four-year degree because composite manufacturing is great work. So, again, that is an example of kind of seeing what you have, the established stuff versus building something new.

Okay, for example in Arizona, several years ago they decided they wanted to become a biotech hub. And what they did was they went out and raised 100 million dollars and got this institute and it is doing real well, The Translational Genomics Institute.

So that is a new industry.

Yes, they made that.

You can attract it, but it is a new industry.

We attracted the new industry. Really it was grow your own starting with one individual.

Right.

We attracted this one individual. That is a good thing and that may pay off, but it has been seven or eight years and maybe they have like 200 jobs. So, they are both important because established industries is where doing new things, growing your own out of the established industries, when you combine those two things, that is where you are going to get some real attraction. Because you are going to have something that has support, you are going to have the cluster and then all of the sudden there is some new idea. Like, for example, Iridium and how that was a spin out from Motorola. Since it was the first company in its area, Iridium did not do too well but they invented this entire new concept of global telephones. So, now they are all doing fine and they have a beautiful company, but after it went through bankruptcy.

Good example.

That was growing your own from an established company. Investible capital and entrepreneurial focus.

Is there money in the area? You pointed out that you could attract money if you have a good idea.

Yes, there are a couple different things that would go in with, social factors and I have to say that investible capital, entrepreneurial focus, is there money in the area? Well, that is going to lead to other quality of life factors that will attract knowledge workers so in that regard,

investible capital and you do not necessarily have to invest it in the tech companies but there has to be money flowing in the communities so that you can have a decent quality of life and decent educational system.

Okay.

Collective identity, 75, I do not think that is all that important. It is sort of funny because sometimes people have identities for places and they are totally incorrect and so that is not really that important. Openness to risk taking and experimentation, 95.

Good. I know that is difficult to do that but I appreciate you doing it.

Yeah, well, I mean, I wish all my answers were not in the 90's.

No, no, I love the way you answered them. And I will share with you what I get from others and obviously the results of this study, dissertation, whatever you call it. Now, after having looked at that, do you think these factors really effect regional technology-based economic development or are this just kind of a waste of time? I do not mean to put that bluntly.

No. They all absolutely affect it, sure.

You think, I am not going to ask you to rank them, but do you think any of those factors jump out at you as being overly important and I am talking about just at the top level.

Environmental, inflow, attitude, policy, knowledge, social.

Knowledge is number one. Environmental is two. Social is three. Those three are the really important ones.

Great, most of the people I have interviewed have said the same thing.

Oh, really?

Those were the top three. It is interesting that policy has come out near bottom in all of them. People tend to affect policy because that is what they can affect. It makes a big difference.

Yes.

I am going to ask you one more question, because I know you have a nine o'clock.

Okay.

Thinking of Tucson and Phoenix for question number eight. Just thinking in terms of those factors not trying to rank each factor by each area, but how do you think Tucson and Phoenix have done relative to those six factors in general? And would you put them in a neophyte, which would be a one, or an adolescent which is a three, or mature economy which is a five? By adolescent, I am looking at something like Huntsville where they have an enormous number of jobs and all high tech jobs it is all dependent on the federal government. You take NASA, Marshall and the Missile defense agency out of Huntsville and it is an agricultural society. They have not diversified so they are on the list as immature. To me that is what an adolescent economy is. So, looking at Tucson and Phoenix, how do you think they perform?

The six factors are: knowledge, social, inflow, environmental, policy. We will do Phoenix first.

Okay.

Phoenix, as far as knowledge, in the past probably six or seven years I would say that has gotten beyond neophyte, it is definitely an adolescent.

Okay.

Social, again, adolescent. Inflow, same thing. Environmental, there has been a lot of changes up there, given the fact that they hired somebody that is a University President that is really someone who has been an outstanding job on pulling the state forward, we also had a very progressive governor which we no longer have and so lately it has been backsliding, like in the past two months.

The past two months. Let's hope it does not stay that way.

The policies have been actually pretty progressive. They have done a good job, they decided that they wanted to go after biotech they went after biotech. They do have some, this biotech institute; I think it is a real positive development. They are not number three between San Diego and Boston; Phoenix is not up there yet. I think it is a real good start and they are thinking the right things. Attitudes, they definitely have a progressive attitude. Given the fact that they are in a republican state that has, well, let's see. Let's put it this way, there is a group of people in Phoenix that do have a good attitude towards tech commercialization and the growth of technology and all that. I think that is really important. A lot of the people in the state of Arizona, either one, like the way things are and do not want to change and certainly do not want to put in any support to them because it is a low tax state. People do not believe in taxes here so given that attitude, I think that is something that has always been difficult.

Okay.

Tucson has, as far as knowledge that they have here; there is an incredible amount of knowledge in science and tech. I do not know if the University of Arizona, they are not number one, they are close to being the top publicly funded R and D University. Basically due to the fact that it is the NASA funding with the Mars Lander and all that kind of thing but that is great so that exists.

Okay.

Socially, they do not have any kind of support or infrastructure for developing technology. That just does not exist. Inflow, Tucson is interesting, it does have some inflow, it also has outflow. I do not know if it is something like 100 people move in and 75 move out, so that kind of thing. I think in Phoenix, you do get a lot of in and out but you get a whole lot, the people who stay there are actually huge, much higher percentage. People in Tucson that come in tend to leave.

Okay. That is interesting.

Yes, there are a number of factors, one would be that you have all these people coming to Tucson because they can get great jobs at the University but they cannot get their spouse a job. That is a huge problem. And, they try to find ways around it, but my husband is in recruiting at the university and that has been a real issue.

That is interesting.

Yes. Environmental, that is kind of what we have been talking about. Policies, that is interesting because actually the policies that do not necessarily relate to tech, to commercialization effect what happened here. Airport is not really policy but how about

property tax is policy and there is the property tax here in Tucson, there are a lot of property tax issues that the property tax is actually really high compared to the services. And, so and even compared to Phoenix there is a different way that they get the money and then it is distributed to the regions. So, they collect it but then they distribute it differently. So, the services that are available in Pima County are not...

People are not getting their moneys worth.

Well, they are not getting any money; the roads do not get fixed. So there are issues with that policy. The last time we were recruiting a biotech company and some of the issues that they had. There are some geographic factors and I am not sure exactly what this would fit under, of course, airport and number of flights out was a huge deal but not only that it was accessibility. So, even though, if you could have 25 flights but none of them are straight through to L.A. or straight through to wherever, that still does not work. Then we go into attitude, again, some of those things we talked about, the folks that do not want change and have a vested economic interest in making sure it does not change.

Which is hard to overcome. I am not going to run through all the rest of these because you have talked through a lot of the later questions. I would direct you just to one thing, real quick, and then we will cut this off. Page 19.

Okay.

My next phase after the literature review which I have worked on for a year, and enjoyed, and the interviews, after I roll all of that together, I really am going to try to quantify even the qualitative effected variables as much as possible.

Yes.

And then feed them, me being a good engineer, I am not an economist, I am an engineer, I use a systems engineering approach and going to feed it into a model. And then I would love to; this is follow-up to my dissertation and if I try to do it all now I would never finish.

Yes.

But go apply in a number of areas and see how well it works. And this is, I am not trying, this is not trying to be “the be all - end all” of technology-based economic development because it will never be. But just trying to be the ability to give areas and some of the things they really should be working on in order to improve their regional technology economy.

Very valuable.

That is pretty much all we are trying to do. I appreciate your time. Oh, do you have any suggestion for improving the interview process?

No, I think it is a good process.

Good.

Dissertation Interview Questionnaire – Jackie Kerby Moore 03/05/2009

(1) Please describe briefly your current position and role within your organization and community.

Let me start with this. And you, by the way, if you want to go off in a direction just let me know. But just some basic questions to get started, which you kind of described already. Just a little bit about your background and your role within the organization and the community, and then after that we will talk more about specifics on economic development.

So, are we running?

We are running, yes.

All right. I have been at Sandia my entire career since getting my master's degree, going on 23 years. And relative to this work, I serve as Executive Director of the Sandia Science and Technology Park and have since its inception in 1998, going on 10 to 11 years now. I am a Sandia employee, and within Sandia, in addition to serving as the Executive Director of Science and Technology Park, I also manage our technology-based economic development programs, which include our New Mexico Small Business Systems Program, our Entrepreneurial Separations Transfer Technology Program, and the Sandia Science and Technology Park.

That is great. You are one of the few people I am speaking with that actually has a direct background in technology-based economic development. There are a lot of people who have an economic development background or a technology background, but not that many with both.

All of these programs are intended to leverage our research and development institution, in this case, Sandia National Laboratories, a national laboratory to create economic development and create wealth.

I remember probably 20 years ago - a lot of my background is in DOE work, and I actually ran some programs out here a long time ago - I remember when we first talked about tech transfer and the labs were trying to spin up on tech transfer. This is when we first started opening up the labs to where people could actually go there and you did not have to have a separate tuba for each one of the labs. You have obviously seen some changes over the years. What are you all doing so much better now as opposed to 20 years ago? You are having a lot of success now. Twenty years ago we did not have that much success.

How I would describe technology transfer from the time the legislation came in place until now, which is about the 20 years you are talking about; I think it ebbed and flowed. When the legislation first came out there was a lot of energy and activity around. How do we make this work at the national laboratory? And there have been some period of years, and some not too long ago, where technology transfers, commercialization, were not a priority any longer. And things become a priority when there is national policy and national and federal programs to support them. When they flow downward tends to be when there is not interest at the national/federal level in policies and programs in support of them. Twenty years ago there was a strong effort in that direction and I would say, right now, today there is another strong effort to support that again. And in between sometimes it is strong and sometimes it is not strong. When there have been federal programs that actually see efforts, see industry lab partnerships. So, Sandia supports industry in a company and there is some seed funding from the federal

government to do that. They have worked very well. When that kind of seed money goes away, there is less interest in industry and Sandia taking a risk on a partnership.

Does that money come through Sandia, through DOE, or does that money come from commerce from economic development administration.

Programs like that came from DOE. So our park, for example, has benefited from commerce funds for infrastructure. But otherwise, Sandia does not really get commerce funds, for example. We participate in SGAR, STTR activities. We are getting ready to look at how we might participate in a technology innovation program, we are not a VIST, but otherwise our funds from tech transfer programs have come from DOE.

Okay. Based on what you have seen, do you think economic growth is predictable? And I do not mean worldwide economic growth, like the down turn that the world is going through now, but more specifically economic growth in a region? And then the considerate question to that is what about technology-based economic growth in that region; do you think it is predictable?

I don't know if I would say it is predictable. I think there are certain factors that if they are in place might have better results than if that foundation or those factors are not in place. I think the likelihood of success is more predictable if maybe there is a basic set-up, competencies and factors in place.

That may be predicting the probability is there rather than that the success will be there.

Right.

What type of factors do you think affect regional technology-based economic development, what are the factors?

So, I am a very strong believer in if there is strong research and development institutions in an area that you can leverage, then there is the higher probability that you will have technology-based economic development success. So, there is research and development institutions, in many cases, are Universities, research Universities. In our case and in others, it is the national laboratories. We have a research park starting up in Albuquerque based on the Air Force research laboratory. So, where this is universities, national labs, federal labs that have research and development activity, and even research and development with a focus on application, there is a likelihood that more can be done in a region than if those research and development institutions do not exist. So, I happen to believe that is key. And if you look at the strong research parks around the country, for example, most of them are tied, most of the successful ones are tied to universities and national labs and, in fact, some of the even more successful ones have executive leadership from those research and development institutions involved in the research parks. And even have executive leaders tied to economic development of the university. So, I think that is a major factor is having and R & D institution. But I have also seen in our area is we have an organization, I do not know if you have heard of it or you have read about it, Technology Ventures Corporation.

Yes, I do not know that much about it but I do know that it exists

It would be great if while you were here, I know you are talking to Saul Thesthesia, are you still talking to Saul?

Not on this trip. He had to be out of the country.

Yeah. I just had lunch with him. He is on...

But a good man to talk to.

Yeah, he is in Australia or... but he is out of the country. He either just got back from Australia or is just on his way to Australia. He is going somewhere else. So, what TVC has done, Technology Ventures has done, is they have worked with R & D institutions in New Mexico to help form companies and then brought venture capital to those companies. So, they serve as an objective third party that matches technologies coming out of the universities and labs with investor funding, if you will. And, so, in the case of New Mexico, Lockheed Martin formed Technology Ventures Corporation when he won the contract to manage Sandia and when Lockheed Martin did form TVC there were no venture capital offices at all in New Mexico and as a result of them being here and being very focus on how to we form companies based on lab and university technology, what does it take brining capital in there is now, I think you would have to check with them, 21 venture capital firms in New Mexico. So R & D institutions can be an engine of innovation, if you will - an impetus for innovation and in applying the technology created together with that venture capital, those are two factors. The other thing that is very thing that is very strong in New Mexico is we have access to our elected officials, which means we have access to our policy makers. And I would say that is true at the federal level, state level and city level. So, if as a national lab, for example, there is policy that would support our efforts. We have access to our U.S. Senators and our Congressmen at Washington, in our case, Sandia is a very large employer in New Mexico and our elected officials are very interested in the success of the laboratories and how they can leverage them. At the state level, we have

access to our governor and we can go set up and meet with our governor, meet with our lieutenant governor, meet with our cabinet secretaries. We can get the attention of the mayor and the city council. So, having access to our elected officials, access to policy makers, decision makers has been a big factor. So, with the state level when New Mexico needs incentives to attract particular industries, we can make that happen very quickly. I would say those are three key factors.

That is great. Actually all three of those are things that I have identified and you have described them very well. What I would like to do, if it is okay with you open your little thing to, I think it is page 6. Okay. Similar to what is it Casika]? Is that how it is pronounced?

Cassisseia

Cassisseia , okay. My Cajun accent will not pronounce that word correctly. I very much appreciate his work because he went and looked at which common variables he could find among areas that had developed here in the U.S. I have gone a step further than that in that I have gone back and looked at a long-term history; Sofia Antipolis for example tried to recreate their growth. I want to put it into a model as opposed to just statistical significance, which Saul has done and done great work on. I would like to model that going forward so I identified six factors that are families of variables that I had found common to one extent or another in the areas that have developed. And I have taken those different areas and been able to categorize them as either mature, adolescent or neophyte. My beloved city of New Orleans would be the neophyte area. Huntsville, Alabama, I believe, is in the adolescent category. And then within those, different regions can be in equilibrium, they are not growing or shrinking, or they can be self-refueling where they are growing and growing because they have diversified enough or they

can be depreciating; had been good and might be going down. So, what I would like to ask you to do is look at each one of those factors and the variables within that and help me grade them as to what, and there is no right or wrong here, it is your opinion of these. Say, for example, the environmental factors, you have mentioned a couple of these items. But things such as quality of life, the workforce, the K-12 education system. I picked the things that we tend to measure because we can measure them but other items that might be more qualitative effective type variables rather than just quantitative. What I have asked people to do is to grade this in whatever way they are comfortable. Some people have used a scale of one to 100 or added them all up to 100. Some have done an A, B, C, D, F and other people have just ranked them in importance. And I will normalize all of that. But would you mind going through and doing that with me?

Should we do that in real time?

Yeah.

Okay.

If you would rather take it as a homework assignment, you can.

No, I would not. Otherwise you would never get it.

Okay. I kind of figured that, I'd grab it while I can.

No, whatever happens, happens in real time and gets done, otherwise it gets in the pile.

Unfortunately, I figured that was the case.

All right. So, you have listed 10 factors here, and two others and..

The two others are just in case I missed something.

In case something else comes up.

Right.

And these are all factors towards what might create a viable region?

A viable technology-based economy in a region. It does not necessarily mean that they are all there or they are all strong. It might be very well they should be Louisiana, I really wish our image was better and image is one of the things I have in one of the later factors. I wish our K-12 education system was stronger.

So, this is for New Mexico or this region that I am in?

If you want to do it that way, that is fine. I am trying to look generically. So, for any region.

So, look at these factors generically and if they were there how does that contribute to the likelihood of that region being stuffed full?

Exactly. That is perfect.

Okay.

And you notice I have six different factors like environmental, inflow, attitude, leadership and policy, I will give you a different page for that one, I actually updated that, and knowledge.

So, if you take all of those and there are quite a few of these variables within that but those are families of variables. In other words, I have taken all the different variables, 20, 30, 40 of them, and put them into categories or factors. Does that make sense?

Okay. So, how should we begin? What is the best way to begin?

Start with the first one and give me whatever type of grade for it that you would like to.

As to how I view the importance of how I view the importance of, for example, the quality of life in an area? How important is that to stimulating tech-based economic development?

Right. How important is that to doing this.

And are you focused on tech-based economic development versus just generic?

No, just on technology-based, because there is a big difference. I'm not an economist; I cannot do the other part.

No, I think there is a big difference, too.

That is why I wanted to talk to you because it is tech-based and it is regional.

Okay. All right. So, let me just talk through this with you and then you can kind of rank it or grade it or assign values how you like. To start out with I identified for myself what I thought were important factors and some of them are here. So, I would tend to rank those higher.

As you should that's fine.

So, in that case, drawing regional university system is key. I think support for technology initiatives is key. Because the university system is tied to the R & D institution, the support for technology initiatives talks about that executive leadership and policy support for activities and I talked about investors and bringing in investor funding and venture capital. So, I think, I would rank those high. And then, because I think all of those are sustainable, I mean, they are building the foundation. And then I would rank, maybe 7, 8 and 9 the kind of the workforce development, an educated workforce, the K-12 and the... I would rank those together as being next in importance. That starts talking to the workforce development. And I... as I have been involved in, so I am kind of prioritizing these what I think has been important when we have been involved in economic development discussions with companies and where I think Albuquerque fairs well and does not and there is... so now I going to what I would probably put last just because it has never come up in any conversation I have ever been in.

That is a good way to rank.

And that technology population. I have never been in a discussion that talked about households with a computer or households with Internet access; that just has never come up, so I would maybe put that towards the bottom. And then I would say quality of life is important and non-technology infrastructure, kind of those two...

Okay.

The other thing that I am not sure I understand, the non-economically disadvantaged workforce.

That has a number of impacts and, again, I will use New Orleans as an example. We have a lot of poor people. It increases the crime rate, it breaks down the image, it makes it that much harder for us to bring money out for the high-tech side of the business, we are always using money to deal with other issues. And it is not necessarily the type of environment that encourages technology companies to move there or even technology companies to grow there.

So where I would put Albuquerque and this region is, we have got, I think, what companies like is that we cover two ends of the spectrum. We cover the very high technology and high paying jobs spectrum. But not every company that moves here wants to pay \$70,000.00 a year to employees.

Right.

But we do cover that end of the spectrum. And we also cover the other end of the spectrum. We have new movie studios here and we have some new call centers here. So we also provide companies options to have lower-paid employees. I mean, so the cost of the workforce would not necessarily drive them out of the area because they cannot get any qualified workers that they can afford. So, we can cover the high-end for those people who need the high-end or we can cover the spectrum where they can afford to hire workers.

That is a great mix.

So, I think we can do both of those.

I know this is not easy to do, particularly just giving you code words.

So, I think I talked about all of those.

You covered all of those. Let me explain inflow a little bit. I have viewed this...

That is funny how . . .

Yes, I notice you are bored. You probably view it the same way but let's say you have a balloon and you are blowing air into it, it gets bigger. Technology-based regional economies in many ways perform in the same manner. Put a hole in it, the balloon is going to start shrinking. So, if you are losing resources faster than you are gaining them, you have the inflow of people and talent and money, etc. does not equal your outflow, the technology part of this regional economy is going to shrink. You all have done a great job in continuing to bring a lot of money and a lot of talent into this area. So, I have identified inflow as a specific category, specific factor and then tried to identify the subfactors within it. And this is not usually identified specifically in any literature but it is something that I have found in 20 or so books and 100 articles that I have read, including Saul's.

So, again, ranking these.

Or if you even agree that this is important as a category.

Well, maybe I will do this and talk about what I think is important in terms of if this stuff flows into a region and creates a stronger region or if we do not have it, would, . . . so if I look at it that way. Our region does not have many IPOs; it just does not, and our region does not have a lot of companies that have gone through that process. We have had a few, a handful and...

Just to validate that, by the way, I found that to be very unimportant in most of my interviews.

So I do not know that it is important or not important. It does not happen much here.

Right.

We also do not have a lot of corporate headquarters here. And I know in some regions that is a very big deal and would everybody like more? Yes. Do we have a lot here? No. Is that hurting us? Maybe what I would say about corporate headquarters is if I look at Minneapolis. Minneapolis tends to have a lot of corporate headquarters and so maybe others follow where there is an environment and that is not something that we tend to have a niche in is corporate headquarters or IPO companies. I would say... what I would say here, I would say R & D expenditures within the region by universities and national and federal labs. In the case of New Mexico, we would be in a very state if we did not have two national laboratories and the air force. And, so, people come to me all the time, some naively and say, "How do we get a national lab in our city?" Or, "How do we get a federal lab in our state"

If only it was that easy, right?

So, when I think of R & D institutions, I think beyond universities, and I think universities national and federal.

I agree with that.

I think the R & D expenditure has been really key in New Mexico, between Los Alamos, Sandia and our research universities and our air force labs.

Yeah. So, you have tied in number 4 and number 6 with number 9.

Right. I thank God for those because they have really helped New Mexico.

You guys remind me a lot of Huntsville because Huntsville has missile defense command and it has the Marshall Space Flight Center. Huntsville has the Cummings Research Park which you are familiar with. Extraordinary number of high-tech jobs but if you pull that out, they are an agricultural society.

I mean, who would think, Huntsville, Alabama? Right now we are seeing a lot of great things happen up in Fargo, North Dakota.

You are the second person who has told me that.

And, it is not because of Fargo, North Dakota; people are not going to Fargo because of Fargo. They are going to Fargo because they have strong leadership in Washington with senator Dorgan. They are going there because the North Dakota State University is very engaged with the community and centers of excellence and economic development, bringing companies in. And that happens to be a state right now that is seeing an inflow of jobs.

An enormous inflow.

When you think of quality of life, what many people think, you do not think Huntsville, and you do not think Fargo.

Right.

But, when you have these key factors there that tend to override other things. So, I am a big believer in the case of Huntsville, there are a lot of DOD factors there.

Right.

So, I think, like you said, if 4, 6, 9... Everyone is always saying that, I mean obviously, New Mexico gets per capita more than its fair share of R & D funding from the federal government, and I think that is key. I think what has helped New Mexico, too, is that we have more equity capital here than we have ever had before.

Okay.

Could it be more? Absolutely.

It can always be more.

And I do not know what to do with inflow of talent. Would it help if we had more people coming in or different kinds of people?

You mentioned North Dakota and the inflow of talent is important to North Dakota right now. It becomes less important the more developed you are. I would have agreed that I bet the inflow of talent is not nearly as important here anymore as it is in North Dakota.

Yeah. I mean, I think these other elements are more important.

Okay.

I do like inflow of ideas and innovation. And I think it is important. I think that is really important. Private funding for research and development, what we are seeing is companies are spending less on research and development and relying on the government and others to do the research and development so that they can benefit from that. So, I actually see less of that. Retention of capital within the region to the extent that means if we form companies here and we bring capital, do they stay or do they leave. And many times of the function of who their

investors are and where their investors want them to be. I find that if people spin out of the universities or spin out of the labs, they prefer to stay here. Their networks are here, their families are here, their networks are here, the source of the innovation is here and so I think, I mean, we try to keep them in the region. We do lose a few small companies because, of course, to move where their investors want them to be. But I think by a large people want to stay and it is important that we keep them.

We have a big problem with that in New Orleans specifically, there is only one fortune 500 company in New Orleans, and we do not have a lab, and there is only one in Baton Rouge. So when companies are going to name their playing field, name a dome, they are going to put a lot of money into charity and into the community, it is in Atlanta or it is Charlotte, it is not in New Orleans. So, a lot of that money does not get recycled, they do not maintain their back offices there, do not have a whole lot of employees, a lot of that is going to Houston, Atlanta and other places. And that really has affected our ability to keep the technology side of the economy above par. It is hard to stay above average. Sometimes we target mediocrity, I think. I do not mean to be too hard on my own city with my point of reference.

I have two factors that are kind of touchy-feely things. Attitude and social, that is more of a Richard Florida and like AnnaLee Saxenian. But I have found these to be very important, obviously, in Silicon Valley but in a number of regions. Things such as tolerance for entrepreneurial risk, very, very important in Silicon Valley and important in every place, important in India, Dubai, I found that a lot. That is what these are intended to be.

Okay.

Would you mind continuing to do the same thing for me?

I don't mind. Okay.

Let me look through these. So, just to get me back to center here, what I would like to do is kind of go through each one and then talk about, I can talk about how important I think they are for regions. I can also talk about how well we do that or do not do that here.

Okay. I would love that.

Okay. So, tolerance for entrepreneurial risk. What we are starting to see in small numbers are serial entrepreneurs. Entrepreneurs start up many companies and when you tend to see serial entrepreneurs, there are usually some non-successes there. So, I think the fact that we have serial entrepreneurs, they continue to get funding and the fact that some of those have been successful, some have not shows that there is... I think it is important to have tolerance for entrepreneurial risk. You cannot be punitive toward the people that fail. You have to be supportive. Otherwise, other people will not do it and so, I think it is important and there are cultures that probably tolerate that better than others. I am trying to figure out, does China tolerate entrepreneurial risk? No.

In very different way, though. I have looked at China and...

Or is it a bad thing because they do not stay faced through having successful companies. I do not know. I think for they're to be a true thriving entrepreneurial culture and I think start-up companies, young companies, small businesses are really what sustain the U.S. So I think you have to tolerate entrepreneurial risk and be supportive of it. And I know we have tried to do that here in New Mexico. It is important that we take the lessons learned from that. We have

people that will share their experiences with affiliate companies and then figure out, what do you do the next time and how do you improve upon that and what can we do as a community to not be punitive and to be supportive. Collaboration for mutual success, technology advancement... I think that is really important and I would say in some communities that is easy to do, sometimes that is hard to do, especially in regions where there might be many universities. To me it is not the norm that universities collaborate on that for as much as they compete. And would we be better off if the university collaborated? Absolutely. Or if the universities and labs collaborated? I think that would be so, so powerful and I think it should happen more.

I agree.

But I do not see it happening a lot.

I do not either. It should be.

But think of how powerful if you had those major institutions collaborate

And the companies, as well. Sometimes the rising tide will lift all our boats type of thing.

When we first started our park we visited several parks around the country. And when we went to Research Triangle Park, for example, and I know that is changing but we asked, "What is the collaborative environment like at RTP? What programs do you have in place to promote collaboration?" And they said, "That is not what we are about. We are a researcher park. Companies come here, they put up their facility, they put a fence around themselves, they put their own cafeteria and gym in and they do not want anybody having access or knowing what is going on in research." They had silos of some of the largest companies in the world but each of them doing their own thing intentionally. Where as if you contrast that with Silicon Valley, I

do not know that at the company valley in Silicon Valley there was collaboration but you saw a lot more innovation occurring as a result of, there just being more openness

Right. There was collaboration, and that is covered in the social factors, amongst the people.

Amongst people.

But one thing Research Triangle Park did, back when they first put that vision together, is they did have collaboration between the universities. Duke, UNC, NC State, Wake Forest, and to some extent East Carolina, as well they did have good collaboration amongst universities and the governor pushed it.

Governor Hunt?

Yeah. Governor Hunt did an extraordinary job. He had a great vision.

That was key.

He took a 40-year view of it instead of a 4-year view, which is what most politicians do.

Which thankfully they did, because they were not successful when they started out, and now they have celebrated 50 years. But, I mean, I know they are looking at different business models for the park now but it just would be so powerful if there were more; I think everybody wants that collaboration. Is it reasonable in for profit companies or for universities in competing for the same resources? I do not know. Albuquerque did well in Richard Florida's study, in terms of communities of creativity. For our size, Albuquerque is number one or right at the top of creativity, value and diversity, supporting the arts, creativity. We did really well there.

And having had an office here, I understand why Albuquerque should do well in that.

We did well there. I do not know how to value that over some of these other factors. Human capital, responsiveness to innovative investors, active promotion of the technology sector. I think if you have a technology sector, you should promote the heck out of it. Not everybody has a technology sector so those that do, I think, have an anticompetitive advantage when it comes to technology-based economic development.

Right. That is good.

We also, and I will share with you our own experience about our research park and even, I think that communities that grown their own, do better over time than communities that rely on just bringing in companies from outside. Because the grow-your-owns tend to stay. Some of the large companies that come from the outside, especially those that always go where the best deal is. It is like easy come easy go. If you offer them free land and incentives, they will come to your community and five years later there is somebody else doing better with free land and incentives.

Particularly with technology companies, because we are mobile.

Right. I highly value the attitude of grow-your-own, because those tend to stay. And, again, the small businesses are what sustains our country. More people are employed in small businesses than at large businesses. It is something we found with our own research park. When we started 10 years ago, Sandia had industry partnerships all over the country. We had a map of the U.S.; I could show you how many industry partners we had in almost every state in the country. And we thought, "That will be our market." We will just say, "Hey, you are doing with Sandia, how about if you are expanding, would you consider Albuquerque? Would you set

a program project office here?” And that was our businesses plan. That was our model of how we were going to populate our research park and continue Sandia's partnership strategy. What we found it that we have done much better with the grow your own because companies that are somewhere else, there is a lot of pressure to stay where they are at, not to move, to obtain the status quo, money is tight. We found that companies really do not, especially large established companies that everybody is going after; they do not really move that often. Boeing made a big deal out of moving from Seattle to Chicago, but I think if you look at really what is really still in Chicago or what is Seattle versus Chicago, Boeing is still in Seattle. So big companies really do not move and we are all after those same companies. So, growing your own, I think is a very key factor. And I think that the more states, regions with universities and our institutions can grow their own better than those regions that do not have those. You have to have some innovation engine to generate and drive that growth otherwise I do not know how you do it.

I completely agree with that.

I mean, I see regions in the U.S. say, “We are going to go after bio-tech. We are going to be the next bio-tech region.” Or you see rural communities saying, “We want to be tech based.” Well, when it comes to bio, I think those successful bioregions have major health institutions and medical facilities. The capital investment for bio is enormous. It is not easy for states that do not have health institutions or hospitals or medical centers just to start it from scratch, you cannot do it. And the same with rural regions. It is hard for rural regions that do not have access to technology institutions to say, “We are going to go after technology-based businesses.” It does not make sense. I think technology-based driven economic development comes where there is a technology industry.

Right. There is a study done by Dr. Philip Shapiro out of Georgia Tech on the second cities regions of Georgia looking at exactly that. Atlanta has all this extraordinary success but there is Atlanta and there is the rest of Georgia and so they have tried to reach out to the rest of Georgia and it has not worked. And for a lot of the same reasons that you just said.

I believe you have to have some; again, I believe that whatever the engine of innovation is drives what happens in communities

I think that is well said. That's good. I can pull answers for the rest of these out of what you just described.

Okay. I mean, obviously, I have strong beliefs around some of these and less strong belief around others.

But the way you did that is fine because this is to generate ideas and if we grade it great but if you just go through a discussion as you just did, that is even better.

Okay.

I am going to ask you to look at a slightly different version of that page and I want that back because it is the only copy I have, I apologize for that. Sandy Baruah pointed out to me that I had blatantly left out leadership and it is obviously is dredged through all of this but you had mentioned the leadership of your state, local and federal government. So, I modified this particular factor here to include that leadership.

Good. Because that is one of my factors before even thinking about this that I think is critical.

And it is all my materials that I wrote I just do not quite know why I did not put it on that page. I do not have a good excuse.

When you mentioned North Carolina and Research Triangle Park and Governor Hunt, I mean, where would that state be without Governor Hunt.

Growing tobacco.

Right. I cannot even imagine. Or where would Boston be without MIT and Harvard? I mean the factors that I consider important to leadership are the R & D institutions and having a way to infuse capital to the park. I mean I always come back to this. So, leadership and policy factor, how do you want to go through this?

In the same way you have done the others is just fine. You have actually covered some of the leadership things. If it is private sector leadership or public sector leadership or are they equally important?

What I see can happen is I think the public sector leadership is key at creating policy and seeding funding and creating ideas and I think that is a good role for the public sector. I think for ultimate success, you want the private sector to follow and ultimately invest more.

One of the people I interviewed said the public sector needs to create the vision and facilitate, but not get involved in the day-to-day; they need to leave that to the private sector. Which I completely agree with.

If we have public sector leadership, I believe private sector leadership will follow.

I think you're right, and that is an incredible state.

That is how I see it. And I think that private sector leadership in a community is important. You talk about Louisiana and who are those companies that everybody goes to for leadership or for money in our community, and it is hard to do that with small companies because they are just trying to thrive and stay alive, so it takes the big ones but our community highly values our private sector companies. And we tend to use them so much and over and over; there is just a few of them, they are the same ones that we always go to but when they stand up and talk, everyone pays attention because they have done it, they are doing what we want others to come and do. But I think the public leadership can drive the private sector following.

Within that, how important are, the tax structure, the tax breaks, the R & D credit, is any of that, does it really matter here?

It does. And I am not a tax expert but what we have seen in New Mexico is where our taxes put us at a disadvantage versus other states. We have been able not to change the policies on the tax structure but create incentives that offset them. So, I think what we have been able to do is maybe make ourselves equal by balancing what we do, tax and incentive wise, to other places. So, again, I am not a tax expert but when state people do not have to pay some kind of taxes into that so maybe they do not pay extra kind of taxes in Nevada but maybe we could help make our own value proposition by saying, "Okay, that is not going to change in New Mexico but is what we can do to offset the break that you are getting in Nevada." So, New Mexico, we use incentives a lot to draw companies in, we do. More recently we have been very successful in the movie industry. Louisiana does as well.

The movie tax credits that we have in Louisiana have increased; we have always had some film, but it has increased enormously. And we have the creative city, we have the

birthplace of jazz, we have a lot of the things that were needed, but once we added in the tax breaks, it made an enormous difference. That area has boomed in Louisiana, all over the state.

And it has boomed for New Mexico, too. New Mexico also built the largest studios outside of Los Angeles.

Oh, I didn't know that.

We have an enormous studio.

Where is that?

It is called Albuquerque Studios, out at Mesa Del Sol, which is south of the airport.

I have never been down there.

It is all new, the studios have only been around a couple years, two or three years and I think there are now seven enormous studios. It is the largest studio outside of L.A., outside of the Hollywood area.

I did not know that, I would have to go look.

It's called Albuquerque Studios. And the master developer for our science park actually developed it in partnership with some folks out of Los Angeles. I know you can't get in because there is a movie with some major folks going on, but you can drive by and see it.

I will just pass by. I will.

I would.

I have time before I leave, I will do that.

It is huge.

Last item on this...

Incentives have been very effective for us in New Mexico.

What about the business incubators? You have an extraordinary successful tech park tied to Sandia. I am assuming you have a business incubator program here as well.

We do not have an incubator in our park.

Okay. So, are the business incubators not that important?

I think they are very important

Okay. But you do not have one.

We do not have one.

Well, you need to add that, then.

I wish we had one, but we do not have one, and there are reasons for it. New Mexico has five research parks, which is a lot per capita. I mean most states do not have five research parks.

That is a lot, yeah.

We have five; we have a New Mexico Science and Technology Parks alliance. The Governor's office is involved, Senator Bingaman's office chairs it, and staff from his office chairs

it. And what it has done is it has allowed out economic development folks at the state level and at the city level to access and leverage the universities and labs in a way that they could never touch. So, these research parks have really been a bridge for the R & D institutions in the economic development community in a way that did not exist before.

That is great.

And so, of course, I am extremely biased toward tech parks having been here since the beginning of ours and having chaired and been president of the Association of University Research Parks a couple years ago.

Tech parks done right are invaluable. The tech parks for the purpose of having a tech park because you want to be able to say you have one; we have tons of little tech parks.

And that is where I tend to distinguish between research parks, Science Park, which tend to be tied to R&D institutions versus a tech park, and office park or a business park. Anybody can get 40 acres of land and call themselves a tech park. Actually they can call themselves whatever they want, but those that are tied to a research development institution are more successful. I think the same with incubators that are tied to universities probably are more successful than incubators that are not. I think that Baton Rouge has an incubator, and from what I can tell, they do quite well.

It is moderate. My first company that I started in '86, I moved in an incubator program in '89, not because they were doing anything for me except they gave me cheap rent and somebody to answer the phone and we were a little bitty company. We were the largest company ever to grow out of that incubator program but it was not because of the incubator program. It really had

nothing to do with our success. If it had been a program tied realistically to a university, where we really could have done what we can do or what you guys have done, Baton Rouge does that okay. They are tied to LSU; they do a decent job of it. We do not have a lot of people in Louisiana that know how to use that but they do make it available. So, that is just a long way of saying an incubator program that does not have the things that you described is really just a place for cheap rent.

Right.

That does not cause business success.

Right.

Doing it the way you have described does.

Well, those of us in the research park business feel very strongly about research parks are really those tied to R & D institutions and I know the incubator industry feels very strongly about. You are not a real incubator if you just provide cheap space and a phone; it is about all the services and supporting services that you provide to the companies to get them to the next level that really is the differentiator. New Mexico has, in fact we have even started a, we have a certified incubator program in New Mexico just to differentiate between the people that are really doing the whole gamut versus those that call themselves an incubator because that is way to get funding.

Right. Exactly.

There is a difference and it is the same way with tech parks. I think if tech parks and incubators are done right then it really does help tech-based economic development, absolutely. It is a way to leverage institutions in a way that you would not do otherwise.

I agree.

I mean, Sandia and universities all have bigger missions than economic development but if they have tools to still do their mission work, still do their educational work and help create jobs, they can do it through tech parks and incubators.

Right. It is not the primary mission of a university or a lab to go create jobs; they do not exist for that purpose.

Right.

But if you can tie it together and make it the add-on, then it can be very effective.

In fact, when we started our park we, the National Academy of Science in Washington D.C., posted a one day workshop in Washington to help us set this idea of the National Lab, starting a research park and it was really powerful because the National Academy convened this workshop. They brought in kind of a diverse set of people from around the country, about 15 people and we presented our vision of creating our park. And we heard pros and cons from everybody, this is a good idea for a national lab, this is a bad idea for a national lab, if you do it, this might help, these are some lessons learned from other researcher parks. And ultimately, what they were very clear about is this is not the work of a national lab to create a research park. But if you did it and, by the way, we think it is a good idea, you have to always be clear about how you measure the success and how does that tie back to the mission. So, for our park,

having learned the lesson before we started. It has never been about the real estate, for Sandia, it has not been about the jobs. For Sandia it has been about how do we promote research and development within industry, how do we commercialize technologies with industry, how do we develop new business with industry to bring funds to the labs? It has been about industry partnerships; and by the way, our elected officials happen to love the fact that we are, through those efforts, we are creating jobs. But for us it has always been about the joint R & D, the commercialization and the partnerships. So, that was a good lesson for us to learn. So we started out leveraging and supporting the mission of the laboratories and just measuring other outcomes along the way that elected officials cared about. It was not created...

It was not about that.

In fact, I did not even know I was going to have to have a development business.

Well you do, and you're good at it.

I will never forget, I was up in Santa Fe, probably two years into the park having started and I was meeting with our cabinet secretary of economic development and it never occurred to me that I was in the economic development business. I was Sandia National Lab's employee, I care about what Sandia cares about and they said, "Anytime you are creating jobs whether that is what you are in it for, you are in the economic development business." That was not even a factor of what was interesting when we started. And we learned very quickly when we presented our concept to the city, they jumped all over it and said, "We love it. How can we help?" Because they saw as an economic development tool, the state did and our start-up delegation saw it as a way to implement their tech transfer legislation that they both sponsored.

That is good.

So, we did not even realize that we were in the economic development business when we started. And we did not start it to create jobs. So, even the fact that I have 'economic development' in my title was controversial.

Was that in the title originally or when was that put?

No, it was like two years ago. I just...

That makes sense.

No, what we did when we started our park, it was an executive at Sandia, a vice president that I happened to work for at the time, whose vision it was to start the park. How we worked from the outside in to make it happen versus the inside out, once we convinced key folks externally, primarily elected officials, that is important and that we could do it, we would not screw it up, then Sandia got more interested. And then Sandia had remained interested because it has become very meaningful to our elected officials and they are seeing return on investments. So, had I used the words 'economic development' in my title 10 years ago . . .

It would have been a negative.

Even when I had my business cards made two years ago, the boss I had said, "This is going to be controversial. I would not do it. You are putting yourself out there." And I thought, "I want to say what it is. That is what it is." It is technology and economic development; that is what my group does. And I wanted it out there.

Has there been any negative reaction to you having that title?

No.

Good.

My boss was concerned that there would be. And there has not been.

Good. Let me, I want to be respectful of your time; can I ask you to do through the next thing?

Sure.

I think that will cover a lot of what I want to cover because you have answered most of my other questions. What the social factor is all about, because you mentioned Richard Florida, same thing with AnnaLee Saxenian. I do believe this is important but it is not my opinion that we are asking for, it is yours. Do you believe things such as the culture of collaboration, which you talked about, not at the corporate level, but at the personal level change social networks, etc. are these important?

Of this list, I resonate most with the investible capital and entrepreneurial focus, the grow-your-own and the geographical cluster technology-base. I think we have also done quite a bit of industry cluster based on Michael Porter's model at Harvard. And, so, I value those above the others.

Would it be accurate to say that as a whole, the social factor is not as important as some of the others we have covered? Or is that inaccurate?

No. I would just say that I think these 5, 6 and 7 out of this group are more important

Okay. Very good. Within the others, the other six or so, are there any of the others you think are much more or much less important?

What I have not heard or seen or read a lot about is collective learning. I do not know, so just the fact that it is not something we have discussed or not something I have read a lot about, I would naturally put that lower.

Right.

And maybe that is my own ignorance or unawareness about it. A culture of collaboration, a culture of change, dense social networks, I think all contribute to the fabric of a community and are important, I think 5, 6 and 7 are more important. In terms of a collective identity, I know that is something that we are trying to do with our research parks, the fact that we have five and that there is an alliance; Albuquerque has three of those. Having that identity with the three of us versus each of us on our own is that more powerful, theoretically, it should be and we are trying to test that. I guess I would say that in our case, 5, 6 and 7 are a little more proven than some of the others. The collective learning I would rank less.

Okay. That is good. That covers all six of the primary factors.

Okay.

And we will not have to go through all of these because in the discussion you have answered a lot of this. But, looking at those six factors, are there any one or two of them that jump out that you think are much more important or much less important than the others? And I have re-listed them up here.

Yeah. I have to go back and see what is in those. To the environment, the inflow, the attitudinal, policy, knowledge, social. We did not talk so much about the knowledge factor, did we?

No we did not. Did I miss that completely? I might have just flipped two pages and think I did.

The reason I thought of that was because it is something I would pick because it talks about university research and development, tech transfer, tech initiatives. So, I resonate most with knowledge factor.

Okay. In fact, would you mind if we just went through that quickly. I just flipped two pages at once. I'm sorry.

That is okay. The other thing that would be helpful maybe to your work or from where I am coming from is if you did add, this is something I have been working on with the Research Park Association that is taking hold, I would say universities and national/federal labs versus just only universities. People think of knowledge creators and R & D institutions are broader than just universities. And then for those states that have national/federal labs it is a powerful resource and a powerful tool.

And not just labs. Marshall Space Flight Center is the cornerstone of Huntsville, same type of thing that is the knowledge base.

Right. So, I think it is more than just universities; and we will get back to this, but I really like and believe this knowledge factor is key because that is your engine for innovation.

Okay.

And you can build on this. Especially for tech-based. To me, many of these things are real differentiators for tech-based economic development. So, I think that is really important. In terms of going through these... how are we doing on time?

I am fine. It is your time.

We planned on a couple hours, so 10 to 12.

That would be great.

We are still good.

We are still doing fine.

Okay. I would put one and two as my top. One is having the base, the engine; the other is then commercializing or transferring that technology to industry. So, I think one and two are really the top of this... I think what are as important as well. Obviously the universities and the tech transfer institutions are into the economical development business so if you have these as a base and then you have strategies and organizations that can leverage what is going on here. That is powerful. And, so I know there was a period where our state was primarily focused on technology recruitment and our community was as well and so they invested some time to learn about nanotechnology and microtechnology and bioindustry, and that was helpful. And, if you looked at what our competencies were within our universities and the national lab, they spent some time investing and learning that. So, I think one and two I would put at the top; eight and nine, I do not know how you can go after tech-based economic development without being

knowledgeable about it. And then I think, and maybe even between number one and two but before eight and nine are the tech commercialization support, I think that is where technology venture corporations have been key. I kind of think New Mexico, I think is number two in PhD's per capita. We are always one or two, between us and Connecticut.

Between 11 and 12, how important are the PhD's versus the bachelor's and master's in engineering and science? Is it important to have the highest concentration in PhD's?

How helpful has that been; versus bachelor's and master's?

It has certainly helped your image. I mean the image is...

It helps the image; it also helps attract R & D funding.

Right. That is a good point.

What I usually look at, I differentiate between bachelor's and master's/PhD's.

Oh, okay. So that is where you make the break?

That is where I make the break.

That is interesting.

It is undergrad degrees versus advanced degrees. That is how I see that. So, for example, when I talked about Sandia, we have 4,000 scientists and engineers with masters and PhD's at the national lab. So, to work at Sandia you have to have a master's or a Ph.D.

Got it. That's good.

I break it between masters. I like masters and PhD's together. PhD's attract R & D funding it helps the image. Does that mean... I do not tend to see companies coming out of PhD's; I tend to see companies coming out of engineers, which tend to maybe be more master's-level. I mean I do not see companies started by scientists as much as I see companies started by engineers.

I agree. I find the same thing.

And do I take these companies that are considering locating that we're spinning off to PhD's? No.

Do you think having college and business with the focus of entrepreneurship training or entrepreneurship training and collaboration in any way is important? Because there are people that spend money on that. That bring up the questions that, are entrepreneurs on or can you make them?

Saul runs the management technology program at the University of Mexico, so they are trying to train people in the business school to manage technology companies. And so I think that is all part of this system. If at the university level, we train people to manage technology companies, that's great. If as a lab, we're spinning out companies based on our R & D; that's great. Or we have technology ventures corporations that can bring capital to those companies who are spinning out and UNM is training people to run, that's great.

Okay.

One of the things we have found in New Mexico is that while we had a lot of science and engineering talent, we did not have a lot of managerial talent which, I think, UNM is trying to address.

Good. That is good.

And if we were to import anything that might be what we imported would be managerial talent.

With the managerial talent. What about a strategy for creating the workforce of your future, your future and knowledge works within the state? You all have done the lab for many years; I am assuming that you have that. It is important to states, such as ours, where the workforce has always been oil and gas or tourism and now we are looking, I have done a lot of IT work there and made the largest IT firm in the region, we worked with the university to create a good five year to 10 year vision for what the future IT needed to be to maintain those jobs. Do you think that such a strategy is important or is it something that just develops?

So, I can give you a couple of examples of how Sandia has been engaged in that and how it has worked in New Mexico. Then it goes back to, as a state and as a city, how we came up with our industry cluster strategy. And then Albuquerque said, "We have competencies in these technology areas based on our universities and labs that maybe are a differentiator for us." I will use, for example, optics and photonics and micro- and nanotechnologies. We thought we have really poor competencies in those two areas so let's look at the whole system and how we keep that competency and how we create jobs based on it. So, at the high school level, Sandia's Department of Energy invested in optics for the academy at one of our local high schools and the

Department of Energy invested in the micro/nano academy at our local high school. So, that way we are getting kids, in this case, high school level engaged in those technologies and a mass of clients to go with those. At our community college level, we went after National Science Foundation grant to set up a micro/nano program at the community college level; and then there was a Dow chair at the university level in micro/nano. Same thing in optics and subtonics there is a high school program, community college program and now we have a Ph.D. program in optics and photonics. So, all of those continue to support the fact that we have competencies in those areas that helps spin companies off and might attract companies to the area.

I like that.

The fact that, again, to create tech-based economic development, the city really had to turn to the labs and universities and said, "What are you good at? What can we leverage? What programs and funding can we bring to the table to get this beyond the labs? Or to feed the right people at the high school, community college, university level?" They will be the workers at the labs in the future.

That is great that you have been able to integrate that vertically and horizontally. That is outstanding. That will be interesting to see how that works out long term.

Right.

Okay. That covers that 1, and you covered 7. Go to page 14-question number 8. We have done this along the way. We have talked about how Albuquerque and how New Mexico has done. If you were going to put your region on a scale of 1 to 5, one being neophyte and five

being mature. *Mature being something that is fully self-refueling and diversified, not depending on any one source. Where would you put you all?*

Adolescent.

And why?

I think naturally we have some foundations in place that are helpful. I think there has been a lot of effort at the federal state city level to support, leveraging the labs to create economic development through programs that I have talked about. We have come a long way in a technology-based economic development perspective, in the 10 years that I have been doing this business. And the focus has really been in those 10 years. Anytime you create a researcher park, the state really wanted to get their arms around it and created other research parks. Technology Venture Corporation being here for 15 year and the capital they brought has inspired the university to do some thing. So, I think we are beyond neophyte and performing modestly. I do not know how self-sustaining we are, so I would not put us in the mature. And I cannot necessarily tie all these programs to a result. So, for me, I cannot say that we have performed excellent unless I can tie the drivers to a result. So, do we have systems in place that we want in place? Yes. Are we getting results we want out of all of them? Some results, not mature. And I think New Mexico still is heavily focused on the government sector.

Right. Clearly, if you took the labs out it would be a totally different world. But a lot of things at the lab are self-sustaining; they have to continue. I have always wondered if you take out Pete Domenici and Senator Bingaman, and they are not pushing the funding for the lab, how

much of it is really going to stay because it needs to be done? Hopefully I won't ever find out, but that would be interesting to know what the result of that would be.

We are all holding our breath. Many of the successful companies in this region do business with the labs.

Right.

There still is many of our high paying jobs are either at the lab or at companies doing business with the lab.

When I was running a big Navy program in New Orleans, it was the largest IT initiative in the region, not just in Louisiana but also in the whole region. And we had about 1,000 IT people working out at the UNO tech park. I had 500 of my employees there and 500 people working on my project that were subcontractors. And I had 20 companies a week come in and say, "We will move an office here if we can get a subcontract." I said, "Move an office here first, and then we will consider a contract."

Build up that relationship.

I can get anyone to come in and move an office here if I am going to give them enough work to keep the office. That does not do me any good. I would rather give it to our local companies and they are going to use that to try to grow other jobs in the region. And it is hard to try to separate the two of which came first, companies are going to come here but they are coming here because they do business with the lab. What do they do that is not direct business with the lab?

Right.

And when SEA was headquartered here we did a lot of other business. We had a tech center up in the north part of Albuquerque that we probably put 10 million a year into that was not tied to the labs. It was here because the people wanted to be here in Albuquerque.

And even I've worried over the years about the companies in the park and the good news is at some point many of those companies have been dependent on the labs. But more and more they have diversified their business. And, so, one company, for example, when they started in the park, 95% of their business was with Sandia and now 5% of their business is with Sandia.

That is exactly what you want. That is a great example.

But what they have created a company not for Sandia? Probably not but they have now found a way to sustain their company and grow their company based on the knowledge base they have with Sandia and that is great. I have another company that spun out of Sandia and have diversified them. A lot of them diversify themselves with other government contracts but I am glad to see that they are not, that the success of their company is not only tied to Sandia.

And that is what you need. That is how you go from being neophyte to adolescent and adolescent to mature by being able to do that.

I would say we are adolescent-plus.

Good.

Three and a half.

Would you look at, it ought to be page 18 in your packet, little guide.

Nineteen.

The reasons I focus so much on these different factors and variables is that in studying this, again, looking at it as an engineer and breaking the whole thing down as a system, the knowledge variables, inflow, attitudinal variable, environment policies, affect a regional technology-based economy at different times and in different ways. I know that I can take variables to make them into mathematical model. And a mathematical model is not as important as being able to understand the impact and what affect any of those variables may have on the future of a regional technology-based economy. But, for part of my dissertation, I am building that model. Do you think a regional technology-based economy can be represented in any type of model? Not just this one but any type of model? And do you know of any such models that have been built to try to represent a regional technology-based economy?

Are there other models out there, not necessarily input/output models but other models out there for regional economic development or technology-based? I would say that I am aware of two. And one, I think, is Michael Porter's industry cluster model. And even then, I am thinking the council and competitiveness of Washington has done some work, some looking at regional economies over the years and innovation zones and hot spots and hot zones, again, I think it is partly based on, I mean, they hired Michael Porter and so it is based on that. But there is a study that they released two years ago about their regional innovation hot spots. So, those are really the two that I am most familiar with are Michael Porter's cluster model and theirs. We have used a consultant in the past that have talked about a conglomeration of companies in an area and having the value chain from and R & D institution to companies

spinning out, attracting other companies and bringing suppliers into the area to have the whole food chain, the whole value chain. So, they call it different things, it may not be Michael Porter's model but it used like it is based on that. And that is some work that came out of Stanford Research Institute, some folks that worked at the Stanford Research Institute.

Most everything I have found is based on Michael Porter's model and I did interview Sandy Baruah, in fact I interviewed him at the council, we were at his office. And he talked about their model and it being based on Michael Porter's model. It is the, by far and away, the one that everyone relies upon. It does not, again, being an engineer and liking toys, I look at it as a simulation. Can I put in place a simulation over time that I can look at how these different variables interact. And Michael Porter's does not allow you to do that, but I think we could go the next step. And then that would have to be applied to each region. Each region is going to be different; each region is going to exist at different points of time.

What is interesting though I am a marketing person, how he owns the brand on clusters and kind of everything that implies. Whether it was his work first or not, he seems to own the brand. Everybody knows of Michael Porter.

He does own the brand, you're right.

He does own the brand.

That's a real good question. I have never even thought to look; did anybody do that before Michael Porter, did he take somebody else's idea?

Did he sell it the best, or did he have the Harvard credibility that people resonate with? I don't know. And the council has been very good at not trying to necessarily recreate their own,

but really just kind of leveraging his reputation in their work. But you talk to other consultants that kind of bristle when you talk about Michael Porter's model because maybe they were doing similar work or other work. But he owns the brand.

He owns the brand. That's right. And that is a good point.

He is whom you pay \$50,000.00 to come speak to your group - he's the one.

Maybe it's the Harvard MBA; who knows?

That's all of my formal questions. Do you have anything you want to add based on the discussion we have just gone through?

No. Maybe the other thing I would point you to, we published a paper last year called The Power of Place. It was unveiled in Washington. I don't know if you have seen that or have that.

I have.

Our whole point is that some innovation happens at the university and lab levels, but where real innovation really occurs is when you have that link with industry and when you have formed a company. And so, the place that innovation occurs can be - and is, in many cases - research parks. I mean, that is the place where it happens.

Right.

And is it the place because it is the cheapest real estate? No. Is it the place because it has a beautiful beach next to it? No. It is the place where innovation occurs because of the link

and services and all that goes with the research park. So, you mentioned basic incubators provide you cheap space and a phone but good incubators provide you with a whole coterie of support services. The same with research parks. A tech park, you could buy land from them and have an address but a true research park and their role with innovation is providing more than just land. It is providing the resources within the universities and the linkages with all the other players. The research parks, we are the convener of many of our state's and city's activities and we are the link, we are the hub between the feds, the state, the city, the place to tech transfer and our lab. So, we provide many of those linkages. There is something to be said for the power of place. I mean it has to happen somewhere. And in our case, at our research park, we are not cheap. We do not provide free land, we do not provide subsidized rent, and we are absolutely market-based. So, people are here because this is the place where they get value added for their business. Value added comes because of all the linkages we provide them.

You do not have to be the cheapest. Businesses will locate in one of two regions, they can sell more of what they sell and make more money or they can produce what they produce cheaper and make more money. And when I say produce that can be knowledge that can be whatever it is. So, if you have the innovation and you can create something you can sell more of then that is fine. Or if there is business with Sandia and you can get other business because of that that is fine. Do not have to be the cheapest. Just have to be the one that generates more to the bottom line. Unfortunately, in a lot of places that are trying to get into the johnny-come-latelies, they always look at how they can make it cheaper for the companies. And that is just a form of prostitution, it is not going to work, the companies are going to go somewhere else with somebody else that can help them do that same thing better. It is interesting that in India, they originally started a lot of what they are doing because of the arbitrage of rates. They have

cheaper rates; they produce engineers cheaper. That is not what drives India anymore. Their model is an extremely interesting thing to study.

I have gotten to do a lot of travel around the world with this work but I have not been to India. My senator has, Senator Bingaman also, because he is a policy wonk he travels all over the world in his role just seeing what are other countries doing to make their countries competitive? What are their governments doing to make their countries competitive? Which we might learn from in the U.S. What is really fueling the up-and-coming, what is fueling China and Singapore and India and Dubai? And the easy answer is a heck of a lot of government funding.

That is exactly right. If you look at Saudi Arabia, their economic cities initiative, it is all government funding. They are creating an enormous city with incredible facilities and unlimited amounts of capital that is basically what Dubai has done. China is doing it on a totally different level because they are doing it for the whole country, so that is an artificial economy in many ways. India is a good example because it is a knowledge pond. It is not about the government; the government facilitates, it does not make it happen.

Even when we went to Hong Kong, we went to visit their science park built right on the water there. And what came home to me was their government spent two billion dollars to get their research park started. I mean that was Sandia's budget at the time. So, my entire laboratories budget, which is a big budget in the U.S., two million dollars, and they invested that to put buildings up in a research park.

Isn't that amazing?

But then you look at what the two billion dollar investment did; would that ever happen in the U.S.? No. But it was not like they lost the money. That two million dollar investment then brought in companies, and the tax revenues from those companies and those people having those jobs was paying the government back. The return on investment was larger than one. So yeah, I believe there is a role for the government, but I think it is to seed the efforts.

To seed the efforts and facilitate it, not to do it.

And then the private sector does have to follow. And in Hong Kong, that appears to be what happened, or at least that is what they have shown us is happening.

Last question: Do you have any recommendations to improve this interview process?

No. When you come back to talk to Saul, I would recommend that you talk to him about Technology Ventures Corporation.

I will.

Or I do not know if you are coming back, or if you have to do it by phone, but it is a really great model and, again, I mentioned how states and cities say, "How do I get a Sandia National Lab in my city?" Technology Ventures Corporation is another example of where people wish they could do that. But, in this case, Lockheed is paying for it, so if there is not a Lockheed-type entity, then it takes money to run it. But it is a great model.

I used to know the people over there, but I have not been over there in 15 years.

Their president is Sherman McCorkle, but whom I would talk with is George Friberg. He tends to be the deputy. He used to be with a small business here in town. He is a UNM grad, an athlete from UNM.

I know his name from somewhere.

Sherman is the president, but George is the person who would probably give you an overview . . . or they both might do it.

I will see if I can get in touch with them. And I still have to follow up with Saul . I am just kind of waiting for him to get back.

I will turn this off.

Dissertation Interview Questionnaire – Michel Bernasconi 03/09/2009

In his current role and position within the organization and community specifically talking towards economic development. Dr. Bernasconi was a graduate of CERAM Business School in 1975. He went directly out as an entrepreneur and spent 5 years building his own company. He returned to school after that and for the last 25 to 30 years has served as a faculty member at the CERAM Business School in Sophia Antipolis.

Dr. Bernasconi has developed extensive contacts with companies both in Sophia Antipolis and around the world, in large part due to his background as having been an entrepreneur. After running his own company for 5 years he returned to school to complete his Doctoral work and then when on to initiate a sector of the University targeted towards entrepreneurship and working with corporations.

He took a sabbatical for a year to study startups in entrepreneurs in Silicon Valley and paid particular attention to the French entrepreneurs that existed in Silicon Valley that subsequently many of which have returned to run companies in Sophia Antipolis. He returned to Sophia Antipolis with the intent of creating a center targeted towards high tech entrepreneurship which he did and continues to run.

He spends much of his time encouraging and building entrepreneurial networks, and networks to target entrepreneurship both in Silicon Valley and around the world. He also, at one point in his career spent a year in Montreal on sabbatical from CERAM helping to run an IT company that he had a partial ownership in and he subsequently returned to Sophia Antipolis.

He was able to learn quite a bit about the Montreal system of entrepreneurship and startup companies.

Dr. Bernasconi was able to describe the traits of innovative entrepreneurship and this may be picked up in his interview. But he specifically noted that entrepreneurs are typically problem solvers, that they are network people. They build relationships, they outreach; they build an environment of entrepreneurship within the organization they start. Entrepreneurs are certainly hard workers; they also can live with the acceptance of uncertainty although they tend to try to put stability into that uncertainty as much as possible.

They are typically risk takers, but then Dr. Bernasconi corrected himself and said rather he would consider them risk reducers. They will go out and take a risk and find ways to reduce that risk and thereby achieve success, and they clearly know how to manage stress because entrepreneurship involves extensive stress.

I then asked Dr. Bernasconi to describe the factors of the region of Sophia Antipolis as it relates to the traits of entrepreneurship that he had just described. This is reading from my notes of his interview, “Sophia Antipolis is a region that did not have traditional entrepreneurs when it began in 1969 and the early 1970’s. It is now an innovative region in technology, so it is by its nature, an entrepreneurial region. Sophia Antipolis builds on the experiences and culture of the people; it is very international and is also very small, tightly knit community. There is extensive interaction between companies and between people within the region. It is self contained in that all of the necessities to create an entrepreneurial region exist.

There is ease of access particularly in regards to the airport. There is also ease of access within the park, from one company to another and from one organization to another. However, there have been no really big success stories out of Sophia Antipolis as far as companies that began in Sophia Antipolis and grew into large organizations. They have numerous small entrepreneurial companies and startups, those companies have not learned how to make the next step into being a billion dollar business.”

According to Dr. Bernasconi they lack the managerial talent, not vision or leadership, but managerial talent to be able to grow companies beyond the startup or small organization to medium organization phase. There is good technology and excellent people, but not the ability to grow big companies to a significant size.

(1) Please describe briefly your current position and role within your organization and community.

So I try to define in my understanding what is expected of entrepreneurs. We try to find successful entrepreneurs or just entrepreneurs in general. I'm sure you have heard about Sarah Svetsi effectual, she is a U.S. Professor on effectual thinking.

*I think this is interesting; my understanding entrepreneurs are **problem solvers**.*

Because they don't necessarily know what is right, so they teach you to find solutions for teaching problems. To find a solution, and then to try to apply the existing solution for problems, so I think this is something important. I think my understanding is they are network people, very much network people. Entrepreneurs are not lonely guys, it's a network, but not only a network; a relationship.

Relationship and very much working with this environment, and as a rule of networking the success of entrepreneurs, it's a rule of networking to get money from the network, or from the network to get clients. It's a rule of networks to hire people, so probably one of the key capacities to network there of course very hard workers. This is something obvious but they are hard workers, they have to live with uncertainty, to accept and live with uncertainty.

Uncertainty is I think this is clearly something which separates entrepreneurs from managers.

If you are a manager you are paid to avoid uncertainty.

Yes.

And you try to find solutions to avoid uncertainty.

That is very true.

When you are entrepreneur, uncertainty is part of your life, and you accept that. Also they are risk takers, and some of them are, most of them are not. I think their job is to reduce risk, so risk reducer. They have to be, so I don't see that all of them are, but that's what we try to find and they have to be able to work under significant stress.

Yes.

And so I don't want to be too long but this is some of the key characteristics.

I agree with those characteristics. Just the entrepreneurs that I know all fit this model. Do you think that many of these same traits of entrepreneurship would be available in a region that is safety and technology based economic development? And now rather than talking about an individual, we're talking about a region like Sophia Antipolis.

Just before you asked that question I just would like to precise that this is very much with innovative entrepreneurs. It doesn't mean that it is true for more traditional business activities.

Very good.

Because I think this has to be older and much more innovative focused company and so it is more different than traditional activities where certainty is more important. So we are pretty much working on uncertain innovation.

Yes.

Within uncertainty, that's why you have to take into account my answer okay?

Yes, yes.

Uh so your question is, is the existence of such entrepreneurs in the region?

The traits of the region, we discussed the traits of an entrepreneur. The next question that we get to I will ask you to look at certain factors and you'll tell me whether you believe those factors effect technology based economic development. This is a precursor to that question, just to ask you what traits to you see in the region. Sophia Antipolis began as an experiment but it's had extraordinary success. It wasn't always as successful as it is now, so what traits have you seen in this region that encourage regional technology based growth?

I'll have to answer without explaining what has happened here and where Sophia Antipolis has come from.

I've studied the history.

Okay, you know the history?

Yes, I've read extensively about Sophia Antipolis.

Okay, here you discovered the history; it is a region that has no entrepreneurial history.

Right.

Is it now an entrepreneurial territory? Yes and no. Yes from certain parts, and if I may try to explain why we have to a certain extent an entrepreneurial experience. I may say it is because we are victimless; it is a characteristic of the activity itself, to facilitate entrepreneurship because many people are colleagues who want to be part of entrepreneurship initiated here or elsewhere. Many people here engineers, lived elsewhere. In France or in the UK or in Silicon Valley so they are all, many of them have another referential. It's not only associates but we build here, the experiences of our people and we are lucky enough to have a very international population. So this is a good entrepreneurial experience because we are a small community.

And we are not a location which is living very much on itself.

It's not like Paris where everything is mixed up, you have entrepreneurs but you have big companies as well. Here it's a small area where people are interacting very much so we are more able to create the special experience because we are networking with peers.

Okay? If we were mixed with everything in the big city it would be more difficult, here it is very easy to meet people.

Right.

It's very, very close.

Very close, very self contained, self generating.

You can have a meeting and be back at the office in one hour, when you are in a big city it takes hours.

So it's faster here period. So from that part we have an entrepreneurial experience but that's, I may say that we are not very, very strong entrepreneurial area at the same time. If we look, we don't have big success stories, we don't have so much. If I should mention success stories, I should mention something like 2 or 3 companies who became a significant, a big company.

We are very good to create business support but very often after a while the company are sold to other companies. So we have good technology, good people but we are unable to grow. So we have little success with entrepreneurs, we have significant number of people who are willing and able to create first business activity, but we have very few of them who are able to grow a company to a significant size. So by telling that, I give you the strengths and weaknesses of the entrepreneurial activities of Sophia Antipolis.

That's very interesting because while you were saying that I was thinking about India, Bangalore et cetera, in India. They are not innovative from the standpoint of technology but they do have very large companies that have grown there simply by being innovative in the way they gain more work. First it was the cheaper labor and good language skills but then that's grown well beyond, but not necessarily innovation. They don't try to create things; they use someone else's innovation but are able to take companies to that very large stage.

So we may be, we try to be because we are in different countries, we know that we have to be innovative if we want to enter a market.

So we focus and we keep a lot of investment in technology, especially the Frenchs who give a lot of importance on technology, less on management and marketing.

That's interesting. I wouldn't have thought about that differential. You are able to go to a certain level but not beyond. Now you have big companies here, those are the companies you have attracted.

Most of the companies we are launching here are on technology which means we have competitors in regions and elsewhere.

And that's why it's very difficult because we are positioning our activities on new fields where there is fierce competition with people who are perhaps gathering more resources.

So if you take new activities here, I'm quite sure that we can find a competitor nearly every time, at least 1, 2, 3, 4 US competitors.

So we are in a very open global competitive world. And that's why it's very difficult to be successful only because we are good technologist.

So it puts the company in competition with other companies as well.

Right, I experienced that with my first company, it was called Science and Engineering Associates. And when we were 100, 200 people, the big companies didn't bother us. Once we got bigger and started winning large contracts, several hundred million dollars then we were competing with Lockheed Martin and SAIC and Accenture, and all the big multibillion dollar

companies. That became much more difficult. Until somebody finally bought us, that's what happens, when you get big enough, they buy you.

Yes. Which is also one of the good things for us.

Good -

Of course, of course, but we have the ability to grow company. It's not only here in Antipolis, it's true in France, it's true in Germany, it's true in Europe as well, and it's not specific to us. But it's true here as well.

Well I'll have to study that some more.

So which means that when we are looking at entrepreneurs the qualities to transform the first business activity into a growth company are very, very different from the beginning. And after those individual interpersonal characteristics we need very strong functional characteristics, in particular marketing managers and we don't have those people here.

Okay so the next level, the marketing managers, the leadership may be here, the entrepreneurial skills, the innovation but not the management to go.

The developer, we need business developers.

Business developer, yes.

Marketing, very skilled marketing managers and we don't have so much of those people here because we have a lot of, and now I'm back to your question, we have a lot of big companies but there are, we have subsidiaries of big companies.

Right, not the headquarters.

Not the headquarters.

Not big companies that have grown here.

No. Which means that we don't have those people who have already done the exercise to grow a company but to begin again? We have very good professional managers who are very good in their jobs but who are not necessarily good in the entrepreneurial advancement. It's very difficult to transform a very good manager into a very good entrepreneur.

Your right.

So we have good managers, smart people, very good vocation, very good expertise, but it doesn't mean they are able to transform themselves into good entrepreneurs. Neither to join, or to grow startups. So we have difficulty to find the right skills.

I know people such as you're describing and I have the think about their characteristics. For example, the person who is the founder and chief executive of the Shaw Group which is now eight billion dollars in size started in Baton Rouge Louisiana. And in a short period of time he bought several companies, he had an extraordinary ability to get new work and the company is now approximately seven or eight billion dollars, and employs many thousands of people. But that's very unique for Louisiana; he's the only person I know that built a company that big in Louisiana. He's a friend so I will meet with him and ask him about the characteristics to go to the next level from beyond the middle size to the big size.

I may add something also of the traits which might be a difference for your understanding. I think entrepreneurs have less individual ambition than their US counterparts. For example, they don't necessarily want to create big companies.

Um-hum, many entrepreneurs do not want to create big companies.

They don't necessarily envision a big company, they want to create a company but they are not ready to work for long, for years as long as necessary to create or to transform themselves into general manager, into a leader. So this is a limit to the system.

Right.

There is not a tradition of very strong individual ambition in this country.

I find the same thing particularly with technology entrepreneurs. They don't want to grow a big company. I enjoy starting smaller companies, growing a big company is not as much fun and it's more difficult.

Yes.

If I might, I'd like to ask you to look at some specific variables. If you would open to page seven of the document that I gave you.

(2) The next six questions list and describe factors that may affect regional technology-based economic development in an attempt to identify the population of variables that impact regional technology-based economic growth. For each handout, please review each factor and the variables listed that comprise and describe each factor, and answer the following questions for each.

What I have done is identify six factors on the next six pages, this one is environmental, the next page is Inflow and then attitude, leadership and policy, and knowledge, followed by social. And then I've characterized the variables that are identified as being common to regional economy that have been able to do technology based economic development. Some very well, some not so well, but for those that have had some degree of success, I've found these factors in the variables.

In common you mean.

In common.

Yes.

What I have asked the people that I've interviewed to do is to look at these factors and tell me in your experience how important do you think each one is. And some people have done that just by saying this was more important than the others. Some people have given them a letter grade A through F. Some of put number scores on them, however you're comfortable doing it, if you're willing, I will normalize the data later on.

So the total is 100%.

Yes if you want to do it that way. Many people did not want to add it up to 100% so they just graded them A, B, C, D, or F. Whichever way you find the easiest. Some of these we had discussed which is why I wanted to get your opinion before we got to this.

Okay. I mean here, for Sophia Antipolis, I grade for Sophia Antipolis?

Yes.

(3) Having considered the six factors that may affect technology-based economic growth - Environmental Variables, Inflow Variables, Attitudinal Variables, Policy Variables, Knowledge Variables and Social Variables.

Okay, I think this is very, very important quality of life is very high here and the people are very happy to be here and it's difficult to leave and that's why it might be. I go directly to other because I think this is very important. We cannot explain the success of such without understanding the international airport. Whatever the location it would not have been a success if we had not this international airport. The ability to go everywhere, one day in Europe and now we are linked with the US, then with Asia. The airport is very, very important; it might be 20% as well.

Okay.

I mean quality of life and airport are the basis of the success and then we'd be done. Sorry I will not go through on your order.

Whatever order you wish.

Originally the system is low. Especially here in Antipolis might be 10%. This is better in terms of, I don't know if, this is very strong. This is obviously today is a key characteristic of Antipolis, why are they coming here to relocate is because they are sure they will find a very good educated work force in particular in engineering. Very strong engineering people in some specific skills, so today it's very important. It was not the case at the beginning, now it's important. . Transportation is not so good, but it's okay. Actually it is very good. Legal

financial provisions are weak, so it is difficult for me to give, one is strong, and the other is weaker. So I guess I'll say something like, well airport is important so I let you...

Okay.

Support for technology is going better. We have in France a cluster policy you heard about and this is going much better than it was. Investors, we don't have so much investors but we have more money now in business angels. So it becomes to be a strength. There's very recently because we have a new tax incentive for business angels in France, which is going to be very good.

It hasn't been; it wasn't in the original success?

No not at all, this is today. But I may say it's very 5% or 2 or 3%.

Okay.

I think we are high in, because we have education in the international profession as well. So this is high, I don't know how much but this is high, might be 16.

We have a big problem in New Orleans, Louisiana because we have such a large percent of the population that are economically disadvantaged. It is very difficult to build a technology environment with that image of lower end work force.

Here fortunately we have both range population in terms of revenue and terms of wealth. First because we have educated people here now but also because we have a lot of international people who are living here which are very active? So we are a rich region. But does it help?

Not so much, for long we are here where there are the richest people around the world of houses and the surroundings.

You have Bill Gates, Paul Allen, all the big rich people worldwide have houses here. So we say why can't we try to help to build up our companies. But those were of no connection at all.

Yes, two different worlds.

Two different worlds, so of course they are here but we never see them. They are not, they are just coming here for friend or for holidays but they are not at all part of the life of this land. So that's why we are very rich in terms of we have a lot of richness. Not only the big ones, but it's very difficult to try to attract very small part of that money to our development.

So this is a characteristic. But anyway, we are considered as one of the richest regions in France.

That's interesting. Though the wealth of the region was not necessarily a factor in the success of the park?

No, no.

Interesting.

You see Monaco for example has a lot of money as well; it's not as big as the ones I've mentioned but Monaco is a good place for wealthy people. But if you go to Monaco it means that you want to avoid paying taxes. So if you want to avoid paying taxes you don't invest in Sophia Antipolis.

So there is a lot of money in the region, but we know that most of the rich people don't invest.

They don't invest.

They invest but not in here.

Right, that's interesting. One of my factors later on is the image, clearly you have the image, but people who have the money don't invest here.

No. Okay so here we have a rich property, rich region. So this is important, quality, what is K12?

That's the Kindergarten through 12th grade.

Ah.

That's in the United States its Kindergarten through 12th grade, high school. Non-college.

It's not too bad in France, it's quite good. Here it's quite good.

Okay, that makes a big difference in the United States because in some regions like where I live the schools are not very good. And people who are technology entrepreneurs don't want to locate where their children are not going to go to rich schools.

Okay, so this is important. We have here, if you are a US citizen for example you are living here and you want your kids to be educated in English you can have access to school in English.

That's important.

From Kindergarten to University level in English. We have an international schools as well, so this is a key element to attract international people. To have education, not only in English, so this is one of our strengths.

Good.

Is it okay for that?

Yes it's perfect. If you don't mind continuing with the other factors.

Here?

No that was an outstanding input. I identified a factor called Inflow. It's not typically identified in literature as such, but the, the Inflow of capital, the inflow of intelligent people, the inflow of entrepreneurs, and the inflow of corporations. In some regions has been extremely important, and I think of this like blowing up a balloon, if there's air coming into the balloon, it will expand. Regional economies tend to react similarly, and if there's a whole it's going to strain. So I've identified a series of factors that I consider inflow factors. Some of these are important to other regions, some are unimportant in many regions.

Okay inflow of equity capital is growing because of this new law I mentioned to you. And we are part of a business club and are now able to raise much more money than in the past. And so we are really now able to give significant amount of money to the company, it was not the case in the past. So as a business, as an early stage, early stage living. And the resources, states system which is quite full I may say it's growing. It's not a strength but it might be 10%, it's

growing. In rough talent yes this is clearly something we are able to attract people for quality of life in particular. So this is something which is important. Inflow of ideas and innovation. This is 10, 10 or 15.

You went to Silicon Valley and looked at the French entrepreneurs in Silicon Valley. I know that India for example, many of the entrepreneurs in India had learned in Silicon Valley and then gone back to India. Recirculation of ideas and whether that generates local ideas or the talent is brought in.

I think people here are moving very much in through Europe for sure, in the U.S., in Asia. So I may say yes significantly but I cannot give a percent on it.

That's quite all right.

But moving very much through Europe and we have a lot of people that have been living elsewhere, so I may say yes but what does it mean. Yes, significant.

Okay.

Inflow of government research and grants. It's growing, it was not very strong in the history of Antipolis, and it has not been part of the success of Sophia Antipolis.

Okay.

But it's growing through the cluster policy. Now we have more involvement with the cluster policy to give grants out. Less than 10% but this is not the key element. Inflow of revenue from outside region; revenue from what, from people or -

That would be the companies here. The ability for them to sell their product outside of the region, software, packaged software that they sell elsewhere.

I mean all of them make their sales out of the region.

Right.

So there is no market here.

Exactly so that's where that money coming back into the region helps create jobs.

Yes, so inflow of revenue is very important.

Okay.

The region is abroad or in France or in Europe so this is very important.

Okay.

So 30% or inflow of science and technology, I think it was a 4 for inflow of research and technology.

Well 4 is strictly government. Six can be private funding, any type of funding.

Well in France it's very much the state as well.

I'm sorry?

In France it's very much the states which are providing the financial resources for this as well.

Okay.

Science is not funded by the government. All the regions.

Okay.

All of it is not private money.

Not private.

Not private.

So the item seven, private funding for research and development, but that doesn't exist here really.

No.

Okay.

It is a zero I think.

Very good.

Inflow of scientific funding is like you're saying 4 and 6 are the same.

Okay.

Retention of capital within the region. Does the money stay here?

Does the money stay here, when you have a large company headquarters here that profits for say here and be invested here, or be put into the community. We support a lot of charitable causes from our company and we support them in the region that we're located.

I may say yes and no. Yes so of course there is a wealth created by, created a lot of wealth for the region for sure. Now we have the same tourism weight on the economy so it's coming from crutch in 40 years, now we have a very significant population of high skilled and highly educated people with high standard so the answer is yes. But one of the most successful entrepreneurs sold a company something like 5 or 6 years ago and as soon as he sold the company he went directly to Switzerland.

So he didn't stay here and reinvest in this region.

No, so the money went immediately to Switzerland. So we have this in France and might be in other countries, the entrepreneurs try to avoid taxes. So most, some of them, if you are big money you leave. So this is a problem. We have not so many of those people but the problem is as soon as we have a really, a big money people are going to avoid the tax system.

So it's important but people don't do it.

It's a pity.

That is a pity.

It is a pity for the country and for the region.

Right.

But globally yes, globally the tension is high.

To be very short, Universities are very good in science, life science, that's where the University is better, life science because there is no company in life science here. Company, private company, very much in the IT businesses.

The University research is the best in life science activity.

So that doesn't much.

I'm simplifying but that very much.

I find that elsewhere too. In New Orleans we have a plant that does composite manufacturing for NASA and we don't teach composite manufacturing anywhere in our state. So it's an interesting mix.

Yes.

I wondered about that here.

Our region by Universities is very weak.

Okay.

I'm looking carefully at this, at these aspects and we'll be able to raise a lot of money.

And even in the year 1998, 1999, 2000, we were able to raise something like 10%; we are nearly raising 10% raised in France. Now we are something like 2 or 3%.

So we were very good at the time, now we are not. But anyway, good project however, and now we are, I mentioned to you this inflow of stature money, so it's okay. It's not a strength but its okay.

Okay.

It's not a strength. Other inflow, no.

Okay. Another area not typically called out in this manner but you've discussed it quite a bit in talking about entrepreneurship is the attitudinal factors and just looking at the region, what is the attitude of the region as a whole. I find different regions have different characteristics very much like different people do.

Yes, yes. It is hard, risk is not too strong. Is not so strong in France at all, I'm not sure it's much better here. So this is not a strength.

Okay.

Need to collaborate for mutual success or technology advancements. This is quite high.

Yes based on my studies I would have thought it would be.

It's quite high. State agencies which are very active in trying to be mutual and civil servant are very positive in general. There's a job with a lot of engagements and I am thinking of some agencies here which are working to support. We have incubators as well; they try to work more and more in networking so, good project. If we have a good project people are trying to gather around in order to push the project.

I find that to be very important.

Yes I think that is important. But it's not necessarily a formal attitude; it's very much more informal.

Oh yes, this is usually much more informal.

Yes. That's true. Image of Creativity and value of creation. This is quite strong. We'd like to be seen through this factor. I think this is valued, we value new ideas, we value people who are trying to, we value creativity and we value as well creation so this is important. Value placed on human capital. Yes of course we value human capital, but not necessarily as much as a culture. We value very much more the collective capitals of the individual.

India is very similar to that as well. They value human capital as a whole but not as an individual. And I'm not sure that it's important -

We are in between; I may say we are in between perhaps on that, in between the U.S. and India.

Okay good.

We value capital but we try not to value too much individual -

Which may be the right way to do it?

I don't know. Responsiveness to innovative research, what do you mean by that?

Using the Silicon Valley model there's a lot of money there looking for good ideas. In many cases you will have, people will respond to the investors. Investor says I want to invest money in a new idea startup to compete with Google, and then people will respond and try.

That doesn't exist.

That doesn't exist here?

No, it's always in the sense of the entrepreneurs have to propose it. There are not enough investors in light of investor money to go in that situation. Yes, there is strong policy to market the region, to market the expertise, yes.

I noticed in studying Sophia Antipolis there's a lot of different entities that promote the region as a good place to do business for technology.

There's a lot of...

Yes.

Sure then yes. They are active worldwide to try and attract industries to let, yes. Attitude of grow your own, grow your own. That's a good question because of course we can find both.

In Sophia Antipolis's history there was both.

You notice image and that, as soon as an entrepreneur is beginning the company he's looking for money or investor money and so it might be very much under funding, and outside money. Is that what you mean? Because they don't try to grow by their selves, they try to get money from the -

No this would be the efforts of CERAM, the efforts of some state entities that promote Sophia Antipolis, do they put more effort on growing companies that are generated here or do they put -

Ah okay, okay.

Accenture and Microsoft et cetera.

Okay, okay. This is different. I may say that the local authorities in my understanding favor attracting new companies instead of helping the existing ones.

Okay.

Globally yes.

Is that how it should be?

Sorry?

Should it be that way or should they...

I don't think so. I've been fighting for that for 10 years. I think we should very much focus on the value of a company and try to grow them. But there is more money to attract, to market the region abroad and to do that.

I find that to be very prevalent particularly in the United States, people focus money on attracting companies because they can do that in a shorter period of time, by the next election, but areas that have done very well like Reese's Triangle in North Carolina have taken a 20 or 30 year view more towards attracting. Entities don't do that too much because that takes too long.

Yes of course.

Won't happen by the next election.

I don't want to be too critical because the success Sophia Antipolis came from the capacity to attract.

So I understand why we have to continue that, so it's not a critic by itself. But I understand how in that phase where we are better to boost that. We improve growth, look at growth but not so much in my understanding.

Okay, we are considered a technology based location, all business are coming here to look for investments so this is good. Building for business, education for, I think this is good. I think this is growing; it's not too bad, it's growing but it has to, I think we are not too bad in that. There is a specific culture. Entrepreneurial focus of the population.

This is something that is measured in the United States because it can be measured. You cannot measure how important it is, but people measure things that can be measured.

Again more of an international matrix on that. I mean we have a region, I mean it's a big region from here to Marseille.

Has a significant good mix in entrepreneurship. As compared to the French, it's one of the most entrepreneurial regions. What does it mean? It means that they are creating independent companies.

So if we look more carefully Sophia Antipolis is a small system by itself. That's not part of a full light of the region, it has to be considered as a small, as a cluster, as a local we have an

entrepreneurial focus. But if we look at the region itself I would say we are not so different from the other.

Okay.

Our region has good metrics in entrepreneurship.

Okay, very good. We have I think it's like 3 more to do, we'll get as far as we can get; I know you have to leave at 11:30.

Yes.

Which is fine.

Okay.

(4) Do you think technology-based economic development can be influenced by federal, state or municipal policies?

Leadership and policy, you mentioned that the tax structure here sometimes people leave and go to Switzerland where the taxes are more favorable. That tax structures and then the vision leadership of both the public and private sector I find those tend to go together. In policies or thing that people can affect so they do affect, but I don't know how important it really is.

Okay first of all I would like to say that in France the environment for small companies improved very much in the last 6 or 7 years, or 8 years okay? And every year we get improvement. So the system is much more favorable to support entrepreneurship in France than

it has been in the past. It's true in general through legal incentive or through tax incentive and now it's becoming to be more and more competitive in terms of tax and legal.

Yes.

Okay? So perhaps the environment, the culture has to change more, not too fast, but it's good.

Have you seen a marked increase in the number of technology jobs because of that change in policy?

Technology jobs, this is true for in general but it's very specific as well so it's a very good tax incentive as well for -

Has it made much of a difference yet?

Locally or in general?

Both, locally and in general.

I think it's the very beginning of the change.

Yes.

We are in the phase where we observe that it's favorable, but I cannot assure you that the results are there.

Yes.

But obviously the results are so business friendly tax structure I say yes now. we have a very good tax system, one of the best in Europe.

Good.

And during this it started improving, last year we had one billion Euros which I think is invested through the new tax law. The tax rebate for wealthy people and it's the first year of application of that law; one billion Euro went directly from the capital of wealthy people to start-ups.

Wow.

So it might be one billion point two or point three or point five this year. So and before money was not going directly through government, but now it's going through tax rebate so this is a very significant change.

Good.

*And the businessmen that are here, we are able to get a lot of money through that. State and local support for working force training. Yes I would say it's quite good, it's quite good. Simplified application process is improved very much, we were not good at that, and we are really improved. Now its okay, you can set up a company with very short delay. Business incubator, yes we have 4 incubators locally and we have clusters which don't appear here in your documents. Also called "pôles de compétitivité" which is a French name of clusters
Should I write that?*

Please write that for me. I will go look at it. Is that based on the model that -

Yes exactly, so we create something like 3 years ago, very strong initiative from the government to create clusters, specialized clusters. So now, in that region for example we have 6 clusters, you can find that on the web site.

And this creates a lot of common work between R and D, big company, SME -

So we try, not only to create a real dynamic of work together. So this is very strong in France in general and Janunour] in particular. We are very strong, this element is important.

Because the clusters, companies and projects are able to be funded by R & D, National R & D France.

It's not R&D to organize locally or to work together, but very much as well to raise money from the government for R&D projects. So this is becoming very, very strong. Political vision and leadership. Yes, the answer to 6 is yes, it's through the cluster.

They've been designed for that, it's the ways they are looking at the private sector and leadership. Here in Sophia Antipolis people are very much engaged locally so we have for example, a series of meetings on Sophia vision. What would be the future of Sophia Antipolis, so yes people in the private sector are engaged in trying to define the future of that location? They don't have a lot of resources for that but in terms of the personal involvement, the answer is yes.

Very good. I know we are just about out of time. Why don't we just take a look globally at these rather than trying to grade each one? You're very involved with entrepreneurship in the, what I consider the knowledge factor. The relationship of the Universities to the workforce and to private industry. I would assume that you believe that to be important here.

Yes.

Is there any one aspect of that you find to be most important? Is it collaboration or entrepreneurship training; is it focused more on students or is it focused more on the companies themselves.

You mean the Universities?

The effort of the University here. What's more important, to create good students or to collaborate with the businesses?

I understand it is clearly to focus on the students, very much. It's a try to change the government, try to change their mind, there is a change but if you look at where the focus is, the focus is on the students.

Okay.

Students' education very much more than -

I can find information on the knowledge factor, just by studying your website. I've actually already done some of this, can I get you to look at page 12, the social sciences. I'm more interested in that; I don't know if you are familiar with Richard Florida's work or Dr. AnnaLee Saxenian from Silicon Valley.

I know.

This comes more from their work.

Culture of Collaboration. I try not only to position my answer regarding your own understanding. Not so much, not so much. It doesn't work, but it's not natural.

At least it doesn't explain the success of Sophia Antipolis. If I may answer it differently; but the clusters, the political entities, I mentioned are here for that. The clusters have been created to force activities to work together. And if they don't, they don't get money.

So what is going on, the government tried to change the behavior of the actors by forcing them to work together. If they don't, they don't get money. So what is going on is government trying to change the behavior of the actors by forcing them to work together. This could be a very significant change in France.

Okay so clearly if the government is trying to force that collaboration and that change through the clusters then they think it's important to the continued growth.

Yes.

Okay but it wasn't in the last forty years.

No this was in the last five years. If you are not part of a cluster, of one of those clusters, one of those political entities, if your company is not part of one of those clusters, you will not be able to get R& D money.

Okay and to be eligible to get that money it means that you have to work on a project which is shared with big company Universities and SME's.

So by doing so we force them to join R&D program. So it's a force to collaborate. This has been true in the last five years already. So I may say culture of change, culture of change.

It's not what is correct of the French in general because they hate change or it's a mix between the fascination and hate. It should be better in Sophia Antipolis than in France. We know that when people are very well educated so there have also been the lifter as well, so in Sophia Antipolis is not too bad. It's better than in France I may say. Then including social networks. One of my colleagues worked a lot in social networks and I'll try to send you documents.

Because he worked a lot on that and he spent a lot of time as well and he did a lot of work on that.

That was clearly important in Silicon Valley, it is so in Huntsville Alabama and in some areas, it was not an issue in Cambridge, in Massachusetts, Route 128, it was interesting.

Here it's, I may say, it's not as strong as it is in Silicon Valley or elsewhere.

But it's significant, I may say. I don't know how to value that, it's significant but it's not as strong as it is in other places.

Collective learning, there are tendencies to try to improve collective learning. But we are not as good at the finish of that.

Since we only have about one minute I'd like to ask two quick questions. Look at page 13, the six factors that we just described, do you think any one of those is more important than any others or can you put those in order of the importance. The factor as a whole, not the individual elements. Do you think the environment is more important than inflow or attitude more important than policy? Or are they all relatively equal?

Well it depends if you think of the Sophia Antipolis of today because there is a difference so how to...

What was most important to the beginning of Sophia Antipolis?

The beginning I may say the airport.

The vision of an entrepreneur, who was able to envision, so an entrepreneurial vision as a part of the French government at the beginning because this guy was a very strong network, so he has been able to convince the government that it was a good project and it shifted from an entrepreneurial project to a national supported project. I may say this also, the idea to create something and to attract talented people from elsewhere; this was a key element of course with location. This was today, what is today, a key. I may say of course today the airport is still important just as the way of living is important. But what is key now a day is a pool of talented engineers. We have now a significant size so for a company to come to this site to set up a subsidiary here for example, well what could I create a subsidiary in Europe or in France, and necessarily new activity you would discover that Sophia Antipolis would be a good place. Because you would be able to hire talented people because they are already here and in France people are stable here. So you can find stable high educated people. And my understanding this is the key to that, the key elements of our attractiveness and our capacity to -

Good. Would you, last question? Would you consider Sophia Antipolis, this region to be a mature regional technology based economy which I would rank as a 5 or adolescent which I would say is a 3, or neophyte which it's not, but would be a 1?

I may say that we should be a mature cluster except if we are able to reinvent the concepts. The concepts itself, Sophia Antipolis, the way we work is a mature concept. It has been very good, so if we don't find a new concept to transform into our activities I think we are a mature phase.

Okay.

This is a big challenge to try to redefine.

I thank you for your time.

Dissertation Interview Questionnaire – Jacques Masboungi 03/09/2009

(1) I will give you a copy of the questions that I have posed. We do not have to go through all of these. In fact, we will concentrate on the factors that I've identified today; but I would like to ask some developmental questions first. Would you mind telling me a little bit about your background and, particularly, your experience with economic development here?

Originally, I'm an architect and urban planner; and I started working on mainly industrial estates and industrial areas. I was working since 1975 with the Caisse des Depots et Consignations, which is a public investment company in France; and the department I was running was in charge of creating industrial areas around the city of Marseille. The basic investments were brought by the local authorities and the management marketing and development of the areas were supported by Caisse des Depots et Consignations. So this was my main background for a term of fifteen years.

Then, I came to Sophia Antipolis in 1990, where I started working on what was supposed to be the Northern Extensions of Sophia Antipolis. As you probably know, Sophia has been created in the early '60s. In fact, physically, the organization was created in 1969; and the project started in 1970. So for nearly twenty years, the development was based on the initial concept – on the initial project.

In 1990, the French government and the local authorities decided to expand the project and to bring it from 2,400 hectares to 4,500 hectares. So it was supposed to be doubled on the northern part of Sophia.

So I started working in 1990 on the extension; and very quickly, we discovered that the idea was not really relevant because the scale of the project was not the right scale,

4,500 hectares was too much. Then, it was not necessary to concentrate all this potential in an area where there was no industrial and scientific convention. So it was much more interesting for the local economy to spread this new kind of development all around the area rather than continue concentrating it around Sophia Antipolis. This is the, let's say, conceptual aspect of the project.

The second aspect was more or less political. Sophia is a kind of island where for years and years we had prosperity. We had, more or less, the kind of specific development in an area where traditionally it was devoted to tourism. So it was politically much more interesting to make people appropriate the project further, continuing to create this kind of development on the island. This was the second aspect.

The third aspect was more financial because when Sophia started in 1970, the French government and the local authorities decided to invest in the project itself. It was before the decentralization policy in France. The decentralization policy came up in 1980. So it was not possible in 1990 to continue with the same subject without the support of the national government. So for these three reasons, we stopped the Northern Extension; and then I continued working on the management of the park itself.

These are a few ideas of what brought me to this position now.

(2) Sophia Antipolis is a good model for other areas in the world that are seeking to develop their technological base. I've heard people talk about Sophia Antipolis elsewhere in the world. Do you have a feel for why it was so successful here? Do you consider it a success, first?

According to the criteria and the objectives and the purposes of the project, yes; obviously, it is successful. Let me just mention three main indicators or elements that show it's a success.

One of them is that the French Riviera in the '60s and the '70s was an area – a remote area in the South of France where it was very pleasant to live, to stay, mainly for the rich and wealthy people and retired people. So it's a place where – Cote d'Azur has this prestige all over the world, a place where it's beautiful to live. So the problem with this kind of image is that, first of all, you cannot have a balanced, homogenous demography. Thirty-three percent of the population living in the area in 1957 were more than 65 years old, whereas the national ratio was 15%. So it was twice as much as the national ratio. This is the first indicator.

The second indicator is that we had just one kind of business. It was tourism. If you were a hotel owner or a restaurant owner or if you run a beach, you can imagine your future. Otherwise, there was no future in the area if you were not directly involved in tourism. This is the second indicator.

The third indicator was that it related to these two first events. The Cote d'Azur was crowded during four months a year; and then during the eight months, there was nobody. Everything was closed. No traffic jams. Nothing. The airport was used less than 50% of its capacity. During four months, everything was completely in a huge activity.

So with these three indicators, things have completely changed now. First of all, you have a kind of normal demography with young people, elderly retired. Now, we still have more than 28% of the population which is more than 65 years old; but compared to a

national ratio, it has raised to nearly 18%. So the gap is becoming closer, smaller. This is the first indicator.

The second one, the high-tech activity: The high-tech turnover is equivalent to the tourism, 5 billion EUR a year. So we have a kind of real diversification.

The third indicator is that, as you have probably seen, we're in the 5th of March, and there is normal activity in the area. We still have, of course, a rush period in July and August; but we can consider that we live now in a normal and balanced activity where you can go to university, you can go to school, you can put your children in the school or university, which was not the case in 1962.

According to these three objectives that local politicians have targeted forty years ago, it's obviously a success. It's a success.

Oh, yes. It's viewed as a success around the world.

(3) Do you know what factors made this so successful here?

Well, with forty years now of background, we can consider that, from my point of view, there are a lot of concordant – or elements.

One of them is that it was the right product in the right time. I'm sure if we had to do it again now, I'm sure it would not succeed. It was really up to the emergence of the Silicon Valley, the first experiences in the science park, or science cities, around the universities in U.K., where it became really successful, Cambridge and Manchester. These projects were really a reference. Sophia Antipolis was the first concept brought by the government and the local authorities in a world where the needs in this field of activity were not really satisfied. So the concept was completely homogenous, and it was at the time where “small is beautiful.” You could not imagine a new town, which was the case around Paris, around

some cities, Louvain-la-Neuve in Belgium, etc. There were a lot of new towns, new cities.

The concept of Sophia was more a development concept, rather an urban concept, an urban project. So it was the right product and the right time.

The second success factor is that such an activity cannot live without its market. We have no market here. Our market is a worldwide market. So the link with the rest of the world cannot be something else than the airport for us. So we are very close to the airport. It's the case, of course, in Paris. It's the case in London. It's the case in Frankfurt. But in our case, we are very close; and it's a friendly airport.

Yes, so it's very easy to –

You can go to the airport like you go to the – When Digital Equipment came to the South of France, or IBM, when they came to La Gaude in 1972 – 1962, sorry; Digital in 1972 – the reason was that you were able to take the plane from Nice, go to a meeting in Geneva and come back in the afternoon, like you go to – It was closer than if you in the east of London and you have a meeting in the west of London or Paris or, of course, big cities like New York. So it was easier for people to take the plane, and they had agreements with Air France and with Swissair at that time. They have managed – They have organized their schedules in order to be as useful for these two companies. The flight from Nice to Geneva, it was – There were two or three flights from Nice to Geneva. IBM and Digital used to book ten or fifteen or thirty seats every day. I mean, it was very easy for people setting up their business on the French Riviera and the Cote d'Azur. You could the plane like a commute from one place to another. So it's the second reason.

The third reason is more, I'd say, political. The project was really subsidized and supported and financed by the local government. The facilities you were able to get at that

time were not very common. You could buy a piece of land on the French Riviera for less than 600,000 francs, which was nothing compared to the price of the land on the French Riviera. So this is what has attracted L'Oréal, what has attracted Digital Equipment, IBM, TI, all these major companies, American or French companies, even public research centers like CNRS (Centre national de la Recherche Scientifique/National Scientific Research Center or the other international companies. So the project was supported by the French government, and it was easy for people to come and set up their business. So the concept was really very clear, very simple; and you had the facilities to come to. So this was the key of success.

Of course, there are a lot of things that have helped the project. In such projects, when I compare our experience to other experiences all over the world, in remote projects, you cannot compare Sophia to Cambridge or to the rest of the country; but we can compare ourselves to Louvain-la-Neuve in Belgium or Tsukuba in Japan or now a lot of projects, like, Dubai or Bangalore, India or Limerick, Ireland.

But in the case of Sophia Antipolis, we were able to create the activity from scratch with very quick critical mass. The problem in such projects and science park projects, you call for the project – you imagine the project, and you have to wait for three or five or seven years to start to see the mechanism start working. In the case of Sophia Antipolis, they've imagined the project for more than five or six years. When Pierre Lafitte started thinking about the project, it was in 1962. They have created the management office, which was called Savalor in 1969. The project started in '70. In '72, two years, we have three national resort centers and laboratories operational on the site. So if you prepare it for a long time and then you start working with the project immediately, it's much more easy to market it.

So this was, from my point of view, the two or three success factors. Of course, again, if we had to do it again, I'm sure now, it would not succeed because the competition is much more significant. Then, what was a smart place for working forty years ago, is now a commonplace. We cannot sell only the sun today. We have to sell the environment, the market, the workforce, etc.

Sophia Antipolis reminds me of Research Triangle in North Carolina.

Yes. Yes.

Good vision, quickly implemented, good leadership. You're right. It's a different market today. Now, places cannot be the same – the next Silicon Valley or the next the Sophia Antipolis. You have to look – have a twenty-year vision on what will be developed in the future and capture it.

I built the largest information technology company in the New Orleans region, which is about a thousand people; and we sold that company a few years ago. We were a couple hundred million dollars in revenue. But New Orleans is a very hard place to build an information technology company because the image is tourism, and the image is oil and gas. The image is not information technology. It's very difficult to build a technology company in that area. In fact, it would have been easier for us to do it pretty much anywhere else but New Orleans, which is unfortunate.

Which was the case here, of course. The French Riviera was not a place where you could imagine a science park, but it was a success because, as I told you, because the concept was clear. Then, we had the right facilities.

I mean, people from IBM that came in 1962, they came with their computers, they needed nothing. If you work in the field of mechanical or automotive or other industries, you

need the raw material; and you need the market. In high tech, the raw material is in your mind; and the market is on your cellular phone or telephone. So it was very easy to set up a business from scratch in a place where you had no raw materials. The raw materials stands in attracting smart workers and in constituting a smart workforce. It was very easy to attract the gray matter, which was the raw material, because we offer exceptional living conditions.

– I always give a very famous reference .:

When Siemens decided to create Infineon, their subsidiary, they decided to locate their R&D center in Sophia Antipolis and their marketing center in Munich. They were looking for 200 engineers. Seventy or eighty were supposed to be in Sophia Antipolis and more than one hundred in Munich. Of course, a lot of people were working all over the world to attract the best engineers. They've got ten times more offers for Sophia Antipolis than for Munich. We had 700 and they had 2 or 300 candidates, because people were attracted by the name of Sophia Antipolis, the area and then, of course, the environment, the image. So, when I came to Sophia Antipolis, in 1990, I had before – the only reference I had it was they were celebrating the 20th Anniversary of Sophia Antipolis, '87 or '88; and I was watching on TV a young engineer was from U.K., I think, and he was telling people on the TV that it's a very famous place where you can work when you want to work and go and surf or ski during the day. So the idea was how to manage your own time between your business and your – the quality of life.

Right. The quality of life.

This was very important at the time. This is the idea I had when I came, and this is what has attracted these people for Siemens because they had the possibilities to work on the French Riviera or in Munich probably with the same wages. It was more interesting for them.

(4) Let me ask you to look at some factors for me. Would you look at page 7 in your little packet there? I have identified six factors that are important to regional technology-based growth. Environment, which you've just talked about, is one. On the next page, on page 8, inflow, in other words, inflow of ideas and money, etc.; and then attitude; entrepreneurship; leadership and policy; which would be the lower tax environment; knowledge, social, and your education level in Sophia Antipolis. I'm not going to ask you to grade all of these, but I would like to get your reaction as to whether you think these things are important or not. In the areas that I have seen across the world that have developed a regional technology economy, I found these factors to be common: Silicon Valley or Research Triangle Park or Massachusetts or here or Bangalore. What's your reaction? Do you think these things are important?

We can discuss about these distinctive factor, but I think if I bring to you the answers according to the past situation, I'm sure the answer will not be relevant according to the present situation.

Okay.

For example, the environmental factor, of course, quality of life is a plus, plus, plus factor; but, again, compared to the situation in 1970, when you present the French Riviera with the quality of life, it was maybe the in the South of France – in France or in Europe – one of the most prestigious places where you could have the climate, the services, the leisure,

the culture. If you consider that now, Montelier offers the same thing. Barcelona offered the same thing. Even Marseille offered the same thing. Now Geneva is offering the same thing. So it's, of course, a plus, plus, plus factor; but we are no more alone in this competition.

Right. It's necessary but it isn't sufficient enough.

It's not sufficient for – Even the support for technology initiatives, as I mentioned, we were guaranty supported by the French government in 1960. We are no more supported by the French government like at that time. So all these factors are true, but they are no more in 2009. They are no more completely relevant. So, for the environmental factor, as you said, it's necessary now. If you cannot get all these factors, you cannot play with the big players. You cannot be with the big players. What does K-12 education system mean?

That's in the United States, that's kindergarten through twelfth grade, through high school, before you go to the university. From five years old through eighteen.

Again, these buildings right behind us are the buildings of the International Valbonne School, which was one of the two public schools, depending directly of the national government, bringing the children from kindergarten to the baccalaureat, in French-English, French-Italian, French-Spanish, and French-German. We had two public schools. One of them was in Sophia Antipolis, and the second was in St. Germain-en-Laye, Paris. Now, we have maybe a dozen of these institutions, private or public, by the way, and all over France, so, which was an asset to us. I mean, you were coming from New Orleans and you want your children to spend just two or three years in France and go back to home and continue their studies in English, you were able to do it in Sophia Antipolis, not in Marseille, not in Grenoble because we had the international standards education in English, in German, Italian, and Spanish. So this was – But now, of course, if you want to be competitive in

Grenoble, you cannot avoid such an environment, which is the case now in Marseille with the new ITER project. So you need such infrastructure now. So the environmental factor, from my point of view, is a basic factor that you need to have.

- (5) When you started many years ago, there wasn't a lot of technology or research and development of talent here, which you all created over time. You brought that in. To me, those are inflow – whether it's money or talent or ideas, just like blowing air into a balloon to make it expand. I call that "inflow."**

Well, again, the inflow was necessary in the beginning for talents, for people, for business, for activities. Now, we need inflow more for the businesses rather than for people. We have reached that critical mass necessary for a science park because our university, 27,000 students now; and the university was created just three or four years before the creation of Sophia Antipolis. So let's say that there was no university when Sophia Antipolis was created, so we have this critical mass in terms of environmental; but the problem is that we need a permanent turnover. In Sophia Antipolis, companies move; but people never move or they stay. When we attract people, they don't leave the area with the companies. They stay. When the companies leave the area, the engineers, the researchers, stay, generally, in the area. But what we need is that when that company leaves the area, we need another one to come. So we still need the permanent inflow of business.

- (6) I understand. Why do companies leave? Do you have a feel for why some of the companies leave?**

Well, it's a history of companies. We have no headquarters here. We have mainly research centers and laboratories. So according to the worldwide strategy of NXP or Siemens or IBM or TI, companies can grow up and then leave.

In forty years, TI on the French Riviera had several different phases of development. They started from scratch, of course. They reached 600 engineers. Then, in 1992, they were, more or less, ready to leave the area. There were less than 270, and they grew up again to 900. They now are down – They have downsized the site, and there are no more than 400 again. Everybody's worrying what will happen in the next few years. But it's TI's strategy. TI's strategy has nothing to do with Sophia Antipolis, and they look on the balance between the site they have in Italy, the one they have – I don't know where – in Ireland. So they have their own strategy, and we just live with that. But what the country needs is that when they fire 200 or 300 engineers, we need these 200 engineers to find another job in other businesses. So we need more inflow of businesses rather than inflow of people.

Of course, the situation was easier in 1990 or 1995 when you consider that now we are in competition with Bangalore with 20 or 30 science parks in China and Taiwan and Korea. Competition has become more and more. When TI decided to reduce their capacity in 1992, the decision was taken in – headquarters were in Dallas, I think –Dallas?

Yes, in Dallas.

The headquarters in Dallas; and they had just three sites to manage. Now they have a dozen of sites to manage. One of them is Bangalore. The other is in Taiwan. The competition between sites is becoming harder and harder.

Yes, it is.

So we still need to attract investments and new-coming businesses. Things are changing now because our development, as well as other science parks or projects developing, will never be like it was in the '70s or in the '80s. We think that we'll never attract companies with 200, 300, 400 engineers. Our business is made with small companies

of 8 to 10 or 15, and they grow up and become more. When Siemens came, they came with 70 engineers. Now they are 200. But you have other examples of businesses that came to set up their research centers with just 2 or 3 people; and they grow up to 40 or 50.

You have many smaller companies?

Many small companies that need this environment, very specifically targeting their activity on Sophia's assets; and they grow up in Sophia, not in Bangalore, not in Taiwan, because they need this kind of environment.

I have that under "Attitude," growing your own companies as opposed to trying to bring another company in. As you've mentioned, if you are just seeking large companies to put a regional office here, they may do that as long as it is the right cost mix for them; but they can also pick it up and leave anytime they want to. Companies that grow up here tend to stay and spend their money here. They continue to employ people here, which we've also found in the United States.

The problem with SMEs is that they can – when they are managed or created by young entrepreneurs, or young people, the problem is that when they grow up and they reach a critical mass, generally when they are bought by other companies, they leave much more easily than big companies.

Right.

We have two or three examples. One of them – Different cases. One of them is French International –. French - . It was created in Sophia Antipolis, a very small company, called VOLIA. France Telecom bought it and took it to Paris. So we lost it. But we have another example, accompany called ISTAR has been bought by Autodesk. But Autodesk brought here an R&D unit. So you can have two different examples.

My first company that I built and sold, I sold it in 2004; and I had a thousand people employed in the area around New Orleans: Southeast Louisiana, Southwest Mississippi along the Gulf Coast. The company that bought us now probably only has twenty people there. They just picked up all the jobs and moved them to Virginia because there's more talent there, better image. So it was not good for Louisiana. It was good for me and my employees because we sold all of our stock, but it wasn't good for the city.

(7) How important do you think the knowledge factor, the association with the universities – You mentioned 27,000 students – how important has that been, and how important do you think it's going to be in the future?

Well, again, in the beginning, it was not important at all because the companies came with their own staff, so they didn't need any kind of inflow from the university; but now when you want to market a science park, you market not the science park itself but the knowledge that goes with the science park. So the implication – the involvement of the university in the life and in the businesses of the science park is now becoming really important. If we want to explain to Autodesk that came from Sophia Antipolis, we have to explain to them that Sophia is the place to be. We had to show them what was the kind – the level of relationship between the companies and the laboratories and the research centers.

Right.

So this now is really much more important than the quality of life, because, as I said, the quality of life is standard. It's not a must. It's a standard, but the must is that when you work in a company – when you work in – when you run a business, you have the background of the university with you. So this is becoming more and more involved.

What happened two or three years has a lot of CEOs or people involved in the businesses that have direct positions in the university. For example, the board of the Polytech Sophia, which is the local engineering school of Sophia, the head of the Polytech is the CEO of GALDERMA, a laboratory in dermatology. So people get more and more involved in the university.

Now we know all the dimensions of sustainable development, the university – It was two or three weeks ago – the university is preparing a kind of think-tank with the laboratories and research centers in Sophia Antipolis in order to create a sustainable development institute in the – not in Sophia Antipolis but in the National Interest project that the French government has approved – I don't know if Michele Bernasconi talked about that, did he talk about this?

No, he did not.

There is, since May of last year, the French government decided to create what we call a “National Interest Operation” in all the area between the airport of Nice and the mountains. It's a 10,000-hectare area. It's called Eco-Valley.” And this Eco-Valley is supposed to be the model of the new concept of urban development for the next twenty or thirty or so. This Eco-Valley is located in Nice, and the university has interviewed a dozen of managers of research centers in Sophia Antipolis involved in sustainable development and environment and energy in order to create this new institute of sustainable development.

That's a good place to be.

So it means that it's really becoming a necessity to create permanent links between the university and the companies.

That's good.

(8) What other key factors, not looking at the past but looking at the future, the next twenty to thirty years, what key factors do you think will keep Sophia Antipolis alive or see it fail?

We had for three months a task force called “Sophia Vision.” It’s a group made with a lot of managers and research centers and the institutional partners. In fact, answering to your question, I think we will be able to lead the trends for the future if we can be an experimental area. If we can apply here in the area things we are working on.

For example, Sophia Antipolis is known to be a place where a lot of software and a lot of products used in the telecommunication devices have been created. The thing is that it has been created here and developed elsewhere. So what we need now, we are not the hub in terms of software; but we are, more or less, the hub in terms of standards of uses – of services. We can – The challenge for us is we would like to be the place where we experiment new uses of telecommunication or acquirement of energy but mainly in the field of ICT.

This will be the real factor of success of the next years because being the place where you design the standard, which was the case and lasted ten years. For example, here in Sophia Antipolis the European Telecommunication Standardization Institute, this institute has attracted for nearly twenty years companies coming from all over the world working in the field of telecommunication. Ericsson, Nokia, Hitachi. They came and located something in Sophia Antipolis because the standards were designed here. So we will not be anymore the hub because of this standard. We can be a hub where we design for you new uses. This is what is supposed to be the heart of what we call the “STIC” campus. The STIC campus is the ICT campus, if you wanted. It’s a campus that should be located in the eastern part of

the park. The work started two months ago, and it's supposed to be operational in – at the end of 2011. This ICT campus is a place where you can find, of course, the engineering school but sociology – sociology school, psychology school, all the specialties involved in the telecommunication; but we will also have a laboratory of the uses, what we call “laboratoire des usages.” What will be the uses of the telecommunication and you have to invent the future through the – not the devices but the use you will get from the device.

So if all the area of Sophia becomes the experimental area for such uses, this will be a real asset.

On a product development life-cycle curve like that, Sophia Antipolis is concentrated on the front end and become known as the laboratory, as you said. Now you want to move up that curve to where it's more the uses and you're creating more jobs. Bangalore, India has done a very good job of positioning themselves where most of the jobs go. They don't create any technology. They don't even create a business model. They just have – They started with a low cost of labor but good communication skills and good education, and then they moved into – they went from call centers to IT development to technicians. Now they even have doctors reading x-rays. So they were able to move into areas that had many more jobs, but it's not about technology development. It's not a laboratory. It's just a lot of intelligent, well-educated people who do the jobs cheaper than we can do them in the United States.

It's a concentration of skilled and intelligent people, but it doesn't mean that when you concentrate skilled people the added value is at the scale of the – 200 or 300,000 engineers they have in the area. I mean, you can have much more added value with 5,000 or 10,000 engineers working in a field – a very specific field rather than accumulate people and just making them work on producing devices or working on software or bringing services.

So the asset of Bangalore is they accumulate, they accumulate, they accumulate; but we cannot compete with this field. We have to be very, very smart in the position.

So this was the case when we – in the curve you were mentioning, it was the case in the beginning; but we cannot stay on the same level for forty years. We have to move forward and change our strategy. Our strategy now for the next ten or fifteen years would be in the field of ICT because we are positioned in the field of ICT. We will not be performing in the health sciences or in the biotechnology. We have no hospital. We have no universities in Sophia Antipolis – I mean, we have no laboratories. We are skilled in ICT. What in ICT will drive us forward for the next twenty or thirty years? It's in the uses, which we call the services related to ICT.

That's very good. You have answered most of my questions.

But when you consider, for example, the attitude factor for the human factors, which is shown on page 9, we are now in the beginning of – and it's the field of expertise of Michele – is the right man have to interview for that field.

Sophia has been created in 1970; but the science part, what we call the “ cross-fertilization,” which was the idea of Sophia Antipolis, the real cross-fertilization started in 1999 and 2000. In fact, because we had to know that critical mass in order to add the gray matter with the industrial factor in order to create added value. We started doing it less than ten years ago. I mean, incubating a new technology or creating businesses from scratch was not our field of activity in 1970. In 1970, we were able to attract IBM to make them – to develop their business; and we were just watching them work and grew up, the same with Dow Chemical when they decided to set up their business. I mean, in 1970, our job was: attract companies, locate them in the park and help them more – just support – bring them

services and creating this environment in order to make them grow faster. But things have changed in 1998/1999 because we had younger children. We had children. We had the local workforce. We had a new work market. We had to create the interaction between university, laboratories, research centers, and companies.

One of our first experiences in terms of cross-fertilization, was when I – we have – we sold the land to Toyota in 1999. Toyota decided to come and create their European Design Center in Sophia Antipolis. They were looking for a European site. They were in Brussels. From Japan, Europe was in Brussels. They created their first design center in Brussels. Very quickly, they discovered that Brussels was not the cultural heart of Europe. It was political. It was financial but not cultural. They, after six months of research, they considered that the cultural heart of Europe was in the south. They have compared a location in Barcelona, a location on the French Riviera, and a location of Milano. They benchmarked the three site; and they considered that, not Sophia Antipolis, but Cote d'Azur was the right place because it was more European than French. It was not the case in Barcelona or in Milano because when you're in Barcelona you're in Catalonia and you are not in Europe. But in French Riviera, you are more in Europe than France. They decided to create their activity. They came here to buy land. Our answer was: What will you bring to Sophia Antipolis? You will design cars. What does automobiles bring to Sophia Antipolis? Their answer was very clear: We do not need anything from you. We just want land. We want to be located in Sophia Antipolis. So it was – We don't need you and you don't need us. We just want the land. Of course, it was not very attractive for us to set up; but Toyota was the one of the most prestigious Japanese companies. Finally, we found the land, which was very attractive for them. It had a sea view. They decided to be: We want to be alone

because of the secrets. They have their own building with no view on the outside. But we started thinking the ideas of working with the – We have a national engineering school called “Nationale Supérieure des Mines” working on new materials. They were interested by new materials.

The “Agence Française pour la maîtrise de , l’ energie, the French agency for energy control, were working on new batteries. They were interested in the capacity of new batteries, etc. They learned working with companies and research centers. So they discovered, and we discovered with them, what was the work of engineering in terms of making people work together. So when they came to Sophia, they didn’t want any relationship with the companies of Sophia, and now their local manager is one of the most active people in the club of Managers.

So, you see, we have discovered very recently what was the re-interaction – When I talk of – I mean by interaction, the business and scientific and that interaction, not human and social interaction.

Right.

So this aspect of the cross-fertilization is quite new to Sophia Antipolis.

(9) Dr. Bernasoni said the same thing when we were talking about social factors, which is page 12. He said that the – as you did – that this is fairly new. That the social networks did not really exist in Sophia Antipolis – and the – that you forced those, more or less, to develop; and then now it’s had a positive impact. But would you push just social relationship between companies – not necessarily people but between corporations and the university, corporation and each other around the cluster model? Would that – Is that what you’re saying?

Yes, that meets management. It's not something's continuous. When they have created Sophia Antipolis in the era of the pioneers, they didn't need management of this clustering. Clustering was more natural because they were pioneers. They were located in an area where just to eat a sandwich you can meet your neighbor because the only place where you can have a sandwich that – I don't know if you just want to have leisure activities. There were very small cultural activities in the area. So due to the scale of the initial project, the relation – human relationship, the creation of the social factor was natural.

Now you need engineering to engineer it. You have to manage it. So this is what we've started a few years ago. It's very difficult in an area like Sophia Antipolis. When I visited the Silicon Valley – I mean, in the Silicon Valley, you live in an urban area. You have neighbors. You have – You meet people. Your neighbors can work in the same company as you. You can meet them on the golf course, or you meet them because your children go to the same school, because you live and you work in the same place. So the clustering effect is – the social clustering effect is natural.

In the kind of Sophia Antipolis, it's very difficult because we have no housing, just very small unit – a small area of housing; but we are, as I say – people of Sophia Antipolis are called “Sophipolitains.” We are part-time Sophipolitains because I'm Sophipolitain just five days a week and for ten hours a day; but for the rest of my life, I'm not Sophipolitain. I work – I live in an area out of Sophia Antipolis. So it's very difficult to create a community if the social factor is much more complicated than in a place like Cambridge or in the Silicon Valley. When you live in Mountain View, you are in Mountain View; and you work with – your business-mates are your neighbors. So in the case of Sophia Antipolis, you have to engineer all this.

That's interesting. I hadn't thought about it that way. So it's more of a virtual cluster because the people don't live near one another.

No.

(10) Do you think the social networking will be important to the future of Sophia Antipolis?

Of course. Of course. Of course. It's very –

It's a difficult challenge.

Due to the size of Sophia Antipolis. In the beginning, it was very easy. There were just a couple of thousand people or three thousand people working in Sophia Antipolis. I mean, everybody used to know everybody. We are now 30,000 people working in Sophia Antipolis, plus 5,000 students, plus nearly 4,000 or 4,500 researchers. So it makes the equivalent of a city of 50,000 people. But the problem is, as I mentioned, we are part-time people.

Right. That's hard. This is going to be quite a challenge in the future.

We just share – Generally, we share housing problems. We share traffic problems. We share, more or less, services rather than quality of life. But there are a lot of positive factors. For example, we just one or two hours of social life in a day at this time. We have meetings or when you have leisure activities. You play golf. You play tennis. People share this small – this very short time of socialization today very intensively because between 12:00 and 2:00 you have a lot of people playing tennis, playing golf, meeting in restaurants. So there is a very tough social life during this short, part-time social life.

That's going to be a unique challenge for Sophia Antipolis in the future because it's a very mobile workforce. As you said, they're not native of Sophia Antipolis. Everyone lives all over. So they could easily leave.

And the plus of this – the positive aspect of this problem is that we are a multicultural society, and we live our multiculturalism through the business life and the educational life. For example, we have some events like the Games of Sophia Antipolis – the Olympic Games of Sophia Antipolis that is held every year in June. The last time was the 12th Edition, and they have attracted more than 6,000 persons that have attended these games. So the Sophipolitains meet together – meet through their leisure activity and the cultural activities rather more often than in business meetings.

So you create these activities to keep people interacting with one another?

It's managed by the companies themselves. We do not promote –

So the companies create them.

Yes.

And do you facilitate it?

Yes. We have subsidized – We're still subsidize. We pay 40,000 EUR a year for the event; but, I mean, it's managed by the companies. The budget is 200,000 EUR every year. We subsidize for 40,000 EUR.

That's good that they do that, though. That shows the interest in the area. I learned a new term today: "Sophipolitain?"

Sophipolitains.

Sophipolitain, like cosmopolitan but Sophipolitain, a new term. That answers all of the questions that I had, the reason I came. I will leave this with you, along with my business

card. This is the company that I now own. It's a new company: Geocent, about 120 employees; but we started this company six months ago and bought a local company in the United States. So this is my business card. If I can be of service

Dissertation Interview Questionnaire - David O'Flynn 03/10./2009

(1) Please describe briefly your current position and role within your organization and community.

This is an interview I recorded or am recording as the result of the notes I took from an interview with David O'Flynn in Dublin, Ireland. The location in which we conducted the interview was not conducive to recording; therefore I took detailed notes and I now commit those to paper.

I asked David to describe briefly his current position and role within the organization and the community. David started to give a history of Ireland, which very much had to do with their most recent interest in technology-based economic growth, and both the successes and failures can be tied to Irish development, both under the British Empire and as independent.

In 1922, Ireland gained its independence from Britain, which was immediately followed by a period of economic stagnation through until about 1960, when Ireland embarked upon the first of a series of economic development plans. In 1960s were when Ireland embarked on reforms in education and economic initiatives including the attraction of foreign, mainly American, companies to invest in Ireland. The first wave of companies tended to be in relatively low-end manufacturing, such electric “harnesses” for the automotive industry, tyre manufacturing etc. In the early 1970s, Ireland joined the European Economic Community (“EEC”), leading directly to an increase in agricultural production and exports and also to the “upskilling” of the emerging industrial sector. Joining the EEC, which subsequently became the European Union, together with Ireland’s low corporation tax regime, English language and

young, relatively well educated workforce were critical success factors in attracting Foreign Direct Investment. . This was the beginning of Ireland's efforts to actually attract companies that could do high-end manufacturing or technology-related work.

The first wave of companies was primarily manufacturers; companies like Dunlop, Ford, etc. In the 1970s and 1980s there was much more emphasis on college-level training in the collaboration with universities, in an active attempt to move the country up the knowledge chain.

Until that time, Ireland was primarily an agricultural community. It is still one of the largest exporter of beef & dairy products to Great Britain. At the current time, Ireland primarily exports computer software , food, pharmaceuticals and medical devices. .

In the 1990s, Intel, Microsoft and a few other large IT companies chose Ireland, and specifically Limerick, as the location for their gateway to Europe. The same was true with the large drug manufacturers, who clustered in the Cork harbor region, and medical device companies who clustered in Galway. They created a booming tech park in Ireland throughout the country, a booming regional based economy. It was particularly true in Dublin and Limerick, where the service companies in IT and Intel tech work was done. However, these companies tended to carry on manufacturing operations in Ireland, whereas most of their R&D was carried on in their home countries. Since Ireland's strategic objective was to also attract R&D companies, the government responded by introducing tax incentives to encourage R&D activities. A growing number of companies, for example Wyeth, Boston Scientific and Abbott now also carry on R&D activities in Ireland.

A seminal moment was the closure of the Digital manufacturing site in Galway in the early 1990's, which was seen as a body blow at the time. However it unleashed a range of management talent and entrepreneurial skills in Galway, which was quickly absorbed by other companies, indicating that the country was reaching a sustainable level of development in technology related employment.

Ireland became an economy clustered around technology; they did do technology research and development and technology development work. And they were able to attract tens of thousands of jobs in the technology fields to some of these areas.

According to David, one of the primary reasons Ireland was able to attract so much interest from technology corporations and create a regional technology-based economy was the simple fact that they provided resources at a cheap price. They provided more value for the dollar than other competitive regions.

Between 2002 and the current date, Ireland became part of the Euro Zone, the common currency area under the , the European Central Bank. Interest rates were now set by the ECB, essentially to suit the French and German economies, which while not in recession, were struggling with markedly sluggish growth. Historically low interest rates gave rise to historically cheap and easy credit. . At the same time, demand-side pressures arose in the housing market fuelled by years of under-development and a sudden reversal of Ireland's traditionally outward migration. For the first time in its history, Ireland experienced net inward migration, particularly from the new EU accession states such that at one point, Polish migrant workers represented about 10% of the population. Lending increased by massive amounts, which caused a classic price bubble in real estate. Oftentimes someone who may have been earning 30,000 Euros a year

would purchase a home for ten times that amount, 300,000 to 400,000 Euros for a home. What that did was it drove up the price of housing, making workers less competitive. It also created a credit-based economy, wherein Irish banks, who incidentally were not significantly exposed to the US sub-prime market, borrowed in the international money markets to lend to the Irish property market. In most cases, the banks were on both sides of the same transaction; they lent to property developers and then to homebuyers to buy the property from the developer. The inherent moral hazard was that if they declined to lend to the home-owner, the developer loan would go bad. This potent concoction of cheap & easy credit, a dozy regulator and connected-party transactions was a recipe for disaster. No less august bodies than the ECB and the OECD warned the Irish government about this dangerous brew, but intoxicated by their economic wizardry, the government rocked on.

Ireland's property market began to slow-down in late 2006, insofar as the rate of price increases ameliorated. With the credit crunch and the unwinding of the credit markets in 2008 and 2009, Ireland's banks found themselves unable to refinance their money market borrowings. At the same time, the international crisis meant that the markets for Ireland's exports was declining. Ireland is seeing drastic cutbacks in some of its technology workforce; thousands of layoffs. In fact, Dell relocated its Limerick plant to Poland, laying off some 5,000 direct employees. It is estimated that another 3,000- 4,000 jobs will be lost in support services. As workers began losing jobs, and with it their ability to finance large mortgages, the property market went into free-fall, and the bad debt provisions of the banks soared. One Irish bank has now been nationalized, but not before its Chairman was exposed as having hidden €87m in personal loans from the auditors with the collusion of another financial institution, thus cementing Ireland's growing reputation as the wild west of finance. The remaining banks have

seen circa 95% of their market capitalization destroyed. Even Warren Buffet got caught in the crossfire, losing \$200m on his Irish bank investments.

Meanwhile, Government spending had increased markedly during the boom-times, driven by the apparently inexhaustible property-tax revenue streams. Government spent like the proverbial drunken sailor. Public sector pay was “benchmarked” to the private sector, notwithstanding that the public sector enjoys a level of job security unheard of in private industry. Millions were squandered in poorly managed projects such as health-sector IT, and electronic voting - neither of which have or will be delivered. Government ministers spoke of a “soft landing” even though a soft landing had never occurred in any asset price bubble....anywhere.

The Irish government now faces a budget deficit of 9% - 11% of GDP, compared with the 3% imposed by the Stability and Growth Pact of the Euro Zone. The spread between Irish and German 10 year debt is now 250 basis points.

This provides a very interesting lesson. Ireland was able to create a value added chain primarily in two aspects of technology-based economic development; one being the creative up-front work, research and development, science and technology. The second, relative to Ireland's population and size, in creating mass employment primarily from companies like Dell where they pieced together parts of hardware or produced software.

In doing so, Ireland was able to capture two very important aspects of technology-based economic development; the wealth creation side which comes along with the value added of the technology work, and the mass job creation side which comes along with technology-oriented

workers that produce hardware, software, whatever other types of items that are going to be exported, and in doing so trying to add the best possible value to the companies.

However, since Ireland is a small open economy and is so heavily dependent on Foreign Direct Investment, it was extremely vulnerable to the down-turn in the global economy. It needed a level of economic management which its government was simply unable to provide. . Ireland binged on cheap credit, lost control of its cost-competitiveness and once the credit crisis hit, it was like blowing down a house of cards. One technological pillar after another crumbled.

Much can be learned from both the success of Ireland, primarily Dublin and Limerick, known as the Celtic Tiger, and the difficulties that Ireland has encountered in the new economic downturn. First, any region that seeks jobs en masse will only hold those jobs as long as they continue to provide the best value for the corporate entities that placed the jobs in the region. That is a highly vulnerable position to be in. Ireland had allowed itself to become a high-cost economy did not have time to adjust before the economic downturn, and therefore was caught when one economic pillar of the economy crumbled.

Ireland did, however, embrace the collaboration with its universities, particularly the University of Limerick, Trinity College Dublin and University College Dublin, and begin to create a true knowledge economy as opposed to simply mass employment. Ireland was able to improve its school system, increase higher education and increase collaboration with those higher education institutions. These are enduring benefits which should help the country recover.

It appears that Ireland was well on its way to creating a diversified regional technology-based economy, but was caught with its trousers down when the credit crunch in the United States pricked the property bubble in Limerick, and drove down credit causing mass layoffs.

Another important lesson to be learned from the experience of Limerick and Dublin is the continued validity and importance of the cluster model developed by Dr. Michael Connor at Harvard. This model is fairly ubiquitous, and used by many regional technology-based economies. It was also utilized by Ireland in assigning lead for different technological areas, such as medical device manufacturing or manufacturing computer hardware or writing software to different regions within the countries, and then a commitment by the state to fund infrastructure development and education development to go with it. Clearly the cluster model was well emplaced and was working well, until the economic downturn cut the legs out from under Ireland.

Dissertation Interview Questionnaire – Mike Oliver 03/13/2009

(1) Please describe briefly your current position and role within your organization and community.

My dissertation is creating a model for regional technology-based economic development.

Good.

Based upon the work that was done at Harvard a long time ago by Dr. Michael Connor called the Cluster Model but that's still in use around the world a lot.

It does modify itself. It's called targeting. Michael Connor theory is not a difficult one and actually it is not one that is new. He just put it into words. It's called targeted industry.

In academia, you put it into words and publish and you become the smartest guy out there.

That's right.

I looked at what he's done and I looked at 20 official regions around the world; Sophia Antipolis, France; Limerick, Ireland; Bangalore, etc.

Good choices.

And it's an interesting dynamic going on there. In Bangalore, Dubai and a number of regions in the U.S. In fact, I looked at the comparison of Tucson and Phoenix because they're both in the same state and they have very opposite growth patterns. And, of course, Research

Triangle Park and Silicon Valley and a number of others. What I've done is actually identify six major factors that are common to regional technology-based economies that have grown and, just recently in fact, when I was in France and Ireland, I actually realized that there are two different directions that those models tend to. There's mass job creation, as was done in India, and tried in Ireland. And then there is more of the knowledge economy, more science, research and technology, that's more of what Israel, Sophia Antipolis and Research Triangle Park have done.

Israel is a much better example of that. You're right.

That is where innovation in. You create something new like Silicon Valley did originally. Silicon Valley, obviously, lost its lead in manufacturing not long after it developed the silicon chip. But going down the path of science and innovation is not necessarily compatible with going down the path of mass job creation.

Right.

It's completely different dynamic. I will email to you the set of factors and the variables that comprise the factors that I've identified.

That's a long winded introduction to some of the questions I am going to ask specifically about your view on which regions have been successful; which regions have not; why do you think they have been successful? And I don't want to prejudice any of your answers by telling you what I've identified; I would rather start at the beginning. First, what I would like you to do I just tell me a little bit about your background in technology-based economic development.

When I was talking to you about Elliott Bouillion, that is part of the story.

Right.

My interest in technology-based economic development grew from when I worked at the University of Louisiana, Lafayette. I was working with Raymond Blanco in student personnel and I got into many different areas. I did a number of different things from counseling students to working with minorities and ended up with international students. But at the same time, when you're living and working at a University like that, the big deal always was, since the 1960's, computer science. What they did in computer science, everybody got a taste of it because you had to register for classes with a computer, even in the early days.

I learned on punch cards.

Oh, yes.

It wasn't like that when I was around.

Because of what Dr. James Oliver started as a Tulane graduate coming to the University of Louisiana as an administrator, in the 1960's before too many Universities were even involved in computers, when the computers filled up whole buildings, remember?

I do remember.

I knew a lot about it and started seeing, through the eyes of people that I was having contact with who were there, who were computer science professors or students who had either left the University and started, like Elliott Bouillion started his own computer company, to understand more about it. No, I was not a computer scientist, I was not a techy but I was beginning to appreciate it. As I got into economic development, working for the Chamber of

Commerce in Lafayette, that's where we started the Silicon Bayou theme, trying to create more of an attractive feature. So, you say, was the University the only part of it? No, but to me it's all about the people. We can talk about regional economic development but if you don't have all the building blocks, and the people are the biggest building block, then you're not ever going to get it. You can say, "Well, I've got good people." But if the people aren't trained in that specific area, it's not going to happen.

Going back to what you mentioned, Route 128, Silicon Valley, then later, Research Triangle, I remember going to Research Triangle so long ago, before they even had very much computer activity out there. The largest thing out there was Burroughs Wellcome, you don't even know who that is anymore, it was a big pharmaceutical company. They don't even exist today, they've been swallowed up by one of the others as we have seen happen to so many of them. But if you go out to Research Triangle Park, you will see it is a very diverse thing. And, by the way, what was the basis of the development of Research Triangle Park? Military research.

It was. And a great vision by the, then, governor of North Carolina to take an agricultural, tobacco producing state and say, "We can be high-tech."

That's the thing. You mentioned the other part of the equation, people, vision and the drive to make that vision occur. That is easily said, not readily done.

No, not at all. Do you know Sandy Baruah?

Yes.

I knew him when he was the head of EDA and then he became head of SBA and he agreed to be interviewed. I did a formal interview with Sandy and he is brilliant. It is interesting, he does not consider himself highly knowledgeable about economic development, he considers himself more of an expert in good management. I thought he was more knowledgeable than most people I had ever talked to.

Because of the work that he has done, he knows economic development, particularly from his end.

It doesn't have to be a worldwide basis.

You don't have to be an economic development practitioner but you do have to be involved in the process.

Right.

Economic development is a process.

That is one of the main reasons I wanted to talk to you. Steven Moret, smart guy, but he will tell you that he is not a practitioner, he looks at the theory and I can help with the vision but there are other people that have to carry it out. Which, I was pleased to see that he understood that.

To his credit, he understands that.

But if you are a practitioner; you went out and got it done. When you were here in Mississippi competing against Louisiana, you were able to take, Oreck Vacuum cleaners for example and their suppliers, and bring them here. A great regional view.

Who are gone now.

I didn't realize they were gone now.

After the storm they had the same problem this plant had, they couldn't get their people back, they couldn't get qualified people. They had such high turnover they closed the plant down and moved to Tennessee.

Did they?

Lock, stock and barrel.

I did not know that.

It is a vacant plant right now. Somebody is going to do a story about the affects of a catastrophic experience on a region. We are still suffering from the storms in more ways than we know.

We will be for many years.

Again, I'm watching what is going on. It is very interesting to be in Houston with the Ike scenario but Ike was not even close. They did have devastation but it wasn't as wide spread. It's not going to be as lasting.

Right.

We have had hurricanes before but this thing is more than a physical thing, it is a mental thing that we are going to see the reminisce of, the impacts of for a long time.

The emotional toll on the kids. My son, who is now a senior and was a freshman at the time, until he got older and we could sit down and talk about it, I didn't realize the impact on it. Driving through neighborhoods that they knew and loved and now they're destroyed, every day takes an incredible toll on the kids. And it takes a toll on the psyche of businesses here.

You need to take that in consideration. That is one subject that we need to go over one night and discuss. But, I'm trying to get back to this people thing. Saying its people is one thing but understanding what people mean. I was tying the people thing to vision, to the leadership, that's another word that's in there, to drive it long-term. Not just to have somebody wave the flag for a few months and then they're gone. We are talking about that there is a persona, there is a drive, there is a charisma that is associated and picked up by others. That is what Bobby Jindal might have if he doesn't lose sight of only wanting to be President, he can do some good things along the way. I'm just using people that you know that have that charisma to drive that leadership vision. That is what it takes. So, economic development isn't done by one practitioner. Economic development is done by a whole parade of people and all of them understand what's at the end in terms of, for my children. That is why we are doing this. It is not going to happen over night. I am going to buy into this because I know it's an investment in my time to make for a better resource, to make a better product for the future.

Right.

And that's the thing that you need to do. We can look at what was done in the past, everything is going to be different, there is going to be a little different mold to it. New Orleans is going to have its time once it solves some problems. You know what the problems are in New Orleans because you live there and it all deals with security and a lot of other issues but it is

mostly the mind-set of the people. To this day you still have not been able to have a true GNO, Inc., it is still not a good functioning organization. Michael is a nice guy, I met him in Washington D.C., he was running the program that we needed to set up real quick in Louisiana. I found out he was from New Orleans and his wife was from Scandinavia and I said, "Hey, why don't you come home." He said, "I'd love to." I know the family name because my wife is from New Orleans and I know the uptown crowd. So, I knew he would have a level of acceptance placing him in New Orleans and little did I know he'd end up directing GNO. But, he doesn't know anything about economic development. Now, he's smart enough to hire the right people, just like Moret is smart enough to have the practitioners to make the wheels turn.

So, economic development needs to be a vision and one of the things that I find with that vision is you constantly have to feed it. You said something earlier that is very important, Bobby, you said, "But that governor determined that he was going to take them from growing tobacco to a technology-based economy and make those strategic investments." The Research Triangle Park which consists of University of North Carolina, I will be there Monday, I am leaving tomorrow for UNC, North Carolina. Our 31-year-old Chief Executive Officer has engaged the Bell Institute of Leadership and puts us all through leadership programs. He has brought Dr. Gerald Bell himself to speak in Dubai many times, now. And, Dr. Bell is who I am meeting with all day on Monday. What is interesting about this guy is in the last 40 years of his career he has interviewed leaders from all over the world, from Gandhi to Richard Nixon and he has studied the habits and traits of leaders and visionaries. He has come up with his own model about achievers. You learn more about what you are and the things that you are not so good at and how do you compensate for them and modify that behavior.

Can you apply the same thing to a region?

That's where I'm going.

I find the same thing.

It is the same premise. You determine, what are the strengths, weaknesses, opportunities, threats, the SWOT analysis, it is the same thing whatever language you apply to it. That is what you have to do. That is what I was talking about earlier where each place is different. You cannot just say I'm going to copy what they did in Route 128 or I'm going to copy what they did in Shannon, Ireland or Limerick, Ireland or wherever because its not going to work. You've got to be able to understand what parts are intriguing enough, what parts could fit and then what you can sell to people to promote it in terms of getting the locals to buy-in, the people who live there. Then and only then can you adequately sell it because, once again, it's going to be about the people. It is always going to be about the people. I don't care how many megabytes of computer memory you have, it is always going to be about the people and what they can do. When I say about the people, it's not just their personalities, their capacity to bring their level up in terms of their learning level, not only being professors, I'm talking about being good worker-bees, good at what they do. I sold that this Mississippi Coast had some of the best, most dynamic workers and after the storm I don't know what happened, something happened.

In the work ethic?

Yes.

That's amazing. I didn't know that about Mississippi. I've always respected the work ethic in the south and in this region.

Mississippi work ethic was tremendous. It was awesome. I lived it, I saw it, I competed against it. But, I can tell you, after the storm, it was virtually eliminated. Even the good people that have tremendous work ethic, it was like the wind was taken out of the sails and it didn't matter.

It's going to have ramifications for multiple generations to come.

One of the things that's critical is image and attitude of the people.

Image is part of it and you need to make sure that is part of your scenario.

It is, I have a whole set of variables. The six factors that I have that each are made up of five to 10 different variables are leadership and policy, attitude, attitudinal variables.

You need put a section in there, leadership, policy and governments. Governments is very important. Leadership is first, policy and governments.

Governments in what way?

Governments are the rules of the game. It's how the things are applied. It's the way your County Board of Supervisors act. It is what they think and do in corporate culture. We need to create a culture within our government system.

I don't have it explicitly called out like that as governments but you're right and I do have the whole culture variables. I'm not trying to say if you follow this model, everybody is going to get rich and you're going to create a booming economy. What I'm trying to tell people is, if you cannot address the variables, don't spend a whole lot of money on things that you can affect, people affect what they can affect. And in some cases, take Louisiana, the perception, even if it wouldn't be reality, which it is, but the perception of how bad our crime is and how bad our K-12 education system is, impeded me from recruiting top-level IT people into Louisiana. I had to pay

them extra to get them to send their kids to private school otherwise they wouldn't move to Louisiana.

Absolutely. I wanted to say that about New Orleans in particular. For a while the city government, when they took a turn and got some change, and Ray Nagin was part of that change, it started to uplift and then it disintegrating with him. Even though some of those good people (city council) are there, they are not making enough of a difference to overcome him.

You also have an enormous inertia in New Orleans because of the 200-year history and all the old families, and you have the same thing in Tucson, that a lot of people don't really want it to change that much. And we still have the Port of South Louisiana, the Port of New Orleans, the Port of St. Bernard and the Port of Baton Rouge all competing with one another while Houston is kicking our tales and Gulfport is expanding.

I will just tell you, be careful because Gulfport is not only expanding, Gulfport is on an 800 million dollar, 10-year expansion jag and they are going to kick New Orleans tale.

We have the Mississippi River, which feeds the entire middle of the country, and we are asleep at the wheel.

That's what you've got because you've got nothing else. You have stuff driven there because of the River.

As you well know, competition is global. My little company competes globally with people, we compete with India. Louisiana, as a whole, has not figured that out yet. We compete from Parish to Parish and from region to region within the state as opposed to realizing if we had southwest Mississippi, southeast Louisiana working together on technology initiatives then we combined can get a lot more than the Parish of Jefferson can get on its own.

We are going into regional economic development and you're so right. Now go back, I want to hear about your other premises, you said there was six or seven premises you were working from?

Right.

You got to the first one and I interrupted you and we got into governments. Now, give me the others.

There was attitudinal which we've just discussed. The attitude of we're competing from Parish to Parish and there are a number of variables under that. One of the things I identified is inflow. Just like air coming into a balloon expands it, if you have a hole in it, it shrinks. If places like Limerick, Israel, to a large extent, definitely all of southern India, the inflow of ideas and capital and companies and innovative people that expanded their regional economies but for that, their economies may not have expanded as much. Now, what they've done very effectively, and in fact Research Triangle Park is a good indicator of this, they were able to recruit a certain type of research and development there and then they built the learning systems, they built the knowledge base, they built the workers all to go with that. At that point it became self-refueling and expanded. When you are starting at, when you're a neophyte or adolescent economy, inflow is critical. I have identified a whole set of inflow variables. What do you think about that?

I think that's right. It reminds me of Dr. Jerry Bell's Leadership Principles, and you might get some pointers just looking up his website on the Bell Institute of Leadership, but the first thing he analysis about a person are the parents.

Does he? That's an interesting concept and a good analogy, in fact.

Yes. He asks about the parents, he asks specific questions about your parents and how they reacted to things, how they dealt with things. Money is not the issue and certainly it comes

out in the interviews but the parents because he can tell you if you're going to be a good leader based on the parental guidance and influence they gave relative to your upbringing. So ,in what you're talking about, in the inflow, you've got to measure the parents, too, because we've got to grow our own. We're not going to be able to depend on just that in-migration of people.

I agree.

But we have to grown our own and the own can't be perpetuating what was the past. Just more losers, we cannot keep going with more losers or flunkers.

I couldn't agree with you more.

Having people like Bobby Savoies and Mike Oliviers coming from poor families, its something you want to strive for to show it can be done.

That actually crosses over into another area, another factor and set of variables, environmental. The environment within which you are raising the economy and the people in the workforce. One of the reasons we have a good workforce in Louisiana has been work ethic. I have looked at a lot of regions that can't touch us on work ethic. But we fall down on so many other variables. So, I am wondering if that is not more analogous to Dr. Bell's work.

It is. The other thing, the balance of the environment, again, I'm not talking about green, I'm talking about the balance of the things that impact the business climate. The people that are there, that balance, you've got to have worker-bees. They've got to be satisfied and hungry to do what they do best. You've got to have the leader-bees, you've got to have the technology-bees, you've got to have all of these people, the balance. That's very critical. And you've got to constantly reinforce it at the early levels so that the kids understand, it's okay to be a plumber. You can make a lot of money being a plumber. By the way, if you go into your own plumbing business, you can make a lot more money.

Right.

As much as most upper income earners make. The point is, they can do it at their own level.

Right.

I was out here talking to a guy who's probably in his late 40's who is one of the best guys we've had as a field service technician. I can send him to Pennsylvania, I can send him to Columbia, Argentina, to anywhere, he will go and do his work and he will do it well. People compliment him all the time, even the people with American Electric Power said, "Look, we would like to do this for you. You are so good. Your company is closing, why don't you go ahead and start your own business, we'll give you a contract for all of our plants."

Wow.

He said, "No, I don't know how to do that. I can do my work but I don't know how to start a business, I don't have the money." He got all shook up.

Right. I know people like that. They are great at doing the work and they have an extraordinary opportunity to be an entrepreneur.

I know he's got history, I know he's got a broken family, his wife and he have been divorced for a long time and he's probably got some issue dealing with alcohol or whatever but he is a hell of a worker. My point is that a lot of these people could find their own level, they need some help. I watched this all the time because I saw it as I worked, you've got a lot of garbage out there with these people from the Small Business Administration, the Chambers of Commerce, these Economic Development Groups and they said they've got so-and-so that is going to teach somebody how to start a business. You know what? That's garbage. We can give people some pointers about what they ought to do but more times than not, those people have

never been in business for themselves and they really should not be giving that advice from a textbook.

You can teach them the processes, you cannot create an entrepreneur out of somebody who is not an entrepreneur.

No. You can lesson the uncertainty.

I agree with that.

You can help them reduce their fear but I don't think you need to reduce their fear too much.

Yes. Being an entrepreneur you need that sense of urgency, I agree.

Absolutely.

I remember talking to Dr. Bob Beyster who was the founder of SAIC, when they were about a two billion dollar company and we had about a million dollar company, I said to him, "I stay up all night worrying about whether we're going to stay in business." He said, "So do I." At two billion. You might make that seven billion, he's still worried about it. That's a healthy fear.

Yes.

But technology-based economic development, how important is physical infrastructure?

It's critical. Let me just go back to when you and I were talking about Spain. Spain determined that to improve their economy which was really bad in the early years after World War II and then up through the 1970's, they improved their economy by improving their infrastructure. They focused on their ports, their airports, their institutions of higher learning, their hospitals, and their roads. And the way they did it was by concessions, they would give a company a concession for 50 years to charge a toll or charge a fee.

They held up their roads that way.

That's right. That meant that the government didn't have to find the money to go do it or maintain it.

That's interesting. China had tried to do the same thing about 15 years ago and I don't know whether it ever succeeded. I remember going on a trade mission there with J. Bennett Johnston in the mid 1990's. And what they wanted was somebody to come in and give them all the exits off the highway and everything else but you had to come in and build it.

The Australians have done the same thing. Two of the largest companies in the world that do this, one is an Australian company and one is a Spanish company that are doing this all over the world now. In fact, you have part of an Interstate Highway in Florida that is being built with a concession, as well as other projects in the United States. The Chunnel for an example, is a concession. By the way, they are all billion dollar plus projects because they have to be large scale to achieve the economies.

You've got to have deep pockets to go after something like that.

Also, they have to be big projects to have the payback.

Right.

The kind of payback necessary. So, when you talk about doing these and you ask about infrastructure, I will tell you that this mega airport thing that was proposed, it was not a crazy deal. It was a bad deal in a way because those people who were driving it were trying to force it on that particular land site.

Right.

That's what the bad deal was. The concept of Louisiana creating a mega-airport was the right one.

In two different regions around the world people have told me that but for their international airport, they could never have developed the way they were.

Oh, it's obvious, anywhere you go, you can see it. Dubai International Airport has the largest duty-free shop in the world. You have to walk through it to go to the terminal. It's a mall.

I bet.

Maserati's, diamonds, gold, Cuban cigars.

Really?

You name it.

Wow.

It's unbelievable. So, consequently, when you're going to Dubai, I promise you, when you leave Dubai, you go to the hotel and you tell them, "My flight is at 9:00, what time should I leave?" They'll tell you, "You need to go at six." You are not going to believe this, you are going to want to spend that much time there.

Wow.

It's duty-free. Remember, tax-free. You can buy anything.

So, technology infrastructure, is that really that different? In other words, you're making technology applications in everything that we do today, there is a technology, it's not just computers. In everything that we do today it's just getting the best technology, at the time, and applying it and then trying to keep up with it. Like I was telling you about the State Port of Gulfport, that port facility is going to be absolutely phenomenal. They've got a relatively small footprint, so they're going to build another one. Why didn't Louisiana negotiate that after Katrina for the port of New Orleans? Through the federal government, they got 800 million

dollars, that's almost a billion. The State Port Authority has hired one of the best design groups in the world to take this and run with it and it is just phenomenal what they're going to do.

There are people in Louisiana that have talked about that and tried it but when you get five different dock boards and you're trying to get them to not be greedy, you just can't do it. It's an attitude.

It's an attitude, so let's go back to that. So, we can easily talk about the applications of technology, the infrastructure necessary and all of the synergies that might exist in a region for regional economic development. But, then what you have to be careful of all the way down is not only building the product, selling the product, getting the people convinced and reinforced to continually sell the product and make it better but to make sure that from within they don't disintegrate, they don't start eroding it. That's what happens. I watched that happen again and again in the New Orleans river region with their economic development group and trying to generate a leading group. You just didn't have the buy-in. I thought, after the storm, that would drive it.

It got worse, not better.

The independence just came out. The attitude was "Forget you, I'm not giving any money to this or that, I'm going to do it myself because that is the only return or benefit that I'm going to get. It is not all going to go to New Orleans city." That was the attitude. So, Bobby, what you're doing is not an easy thing, I look forward to reading your dissertation on this. It's something that, by the way, when you complete this, I encourage you to submit it to the International Economic Development Council which has a publications function and economic development practitioners would enjoy having access to it.

I plan to publish it, in whatever way you publish it through the University, once I get it done. I've got some great interviews. The ones from France and Ireland, unique perspectives. And it is interesting because I only did so well, the whole "Celtic Tiger" thing, now their economy is falling apart. A lot of the IT people are being laid off, unemployment has doubled in the last month.

This is their second time. Do you realize that? It started with the automotive industry.

Right.

Then it failed. It waned and then they came back with the IT industry. I think you also need to look at what's going on in Scotland relative to the oil and gas industry and the technology applications there.

I've not looked at that.

Because of your knowledge of oil and gas and the applications of advanced technology in the oil and gas industry, you need to look at that. It is amazing to me, there are synergies between south Louisiana, offshore and oil and gas in the North Sea just off the Scottish coast.

How important do you think it is that the technology that you're trying to develop the region on be, not necessarily indigenous, but compatible with the region? Ireland, for example, decided to develop an IT economy and they did. Their second largest export after agriculture is software. But it was not natural to the region. They developed it and they artificially kept wages low and did not put a lot of money into it, had a state corporation that effectively subsidized it all. Now, with the worldwide economy dropping, a lot of that is falling apart. Sophia Antipolis brought in a lot of research and development that was not indigenous to that region and it's interesting because they said they call themselves, "Sophia-politans." People who work in Sophia Antipolis but don't live there. And I'm just wondering how critical is it that whatever

technology you're developing, it can be IT, it can be oil and gas, it can be agricultural research and development, how important is it that it be compatible but not indigenous?

Compatible, yes; indigenous, no. Again, I think you have to go to an area where the people are willing to accept it.

Right. That's an interesting challenge, too.

Well, I think the people of south Louisiana, as an example, they embraced the oil and gas industry. Of course, I realize oil and gas started from the roughneck on and off shore drilling, now, to directional drilling with computers. See, that was not created, necessarily, in Louisiana, it was created in many cases out of Louisiana but it was accepted and applied. Then it was enhanced. That's what we need to look at. The collaboration of the NASA connection and the military connections along the I-10 corridor has never been captured. No one has ever been able to put those together because they are segmented.

We have 8,000 technology related jobs just in the military and NASA communities along that corridor and we don't build on them.

We don't build on them and the greatest training capacity exists at military facilities. So, when we're talking about people, again, one of the features of a regional economy should be the training capacity and the people who separate or retire from the military. What are their ages and what are their training capacities at that point in time? To me, we're not capitalizing off of that as we should. That's where we're losing, in Louisiana for instance, there is not real strong effort, in Shreveport for instance, at Barksdale Air Force Base to try to capture those people that leave there. There is no real strong effort about doing something with people at Fort Polk. Granted, Fort Polk's training infantrymen, I understand that. However, there is a lot of technology that goes along with that training. The point is that Keesler Air Force Base in Biloxi,

the two NASA installations right here Michoud and Stennis, not 30 air miles away from each other which employ six or seven thousand people, make a formidable asset, a critical mass of technology and mind power along the I-10 corridor, NASA is not the largest employer at the Stennis Space Center, the largest employer is now the Navy.

Right. We do some work with them.

A lot of technology there.

Incredible technology that has not been spun-out. And, you know what, they want to spin a lot of it out.

They do encourage it.

We're not there with the catcher's mitt.

So, we missed that, even though LSU, the Department of Economic Development, we help fund a feeble attempt to have a presence there, an office there, but that's not enough to catch it.

No. And I know it's all that we can do at the time but it's nothing. One of the regions I looked at was Huntsville, Alabama. Huntsville, to me, is a perfect adolescent technology economy. Now, they have more people working for NASA and the Military than we do here in Louisiana or Mississippi but if you pull the Army Military Command and NASA Marshall out of Huntsville, then it is an agriculture economy with nothing else.

It dries up.

To me, the different between an adolescent and a mature, self-refueling economy is exactly that. You pull one factor and it falls apart.

You were using the southern Ireland example, Limerick/Shannon area, what happened to them was the Indians beat them at their own game.

Right. Beat them at their own game. And India had become, at least the southern part of India, has become very much self-refueling and they do it based upon mass job creation, the arbitrage of rates, now it is more a knowledge-based economy, it's not just about help desks.

So, that tells you what? What they need to do and what we need to do in every case is that we've got to be prepared for the next level of growth and it may be different.

I've been going to Europe, to England for a long time, I've been going to Ireland for a long time and I watched in the late 1970's what Ireland was like and I know what Ireland is like today and it is hugely different. But I also know that a house is twice as expensive there as it is here.

Right. And that's what crushed them.

For a long while we had U.S. retirees going there finding deals and for fifty-grand, they could live in a palatial home and have enough money to subsist forever. That's out the doorway now. If you got to those cities and you see the realty pages, the cost of living is just extraordinary. The cost of food is extraordinary. So, they have uplifted their economy but it takes more to live there now.

And that became self-defeating because they could no longer keep the wages artificially low so the people who moved in said, "Hey, you guys are too expensive. We're going somewhere else. We're going to Bangalore, we're going to Vietnam." They're going anywhere else.

It is the same thing that happened in the tired burrows of England. They have tried to recreate their own new economies, if you will, based on certain sectors or segments of industry. In some cases it has worked some but I don't know of any that have been totally successful.

The last factor that I have is knowledge. A lot of that is what the Universities can impact, the knowledge of the workforce, to a large extent, what they're teaching and training, the collaboration, the research parks, things that they actually can impact. Some do it well, some don't. What is your experience with the creation of a knowledge-based economy? What is the importance of the knowledge variable?

I don't know that the Universities have changed enough to date to meet the demands of today. There are still doing what they were doing in the 1920's or whenever. That is the teaching is one thing and the access to knowledge is another but the transfer of that knowledge, the openness, the transparency to access it is, to me, the biggest impediment that exists.

I discussed at the Loyola Board Meeting this morning, we were talking about retention of students, if they want to retain more students they have to create people who can go into a career and help them get there. That means collaboration with the business community in New Orleans. The law school does it and the people who go into elementary and secondary education do it. Beyond that, the University doesn't do it and I talked about that amongst the group at the Board and they all looked at me with blank stares because they're academic. "We have people come to campus and talk to our guides." They just didn't get the next level.

It's not real interaction.

Not at all. Not the way it's done successfully in a lot of places. The CERAM School of Business at Sophia Antipolis does it very well. The University of Limeric did a good job at it. Research Triangle Park, obviously, is one of the places that does it.

John Kelly's friend from Ireland, did you ever meet him?

Yes, I did, actually.

Did you ever go to his program there?

No. I went to a presentation they made on it but I didn't actually go beyond that.

He has a technology seminar that he does every year which is at a University of Limerick.

He uses the University facilities but he brings in people from all over the world dealing with security issues.

I went to a part of that with Dale Galloway, five or six years ago, and it was at the University of Limerick and I was amazed, one by the park around the University, a little bitty University in a small agricultural town, and the amount of people that were there from all over the world was unbelievable.

They released their findings at the end. I don't know if you've ever received a copy.

No.

It is a bound copy, by the way, I'll bet John Kelly has editions.

I will get one.

I left my bound copy at the Economic Development Office in Baton Rouge for them to use it. John Kelly will give you a copy of it, John can give you a copy of every one from previous years.

In fact, John was there, I went to his house that he was building there and was so gung ho on Ireland, his family if from Ireland. I will talk to our mutual friend, Mr. Fudickar and see if I can track one down. If I can't, I'll call John.

Take a look at this and I'm sorry I don't have it blown up because I didn't bring a different copy. If you think of external events, inflows, outflows, customers of a regional economy, whatever the product happens to be whether its brains or products, environmental policy and social variables within the region. And then, knowledge, inflow and attitudinal variables affected more by external events. One of my tentative findings is that entities whether they're government

or private, such as GNO, Inc., tend to impact the variables that they can impact and not address a lot of the variables that are more difficult. Attitudinal variables, for example, are so incredibly difficult and you have to have a 20- year vision, it can't be by the next election. That's what North Carolina did, that's what a lot of worldwide places have done; North Dakota is doing a good job on it right now.

It's how we fail. Yes, I've watched North Dakota in what they're doing.

They actually have an inflow of knowledge jobs, right now. There are two questions, one, do you know of any models that take this type of an approach; and two, do you think these variables really impact technology-based economic development and can be affected by anybody?

I don't know specifically if there's anybody that has this but I know that there are people who try and have attempted. I think that one of the things you may want to do is to put this out to the International Economic Development Council and there's a website that you can go to, Jeffrey Finkle is the director, I would be glad to hook you up with him.

I may have you do that.

So that you can ask that question of people in economic development. Now, you may find that there may be some interesting response from that because it's not just people from the United States, although IEDC is dominated by economic development professionals from the United States, there are some members from different Universities who belong and who are engaged in some of this thinking.

I interviewed people in Arizona, I was there last week, Eileen Walker. And we compared part of it and the main reason I wanted to do that was a comparison of Tucson to Phoenix. They

are both in the same state and could not be more opposite. The attitudinal variables and leadership were the biggest distinction.

Not just the Universities.

No, not just the Universities, not at all. But, in any case, not to derail what you were thinking, I've not seen any models in all the research that I've done. I find that people impact variables that are the easiest to impact and we spend a lot of money and don't know whether we're getting anything for it because we don't impact the variables that are so hard, that are 20-year changes.

Right.

Have you seen any?

No. I know that there are a lot of people who talked about it, who thought about it, people who would like to do that. I don't know that I know anybody who has.

Have you noticed, in your career in economic development, that we don't necessarily go after the harder things to change such as North Carolina did 25 years ago?

The reason, I find, is because it always is broken up in four-year blocks of time. And as you stated just a bit earlier, it's going to take 20 years. It will take five times that to really get it done and that's where the leadership, the vision and the perseverance to get it done. So, there has to be a long-term lead time to get people to do it. I think of the Mayor of, I think it was Charleston, and his leadership over the many years he's been leader, you can tell what he's done in that town and it's made a big difference. So, my point is, it started long before the storm but they were able to recover better because of the attitude, because of what was in place, because of the pattern that was set, because of the vision that existed.

I think, by far and away, is the most critical aspect of all of this and the hardest to affect because people look at the next election. That's why a more totalitarian state, like Indian or China, places like that, tend to have more success.

They've got a longer climb but a faster one.

A faster climb and it's not impacted by who wins the next election.

That's true. From my review, right now, that's probably true but it may not be.

Right.

I think to talk to somebody from India would be a great help on that.

I talked to VJ Gopu, who is actually here but he is from Bangalore. It was a great learning experience, he had interesting insight.

The cast system still exists there, that's what I'm talking about. There is still a cultural barrier.

Huge. But that's why they go create mass jobs and their standard of living is a long way from ours.

That's right. That's why I said its a long climb. But they are doing it faster.

You need to go?

Yes.

I am going to be respectful of your time.

Thank you.

I will ask you one closing question.

May I keep this?

Absolutely.

I want to think about it a little more.

I will send you an email with some more stuff on that. In fact, I'll send you the variables that I've identified to date. In research, you reach a point where you're going around in circle and you're not getting anything new. I am at that point.

Send it all to me at one time.

I will send it to you and ask you to comment on it.

And that will give me time to contemplate. I do have time in the evening whenever I leave work at seven, I go back and I relax for a little while then I get back on the computer around ten.

It's a bad habit, I do that.

It is a horrible habit. That is what we do, right?

Of course.

That's when I communicate with people and work on esoteric things and things that I'm thinking about.

I will send you what I have. I will also send you the transcript of the interview, if you want to comment on it. I do very little editing other than take out some of the things that we might insult others with. And then I will share with you my dissertation when its done. I expect it to be done within the next 45 days.

Great.

In the final state.

Good for you. I'm proud of you. That's awesome.

Dissertation Interview Questionnaire – Ashton Ryan 03/18/2009

Ashton, tell me a little bit about how you feel about your knowledge of economic development and more specifically, technology-based economic development.

I don't claim to be the world's greatest guru on this but I will say that economic development has been one of the major things that I'm involved with over the last 10 or 15 years. When I was at Arthur Andersen, I was more dealing with accounting and accounting type activity, auditing, etc. But I got to see a little bit of economic development because we had many small companies that would come to us when they needed audits for their investors and things like that so we got to see some small things. At First NBC, had a venture capital company, SBIC, that Bill Harper ran so we had a pretty good operation ran for about five years. We were not primary invested most of the time doing deals would be buy-outs of existing deals or we would do growth capital, a lot of companies already that got started through the second-phase growth but we did see a lot of that. Then when I went to First Bank and Trust, we formed a CAPCO and then I saw tremendous amount of venture capital and around a lot of different issues but especially around technology. I saw a lot of opportunities to invest and we did do some investment. Some of them were not just small business. We put out a lot of money, about 16 million, in venture capital operations. And, finally, here, although we do not have venture capital operation, we see an awful lot of people coming to us for money that would be investing in those types of activities. In a small bank, you're dealing with a marketplace where people cannot go to a big bank and get venture capital-type loans, they are just not available. But they can come, and somebody in the family is going to c-sign, and we do see a lot of that. Over the time, negatively from my viewpoint, I have only really bee in this area. So, I cannot comment as much on what happens in China or someplace like that but the reality is that

here I feel like I am pretty fluent on what goes on, how it is done and also the things that drive it as well as the things that cause it to be problematic.

Looking at what you have done in this region, do you think that regional economic growth, and more specifically regional technology-based economic based, is predictable?

No, I really don't. I think it follows the brain trust. I really believe that you can have economic development around technology in Bismarck, North Dakota if you have the right brain power in Bismarck. In Boston, where you have these support mechanisms that are there and people can grow off of each other and you have the investor groups that come and identify that, Silicon Valley in the west coast, a few Texas around UT, there have been a few places that have been singled out. I don't believe that is really what drives the technology venture capital, I believe it is really developed around somebody that has the right idea and the right concept. Technology you can do from anywhere especially with the internet and with all the different things that exist, you can be working with somebody in Palo Alto and you are here and you are here and you all are swapping things back and forth every hour on the internet. I think that I gets to be that there are places that are more likely to have it because of their University setting and the brain power that exist in those areas. But not all technology comes out of Universities. A lot of time they are very moribund in the whole approach to technology. More like doctors and stuff like that will jump on their technology, Universities have really been big investors with that kind of thing off their medical schools. In general, I think you can put it together any place so it is not regionally bound. But it does need some kind of incubator status, some way that people with good ideas can get some capital in order to take the next step. New Orleans should be a good place for that just like Houston, etc. because our oil business generates a lot of wealth. There is opportunities for people with a lot of money looking for some other way to make money besides punching holes in the ground. Historically, we

have never been able to get the oil guy to invest. One of the things I think you have to have in a region is some venture capital. We use to have a capital program, the state committed a half of a billion dollars to that program. That was an awful lot of money. It should have gotten a lot more value than it did and I think that was just because it was not managed right.

You mentioned a lot of factors that are important to regional technology-based economic development, qualitative and quantitative. What factors do you think are not in existence here in New Orleans that are important?

Well, the number thing has always been the investor. Even though the CAPCO money was spread out, even though the money from oil where you have many people with leases and their oil rich families that have millions of dollars of liquid investment, but they just did not seem to want to invest back into venture capital. So, we have not had the real source of funds. When we did the SBIC at First NBC, we were one of the few players. Today, you have some strong players that have big balance sheets, Enhanced Capital, Stonehenge, Advantage, the things that were left over from the CAPCO days that still have big bucks to spend and invest. They do not seem to have been aggressively looking at the first stage. They look like they are doing what we did at First NBC, they liked it to be proven and true and one of the problems with technology is getting it to that stage. I think the biggest issue in this area has been that. The second biggest issue has been the lack of really talented people. Because of our educational system, we have a small group of elite people that are very small and are very well trained and educated but then there is a huge drop off and that small group has typically left the region. I think the second big risk that we have had which has been a big detriment to capitalization of technology companies has been no real depth of people that can feed and grow off each other and be able to trade ideas. Where one guy has an idea and somebody else enhances it, that kind of process can lead to great partnerships, can lead to Microsoft

and people like that. There is nothing special about the Pacific Northwest that led to Microsoft, there just happened to be a couple guys that knew each other who lived there. They could have lived anywhere. Once they are there, they do create a climate of future because once they understand and say, "Okay, I can make this work." And the next stage is, "Well, if I can make it work then I will invest in the next guy that can make it work." Our technology-base has always struggled getting the investment capital and to get up the chain. The brainpower was there, we have some bright, young entrepreneurs, but I think they have had trouble getting money. Some of the things like the Idea Village, in my view, have not worked. There was suppose to be incubators to try to make these companies go along and I just don't see that they have worked that well and that has been a disappointment to me because I think that money is the key but the money guy always wants to see something. You have got a great ideas and I will give you a great to go check it out is not normally the way that works.

Not in this region.

No, not here. There may be other places where people have done it before and they know they will get rich and they will do it again. They know they lose some and gain others. That balancing game where if you hit one out of 10, you're in pretty good shape. If it can be Seven Rosen or Microsoft or Steve Jobs at Apple, whatever it is. I think the biggest thing for us has been the lack of investment capital and interest in supporting technology. I think that is partly due to the nature of the money that has been gained, the source of the wealth, because it took it on the ground and it is high risk so they put it to what they viewed as very low risk, stocks and bond, mutual funds in Washington rather than putting it into small technology-based companies that could develop and grow.

I sat on the business counsel here when I was running SEA and the head of all these big companies and brilliant people who I have got great respect for who have made their money and I think we were the only technology company in the room that had gotten about 50 million and we were 120 million at the time. And what I heard was all this money but none of it was going to create the next generation economy. It was more protecting what they had than it was looking at the next level.

Some of it wasn't too liquid, that is the other part of the problem. A lot of those big companies think they are big because they are powerful and they have a lot of employees and they have a lot of cash flow but they don't look at a bank account that has one hundred million in it because they've got it employed in their business. So, some of them are constantly working just to keep that business going.

There is major capital but it is not venture capital.

When they sell-out, that is the disappointing part and you can name, in the last 20 years or so, all kinds of people who have sold-out, we've got Freeman that took over Coca-Cola for a whole bunch of money. There is a whole bunch of those things where local companies are sold-out. They take it and immediately put it in stocks and bonds. It was almost like they went from venture capitalists to chickens. They run risks and they run the business and they loved it and they would take all kinds of gambles doing it but the minute they got the money it was like, "Uh-oh, I have got to be safe here so I am putting it in something much safer." And it is really a shame because they had the right entrepreneur spirit when they were running their companies.

Right.

You cannot criticize Goldring or any of the Freeman's at Coke or any of the people like Riley, people like that.

There is a whole bunch of incredible entrepreneurs in this area.

There is no doubt about it. Businesses are worth close to one billion dollars but when they cash it out it is amazing how they just took a different approach. It really was surprising. You think those are the people who would look at see how they could get involved with this whole new economy and the chance to develop here which was not bad because we had good support from the University of New Orleans and ULL is not bad, they have been leading the way there, too. LSU, not quite as much, I would like to see them do more for being a big state school, certainly in the UT type, there is not doubt about that. Even with the University of New Orleans, we had the right thought process on the chancellor side, we just don't have the resources.

They did everything that I asked them to do within the resources that they had but we were bigger than our next five competitors combined and when we got everybody together in a room and talk about how we would create a collaborative technology environment and a big part of that was the lack of support from the community, the lack of money for collaboration with the Universities or the lack of funding, a lot of it was attitude, a lot of it was inflow. Those are the types of variables that I have identified looking at Sophia Antipolis and Limeric and Silicon Valley and Route 128 and interestingly, North Dakota is having a big influx right now of knowledge-based economy because they have a great vision. If you turn the clock back on Research Triangle Park, a lot of it was vision, the people who had the leadership to make it happen and I have just never found that again.

There was always some money that lead to the growth of that area. If something happened right now, Bobby and I am more optimistic about this for the future, because there are a number of bright, talented entrepreneurs who are coming to this city on the theory of, "I've got to work with this city and it would be a real nice thing to be part of the recover of New Orleans. I think this is a business that I can build quickly anywhere, so why not build it in New Orleans."

Right. There is an influx of talent right now and that is huge.

I am on the board of the New Orleans Exchange, that is technology into a very specific business format but it was technology, they had to build an exchange. There are only four or five exchanges in the world. It is not easy to build an exchange with all the technology involved. There is creation of the receivable exchange and to me that is a brilliant idea. A young guys who could've gone anywhere in the world picked here and they picked here because they wanted to say something about doing something for New Orleans. Yet, I am trying to get some money raised for them because they were a little slow getting their product to market and because of that they ran down to the tight-end on cash. They were only looking for three or four million which in terms of a raise is nothing at all but they could not get much local attraction. They found a west coast firm to put up the money but it was funny that these guys had created at least 20 jobs in New Orleans over 75,000 and it was a big deal.

They could get no support.

They were kind of disappointed. They said, "Well, we came down here and we thought you all would at least support us." I introduced them to a lot of people and we talked to a lot of people and there was no attraction. You would think that since they were already here, they were not quite started up, they had already did about 90% of the software, they were going live in November and they were looking for money in December. They were already live, they were starting to do transactions and trades. You would say, "Gee, about 99% of the risk is gone now. This is a good idea, once it gets executed." And technology was the biggest part of executing it , just being able to do trade. You take it for granted when you call up your broker and say buy 500 share of IBM, you take that whole system for granted but it is a huge complicated on-line system. Just like when you call the reservation desk and ask the airline to book your reservation. So, there is a tremendous

amount of technology that goes into that and it is not easy to build. They built it and it worked. To me, that was 100% down the road, we should not have had any trouble raising that money and I was disappointed with the local market. I talked to the CAPCOs, I talked to wealthy investors and I just did not get much response. It seemed like that was pretty much peanuts to be in a situation where they would have trouble with that.

Was it just a lack of vision of what the technology could do?

I think it was vision and I think, this was before the crash but the crash was coming around that time, I think the crash had something to do with it, too, it was not the best time to try to raise money. I don't think New Orleanians, historically, have thought about this kind of operation. We spend so much time thinking about how bare our education system is, we ignore schools that turn out some of the brightest kids in the world. We get general high school that does 50 or 60 National Merit Scholars and we talk about how we don't have good education around here. We don't have good mass education, that is true but we do have a lot of very smart kids and kids that could come out and do the kinds of things that kids are doing all over the world.

Our image of having a poor education system hurts us but when you look at Jesuit and Newman and Ben Franklin and so many others, we have plenty of bright kids coming out. The image kills us.

That is right.

Let me ask you to look at something for me. I am not going to ask you to grade this stuff. In all my research, what I have done is identified six factors and each one has some variables that make up those factors. These six factors are the things that I have found that are common to areas that have developed in a regional technology economy. Whether it is Bangalore, India which did it through mass job creation or Israel which did it through research and development or Research

Triangle Park. The six factors are environment, inflow which is not identified anywhere but it was clearly what happened in Limeric and in Bangalore and in a number of others, attitude, attitudinal factors which are not typically categorized that way, leadership and policy which it was suggested to me that I add governments into that which may be a good one, and then knowledge. I am not going to ask you to grade all this stuff but look at theses and tell me, just off the top of your head, which of these do you think are very important versus which ones you think are not as important. Just take environment, for example. Quality of life, clearly, everywhere that is developed, the people who do technology, they are looking for a good quality of life. We have that here, we may not have the safety and low crime but we certainly have attractiveness. When I was recruiting IT people here, they love the quality of life.

I think quality of life can be looked at two ways. If you are elderly, you are worried about crime. When you're young, you're invisible, you are not worried about crime. You are worried about where you can get a good drink, when can you have a good party, what is the overall environment for creativity, is it supported, is there a market that accepts creative people and supports them. So, I think that environmental is a very key issue to this because, again, I go with the theory that people can do this most any place.

Right. You can. You can do it most anyplace that has the right factors.

They would moving towards and then they went to that way after they became Excensure, they went to a deal where they operate out of their home. They never had an office. We didn't need to have 10,000 square feet down at Place St. Charles where we were paying a zillion dollars per month. They could do this wherever. They guy could be running a one hundred million dollar project in Australia from New Orleans is he is on-line and doing the right stuff. So, I think the

environmental factors are very important because of the ability to operate at a distance and be very affective at a distance.

That is a very good point.

I just believe that it is where people want to be and generally this is young people, Bobby. I don't know why. I guess because it is a different way of life.

And there is more risk taking.

It is like the industrial revolution, some things that come along that are sea changes in the way people operate their lives. The people at the older level, some catch up, but none of them ever get in the leading edge of it, they always are reacting. The drive is always coming from younger people who have come out, they live the life, they understand it and they feel strongly that they can solve problems that they see. Everything they see is in terms of what they can do and they can see problems being solved through technology. Older people cannot do that, they really struggle with it because they do not know what it can do. That is why I think this is really important because you have to have the environmental factors, I really believe that is a number one thing. If the environment is not right then you will have people who are bright and intelligent and having good ideas and they will die, they will be smothered out.

Right.

Environmental is one of my heavy deals, it has to attract the right people and it has got to be positive for those people to here. So, again, they can live where they want. They can live in India, they can live anyplace, they just have to be comfortable to work. I think some of the other factors are not totally major issues but I think that lifestyle, the way you want to live and how you want to live, these are young people and they are going to want to live where they want to live. In 10 or 15 years they will have kids, they will get married and maybe some of these things change and then the

things that become more important are, do you have a good education system. The people who are coming here now are not bound by those things. They really enjoy what they are doing and live their life and they want a culture that supports that kind of creative atmosphere in the career approach. There are many places that do that, middle America is not responsive.

Not at all.

You will find these places that tend to be around the sea, they tend to be places that are known for their ambiance and their friendliness and the way they treat people. I think that is natural.

That is interesting because we have such an extraordinary environment for young people here. Just look at Teach for American, we get so many teachers that come in and they cannot wait to come in but at the same times, items two and three on this, support for technology initiatives, we don't support it. So, we are getting an great influx of talent in young people but not a technology environment.

The new chancellor at Delgado, Ron Wright, he does a big deal on smart classrooms. He wants to get smart classrooms. These are simple things where you can beam student's items up on a screen, where you can have the teacher interact with the student, it is pretty simple stuff. But we don't even do this. We don't even support it. We can't get his old classroom rebuilt from FEMA which got flooded six to eight feet, we can't get those rebuilt.

My middle school in Newman does that, by the way, but we cannot do it at Delgado.

Jesuit does it with a few, they built the chemistry and a physics labs that do that stuff, too. I don't even think Tulane does much of it.

No, they do not.

They kind of moved towards it with the new business school building but not totally. To them a smart board is one of those deal where instead of writing on it with chalk you are doing something else.

Look at the next page. Inflow.

I have a belief in this. I believe that the inflow is necessary but it is a secondary deal.

Okay.

It comes second. In other words, you have got to have the first piece. You have got to have the people and you have got to have the ideas. I do think it is, obviously, better at the Universities who have big R and D budgets to spend but generally, what I find, is that inflow is a reinforcing action.

I like that.

If you don't line it up first, then it won't work because if you have the right people and the right mindset and the right creativity and the right environment for those people to survive and do well, they will bring the inflow. The inflow will follow. I worked on the Louisiana Cancer Resource Consortium, and let me tell you that they are a perfect example of why nothing ever gets done this day. We have a partnership between LSU and Tulane and the idea is to take 18 to 20 million of tobacco taxes and sink them into research to cure cancer. It is a wonderful objective, right? It is beautiful and its inflow. We didn't get any success from it at all. You want to know why? Because the way it is used is that both of the medical school presidents used it to pay their rookies and pay their staff. No offense, but you are not going to get the leading edge technology off the rookies who just got out of med school. They are the worker-bees and you need worker-bees but you need to do is take the 18 million and go after four of the top guys in the Universe.

That is right, get the four best in the world.

Get them started and you are going to be able to hire all the work you want.

Everything else will follow.

The inflow comes next, it will follow. It is important that the state designated the inflow, I agree with that. You have to have some money for all of this or nothing happens. But, inflow, to me, is following them. It is the second stage. The first stage, you get the right people doing the right stuff and then they will attract the inflow. All around this country and this world, people want to support advancement of the human race. We have huge problems to deal with and technology can be a solution to a large number of different problems.

Right.

I think that is one of the things, but I don't think technology is an end. I think it is a means for an end.

I completely agree.

We always try to sell it like it is an end. It is an end, you have to have problems to solve with technology.

That is right.

Then technology will be the way you solve problems effectively and deal with them better. It is identifying the things that you need to solve as the key then technology becomes the solution on how to do it effectively. I tell them all the time, "Guys, why are we doing this? You're buying 18 junior doctors. What is that going to do?" Eighteen research assistance. All you're doing is taking your budget and sticking it over in the LCRC so you can keep your budget going with taking the cuts. That is not helping anybody get out of cancer. None of those people are going to invent the new cure for cancer. I tell you what, you go after those top four guys, one of them may come up with a cure for a certain type of cancer. I think inflow is secondary, not because it is not needed, don't get

me wrong but I see that once you get the right people working in the right area, the inflow will follow. The market will realize the value. It does not have to be regional because dollars are fundable, they come from all over the place. I would rather see them coming into the market and following it because behind that top guy, he will bring his NCI and his, I forget, there's two big grant agencies that give out all of the medical grants.

NIH.

Yeah, the NIH, the National Institute of Health and Cancer and those guys will give you the grants.

Right.

If you have got those junior guys, you will never get a grant.

They are going to follow the senior guys.

They are going to get eliminated. They are going to say, "Where is the guy that wrote the paper on how the cell theory can defeat cancer." And that is the guy who can get the money. If he moves from Boston to New Orleans, the money comes to New Orleans because it is following the vision, the ideas and the creativity. That is where you get it. It is not a bad or a great thing, I just don't think you start with this. If you lead with this it will not work.

Actually, I completely agree. One week ago, I might not have agreed with you but after looking at Ireland that put all of its eggs in a basket of inflow and now, with the economy, Ireland's unemployment doubled last month because the inflow is not there anymore. In fact, they have an outflow.

Again, I don't mean to belittle it, just to me, this is a secondary thing. You have to go to first and then to second and this is second.

There are two other ones that relate to that. Attitude, which is the next one, and then social, which is the last one. I will tell you why those have been important to me and they may be primary or they may be secondary, I like the way you put those. When I look at Phoenix and Tucson. Tucson has the best at interest at keeping things the way they are, the status quo. In New Orleans, we have a lot of people who feel that way.

I agree 100%. That is one of the real problems that cause our trauma is people who do not want to change.

That is right. The people who did not want to change in Tucson have kept it backwards and the people who wanted to change in Phoenix have seen it explode. I say that as an entree to how important is the attitudinal factor?

I think it is very important and it is a primary. Let me tell you why I think it is primary. Because we are all human beings, and if these young people, like I am talking about with the public, if those people come in and they are rejected and they deal with negative attitudes and they are not treated or dealt with right and if they are not respected. They are going to leave.

Right.

So, I believe that attitude is really a very key thing. There are more people that will turn you off than will turn you on. It is really easy for people to turn you off especially when you get the younger people, they do not have thick skin, they have been rejected one thousand times, these real bright kids that have been successful all their lives. They expect success because they are brilliant and they deserve it. When they hit barriers and get jerked around then they will leave because, as I said before, they are not tied down here. I think attitude in the area is very important. I think the more supportive it is, they will stay more, they will give you more time, they will invest more effort and part of it is you have got to get cooperation with these things. When you are trying to find

money, when you are trying to find work, when you are trying to find employees, when you are trying for everything, the attitudinal aspects of this can be very important to people. If they are constantly turned down and they are constantly turned off and they are constantly getting told no, then they will say that this is not a place where I can exercise my creativities. So, I think attitudinal is very important. I think that the lifestyle is important but I think a big piece of lifestyle is also attitude. What does the market feel like? Are they receptive? Are they growth-oriented? Are they looking to encourage young people? If we had the right attitudinal things here we would have incubators, we would have a lot of places that were out to help people get started and help people network and grow their business. It does not have to be just one company that fits to scale.

We have a little bit of that, the Idea Village is suppose to be that, the JEDCO incubators but it is so minor and there is no real backing. Frankly, most of the people involved don't get it.

The Business Council, a lot of talk but they are not doing anything.

Right. They are not going to create one job.

That is right. My point is that their whole focus is not to support this kind of stuff. They do not value it. If they valued it, they would create something that recognized and valued business collaboration.

They do not value.

They would say, "Let's get behind this, let's push it." That is attitudinal, that is where we suffer a lot in New Orleans. We get these kids in, again, we talk about it is a great city to live and it has got a great culture, it has huge entertainment opportunities in art but then we run into this wall. Do we have the city attitude right? No. Do we have the state's attitude right? No. Do we have the business community's attitude right? No. I think that is why we are not successful, to be frank. Not because we do not have the smart people that come in to do stuff but because they hit the wall. That

wall is, if I'm not being successful, I can go somewhere else where I can get a better attitude. The money will find me but I am worried about how I get treated, do I get respected, do I get recognized, am I accepted into organizations, am I interfaced with the right people. Jay LaPare's company is known as a great company based on a brilliant entrepreneurial guy. I don't know how entrepreneurial they are anymore, his dad was the entrepreneur, Jay is more of the business guy. I don't know if Jay encourages the entrepreneurial stuff or not.

I do not know.

He should because that is where he came from, his whole company was based on that. His dad was an inventor, he loved to invent different ways to do things. He saw, for example, peeling shrimp, a really simple process, I can build a machine that can do this and boom he does it. He just invented stuff because he saw a problem and he fixed it.

Right.

That ought to be something that is supportive. They should be supportive of that. I think they are chained more to an operating business than just commercializing the idea that his dad had rather than necessarily trying to create new ideas. If you had a group that was sufficiently supportive of business idea's then it could be of value. And this is not to criticize Jay by any means, he has been a great leader with the storm, but at the same time I am just saying, where is that source of support where those people who come in can hook themselves on and stay involved. How do they survive? How do they grow? How do they exchange ideas? Where do they go to get positive feedback on whether they going in the right direction or not? I think that is where attitudinal factors are very important.

I wonder about that because particularly, in this city, there is a lot of old money and when I went to the business council, a lot of people there are 70 years old that were great inventors that are

in the wealth maintenance mode right now. Jim Bernhardt once told me, “If you want to buy a company, buy a third generation company because the first generation invents everything and they knew it and they built it; the second generation built on their dad's ideas; and the third generation just wants to inherit the trust fund.”

That is right.

I see so much of that here.

Bernhardt is a perfect example because Bernhardt saw a problem and saw a solution.

What he has done is incredible.

He built a company out of a very simple solution which was if you wanted to take and get a major plant disrupted, you had to have these big architectural and engineering plans, then what was done manually was turn it into a set of welding diagrams so the guys could weld it right. Those diagrams would be very simple. What Jim had the vision for is writing the software that could scan this sophisticated engineering and architectural diagrams and come out with welding diagrams.

And he bought the companies he needed and integrated them.

I financed him for it. I will tell you what my first step was. When I financed it for him, he was buying a company called Sunland in Baton Rouge and he came to me and asked for money. I said, “Well, I like the idea.” I went to see what Jim did and it was amazing. I said, “Well, this is really good.” That afternoon we had lunch then we went to tour Sunland and I was dealing with the Executive Vice President because they did not want anybody to know about it. They were still negotiating at that point because I had to make the commitment on the loan. The guy had a big room with 47 drafting tables sitting there and I said, “What is that over there?” and I pointed to them. He said, “That is my drafting men.” I said, “What do you need those guys for?” He said, “Well, all these fancy plans and things that we do, they come with detailed architectural and

engineering drawing but they cannot be understood by welders.” I said, “Wow. That must take a lot of time. On a regular job, how long would that take?” He said, “Oh, about three months.” And I said, “How many people would work on a regular job?” He said, “Oh, probably one-third of the people in the room working in the job if it was a big job.” I said, “Gee, that is a lot of money.” He said, “Yeah.” And he quoted me some numbers. I walked away saying I was going to make that loan.

Oh, yes.

I saw the new technology and I saw the old technology and I didn't have to be a genius to know that he was going to do well. This was a world shift. This was like going from horses to a model T. This was one of those huge shifts in that particular business. That is what you needed to have was somebody that could see that. Then the second thing you have to have is the ability to implement it and get it going. I think that is getting back to the attitudinal factor, Jim had the right environment. The other thing that I loved about him was whenever he bought a company, the President of the existing company stayed with it.

They stayed with it.

That showed that they knew that he was a better competitor than they were.

He is the most competitive person that I have every known and I consider Jim a friend. I was laughing with him on time because he said, “You know what? If there is a company that starts up and they are going to do pipe hangers. I will compete with them for a \$5,000.00 job and I will undercut them to put them out of business because I don't want them doing to me what I have done to everybody else.” And I love the attitude.

I think that attitude issue is very important. I think that is one of our detriments here is that we never really opened up to this. My boys are great guys, they come in and they have not really

been invited in, everybody reads something about them and they say, "Oh, great, this company is here." and everything but nobody goes out of their way to help them. We need to have that. The one time the technology park was going in that direction.

We were, it is not there anymore.

I noticed that. We created an ambiance and we got all confused. It all got lost, one time I was all technology and it all got lost.

We had a whole floor and a half out there at one point. All of the companies that worked around us worked together.

You had the attitude.

It was great.

You go to lunch and you're talking to people that work around you and they're sharing their ideas. Talking about a concept to do this and another person says that they know something about it and it could work.

Dale Galloway, for all of his faults, helps create all of that, he really did. He believed in getting the best of each company. In fact, he told me, "Bobby, you will subcontract 50% of the work because I want your best 50% of the people. I do not want the 50% who are not good, I want the 50% from the other companies that are good." And it worked.

I agree. The problem was that the ran into a governmental contracting fopa of getting it and not getting it.

Too much politics. Bob left and Bob use to fund the whole thing.

Let me ask you about leadership, that is the next one, leadership and policy. There are two pieces of that on the next page. There is the policy factors, business friendly tax structure, Ireland did that, the tax breaks, there is all of that. Then there is the leadership. Research Triangle Park happened

because of good leadership. A lot of places happen because of really great leadership and a 20 to 30 to 40 year vision. Not a vision to the next election. What I find is a lot of people affect policy because they is what they can affect. They cannot affect a lot of other things so they affect policy.

I will divide it up for you.

Okay, go ahead.

I think leadership is the answer. I have seen policy without leadership and it does not work.

I will give a you the best example. The state of Louisiana spend over a half of a billion dollars in CAPCO and got nothing for it. I thought if you could find anybody that claims that really was the solution. It was great policy, Bobby, but where policy works is when leadership is there first and then asks for policy. That is when you find those two match. I doubt you will ever find policy before leadership. I think you have to have leadership first and I bifurcate them because I think that leadership is what gets you started, policy is what leaders do to take advantage of and support.

But a lot of people put in place the policies without the leadership and to me that is a waste of time and money.

That is a waste of time. Look a CAPCO, 500 million dollars was a big number that could have been spent on a lot of good things in Louisiana got put into worthless investments and Advantage Capital and they fiddle around with it and used it. They got fights with all the people who put their money in and it was a disaster. Policy without leadership is a waste of time. I will repeat that, it is my firm belief. Policy is what leaders get after they are there. When leaders are there, they can drive policy because leaders can do that and if you put policy in place before you have leaders, that is the biggest problem. I think that is a little bit of the problem in the Idea Village suffers from. They will put together a policy without having real leadership there. They have good guys with a nice friendly handshake as far as raising money but the reality of them being able to take

companies and incubate them and nurture them and develop them, they just do not work. That is why you need the leadership. Leadership is back to one of those key things, like when we talked about attitude and we talked about the ambiance and location, I think those all go together. Leadership is part of making a good ambiance, making it a good attitude. If the leadership leads the attitude right then people feel supported, they will come where the right people are doing the right things. That leadership will also put them together. I would divide them up, I have seen policy without leadership and it does not work.

I had thought about dividing them up and adding in governments because so many places put in government models like when we created New Orleans, Inc. Good concept of a 10 Parish region but it does not work that way.

I am on the board and I am trying to help them but it is back to the same thing. It is more of being something internal and getting back to where it is out chasing guys from out of state that want to build plants here. We learned a long time ago that we are not going to win that war.

If we do, we lose in the long run.

Those other guys who make those decisions and run those companies, they do care about crime, they do care about education, they do care about all the things that we score low on so it does not matter that we would get the young bright people here, they want to know about their middle-aged guy with three kids and a family.

We are not on their list.

That is not going to be a win for us. We need to fix that. I think that after the storm, the advantage of the Charter schools, Paul Vallas has been a great addition, I think we have got some good things going but those are 10 years down the road. But now and in the next 10 years, you are wasting your time trying to sell somebody to come to New Orleans unless you want to sell something

that goes on tax credits or something like that. I believe that as you go through this, governance is a piece of it but, again, if you don't have the right leadership, governance does not do you any good. Governance and policy fit together as a stage behind leadership if you can get it done.

I want to ask you about the last two. Knowledgeable and then social, knowledgeable is what the Universities can create. It is a collaboration, it is entrepreneurship training, it is University research and development, it is the educated workforce who have bachelors, masters, doctorates. It is interesting, some places that do just research and development but not mass job creation, they do the doctorates, Sophia Antipolis, France does that. A lot of other places are more about the bachelors and, frankly, in India they talk about all their engineers which are really technical digress, two-year degrees but that is mass job creation. So, how important is the knowledgeable.

I think this is very important. Obviously, without the knowledgeable you do not have anything to build on. We talked about before, people coming into a market but it is a lot easier if you are creating your own and you go internally. I think that this is a key part. We do not score high on it but we do not score low on it. Every place has bright kids and the question is, do they stay or do they leave.

What do you do with them.

Do they get involved in stuff here? Do they do into a family business and then become the second and third generation like you talked about? Are they open to creating new businesses? To me, the base incubator is the college and the Universities, creating the knowledge that we need for people to be successful. You get those kids that are 13, 14 years old that are already doing crazy things like Isaac Newton or somebody who used calculus in order to describe what he saw in the laws of nature. That is incredible and we have a few of them, not many. Most of our kids are going to come out with the knowledge and if the knowledge challenges them, if it really stirs them on , if it

moves them to look the right way then I think that the knowledge is very important. Alternatively, if you did not have knowledge based, you could attract the knowledge with the right ambiance and the right environment. It is a lot better grown than it is to try to attract them.

How important is it that the Universities collaborate with the local businesses? I can give you two examples. One is that I know Boh Brothers used to work with Tulane's College of Engineering all the time and when they killed the College of Engineering, Robin was talking and he said, "I used all the interns because that is where I got my workforce." I did the same thing at UNO, I hired as many technology people that I could get my hands on but I wanted to come to me when they were juniors in college and start interning with them because it created the workforce I needed.

I think that is very important. I think the problem with the Universities is that they are their own entity. They are knowledge for knowledge sake.

Academic purity.

Exactly. So, knowledge for knowledge sake has never generated any new jobs. You have to be knowledge for application's sake. If you can build the right kind of partnerships between the Universities and between the businesses, the problem I see is that those partnerships are pretty limited. Our businesses are not aggressive on the technology front so we do not gain much from it. If you have the right businesses and the right knowledge base, I think it is a perfect opportunity because you are putting them both under one roof. Your point is well taken. To have people get into applied knowledge, once they have mastered the basic concepts, is really outstanding because you re-trigger their brain to go in the vision. You have to have the vision. The vision cannot come out of a vacuum. Unless I am another Einstein or another Newton who is just going to sit and think of something new that nobody has ever thought of before and make history, there are not very many of them that come along in one thousand years, you have to have the vision. We go back to what our

definition of technology, in particular, it is a problem solving orientation, it is how we solve problems. In the real world, they know what the problems are. If they are in the academic world, most of the time, they are just going to go with theory.

My daughter, Mallory is at SMU, she is in corporate communications and math and wants to get an MBA. The opportunities for her to intern in Dallas are unparalleled to here. My son Matthew wants to go into genetics, he will start as a sophomore interning in North Carolina. We do not have that here.

We are not trying to teach the best stuff in the world but just to do the basic stuff and then go work at it and learn it while you are working.

Become affective the day you get out.

How to be an electrician and then do it when you are there, that can be something you should be working on after your first year. I think your point here is good and the mix of the two is more important than either one. If you have got the one, the knowledge is key, you have got to be able to part knowledge, most kids do not come with this stuff, you have to teach them. Transitioning that to how they can solve problems is where our Universities really

How you turn it into a career.

How they make it work, how does this really happen. That is where your knowledge of the technology park was a good thing because the theory was, you put them on the same campus, you would have the same interaction and that would help.

It did that well because I still, right now, have set up things for the engineering school and computer science and the business school working with the Navy. We have got 20 professors and probably 20 grad students involved. That helps.

It helps tremendously, especially when you get the professors because the professors add even more value.

That is right.

They get to see what the real world is doing.

Then they teach that to the kids.

Otherwise, they are just talking theory. The kids are learning, the knowledge they have to have is there but they cannot see the vision of how it can be used. Now, when I came out of Tulane, I knew all about accounting and I went into Anderson and they taught me how to apply it. It was two separate deals. Over time you could see, we began to hire interns and we hired younger people, after their junior year, to work on our audits during the busy season and even went to a different style of education that would do more than that. We never got quite done and Anderson went away. The reality check was that the kids began to see how they would apply it and began to understand what the issues are in the real world. That is where people fly, that is when someone goes in and says, "I see a better way of doing this."

That is right. Young hungry people who get how it works and they will teach you more than you will ever teach them.

Last one, social factors. That was important in Silicon Valley, there has been book after book written about the social factors of Silicon Valley, the collaboration, the people who were getting together, the dense inclusive social networks, we have that here in New Orleans but we do not have it in the technology stand. How important do you think that is?

It is pretty important. I go back to my thinking, it is not the number one thing but on the continuum it is in the middle. I think this is the reinforcement area. This is where you bring people in or you grow them yourself, then the question is, can they network, can they build their vision, can

they broaden their vision, can they begin to understand the world in a much more appropriate way to the way the world works. I think social is a big part of that. I think if you push them into a box and seal them in, that is like academics. You get someone who may be very bright to learn it but they do not know any applications of the real world. To me, the social thing is a support factor to grow. It is a support factor to broaden. Just like when you talk about job experience, the social factors are also important there. I think it is very important for people who think like this have other people to associate with and see that they are not alone and that they can have other people to build with. That is where you get the teams that build some of the greatest companies in the world. Very few of them are just one brilliant guy who sat down and wrote and developed everything. Usually it is him and two or three friends who really bounce off ideas and dream the vision together and support, I think the social thing becomes very critical for that. I also think that part of it is the reception and the market, getting back to what I was talking about earlier, that social aspect of that as well because if the market is not receptive, these people will say, "Well, I can go somewhere else."

Okay. I am going to ask you one last question. I know you have a lot to do. If you were looking at New Orleans, this is a region we are most familiar with, the greater New Orleans region, southeast Louisiana, southwest Mississippi, I have been able to characterize regions as neophyte (just starting out), adolescent or mature, from a technology standpoint. Where would you put New Orleans?

Neophyte.

Completely.

Yes.

Yes.

I use to audit hundreds of companies that technology should take apart, even when they got it they would use it for like a printer or like a Xerox machine, use it like a calculator or a typewriter, I never saw the real depth of understanding in the business community of what technology could do for them. I am not saying we are completely bad. The three things that I think caused this are, we do not have big companies, we tend to be ma-and-pop businesses. Ma-and-pop businesses are the toughest things to adopt technology in because they do not have access capital, they do not have access resources, they have to be competing every day or they do not eat. So, they not have the time to develop and learn. Secondly, I think that our education being so poor has not created enough flow of people, flow is out, to be honest with you. That outflow really makes us neophyte because we have kids that could do a lot here that end up going and doing it in Houston and Atlanta and Boston, etc. The third factor is that because of the lack of resources, we do not have investment capital that is out there. When Jim Bob Moffitt came in and Freeport had really been expanding during that time, we had got it mostly during the contracting phase, if they had been expanding I think they would have been they kind of company who would have hired the good people. I know they hired Mike Arnold who was one of my guys who was a brilliant consultant and a good technology guy. He has done all kinds of worldwide things. He lives in Indonesia, now and comes back every now and then.

They went to Phoenix or somewhere like that out west.

But they were one of the few companies that was functioning but they were shrinking, all the time we had them, they were shrinking. The lack of the leadership of the big companies, even IBM which had large offices here that sell product, got away from their office.

They were just selling product. They were not innovating.

Right, there was no innovation. So, we never had a real community that oriented towards that and generally technology when put to the place of application can be very expensive. Don't get me wrong, we are a bank, we are technology oriented completely, but we outsource it all, we just do not have technology jobs here. That is a shame because those kind of environments would generate bigger jobs, more people would do this and think about doing their own business and doing their own thing. I would say we are neophytes to be honest with you. It is not for lack of putting money at it. For example, if you want to list the failures, we are a good example of people who put a lot of money into it and it did not work. We did not put it in the right place, we did not have the right environment and we never followed up with the right leadership and the right people. We got a few success stories. I think the chance to re-write the book is today because of the New Orleans Rebuilding Program and the image that has around the country. In the budget crisis, what are we going to do? Are we going cut back higher education further? Are we going to do all the wrong things?

Can the government change this or does it have to change from the private sector?

The private sector has to drive. I will give you an example, when I got to Delgado, we were mistreated completely. No one understood what we did, nobody cared what we did, we were just a disaster. The only thing that got us back to getting funded right was just the business community had to get down and understand what Delgado did for them. Understand if you are in the hospitality business, where your people came from. This is not high-tech stuff. This is the way you get things done in the world. The business has to drive it because government is not going to drive it. Government is going to take the path of least resistance.

They have to facilitate it and make it possible.

They have to help you.

But they cannot lead it.

The demand has to come from business. The demand has to be from the business community saying, "We want this." If it is not from the business, it is not going to happen. Government is not going to do it automatically, in fact like I said, the path of least resistance is under the constitution rather than re-writing all the way we spend 30 billion dollars around this state every year. Instead of looking at that, we say, "Well, under constitution, we can cut health care, we can cut higher education." So that is what we cut. And we put these huge burdens on the things that are critical to our long-term survival.

We are cutting the things that are our future.

It does not make any sense. It is hard to tell a bunch of legislators, and I would say this to Bobby, "You are doing the wrong thing." The other day I heard him say something right, he said, "I'm going to go through all of the expenditures and I am going to really see what we are doing wrong and what we need to do and cut back." I think that is what he needs to do because he should not be taking these big chunks out of higher education, it does not make any sense. If it was California and we over funded it for 10 years, I could see taking some of it back. If you run it up to here and cut it back to here it is still way up. I am saying that we have been like this all along and then we take it down.

We aspired a mediocracy and now we are going below that. That is politics. When our mayor says, "Well, if we don't raise taxes, we are going to have to cut back on firefighters and police." That is because it hits everybody emotionally. Why don't we cut back on 100 extra cars that they don't need.

Why don't we cut back on the garbage stuff, not something we need.

It is ridiculous.

I agree.

One last question. You have any suggestions for improving this interview process?

The process is good, I thought it was a good thing. I think you have done a lot of research and you stimulate good activity. You had good input that could be reacted to. I think it is a pretty good process. The only thing I would say is, obviously, the key is in getting change made and getting people to do things.

Right now, this is about writing a paper and getting my doctorate but I can tell you this, I cannot wait to publish it and try to see if we can make a change.

I agree.

Dissertation Interview Questionnaire – Pete Wilson 03/22/2009

(1) Please describe briefly your current position and role within your organization and community.

Good. Well, first, thank you very much for agreeing to talk with me. Let me give you just a quick introduction as to what I am doing and walk through a few questions, if you don't mind. As you know, several years ago I decided to go back and complete my doctoral work in engineering and the topic that I chose for my dissertation is to develop a model for regional technology-based economic development studying regions all over the world and putting that effectively into a neuro network model but it is a simulation of a neuro network model. I have been able to identify a series of factors that are common to the different places that I've studied. Obviously, Silicon Valley is considered the granddaddy of them all, I have gone to Sophia Antipolis, France which I have always been very impressed with, and Limeric and Dublin, Ireland, Bangalore, Dubai and a number of places here like Research Triangle Park, etc. My last piece of that is to do a series of interviews and I have chosen people from numerous different backgrounds; two different secretaries of economic development from Louisiana, the current secretary, Moret, who is much more of a theorist versus the previous secretary who was much more of a practitioner. I was fortunate enough to interview Sandy Baruah who was the head of the Economic Development Administration under President Bush and he is a friend and was kind enough to give me a lot of time. I am looking at this from a number of different perspectives and I say that so that you don't think that I am coming to you looking for someone who is an expert in technology-based economic development. My purpose for the interview is that you were the Governor of California, a great innovative state and I have seen many things there, I am more interested in your opinion than I am in any statistics or specifics.

Okay.

If that is an acceptable introduction then what I would like to do is ask a number of questions.

Fire away.

Thank you, sir. First, Governor, I obviously know your background relative to your role of Governor of California and since then our friendship is being part of the World War II Museum but would you mind giving me a little bit more on your background specifically as a man related to involvement with economic development and the economic development program in California while you were governor.

Sure. It began, an obvious generalization that I think is valid, if you are a chief executive whether it is as a mayor or as a governor or as a president, you are inescapably required to be very much concerned with economic development. I think what that involves as the outset is the very candid self-appraisal of what your particular domain offers. What it offers and what are its liabilities in terms of trying to recruit or to woo investors, employers who would all be job creators. I have had two opportunities to do that, once as a mayor of a large city and then as governor of California. As a mayor, I was particularly involved in the city of San Diego and that comes back to the point of beginning with an honest appraisal of what you offer and what you do not. We had an economic development corporation which I thought was all but more abundant, it was just not terribly effective. Part of the reason was that we were not getting CEO's but third and fourth level people and I called the CEO's and I said, "Look, if you're not interested enough in this to spend some time working for economic development most specifically on a broad front to assist this city to become a whole lot healthier, then, frankly, I don't see why the city should continue contributing room tax, transient occupancy tax. We might just as well shut it down and we'll find other uses for

that money.” So, they came and I said, “Let's be very candid about what we think we might be able to do that we're not doing now. Let's be honest that there are certain things that we are never going to be.” We actually hired a person to perform that analysis, a guy named Victor Gruin from Los Angeles. I thought he did a very good job. He said, “Look, you're literally at the end of the line with respect to both power and water. So, major manufacturing industry that requires low-energy costs and low water costs and certainty that will have both are going to look with some trepidation locating in San Diego. To put it in simplest terms, there are certain things that you are never going to be. You are never going to be the home of oil refinery, you're never going to be the home of tire factories, you're never going to be the home of steel plants. You have been the home of aircraft manufacturing and that was a case of overconcentration.” And he was absolutely right because in 1960 there was an issue of Time Magazine where the cover story was “Atlanta Boom Town, San Diego Bust Town.” It is because there had been a real collapse of the airframe industry and we were overconcentration, we had too many eggs in that basket. So, I said to him, “Well, okay. I'm prepared to accept that. What is obvious that we have a great climate and pleasant surroundings? If we work at it, I would think we could develop a very strong convention in visitor business. What we do know that we have already are two things, one is the U.S. Navy.” We have, in San Diego county, Camp Pendleton, First Marine Division; we had the recruit depot in San Diego not far from downtown, actually right next to the airport; we had the 32nd Street Naval Station; we had the Naval Amphibious Base across the harbor in what they call The Strand, it is the peninsula that runs up into the boarder and the city is Coronado where there was, you may recall, the North Island Naval Air Station.

Right, I've been there.

We had a quite a lot of Navy and Marine Corps payrolls, not only military but civilian as well because there was a big aircraft repair shop over on Coronado, they were almost all division. That was fine but it was certainly not high-tech. There had been, finally after a lot of years, successful efforts to open a third campus of the University of California, there was one at Berkley, UCLA in Los Angeles and we managed to get one out of another Marine facility, the old rifle range at Camp Matthews was given up by the Marine Corps and it became the campus of the University of California at San Diego. It is just up at La Jolla, which I think is a separate city but it is actually part of San Diego. With that, we not only got a medical school, in time, but we had a big Veteran's Hospital, we had the Salk Institute named for Jonas Salk and the site of a great deal of his research, we had Scripps. So, we had, as it turned out, a rather impressive store of intellectual capital already there and had a big county that became the teaching hospital in connection with the medical school. In addition to the Scripps Research, we had Scripps Clinic. We had a fairly impressive concentration of medical research going on, to make a long story short, when Gruin came back to us with his analysis telling us all the things that we were not and we were never going to be, that was not exactly a shock, but he said, "What you do have is something that you should exploit." And he said, "The future for you may very well be in trying to attract what is essentially a new and growing industry and that is bio-tech." And we did. We wooed 13:20 bio-tech industry and a lot of them moved to San Diego, once some had moved, a lot of start-ups resulted. We all but assigned one valley called Serato Valley, we zoned it for light industry and research, we also had a very attractive area up on the cliffs in La Jolla, I know you've been out there you may have even played the golf course at Torrey Pines.

I did.

Well, right behind that up on that plateau behind the golf course were a whole lot of sites and in order to bring the kind of corporate headquarters that I felt were necessary, we very carefully zoned that but made it available over the protests of people who wanted it forever green, we were able to bring down those corporate headquarters. That was one thing we did. Then we made a concerted effort hammering that we needed a new convention center with enough space for trade shows. I came to office just in time for us to inherit what was then the 1972 Republican National Convention. You may recall, you may not, but it didn't happen in San Diego, it started there, we actually won the competition but it wound up in Miami Beach because the Republican Party moved it. They said they moved it because there was an inadequate site, they were going to use the sports arena as the venue for the convention. It really wasn't particularly good, it was too small and it was not a first-rate site for it but it was possible. They could have done it, in fact in a way, the small site might have actually assisted. They then complained that there were not enough first-class hotel rooms which I think, at the time, was a valid complaint but, again, not necessarily a deal breaker. Then they made a, not absolutely false, claim that they were not getting financial support from the city and the community. That was just plain phony. The real reason that they moved it was because of the then ITT scandal, there was a woman named Nita Perry who was a lobbyist, this is more detail than you need to know, but in any case, what they were afraid of is that the big ITT hotel on Shelter Island would become the backdrop for every television report that was covering the convention reminding everybody that this scandal had to do with the Fed's contracts. Anyway, they moved the convention. That, to me, said, well, okay, there is a political reason for that move but the fact of the matter is, we really needed to do something to maximize the tremendous opportunity given to us by nature, really, a very nice climate and attractive natural environment. Well, that was hardly high-tech but the interesting thing is that the major industry became light manufacturing and a lot of

it was bio-tech and a lot of it was high-tech. Now, fast forward a little bit to governor but before we leave San Diego, when I was mayor, when I was trying to recruit people to come and either bring jobs or create them, what I encountered was that they said, "We love San Diego, we greatly appreciate the welcome that you are extending to us but, frankly, we're not in love with California because it is too expensive."

Right.

"Taxes are too high, there is excessive regulation. When we try to get in to any community in California to put in a new plant, we encounter, what we think, are excessive unreasonable delays that cost us money and can cost us the loss of an entire cycle." Then, just to add insult to injury, the then governor was Terry Brown and he made the statement that he regarded using any kind of state funds to promote the state as a destination for convention and visitor business was like leaf-raking in the wind. That came back to haunt him when he and I ran against each other for the senate about 10 years later. Now, as governor, I came to office just in time to discover what no one else had really discovered, I was having lunch two weeks after the election in 1990 with my old friend who was then the incumbent governor, and during lunch he said, "I'm kind of troubled that we are experiencing some decline in expected revenue." Well, absolutely, while we were sitting there after he had made that statement, an aid from the Department of Finance came in and gave him the October revenue numbers which showed that we were down 260 million and I said, "Is that for October or is that for the accumulative four months with depreciating quarter?" He said, "No, sir, that is just for this month." And he said, "For the four months, we're down 400 million." Well, about a week later I went out on a Monday morning to draft the budget that I would have to submit about four days after being sworn in and my newly appointed director of finance, he walked in whistling, cheerful and upbeat and he said the staff who were waiting there, "If you don't mind, I need a moment or two

alone with the governor so would you please step out into the corridor.” So they did and I said, “So, Tom, what is the big mystery?” He said, “Do you remember that when you asked me to take this job you said that if there was ever a problem I should not conceal it from you.” I said, “Of course, I remember.” He said, “Do you remember when you said if there was bad news, we should break it to the public.” I said, “What the hell is the bad news?” He said, “The bad news is that you’re going to have to close a revenue gap of at least five billion dollars.” I will not tell you what I said then. Anyway, it took us about two weeks and at the end of the time that we finished it we had come to the conclusion that we would have to close a revenue gap of at least seven billion.

Wow.

Which we did entirely with spending cuts and as a result the liberal democratic majority in both houses when I submitted it hooted and hollered and pronounced it dead on arrival. By April, we knew that the gap had grown to at least 10 billion and by the time I signed the first budget, it was closing a gap of 14.3 billion.

Good grief.

What had happened was beginning in May of 1990, which was the election year, we started losing jobs for a variety of reasons. Talk about the perfect storm. There were defense cuts, base closures, and as you may recall, an awful lot of just corporate downsizing by companies trying to get leaner. There was a lot of people who made a lot of perfectly competent mid-level managers, one example, Bank of America acquired security specific bank, they had these guys who were perfectly competent who had never been out of a job suddenly they were out of a job.

Right.

And these were not hamburger flippers. The gap that we had to close amounted to one-third of the entire general fund.

That is extraordinary.

The other thing that was perfectly clear to me, Duke Macon who was a conservative republican, my predecessor, he had deeded a lot of bad bills that would have made the state even less attractive but what had happened is that they had passed bills really scare off the ad with the democratic majorities, he could never get it repealed. He was stuck with what was not really a very good business climate. In fact, in terms of the state's image, I think that we were deservedly perceived as indifferent or even hostile to job creation. When I came in and we had this revenue gap, I tried to put it to the legislature, they could not continue, we could not afford to continue with that image. I remember making an issue of workers comp reform and the two democratic leaders in the assembly in the state senate, Willy Brown was the speaker of the assembly and a man named David Roberti was the protom of the senate and they said, "Governor, that is not a budget item." And I said, "Listen, everything is a budget item if it affects the business climate. What do you think is causing the drop in revenue? Where aren't the states all around us experiencing the same thing?" And the answer is because they do not have the same business environment, therefore, do not have the same business image. Well, I said, "The fun part of this job could be, and I would be happy to have you with me doing it, is going out on the road and selling a good product. Right now we don't have a good product and we've got to fix it because the people who we are trying to sell it to are not stupid. They know what their costs are and they know what the competition is offering them." There was a one or two man bureau from every other state in the union in California trying to rate California's jobs.

Right.

This is a long-winded answer to your question but what happened is that part of the cure, I did take these guys with me to make a pitch to bring jobs to California. I will never forget one guy

in Chicago was the first really to sound the dissatisfaction and he was quite articulate, he said, "Governor, Speaker, Senator thank you for coming. You have invited us to this breakfast and, frankly, it seems to me that I know you're sincere but I think because of that I owe you candid response." He said, "I have been fortunate enough to increase my market share. I really need another plant in order to respond to the business that I am getting." He said, "I have already got one plant in California," he said, "I will be absolutely frank to tell you that it is the last place in the world I would ever dream of locating the next plant that I need." He then went through a litany of grievances, very specifically spelling out why and why it was so much costly to operate there. Well, that is exactly what we needed and that kind of opened it up. On the way back to the airport from that particular session, the democratic floor leader said to me, "Okay, Governor, I've heard it now. I was skeptical when you were saying these things but I am hearing it from the very people whom we are trying to woo and get to bring jobs." I said, "I'm a convert, we have got to make changes." And what I had done is set up, in my first year, a council on California's competitiveness and I had Peter Youbroth chair it, the guy who had successfully run the 1984 Olympics and had actually made a profit, return money, without spending any public funds. I said to him, "Peter, you and I know what's wrong with the business climate this date but we're going to have to go through this exercise and document it in order to get the legislative change and the regulatory reform that we need in order to be an attractive place in which to do business." So, he did that and at first the democrats were very skeptical, this was before I had taken them on the road. Part of what we said to them was, one of the things that is causing us to suffer is, frankly, we have got a first-rate, world-class higher education system but the K-12 system has really deteriorated and that affect worked for us. Believe me, I had employers complaining. The guy that was the head of the telephone company at that time, very smart guy and a good guy, he said, "We give an entry-level test that is based on about a seventh

grade level of competency.” He said, “The math part of it is particularly relevant,” and he said, “I’m going to tell you, we just test them essentially on arithmetic, on fractions, on percentages but we don’t even get into the most basic simple equations. There is no algebra, there is no calculus. This is seventh grade.” He said, “We give this to people who are presumably high school graduates, they have a diploma that so certifies.” But, he said, “Two-thirds of these high school graduates flunk that seventh grade exam and they shouldn’t.” He said, “If they are near enough to the line, if we are in need of bodies, we will conduct remedial education. Darn it, we pay high taxes, I don’t think that is our job. I don’t think it is our responsibility.” One of the other things that we did, I said to these same guys, “We’ve got to change the tax structure. The one thing where we do enjoy a present advantage is we have got a lot of very innovative people who are creating new products, new services and bundle of jobs. They are not all in Silicon Valley but that is the incubator. We have got some in San Diego, we have some in Orange County, a lot in L.A. but they do not necessarily have to stay there, they are not real estate based. If we’re not careful, they’re going to be wooed away by lower taxes, by less in the way of excess and regulation and by people who make an effort to get them.” We did a couple of things, we created a trade and commerce agency that was an economic development corporation, essentially. We have got a crackerjack woman, she was about as good as anybody I had ever seen. We discovered, by the way, that a lot of the problem was not just the high taxes at the state level, not just the educational deficiencies, but we had discovered that a lot of local government were the ones that were holding these people up when they were trying to move in. We created what we called Red Teams and went down to the community where people whom we were trying to interest in coming had decided that they might be interested in locating and effectively knock head together, got the county property department with the other local agencies and really said, “What is the hold up? Why can’t we expedite this? These

people are willing to meet your standards, let's move it." It worked pretty well. The other thing that we did do is for a long time, I don't know that it is still true, we had the highest state R and D tax credit in the country. We also made a concerted effort, I explained to these guys, "You are always harping on big business." I said, "It is small business that is the major employer in this state. There are 800,000 small businesses and I mean small and they cannot afford a whole lot of extra burden. You had better start looking out for them and if you're interested in start-ups then you have got to recognize that you'd better create something called an Operating Loss Carry Forward so that these guys in the bad early years, where they are building the business, can get well when they finally start to make money and have this offset." Anyway, we tried to do all of those things and it worked. We rescinded four thousand regulations. We did substantially change the business environment in California and we did make a point of courting high-tech entrepreneurs. We had already lost some, for example, Intel had opened two or three fabs in New Mexico because it was a lot cheaper.

Right.

Unfortunately, by the time I left office, in fact, my second to the last year of my two terms, we were producing more jobs annually than New York, Pennsylvania and Illinois combined. They image had completely changed. It was clear, we not only were welcoming people but we were aggressively competing and all of the guys who had come out from the other states to rate our jobs closed down their shops and went home. That is a happy story but the sequel to it is not happy because it did not take all that long, my successor, violated the state constitution after about two years his third budget was in violation of an express prohibition against deficit spending. The constitution says the Governor shall submit to the legislature a budget in which revenues and expenditures are in balance. He did not. He had said to me after he had won the election, he said,

“I’d really like your council.” I said, “You have been the controller, you’ve been the Lieutenant Governor, you have been here, you’ve seen it. Since you have asked, I will give you one piece of critically important advice.” I said, “I am leaving you a 12 billion dollar surplus after giving the biggest tax cut that the state has ever seen.” Unhappily was not in personal income tax because the democrats would never go for that, I got them to do almost everything else. They lowered the bank and corporation tax, it was lower than it was under Reagan but they never wanted to get away, as they saw it, taxing the rich and never seemed to understand that if you do that enough, you’re going to drive them out. I said, “I am leaving you this surplus but, Ray, I will just tell you that the only thing standing between financial ruin for this state and the irresponsible legislature who will otherwise achieve it is you. You as Governor and you alone will have to say to them, I am not signing this and do not bring me a budget that is not balanced.” I said, “Because if you don’t, I guarantee you, they will blow right through that surplus. They will spend every penny of revenue that the state is legally entitled to collect then they will spend money they do not have.” Violation of the constitution. He said, “I hear you.” For two years, he had balanced budgets and then I think he was fearful of getting a challenge from the left in his primary for his reelection. Twice before his reelection, the last two of his budgets were unbalanced, they were deficit spending. It was just amazing. First of all we had, a nice guy but a crappy candidate, his campaign was a disaster, the media barely mentioned the fact that we spent money that we didn’t have and operating in the red.

And just ignored the constitution and did it anyway?

Yes.

Amazing.

Here people take an oath to uphold the law and this constitution of the state of California and didn’t even blink when they were busting it.

Amazing.

What had happened this guy, as you recall, my successor was recalled.

Right, I do.

He got reelected and then in the first year, finally people awakened and were outraged, in part because he had also mishandled a power crisis, and Schwarzenegger won the recall election during which he said all the right things about how we do not have a revenue problem, we have a spending problem. Frankly, with the eminence political capital when he took office, after Ray Davis recalled, Arnold defeated the other candidates, he had huge political capital and if he had the guts to do what he needed to do then, to cut spending which had grown just meteorically. Then, of course, we had the bubble and the bust so they had treated what they should have treated as a one-time win fall, they spent it for an ongoing program not for a one-time capital. Anyway, he should have cut back spending and he didn't and he is now in trouble.

Big trouble. You know, it is amazing, we have spent so much time trying to capture the lessons of World War II, it is unfortunately that we have not captured the lessons of 1929 through about 1938.

Absolutely.

We are living them again.

I have been conducting this monolog and you're probably tired of hearing it, let me conclude it with one thing. We are now in a situation where the same people from the other states are back with these bureaus to rate our jobs. God knows, we are making it easy. We are practically inviting them because he has just signed a budget and finally it got around to some spending cuts, a big number around 15 billion. It is a small part of the massive increase of the last 10 years and an increase that is not justified by the growth and inflation or in population. Part of this package that

resulted in finally getting a budget was in addition to the spending cuts, they also raised taxes. They raised the personal income tax rate to the highest in the nation, ahead of New Jersey and New York and the same thing with the sales tax, that is now the highest in the nation. Guess what? We have been talking about Silicon Valley and the one industry that I know about, as it happens I am interested in terms of their water usage. High-tech companies, typically, are major consumers of water as well as power and we are going through a drought and it is the most serious drought, I had one of those in 1991, too and we created a water bank so that the people who had water would tell us of people who needed it.

I remember that.

This is an even worse drought, it is prolonged and it is scary. What has occurred, I have been trying to find out semi-conductor makers are in need of a reliable supply of water and what I am finding out is that a lot of them just are not there anymore.

They suppliers are not there anymore?

The manufacturers, I mentioned that early in my 10-years we had discovered that Intel had moved a lot of their operations, at least they opened new fabs to Mexico. A lot of them, whether we're talking about Intel or National Semi-conductor or NEC, have in many cases not only opened other places but have shut down here. I guess, what I would say, Bobby, is that the point of these two long narratives, both about being mayor and about being governor, is that there are certain things that you can do to try to attract innovation and have a high-tech based regional economy and we did have that for a considerable time. If you ignore the basics which cause uncompetitive operating costs because of your taxes, hidden taxes and excessive regulation, if you cause delay which can make projects infeasible in terms of their financing, you're going to lose business both high-tech and non-high-tech. I am going to tell you, having done it, it is not a quick easy fix to undo

that image and that reputation. While we had it, the high-tech community was a major employer and also a major source of revenues and a lot of their revenues derive from sales, not just domestic, but export sales and for a significant time during that period when we were out producing New York and Pennsylvania and Illinois, we were the premiere export state in the country. That honor has long since passed to Texas. Texas is booming, Texas is the big job producer.

Yes.

With no close second.

My daughter is in college at SMU in Dallas and the opportunities that are available to her in that area are unparalleled in any place I have seen and not necessarily technology jobs but all jobs. Actually, Governor, walking through the two things you have just did were extremely useful to me because you have lived both as the Mayor and as Governor, it is interesting because one of the first things you said was you took a good hard look at yourselves. That is one of the things that so many regions do not do, New Orleans is one of the worst at it, frankly, but certainly not by themselves. They will put together a cluster model and say here is what we would like to become and people will create policies and entities because they can, because they create policies to affect things that they can affect and don't affect the things that are, frankly, just too hard. I love what was done in Research Triangle Park in North Carolina because that was built on the vision of the then Governor, Governor Hunt, if I remember correctly, but it was a 40-year vision, it wasn't for the next election. The same thing in many other areas that have been successful and what I have found is that I have been able to break down the factors that impact regional technology-based economic development into six primary factors and each of those broken up into specific variables. Just in doing these interviews, this was not in literature anywhere, I have read one hundred books about this but what I have discovered is that there are really two aspects of it. There are those that go after real science

and technology as Silicon Valley did in the early days and then they created many high-tech, good paying jobs but Silicon Valley lost its lead in the production of silicon chips many years ago but what it did was created an engine of innovation where they continually innovated but then people such as Bangalore, India, in fact, all of southern India, they created mass job creation. Their technology economic development model was first based on rate arbitrage but then based upon education and the creation of mass jobs, they do not do research, they do not try to do things better than someone else, they do not try to go out and create anything, they just try to get the mass jobs that go with it after somebody else creates it.

That is right.

I have found places like Sofia Antipolis in France that is strictly research and development, it has got a great business school and they collaborate very well in the same model as Stanford but they do not do mass job creation. They are where they are and that is where they are going to be and they would love to go to the next level but, frankly, don't know how. Limeric, Ireland, their second largest export now, after agriculture, is software so they sought the mass job creation by having artificially low rates and numerous incentives for companies to bring jobs in which they did but now that the bubble burst, a lot of that was based on the credit bubble, they are losing jobs by the thousands every month and Bangalore beat them at their own game but they never did create the technology. They just went after the jobs and one of the problems with going after mass job creation is, you will get the jobs as long as you're cheaper than the next guy and have better policies and give breaks to the companies but if you don't have any other indigenous or inherent reason for them to stay, then they are going to move on to the next cheapest place as soon as it's available for them to do so. A lot of my research has been on trying to not only identify but quantify those various factors which I have had a ball doing, by the way, I am enjoying the heck out of it. I would like your

reaction to what I just said and then I would like to ask about some of those specific factors that I have identified and see what you think of those.

Okay. Ireland is a very interesting example because having been a very poor country, they awakened to the fact that they had a well-educated workforce with a work ethic and that if they made it attractive from a cost standpoint, they could probably bring in a lot of people. Well, they did, in fact, they brought in Intel, Intel went to Ireland in 1997 and the largest employer in Ireland was Intel.

Right.

Another big employer was a southern California pharmaceutical company called Allergan.

Right.

Suddenly they were no longer a poor country, in fact, I have got some Irish cousins who have lived through hard times, one of them is a business man said to me, "You know, these kids today have no idea of what it's like to be poor." Then he said, "I think they're going to have a rude awakening because I see some hard times coming." Your point that essentially money is a moral, as an investment, it will go where it can make the best return so will people who are trying to make money, they will go where they are going to be best treated. Part of making money is not having to spend it on taxes or other costs of operation. The one thing that I would say is that there are some interesting examples of people being influenced by the kind of life they are living in a particular place. This is, I suspect, unique, first because the example I am about to give you is not based upon a company as the employer in a profit making private sector situation, the Los Angeles Air Force Base which is something that most people here in Los Angeles look blank about, is actually an air force space installation. It is very high-tech and has some very highly educated people and in great numbers, they are not just aeronautical engineers but they are base scientists, a lot of Ph.D.'s and

there was an effort in the last barrack, the last base relocation effort, to move it to Colorado and it was unsuccessful. I think it was unsuccessful largely because they had come to the conclusion that they would lose about 80% of that extraordinary capital investment, the human capital, all of the education, all of the knowledge and experience because these people had simple put roots down on a change. They could find employment in other venues in Los Angeles County. That is interesting but not really relevant because the point that you just made, I think, is valid. People are going to go where other things being equal, they can operate at the least cost, and that makes them the most competitive.

The companies will do that. It is amazing, though, that your point about people, the type of people that are typically involved in technology industries look for certain lifestyles and that can be a huge attractor. A lot of places, New Orleans included, that have some attractiveness to those type of people do not quite know how to use it. It is unfortunate because it could be a big plus.

I think you're right. I think most people, at least a lot of economic development efforts, don't do a good enough job in selling what they have to sell.

Correct. And a lot of that is going all the way back to your first comment that most people will not do a true analysis of where they are. They just will not admit the weaknesses that need to be overcome and those that do, a lot of times, they don't get elected in four years. Leadership when it comes to creating a technology oriented regional economy is not a four year job.

No, absolutely not.

Governor, I won't take too much more of your time but let me ask you about certain factors. There are six factors that I have identified and I did this by grouping numerous variables together and then working this through the various interviews. I actually have some updates I want to make to this but I am going back to my original grouping to keep the interviews consistent. The first one

is the environmental factor that involves quality of life which includes safety but also leisure time activities and I mention New Orleans, it is amazing how many people who work in information technology love New Orleans because of the music and the lifestyle because so much of that goes together with people who like information technology. It is also support for technology initiatives, the available of tech-savvy investors, it is also the quality of the K-12 education system, the talented and educated workforce, those environmental factors some of which can be affected by government leadership, some of it can be facilitated, some of it can only be affected by private level leadership but that is one of the factors that I have identified. The question to you is, your thought on the relative importance of the environmental factor.

Well, I think they are important and I will give you what I think is close to home. You will recall that a couple of the board meetings that we have had, I have made a point or tried to make the point that the fortunes of the museum are going to depend on the fortunes of the city. We are inobstructively linked to the success that New Orleans has in attracting convention and visitor business. The foremost, most fundamental concern that you have if you are trying to develop a community as a convention and visitor destination is that people take for granted that they will be safe, that their personal safety will not be a question. The worst thing about Katrina from my standpoint was that we have suffered in the wake of that a rash of national news stories and every other one of them betrays New Orleans as the crime capital of the western hemisphere which is crap but we get those stories and it is primarily from people who are drug dealers that are drug deals gone bad. They are killing each other and a lot of that was happening particularly right after Katrina because of all of the vacant houses out on the lakeside and the lower ninth ward. We invited the mayor to come to one of our board meetings, we didn't even a response, two months went by, no response, the night before the board meeting, a staffer called up and said the mayor cannot make the

meeting. That did it for me, when then subsequently did have a meeting with the U.S. Attorney, who was terrific interesting enough he is a former student of Nick Mueller..

Jim Lattin?

Yes.

I didn't know Jim was a former student of Nick. I know Jim and I have extraordinary respect for him, I hope he is able to stay around. Our mayor could not be a bigger disappointment but you're right about the image, I get asked about that all of the time. Let me move onto another one. I identified a factor that is not normally identified in most literature and I called it inflow. Inflow of equity, inflow of talent, inflow of ideas and innovation, research and development grants, science and technology, it is not normally identified as inflow but that is what really created the economy in Ireland, that is what created the beginnings of the economy in Bangalore. Even in Research Triangle Park, inflow started it 40 years ago. It is not something that can be exclusive but certainly seems to have a direct impact on the ability to develop.

Well, I think it occurs because of the other factors.

Right.

What is definitely true is once you have got enough people who answered that description. You have got the innovators when you got the educational or the research institution, there is a person-base and once you have achieved it, that is a powerful attractor of more. If you have got a first-rate higher education system, in particular, if you have got schools that are performing research under a government contract, you're going to attract all kinds of people who are looking for that environment professionally and who are looking for all the good things that a community will offer. This is kind of an interesting thing, when you see San Diego open their medical school, the first year it was in operation it was ranked the sixth best medical school in the country.

Was it really? Wow.

And the reason was very simple. They had great success in attracting some of the best people in the business to move from Harvard or from Chicago or from Peter Brigham in Boston, who come and live in La Jolla and teach at the medical school. It really comes back to your point about lifestyle and about what attracts people who are very talented, very innovative and typically they want to live in a place that is pretty that has good climate that is large enough to attract a symphony orchestra and has a lot of amenities.

Right. I agree completely. In fact, what I have found is that one of the other factors that I have identified that I will not go through in detail is attitudinal factors. You mention the symphony, it is interesting because one of the reasons that I have identified that is I compared Phoenix and Tucson and in Tucson you have an old guard that has been there a long time that did not want to see a whole lot of change and doesn't have a whole lot of the attractive factors that you would find in a larger city, where as Phoenix has just the opposite, their attitude is very much focused on entrepreneurship, entrepreneurial risk and the image of creativity and value creation. I know in New Orleans, we struggle with the attitudinal factors here a lot because we're busy with the Port of New Orleans competing with the Port of St. Bernard who competes with the Port of Plaquemine while Gulf Port and Houston our kicking our behinds. It is interesting because those go together very well. There has been a lot written about the social factors involved in Silicon Valley and it is interesting because I have noticed similar social factors in other areas of the world but Doctor AnnaLee Saxenian has written several books Doctor Richard Florida, just the whole concept of social networking and collective learning, culture collaboration with the Universities and Stanford, in particular, with Silicon Valley. Do you believe that those social factors are as important as people try to make them out to be?

I think they are important. No question that Stanford has been a magnet, no question that Stanford has been a major beneficiary and they've had a number of people who have repaid the kindness of the University's policy while those employed as professors do have outside activity because it is a private school not a public University. They have had a fairly liberal policy with respect to allowing on the faculty to engage in research and they share in the profit. It has been very smart and it has paid them high dividends. There is no question, I think Silicon Valley would not be what it is if Stanford were not there and they have really had one hand wash the other. One of the interesting things, and this information is not the most recent but I suspect it is still true, for a time as kind of a rule of thumb, most of Silicon Valley were people who had come to it and about one quarter of them were Indian, about one quarter of them were Taiwanese and the rest were Caucasian and they had come from all over. Silicon Valley, I think, is the classic case of achieving critical mass as a magnet to further roads of the same people of industry.

And to follow up on what you just said, there are books that have been written about the visiting entrepreneurs, I guess is the best way to put it, and you're right, a lot from India, a lot from Taiwan and many other areas where people would move to Silicon Valley, live there a few years and take the ideas back to their own countries. In fact, there is a book called the New Argonaut that discusses exactly that, the brain recirculation with Silicon Valley exporting its model to the rest of the world. Of the various things we have discussed, the social factors, the policy factors, leadership, attitude, environment, inflow, what do you think is the most important in an entity, any area, North Dakota is doing extremely well right now in attracting knowledge-based jobs, an area that decides to go out and take a long-term view of creating a regional technology-based economy, what do you think are the most important factors we have to consider of these ones we have discussed?

I would say, still, the most important is cost of operation. If they are in a competitive situation, that has got to be a major factor. The other things I think are the things that you have been talking about. Part of quality of life would be not only the ability of an educated workforce but also educational opportunity for the children of the people whom you are trying to attract.

Yes, I have noticed that.

I will give you one quick example and it was not necessarily high-tech. One of the corporate headquarters that we springed, several years ago, was the WIX Corporation, it moved from Saginaw, Michigan to San Diego. San Diego was a lot more attractive place to live than Saginaw but after the relocation had taken place, about a year or so later, I got a really irate phone call one day from the CEO. Very good guy named Ed McNeilly. He had bought a home in La Jolla, he just thought San Diego was wonderful but a year later he called and raised a fuss about the inadequate school system. They were going to La Jolla High and thought it was a very poor school and what he was really complaining about what not only his own kids but all the kids of his executives. They had all been complaining that their kids were not doing any homework, it was not a challenging educational environment, they were not learning anything, they were afraid they were not going to get into colleges that they wanted. That is part, I think, a broad definition of quality of life.

I could not agree more. When I was hiring the IT in Louisiana and these were disciplines that did not exist there, I was hiring e-business architects and people soft programs, etc. most of the executives I hired, I had to offer to pay them extra so that they could send their children to private school because they had heard so much bad about the school systems in Louisiana. It was quite a learning experience but it is terrible. Unfortunately, we deserved the reputation.

That is right. I think the one good thing that flows from Katrina was that there was a blossoming of all kinds of charter schools.

That is true. I like the work that Paul Pastrick is doing and, obviously, I am a big fan of our governor, Bobby has been a good friend of mine for many years and I think if anyone can do it, he can. Governor that covers the main things that I wanted to discuss. I appreciate, so much, you taking the time to discuss this with me.

Happy to do it, Bobby. I advise you for going back and getting your doctorate. I am pleased if I have been able to be a little helpful.

You have been extremely helpful and I will share with you whatever I come up with.

Okay. Yes, I would be very interested.

I will see you at the next meeting, Governor, thank you.

Thanks, Bobby.

Dissertation Interview Questionnaire – Michael Hecht 03/25/2009

- (1) **Please describe briefly your current position and role within your organization and community.**

Feel free to say whatever you want. You will get to edit it appropriately.

That is fine.

Let's start with this. Give me a brief background in whatever you would like to about your knowledge base in economic development. I am particularly interested in regional technology-based economic development. How did you get into it, why you're in it, what is your background.

My background in economic development has come more from a practical and applied experience base in that I have spent time as a management consultant doing strategy for large fortune 500 firms. I have been an entrepreneur in a small restaurant business. I have spent time in the non-profit sector. I have spent time in the government sector working in New York City for Mayor Bloomberg and in Louisiana running a post-Katrina recovery program. In terms of technology, my experience really rests with my first experiences in San Francisco in the late 1990's, went to business school in the mid-1990's and then coming out during the dot com boom. I was in the restaurant business so I was not directly in the technology business or economic development. The multiplier effect, the impact of dollars, the impact of energy, the impact of ideas that came out of the technology revolution that was occurring at the time, it is really based on that.

Out of all the four sectors that we have at GNO, Inc. with energy trade, advanced manufacturing and creative and digital media, it is the fourth that I think is the most exciting because the first three are based on large pieces of fixed capital, major assets. The fourth is based on human capital and I think it is those people and their ideas and their energy that is really going to make this third act of the Katrina story a happy ending, a redemption story. In terms of my formal economic background, I really don't have much of one and, in fact, I have stayed away from it on purpose. I have never gotten my accreditation through an IADC or another organization because, quite frankly, I have found that most of the people who go through that process end up having an academic approach to economic development when in reality, economic development is really about running a business, it is about execution. I am not very interested in us doing a lot of plans and studies, I am much more interested in, as Jack Welch said, picking a direction and executing like heck.

You mentioned being an entrepreneur, and obviously I know this from knowing you previously, you have been an entrepreneur, you understand what being an entrepreneur is all about. What similarities do you see in the traits of an entrepreneur and the traits of economic development in a region, particularly related to technology?

A good entrepreneur understands that taking a project to completion is a bit like rock climbing, it is very incremental, you put one hand above the next whether you are talking about fund raising or product development or even roll-out, it is a seemingly slow process but suddenly you look down and you're 500 feet in the air. There is nowhere to go but continuing to go up because if you don't you're just going to fall and lose your funding and lose your product. Economic development, I think, is similar in that it happens incrementally, there are a lot of

small things that get done right, small adjustments to tax policy, small adjustment to work force and getting the right curriculum and the school, and then suddenly those things come together you have developed a new industry. Of course, when you're talking about technology, I think the direct connection is that is it more speculative. Like entrepreneurship, there is a very high failure rate but just like the failures in entrepreneurship tend to yield learning and other bi-products, unquestionably, the failures in technology tend to lead to other applications, other technologies. There are probably very few real dead ends.

I like that answer. In fact, I asked the same question of a serial entrepreneur at the Ceram Business School in Sophia Antipolis and he had a very similar answer. If you think about a product development lifecycle, imagine putting 20 of those back to back.

Right.

It is all about the continual product development lifecycle. That is one of the analogies in my dissertation and with Silicon Valley, it wasn't so much about mass job creation and manufacturing as much as it was innovation, create the jobs, then the jobs were usually sent to India or somewhere else but then there is the next innovation and created the jobs. It was a continual process. I will walk about that a little bit in one of the questions later. Based on what you have learned so far, do you think that economic growth is predictable? And I don't mean worldwide economic growth; I mean regional economic growth and in particular regional technology-based economic growth.

Do I think that regional economic growth is predictable? I think that economic growth is precedented.

Maybe a better word, precedented.

I believe that there are templates that can be applied. I think that there are generic things that can be done to spur economic development. For example, if you look at any city that has done well recently, I think they have had three factors in terms of economic development. They have had an engaged business community, they have had an acceptable quality of life, and they have had a strong visionary political leader. I think that if you put those three elements in almost any place and any region, you are going to be able to predict with confidence that they're going to see economic development meaning job growth and wealth creation.

Or the possibility thereof.

The probability.

The probability, that is even better.

Unfortunately, if one of those is missing, particularly the leadership component, you could predict probably just the opposite.

Right.

So, I don't know that you could say it is predictable but I think you can certainly say what the secret ingredients are, and this goes for countries as well. If you look at nations that have turned themselves around, South Korea, Ireland, some degree of Rwanda, Botswana, Costa Rica, these are places that basically put in place economic plans and executed them. I am utterly convinced that you can replicate this, with some modification for local conditions, anywhere.

That really is the core of what I am doing with my dissertation. I have studied the literature until it started going in circles, 100 books and I don't know how many articles, looking at 20 different regions, primarily around the world. I have identified a group of six factors and within those factors identified variables that I have found to be common amongst the areas that have succeeded. Interestingly, once I started doing the actual interviews, I learned a heck of a lot more than I could have possibly learned in the books.

Let me ask you to do something. Look at page 6 in the packet that you have. Then I am going to ask you to look at the page that follows that. There are, again, six factors and each one is made up of different variables, what I am asking is, do these factors actually impact regional technology-based economic development? If so, which ones are the most important and within that, can you weight the variables? So, look at a page 7. You mentioned environment, environmental factors. You will notice on the other ones, I have environment, inflow, attitude, and these were my break-downs based on all the books that I have read. We will go through each one of them but the environmental factor, there are some aspects you can do things about and some you cannot. I have asked people to grade them. People have done that with A through F, some have put percentages, and some have just ranked them of importance. Look at this and tell me, from your perspective, what do you think is the most important? Quality of life, for example, safety, low crime, leisure; we have great leisure time activities in New Orleans but we have an image of crime.

Right.

When I try to bring people into the city, it always makes it harder. Tell me which of these you think are most important in whatever way you want to rank them.

This is for technology-based economic development.

Right, regional technology-based economic development.

Okay. What is the best way? Do you want me to rank these one through ten?

However you want to do it. You can put A, B, C, D, F or you can rank them one through 10. If I miss something, just tell me what it is. Do it however you want to.

Can I do one to five?

One through five is perfect. I am going to normalize them.

Okay. I am going to do one through five, five high. I think quality of life is extremely high because these are creative professionals. Now, interestingly, I would say that some aspects of quality of life, like attractive leisure time activities is very important; safety, relatively low crime, I would say, not as important and I think that is one of our arbitrage opportunities in New Orleans is that if you're an immortal 25 year old, you're not expecting to get shot or to have to go to the hospital, it is not as important.

You are right, by the way, I completely agree with that.

Support for technology initiative, institutional support, which is pretty important when I think of the Bay Area. Availability of technology savvy investors, I think this is a real major problem that we have here, I am going to put that at a 4. Technology population, I am going to put that as a 2.

It has become less important. If you want to look at India, for example, southern India, you just have it. Northern India does not and if you don't have it, you don't develop.

Your next one, your non-economically disadvantaged workforce, you would think that would have no impact. What happens, though, is people want to live in an area that is thought of as being advanced.

But you can get a place like San Francisco which has the richest people in the country and abject poverty and there is just no middle-class.

That is right; there is no middle-class.

So, my answer to this, I almost don't know the right answer. I would give it a low answer because a lot of the places that have a lot of innovation around them, New York City, is an example, so I will give it a 3.

I agree.

Non-technology infrastructure, availability, I think this one is more important that people recognize. A talented, well educated workforce, I think that is critical. Quality of K-12 education systems, I think is less critical because the Bay Area has junk schools; New York City has junk schools. The Universities matter, the tertiary schools. Undergraduate and technology, this is a 5 plus.

The last part is regional, is it important to have a regional university system or is it important just to have the ability to educate people in science and technology? That matters a lot because if you look at Louisiana, we spend a lot of money in higher education. Frankly, if we

had less of a regional university system and we had a few places where we just bring in the top talent in the world.

If what you're saying is that it is better to have centers of excellence, I would agree with that.

Instead of getting 20 mediocre people, let's go get two Nobel Prize winners.

That is a crippling LSU problem.

Exactly. I think it is killing us. Inflow is something that I identified, it is not identified this way in most literature but let me tell you what this is. I have been able to identify two different types of technology-based economic development. There is the educated workforce, the intelligent jobs and there is mass job creation. Limerick, Ireland, and Ireland in general, went after mass job creation and then tried to bring along the education system. They never quite got there and now that the economy is falling apart, their unemployment rate doubled last month.

Right.

India could care less about innovation. What everybody thinks about their education system is not reality. They have more 2-year degrees than they have 4-year degrees but they have mass job creation and they do it because of the rate arbitrage. Those that seek mass job creation have to have inflow, inflow of talent, inflow of capital, inflow of ideas. Just like blowing up a balloon, the air is coming in, it expands. It is very different when you are trying to build a knowledge economy. Research Triangle Park built a knowledge economy, not necessarily mass job creation. Huntsville, Alabama is an adolescent economy but it is a

knowledge economy. They have never gone beyond aerospace but they are the perfect example of an adolescent knowledge economy.

Right.

So, that is why I have identified inflow because if you are looking at a decision tree whether you go mass job creation or you go knowledge, inflow matters. That is why I have identified this as a separate factor.

So, then, the question is, in terms of a regional based technology economic development.

How important is inflow? It can be on either one, you may want to rank it in two different ways.

Well, there is a difference, I think about what we suffer for here. We suffer for not having enough capital but it is really less of this because there actually is a lot of money.

Right. It just does not go into technology.

Right. You need the people and the ideas but really the culture, what we lack here is a culture of entrepreneurship.

That is the next one, attitude. You are absolute correct.

Inflow of government research and development grants, it is probably pretty important because it is big money, if you can get your hands on it.

It is of extreme importance to places like Albuquerque, Phoenix; we do not get very much of it. If we had more of it, in fact I will tell you about separately, but we just picked up five million dollars for integrated advanced manufacturing and simulation and modeling. I was going to tell you about it today, I just picked it up today. But that is nothing compared to the two billion that they have in Albuquerque.

Right. That is incredible. Inflow of revenue from outside the region, this is interesting, it says IPO funds raised by companies in the region, let's not call it IPO funds but I would call it liquidation event.

Okay. I like that.

Because it could be a buy-out. I think the point is that once one of our companies has a big event, a couple of things happen. First of all, it makes the news and also suddenly everybody who was in a senior level rank of that company is wealthy.

Right.

It is viral. I think that is very important.

A lot of times it can become viral. When we sold SEA, most people don't know this, but employees owned 54% of the company. We put 51 million dollars in the pockets of our employees.

Right.

And created wealth in this region.

That is the point, which is why the retention of the capital within the region is very important.

I think that and the inflow, in terms of the Shaw Group, for example, there are companies that exist on Essen Lane strictly so they can be near the Shaw Group. The jobs that we created here at SEA, all of that money came in from outside of the region. We were not fighting over the same pie; we were bringing in a new pie. That is wealth creation but it is hard. I bought Diamond Data last August and they were about 80 people at the time, we had gone out and won a couple of contracts, we are 130 people, now. Those 50 jobs have been created by money that came in from outside of this state.

Right. That is the point. People sometimes don't understand why small businesses don't get more attention in the economic development realm and that is the reason why is because small businesses are generally just churning.

Right. They are not bringing in new wealth.

Right.

That is what inflow is all about.

By inflow of revenue from outside the region, what do you mean by that? Do you mean exactly what we're talking about?

Yes.

Okay. That is a 5. I didn't do much here on the inflow so I am afraid these are lousy answers.

No, that is okay. They don't have to change that much.

Attitudinal factors, tolerance for entrepreneurial risk, very important. Failure has to be celebrated. Willingness to collaborate.

That is one of the things that drives me nuts about our state, and I love this state, but we are so busy with the Port of Orleans fighting the Port of St. Bernard fighting the Port of Baton Rouge and guess what, Gulfport and Houston are kicking our behinds. We try to do this previously at SEA, we did it actually, we were able to bring in extra money but as a whole, we don't do that in this region.

No, there is smallness. It goes back to people here come from a culture where conserving wealth is more important than growing wealth.

Exactly.

This is all kind of part and parcel. It is almost like the prisoners dilemma. This entire region exists in the default box of the prisoners dilemma where it is just easier to be suboptimal but know that you're safe than to go for the parade of optimizing answers that puts them at risk.

That is a perfect description. We sub-optimize and we protect wealth as opposed to try to create the next generation of wealth. Interestingly, one of the places that I looked at was Tucson and Phoenix because I had someone that I was interviewing on both of them and there is an enormous difference between Tucson and Phoenix. The difference is attitude. Tucson is busy preserving the wealth it has and there is no desire to go beyond where it is. Phoenix, wide open, lots of cash and ready to go invest into the next item.

That is incredibly important. Attitude of grow your own versus focusing funding on outside attraction; I don't know the answer to that one.

That is a tough one.

Yes, because it is two different models.

And it might be that both of them are equally important.

This is very important, it is, how do you get academia to not think of the business world as evil and not be so wrapped in up IT issues that they cannot do a thing.

I am on the board at Loyola University and we just finished our strategic planning offsite and half of the room is filled with the Jesuits and half are board members and I discussed this and tried it in three or four different ways, the bottom line was that what happens with business doesn't matter and it is the future of academia.

The schools that have figured that out and have gotten their lawyers to cooperate do very well.

Right. Part of the reason my daughter Mallory goes to SMU is that they have businesses engaged from the time their sophomores all the way through until they graduate.

Item 10, you don't have to rank each one of these that was just to give you an example of the type of items that I was talking about.

So, for attitudinal factor, tolerance for entrepreneurial risk is the one that I am going to give a 5+.

It is a hard thing to teach.

It is very difficult to teach because it is something that is a deep cultural trait. For example, my wife is Danish, she has a very European attitude towards debt, debt is bad, and debt is shameful. I have a much more American attitude. Now, I don't know which attitude is right but these are just ways that we grew up.

That is interesting. I kind of grew up in a family that was growing up in the depression and it as the same way.

Precisely right, you do not go into debt.

You mentioned leadership. Leadership and policy I put together and I may separate them because there is also governance that factors into that. What I find is that a lot of people affect policy because they can affect policy but everywhere that I have seen throughout the world over the last 50 years that have been successful has been because of leadership.

That is the unfortunate thing about all of this is that every case study you look at, for all of the nuances, you always come back to the same thing, it is about that one guy or gal, always.

Senator from Lafayette who had the vision of Sophia Antipolis, Governor Hunt who had the vision of Research Triangle Park.

Tom Murphy in Pittsburgh.

Exactly. In fact, I had not even thought about that, you're right.

Pittsburgh should be Detroit right now but instead it is the robotics capital of the world.

That is a good point, I need to go look at that.

I think that Murphy had a lot to do with that.

So, how important are the policy factors such as a business friendly tax structure?

I am going to give it a 3 because some of the most innovation places are not business friendly.

Right.

California is a catastrophe. Tax breaks for R and D, angle and start-ups, my sense on this stuff, and you would know this as well as anybody here, is that these things don't pass the "if not but for" test. People who are smart enough to take advantage of them can make some money on them.

We did them when we bought Diamond Data but that is just because they were there.

I called the one here the Bobby Savoie Angle and Mr. Tax Credit program because you are the only person who I have ever known who has done it. I would put these at a 3 at most. State and local support for workforce training, I would put as a 4, it is a question of, is it done well. The next, a 2. The next, 1, 0, I don't believe in incubators, I don't think they work.

Because most of them are not what they should be. Sophia Antipolis, great. Incubators that bring in businesses and say we're going to give you joint shared secretaries and shared office spaces, they're nothing.

You give somebody cheap rent for a year and then kick them out, congratulations. Public sector vision and leadership, 5 plus. Private sector and leadership, 5 plus. You need both of them.

That is what I was going to ask you. Is one more important than the other or are they equally important?

Yes. The public sector is the most important, I will give this one a 5, because if you think about it, if you had to have either an extraordinary elected leader or an extraordinary business community and you could only have one or the other, you would pick the executive, I think. Look what we have right here, we have a business community that is increasingly on it, we are not Houston, we are not New York, we are increasingly on it, you can stymied by that. Very important.

We actually only have two others, knowledge, this is the whole university thing, the entrepreneurship, the collaboration, how important is the knowledge factor in the creation of a regional technology-based economy? Some of this is measured because it can be measured, educated workforce, but is important just because we measure it?

A lot of things are. I guess the question is, can we think of a place that has had regional technology-based economic development that has not had a university or universities as the nucleus. I don't think that example exists.

No. They have all had some involvement. It could vary widely. Ireland brought in Trinity and University of Limerick after they started getting the jobs but they brought them in.

Ireland made more of an arbitrage play.

They made an arbitrage play with India.

Right. We have got river taxes, our people speak English, and it is like Puerto Rico and pharmaceutical companies.

Right. Then you look at North Carolina, they specifically went after the knowledge factor first. Same thing with Route 128, same thing with Silicon Valley, same thing with Austin, is there places that have done it without them? Not that I know of.

It seems difficult. So, I'm going to put this one as a 4+. Technology transfer and collaboration between.

This is getting the Universities and industries to work together.

It is pretty darn important.

Yes. It is interesting because we keep talking about wanting to do composite manufacturing out at Michoud, there is not a composite manufacturing program taught in this state. We could still get it because we can put in place a forty foot autoclave, but we don't teach it. Well we'll have to.

My frustration with the universities always comes back to the story of the Maritime Architecture School at UNO; it is one of the leading ones in the world, now. It only happened because, who was it? Bass or some business person just insisted that this thing was going to happen.

It is a great program. We don't take advantage of it enough but it is a great program.

This is depth as opposed to breath. UNLB has a great nuclear engineering program, it doesn't matter because it has not created any jobs there other than that test site and they were going to have that regardless. Is it important to have a deep program?

I don't know the answer to that one. Entrepreneurship training and collaboration, I don't think this is nearly as important as the culture, I don't think you can teach entrepreneurship. I have a good friend from business school who teaches entrepreneurship at University of Texas, she has four degrees from Stanford, the only job she has ever had in her life is as a consultant to McKenzie. Lovely woman, what on earth is she doing teaching entrepreneurship?

I have lectured a lot on entrepreneurship and I agree that you cannot teach it. You can tell everybody, here are the pros, here are the cons, here are what you need to look out for, do this, don't do that, but you just cannot teach entrepreneurship.

It is a feeling.

What is interesting is Doctor Bob Beyster, who was the founder of SAIC; when he left they were eight billion. I talked to him once when they were about two billion and we were a one million dollar company, I said, "You know, I wake up every day scared to death that we are going to go out of business." He said, "So do I." They were two billion at the time, you never lose it.

It is a certain edginess which is very productive.

Defined strategy for creating future knowledge workers, I think that is probably fairly important. The next one, I am going to put as a 4+. Strategy for regional cohesion and technology transfer and commercialization, what does that mean?

A lot of what you guys try to do in a 10 Parish region but more targeted towards reaching into the Universities and trying to pull out whatever technologies they have. Frankly, we don't do a very good job of it here. I have seen it fail at every national lab that I have ever worked with and I don't know how important it is. I have read about it. I heard people talk about it. I have never seen it work.

Let me put in one thing on the next one here, competent.

I like that, thank you.

I think a competent one can make a big difference. The problem is that 99% of them are lousy.

College and business focus entrepreneurship, I will give it a 4. Here is the thing, I went to a business school with a focus on entrepreneurship in an area that was known for entrepreneurship, and the school itself was lousy in terms of the entrepreneurial program and the teaching. I learned nothing at Stanford that served me in my entrepreneurial adventure coming out of that because I was being taught by academics. However, the fact that I had gone to that school helped me raise money, gave me credibility on the street as an entrepreneur.

I understand.

In a secondary way it helped. If you look at what has driven innovation in Silicon Valley, it is engineering school, not the business school. The business schools are the guys who go to Sand Hill Road and fire all the innovators.

The last two, I am trying to understand how important are the bachelors and masters versus Ph.D.'s.

Maybe you can help me here. I am willing to bet that the bachelors or masters is probably very important but that the Ph.D. is a little bit more hit and miss. You are going to be the exception to that you are going to be an entrepreneur with a doctorate.

I am getting mine after I was an entrepreneur.

A lot of these guys did not graduate college, they dropped out to go and start their company so I don't really know.

Again, this is one of the things that we measure, I asked Sandy Baruah about that and his opinion was, yeah we measure it and it doesn't matter.

I am going to grade these actually because what I think is very important, which you don't list here, is horsepower. Horsepower to me is smarts plus drive. That is a 5+. You need horsepower and our region lacks horsepower.

I like that. I have to figure out a way to describe that because that is very well said.

Our bench is really thin when it comes to people who just get stuff done. Somebody like a Ron Foreman, love him or hate him, Ron has built some great institutions. He gets things done.

Look at the center across the river, research on endangered species, they are doing incredible things but nobody knows about it.

Somebody like a Leslie Jacobs, she goes around making everybody angry at her but she gets stuff done. You need those types of people and as a region we lack those types of people.

I am going to try to come up with a good way to describe that but I completely agree with you. In fact, you just nailed it that is one of our biggest issues here.

Last factor, social, this is the whole social interrelationships, all the wonderful social factors related to Silicon Valley. It is interesting because I have learned in so many other areas, it was not important. We have, for example, great social networks in New Orleans not necessarily amongst the business community, we have social networks, and they don't mean anything to us from a standpoint of entrepreneurship.

They are actually the opposite because they're a drain on capital.

Exactly. I use to be part of the business council but I got tired of going and listening to everybody talk about how they had all their money and were not going to use it for anything.

The culture of collaboration I found important, the culture of change I found important, beyond that, these were all things that there was book after book written on Silicon Valley about it but how important is it, really?

I do think that the culture of change is very important. The culture of collaboration is an interesting one, on one had you have collaboration and it is great, on the other hand cut-throat competition is also good.

You can do both.

Right. I will say 4. Deep inclusive social networks, this is a funny one, this is a problem that we have here is that a lot of talent is coming through here right now but we risk losing a lot of it because we have dense social networks but they're not inclusive.

That is why I added the word inclusive. When we were hired a lot of SMEs, they wanted to know that there were other entities here that if it didn't work out with us that they could get to know other people here. We created some of our own music groups so that we could get people to know each other. We lost some employees to SAIC and Entergy because we introduced them to each other but ultimately it helped us recruit people.

This is why, for example, we are opening this tech quarter building over here on April 16th. It is an englomeration. It is getting IC's, Turbo-Squid, CALPRO Technology Partners, Idea Village for some reason Rob Kuhig all in the same building because they are going to steal each other's employees but that is good.

Sometimes companies, like ours, we do it on purpose. I have hired some Turbo-Squid people and I have given them some of ours.

Collective learning is, I don't know, but geographically clustered, I do think there is something to that, to being proximate. Focus on growing and training technology, that I think is very important and we have gotten that from Moret. Steven is absolutely determined that creative and new media and digital is the future of this city and he has gone to the map for me for it.

And he is right, by the way. I think it is great.

Yes. If we can close this deal, it will be the first big win on that one.

Investible capital with entrepreneurial focus, I think it is important and we do not have it. I was talking to Chris Schultz at Voodoo Ventures the other day, it is a little shop, he said, "Michael, I have raised money in L.A., I have raised money in Dallas, I have raised money in Tibido, I've raised money in Monroe. I have never been able to raise a single penny in New Orleans."

I have never raised money to buy anything up until we bought Diamond Data because I have always done it with my own money. I raised money here but I raised it from people who knew me and knew we had done it before. It was not just going out and raising money.

Collective identity, 3. Openness to risk taking experimentation, I think is important. It has got to be a place where it is celebrated.

Those were the factors I have identified. In these interviews, I am changing that somewhat. By the way, I am going to share all of this with you when I get it all done. Just looking at these factors, on page 13 I have listed them again, which ones are the most important? What of environment, inflow, attitude, leadership, policy, what is the most important? I think I heard you say leadership earlier.

If I had to say what was the most important, I would say leadership and policy followed by culture. Then I would put last, business conditions, cost of doing business, incentives. The reason why I think we have a good chance to do it here is because we have these three seeds, we have culture, conditions and cash. You need culture, cheap business conditions and incentives that are worth a lot of money.

Right. By the way, they did a media incentive that we are using a lot of, I will tell you about a project that we are getting ready to start on that and I think it is going to be great. Look at page 14. I have been able to categorize by weighting these various factors and I have put them in a model that I will show you in a second. As an engineer, you can create anything mathematically. If you list it, you can model it, you create a mathematical model. I have also ranked different economies as neophyte, adolescent and mature. I have also ranked them as self-refueling, stagnant or depreciating. You can have a mature economy that is depreciating. Where do you put us in neophyte, adolescent or mature?

As an economy?

As a regional technology-based economy.

I truly think that we are a neophyte. I think that we are an emerging economy. I think we are like Vietnam.

I think if we changed a few things we could be so much better. We are not there yet. By the way, if you will look at page 19. If I look at all the external events and the outflows and inflows, environmental, policy and social variables are within the region; knowledge, inflow and attitudinal are affected by external events. If your inflow is greater than your outflow, it is self-refueling. If it is not, it is either going to be equilibrium or depreciating. I can commit this to a neural network model that can then learn from itself but that is not what is really important. What is important is the decision tree. This is one of the things I learned from the interviews. Are we going after a knowledge based economy or are we going after an economy that is a gross jobs producer? Bangalore, Limerick, Sophia Antipolis, Research Triangle Park, you can do both

but the variables are different and the focus is different. It is interesting because I don't think we have decided which one we want to be here yet.

No, we have not but this is very interesting to me because I feel that implicitly, in my mind, I have been trying to develop this into a knowledge based economy. Whereas actually other industries as more about gross job producing, the more mature industries. We have never explicitly made that choice.

If we do, it affects where we focus our money.

Absolutely.

That is why I was so impressed by what Steven Moret was saying, yes we are doing some things that are job creators now but what he is really looking at, he is not going to try to compete with people that are 20 years ahead of us in biotechnology or in nano manufacturing, he is going to look 40 years ahead and say, "We are going to go into the next level and we are going to create that knowledge economy." That is the digital media items. We picked up a couple million dollars of NASA money, actually it is Navy money but we are using it with NASA, and what we are going to do is a 3-D model of the Michoud facility, not just the facility itself, but the workflows, the equipment, the engineering, all of the intelligence that goes in it, we are going to bring in the Cisco TelePresence capability but then we are going to build a gaming engine and we are going to do the robotics. We are going to create a robotics system that college students can access and teach robots, just by playing with them that ultimately go to the moon and go to Mars. I could have 20 taskers working for NASA doing it or I could have 20,000 college students teaching it and we're going to use that to learn and to teach the system. We have just,

literally last week, had NASA approve us to do that. That is going to be a kick in the behind. Now, how far we can take that, how much money we can put into it, I don't know but if we can get the Department of Defense to accept it, then we have accessed a billion dollars. We have five million in it right now that we have gotten approved to put into it. That type of thing, I think, we can do in this city. It is a whole different story.

That pretty well covers the interview. I will have it transcribed; I will send it to you for you to comment on. As I pull this together and draw the conclusions from it, I will share it with you. My actual defense is on the 16th of April so hopefully I will get past it. Anything that I can do to return the favor let me know.

This is a thrill. I would be very interested in reading it. You have thrown out a couple of issues that we have just not thought about yet.

APPENDIX D

Scoring of Factors and Variables Obtained in Oral Interviews

Environmental Factor										Average
(1)	Quality of Life	4	4	5	5.5	5	5	4.25	3	4.47
(2)	Support for Technology Initiatives	5	2	4	4	5	2	3	5	3.75
(3)	Availability of Technology-Savvy Investors		3	4	3	3.5	1	4.5	5	3.43
(4)	Technology Population	5	5	2	4	3	3	4.75	1	3.47
(5)	Non-economically Disadvantaged Workforce			3	5	2	5	4.25	2	3.54
(6)	Non-technology infrastructure	5	2	4	4	3	5	4	2	3.63
(7)	A talented, educated workforce	5	3	5	4.5	3.75	5	4.5	4	4.34
(8)	Quality of K-12 education systems		4	3	5	3.75	4	4.75	4	4.07
(9)	Undergraduate, graduate & post graduate programs in technology sectors, including Science and Engineering		4	5.5	4	5.5	4	4.5	4	4.50
(10)	Strong Regional University System		3	3	4	5.5	2	4.25	5	3.82

Inflow Factor										Average
(1)	Inflow of equity capital and debt financing	5	4	4	5	2.75	2	3.5	3	3.66
(2)	Inflow of talent	5	4	5	5.5	5	3	4	3	4.31
(3)	Inflow of ideas and innovation		4	5	5.5	3	4		3	4.08
(4)	Inflow of government Research and Development grants	3	3	5	4	3.5	2	4.5	4	3.63
(5)	Inflow of revenue from outside the region	5	4	5	5	3	5	4.25	5	4.53
(6)	Inflow of Science and Technology funding	3	4	4		5.5	2		4	3.75
(7)	Inflow of private funding for researching and development	4	3	4	5.5	4		3.75	3	3.89
(8)	Retention of capitol within the region	5	5	5	2.75	3.5	4	4	4	4.16
(9)	R&D expenditures within the region by Universities		5	4	3.75	3.5	1	4.5	4	3.68
(10)	IPO funds raised by companies in the region	3	4	5	3.5	3	2	3.75	1	3.16

Attitudinal Factor									Average	
(1)	Tolerance for entrepreneurial risk	3	3	5.5	5	5.5	2	4	5	4.13
(2)	Willingness to collaborate for mutual success or technology advancement	5	3	4	5	5	5	4.75	5	4.59
(3)	Image of creativity and value creation	3	3	4	5	5	5	3.5	5	4.19
(4)	Value placed on human capital	3	3	5	4.5	5	4	4.5	5	4.25
(5)	Responsiveness to innovative investors	5	5	4	4.5	4	1	4.5	3	3.88
(6)	Active promotion of the technology sector	5	4	4	4	4	4	3.5	4	4.06
(7)	Attitude of "grow your own" vs. focusing funding on outside attraction	3	3	3	5	3.5	3	3.75	5	3.69
(8)	Willingness of investors to consider technology investments	5	3	5	4	3	3	4		3.86
(9)	Belief of business and education communities in the importance of technology transfer and commercialization	4	4	5	4.5	5	3	3.5		4.14
(10)	Entrepreneurial focus on the population	4	4	5	4	3	3.5			3.92

Policy Factor										Average
(1)	Business Friendly tax structure	5	4	3	4.5	5	5	3.75	4	4.28
(2)	Tax Breaks for R&D, Angel investment and Start ups	4	5	3	4.5	4	5	3.75	4	4.16
(3)	State and local support for workforce training		4	4	4	4	4	3	4	3.86
(4)	Simplified application processes for new businesses	5	5	2	4	3	4	3.75	4	3.84
(5)	Establishment of business 3 incubators and tech parks	3	5	1	4	4.5	4	4.25	5	3.84

Leadership and Governance										Average
(1)	Public Sector vision and leadership	5	5.5	5.5	5	5	5		5	5.14
(2)	Private sector vision and leadership	4	5.5	5.5	5	5	5		5	5.00
(3)	Regional Governance		5.5	5.5	5	5	5			5.20

Knowledge Factor									Average
(1)	Commercializable University research and development	3	5	4.5	5	5.5	4.75	5	4.68
(2)	Technology transfer and technology collaboration between Universities and industry, including plans or strategies for targeting technology sectors	5	2	4	5	5	4.45	5	4.35
(3)	Depth of technology initiatives and targets including existence of technology/business incubators	3	2	3	5	4			3.4
(4)	Entrepreneurship training/collaboration	4	3	3	4	2.75	4.25	4	3.57
(5)	Collaboration and idea sharing between firms; joint marketing	3	2	4	5	3	4.75	3	3.54
(6)	Defined strategy for creating future knowledge workers	3	2	4	4	5	5		3.83
(7)	Technology commercialization support	2	3	4.5	5	5.5	4.5	5	4.21
(8)	Strategies for regional cohesion in technology transfer and commercialization	2	1	3	5	5	4.5	4	3.5
(9)	Effective Economic development organization with knowledge and charter to focus on technology	5	2	4	5	5	4.75	4	4.25
(10)	College of Business with focus on Entrepreneurship	1	2	4	4	3.5	4.75	3	3.18
(11)	Educated workforce	5	4	4	5	3.5	4.5	4	4.29
(12)	Advance Education	3	3	3	4	3.75	4.5	4	3.679

Social Factor							Average	
(1)	Culture of Collaboration	1	4	4	5	4.5	3.5	3.67
(2)	Culture of Change	5	3	5	5.5	4.5	3.5	4.42
(3)	Dense, inclusive social networks	5	4	4	4.5	4.5	3.5	4.25
(4)	Collective learning	5	3	3	4		3	3.60
(5)	Geographically clustered/technological base	5	4	4	4.75	5	5	4.63
(6)	Focus on growing and attracting jobs instead of sole focus on established industries and companies	5	5	5	5		5	5.00
(7)	Investible capital with entrepreneurial focus	5	3	5	4		5	4.40
(8)	Collective identity	5	5	3	4	3.75		4.15
(9)	Openness to risk-taking and experimentation	5	4	5	5.5	5		4.90

Robert A. “Bobby” Savoie Vita



Mr. Robert A. “Bobby” Savoie currently serves as the CEO of Diamond Data Systems and the President of its parent company, Geocent, LLC. Geocent was formed in 2008 to acquire and integrate several related firms in the fields of Information Technology, Nuclear Engineering and Energy Services, and Defense and Aerospace Manufacturing Support. Geocent is working with both government and commercial clients in six states. Mr. Savoie is also in the process of completing his doctoral studies in Engineering and Applied Sciences at the University of New Orleans. Mr. Savoie’s recent honors include:

Loyola University Alumnus of the Year, 2008
Young Leadership Council Role Model, 2004
Eward Growth Company of the Year CEO, 2003
Ascension Catholic High School Distinguished Alumnus, 2003
Ernest & Young Entrepreneur of the Year Finalist, 2001

Mr. Savoie is currently serving as a member of the Board of Trustees of the National World War II Museum, Loyola University, the UNO Research and Technology Foundation and Isidore Newman School. He is also a member of the Board of Directors of Geocent and Longenecker & Associates. Mr. Savoie previously served as a Director, Trustee and/or Advisor for the Atlantic Council of the United States, the Louisiana Technology Council, the U.S. Small Business Technology Foundation, the New Orleans Business Council, the Boy Scouts of America, the Academy of the Sacred Heart, and the J. Bennett Johnston Science Foundation.

After a 28 year career as an Engineer and Chief Executive Officer, Mr. Savoie resigned in August 2004 as CEO of Science & Engineering Associates (SEA) and Vice-Chairman of its parent company in order to return to school to pursue his Ph.D. in Engineering and devote more time to civic and humanitarian activities. Mr. Savoie previously founded Integrated Resources Group (IRG) in 1986 and served as CEO until IRG merged with SEA in 1997. Mr. Savoie became President and then CEO of SEA and guided the company through an extraordinary growth period during which the company transitioned from a small consulting firm to a \$120 Million per year technology corporation with four subsidiaries and 14 offices in 10 states nationwide. Under Mr. Savoie’s leadership, SEA’s revenue grew 700% in five years. After its merger with ITS to form Apogen, SEA continued to grow and ultimately became part of QinetiQ North America.

Mr. Savoie holds a B.S. in Industrial Engineering from L.S.U., and an MBA from Loyola University. He currently expects to receive his Ph.D. in Engineering Management from the University of New Orleans in May, 2009. He is married to Lori Kent Savoie, formerly of Houston Texas. The Savoies reside in New Orleans, Louisiana with their three children, Mallory (21), Matthew (18) and William (13).