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Development of a Business Case for Investment in Analytic Software: An Organization Development Perspective

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An Exploratory Case Study

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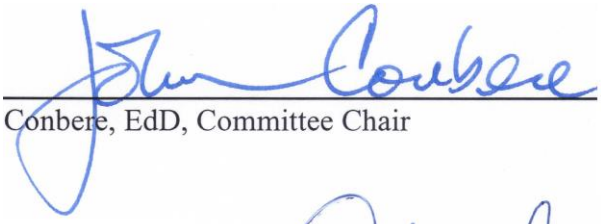
We certify that we have read this dissertation and approved it as adequate in scope and quality. We have found that it is complete and satisfactory in all respects, and that any and all revisions required by the final examining committee have been made.

Dissertation Committee



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ABSTRACT

Expenditures for data and analytics may be among the most costly investments an organization can make, and yet the traditional cost-benefit models that support decision making about those investments have themselves become outdated approaches – often leaving out the social and socio-economic factors that are related to development of new capabilities. This exploratory case study considers alternative perspectives about the construction of the business case for organizational investments in software used in analytics. As investments in new analytic capabilities are considered, costs for new technology are often evaluated and weighed against potential benefits. Although there are many potential points of view that could be considered, legacy organization development theory and the Socio-economic Approach to Management (SEAM) provide critical perspective. Cross-model comparisons show how paradigms of thought can affect evaluation and measurement of costs, benefits and productivity. Findings from this research are discussed in context with organization development and capability-building for data and analytics.

Acknowledgements

When I began the Organization Development program at the University of St. Thomas, I had romanticized the work involved – thinking that the new demands on my time would just affect me. I pictured myself working late at night, alone with my thoughts and my books. I did not know then that I had embarked on a journey of personal transformation and change. Far from the individual pursuit that I had imagined, my personal journey had a profound effect on virtually everyone around me – especially my family and my closest friends. This dissertation could not have been written without their selfless contributions. The fact of my constant focus on my coursework and dissertation meant that many other people filled in where I had been absent, covered for me on short notice, and even graciously excused my lapses in judgment and attention. Like many hands lifting me up and over a crowd to deliver me to this new place in life, I received conveyance in the form of patience, love, hope, forgiveness and forbearance. For all of these priceless gifts I am profoundly grateful.

Probably no one saw the truth of what I am saying more clearly than my husband Steve, who patiently watched over my process with more than a little of his trademark humor – making light of the fact that I could write for an entire day and still be on the same page – and yet somehow accepting the time involved. As I sat in endlessly in front of my computer monitor, Steve delivered plates of food, messages, and hundreds of cups of coffee. He talked me through my despair over arcane details, and orchestrated ways to free up time so that I could work without interruption. While all this may seem like a huge amount of effort, please believe me when I say that this isn't even the half of it. Steve has always been my constant supporter, my best friend, and the love of my life. Our daughter Sara was also a co-conspirator with Steve in supporting me through this process. Although she was busy with coursework of her own, she

always made time to be with me and to reassure me that she was fine and not to worry (as she knows that I often do worry), and to just focus on my paper. On the day of my meeting with my dissertation committee, Sara made three trips to the printer to get copies of my document. She also navigated the bus trip from our hotel in Lyon, France to the ISEOR offices where I described my research and findings. Sara and Steve were there when I learned that I had passed my defense, and in that moment it seemed to me that the three of us together had achieved something very important.

And of course there were so many other people in my family that supported that my efforts -- especially my mom and dad; Ann, Paul, Justin and Jake; Gregg, Sally, Jay, Ryan and Marissa, Kam and Craig; Kelsey, Derek and Carter; Andy and Megan; Lisa, Bradley, Addison and Devon, and – last but not least – Kristina and John. Dear to me as family, my closest friends also provided support – JoAnn and Brad; Sarah; Bob and Sharon; Steve, Cheryl and Heidi, and the members of the Frostbite Falls book club who were always interested to know about my progress, or lack of it. My classmates in Cohort V were unfailingly optimistic about my ability to actually finish the dissertation, even though I had my doubts. Deb, Kari and Kim often adjusted their busy schedules to meet for dinner. They understood everything that I was experiencing and consistently offered their friendship, encouragement, empathy and humor. I will never forget our time together talking and strategizing about the writing process.

Finally, this dissertation could not have been written without the guidance, patience and thoughtful curriculum developed by John Conbere and Alla Heorhiadi. They introduced me to a new world of scholarship and organization development literature, and along with it the body of research and professional practice related to the Socio-Economic Approach to Management (SEAM). They were not only my teachers but also mentors and guides – and ultimately served

on my dissertation committee. Through John and Alla I also met Vincent Cristallini from ISEOR, who graciously agreed to participate as a committee member. As a committee, John, Alla and Vincent inspired me to expand my research to make it more relevant to organization development practitioners. As the committee chair, John went out of his way to provide feedback on my work, and encouraged me to expand my thinking and narrative when it probably would have been less time-consuming for him to just outline the missing points. Henri Savall and others from ISEOR generously supported my attendance at their SEAM conference last fall, where I was able to hear translated presentations from many organizations all over the world. Virtually all of the presentations highlighted the benefits of organizational change achieved through SEAM interventions, and it was inspiring to see how academic research can inform professional practice. My case study company, too, was interested in the relationship between research and management practice, and provided the basic parameters of the case and relevant artifacts.

I hope that the following pages will honor all those acknowledged here, and that my research will contribute to the practice of organization development.

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Chapter One

Standing at the center of a large Millennium Hotel conference room overlooking the Minneapolis skyline, futurist Thornton May addressed a group of business people representing some of the largest companies in Minnesota. May, named by eWeek magazine as "one of the most influential people in IT" and by Fast Company magazine as "one of the 50 best brains in business" also authored a book titled *The New Know* (2009). Copies of the book, intended for each participant, were arranged in neat stacks in the front of the room. Smiling cheerfully at the audience that had gathered, May began his presentation with idea that the *amount* of data available within organizations is expanding faster than people can make sense of it. At the same time, the *use* of data has expanded to address a broad range of business issues – greatly impacting the way that some organizations have been able to manage interactions with customers. Indeed, the use of data has even shaped the way that some businesses think about the nature of competition, which – in May's view at least – has resulted in the idea that *everyone* from *everywhere* is competing for *everything*. "We've now reached a point," May said to his audience, "where in order to remain competitive, we must *know* everything: it's no longer okay not to *know*."

May smiled at the way this assertion had affected his audience. Like many people seated around me, I shifted uncomfortably in my chair thinking about the sheer challenge of knowing everything that might be important to my own organization – the key facts that are important now and that would also be important in the future. Having worked for over thirty years preparing information used in management decision making and strategic planning, I saw it as not only a matter of knowing *which* facts, but also the *way* that those facts are assembled from millions and millions of rows of transaction detail that is stored electronically in a repository that

IT professionals refer to as the "data warehouse." Data is accessed with a variety of software tools; in fact, I attended May's presentation because the team I led preferred to use SAS software to retrieve data from the warehouse. If it is true that in order to remain competitive we would all need to know everything, then it seemed to me to that the ability to know everything would be a matter of leveraging billions of pieces of information for the right reasons and at the right time.

May's presentation was sponsored by SAS, a leader in business analytics software and services, which – perhaps not so coincidentally – displays the tagline *the power to know*. In 2011, SAS – in partnership with Bloomberg Businessweek Research Services – sponsored a series of meetings they called *power breakfasts* in eight major cities in the United States. The tour included Minneapolis, which is home to many SAS customers. Bloomberg, a self-described leader in business and financial services information (displaying the tagline *delivering the world's information*) collaborated with SAS in order to conduct an assessment of the state of business information management in the United States – especially as it related to the effective use of data and the new focus on analytics within organizations. Davenport and Harris, who have written extensively about companies who compete by leveraging analytic capabilities, explained "By *analytics* we mean the extensive use of data, statistical and quantitative analysis, exploratory and predictive models, and fact-based management to drive decisions and actions (2007)."

The people that I was teamed up with at the Minneapolis power breakfast were all part of this accelerating trend. Working on whiteboard walls and aided by an artist, we developed mind maps that were ultimately incorporated in the national power breakfast research. The mind map that we generated in Minneapolis identified key challenges with respect to 1) the increasing amount of time spent on data management, which was decreasing time available for analysis; 2)

the idea that analysts are decentralized in organizational silos with only informal ways to share knowledge and resources; 3) lack of integrated governance or coordinated organizational processes for decision making; 4) the difficulty of attracting and retaining analysts; 5) the difficulty of developing analytical skills and talent, and 6) the lack of appropriate software tools for analysts to work with large sets of data (Bloomberg Businessweek Research, 2011, p. 2). Given these challenges, along with many others identified by the study participants, the Bloomberg and SAS research ultimately concluded that business analytics is still a field in the emerging stage.

I think that the key challenges identified by the Minneapolis group are not unlike other organization development problems related to gaps in organizational capabilities. The current focus on effective use of data and analytics as a source of competitive advantage, in my view, has romanticized the relationships between people, processes and technology as if the supporting organizational resources and structures were already in place. Organization development practitioners, trained as they are in holistic thinking, regularly face problems that are the messy outcomes of relationships between people, processes and technology. In my experience, the new focus on data and analytics has only fanned the flames of discordant organizational relationships and situations – and has made those messy problems even more difficult to address.

Instead of addressing the need for an increased focus on data and analytics as an organization development problem, the media coverage associated with business analytics seems to be driving an increased focus on investments in technology. No wonder the analytics movement is relatively slow to take off. I believe that the focus on technology is misplaced, because development of new analytic capabilities and strategies will involve significant organization capability-building work effort (Davenport, 2006). Davenport and Harris (2007a)

pointed out that "Some people would simply equate analytics with analytical information technology. But this would be a huge mistake…it's the human and organizational aspects of analytical competition that are truly differentiating" (p. 8).

The focus on data and analytics will also drive the need for change in organizations. Davenport (2006) wrote that organizational decision-makers must acknowledge and endorse the changes in culture, processes, and skills that analytics competition will mean for the organization's workforce. Mainstream business magazine articles have also highlighted the need for organizational change in order to build new data and analytic capabilities. A Harvard Business Review article, for example, pointed out that "Companies won't be able to reap the full benefits of a transition to big data unless they're able to manage change effectively" (McAffee & Brynjolfsson, p. 66). Davenport and Harris (2007a) also emphasized the need for an organization development focus to address analytic capability-building. The authors wrote, "We hope that many academics and consultants will embrace the topic. If this field is to prosper, the world will have to spend a lot of time and energy focusing on it, and we'll need all the guidance we can get" (p. 10).

Statement of the Problem

If, as Davenport and Harris suggested (2007a), development of analytic capabilities within organizations depends on capability-building work efforts and change initiatives, then decisions about investments in analytics would ideally address a complexity of organizational issues. However, it is my experience that a classic construction of costs vs. benefits to assess investment proposals would leave out many important organizational factors. For example, a classic cost-benefit construction of the costs associated with software would highlight the licensing and maintenance fees, implementation costs, infrastructure costs, vendor consulting

fees and training costs. The analysis would also show how the identified costs would be offset by benefits expressed as financial savings. Ideally, the analysis would also show that the use of the software will drive a return on investment. In other words, the investment would *save* more money than it would *cost* to license, maintain and implement the software. For the investment to be considered viable, the organization may also define a set requirement for a positive relationship between benefits vs. costs; for example, an organization may require that benefits would be equivalent to three times the costs. The positive return on investment would not necessarily need to be experienced immediately, but rather within a specified timeframe. For example, an organization may require a three year pay-back in order to achieve the desired level of return, but that can vary based on the nature of the investment.

While the classic business case provides an important itemization of costs, I believe that it is just one view of the investment that is being made. Other considerations – such as investments in the productivity, knowledge and capability of people – are noticeably missing from the analysis. In a classic cost-benefit construction, the positive impact on the productivity of people is very difficult to quantify as a benefit and is generally dismissed as "soft" savings. Even if benefits are quantified based on a corresponding time savings for people, that time savings will be regarded as a potential reduction in costs – as opposed to an investment in the capacity of people to do more value-added work.

Having worked as part of financial functions for my entire career, I regard the financial view of investments as an important, even crucial view. In my experience, financial executives will not consider investment proposals unless there is a full accounting of the costs. The costs, in the accounting view, are an offset to revenue, and directly affect overall profitability. The expected savings associated with technology investments will not considered a benefit until they

actually materialize. Most often, in fact, financial decision-makers do not actually know if people are going to be more or less productive if they have access to a new technology – or if the new technology will actually live up to its promises. Good financial managers are wary of situations where technology might not deliver expected results and only add to costs. Where the productivity gains from automation were once more clear-cut, more contemporary applications are part of existing systems that are themselves part of other larger business processes. In other words, it is often difficult to isolate the expected impact of any one change in a larger web of work effort – much less quantify costs, benefits, or expected changes in the productivity of people.

Purpose of the Study

The construction of cost-benefit justifications for business analytics is fraught with so many complexities that it is tempting to just give up and hope for the best. After all, most decisions are still made based on judgment – even when the numbers are presented clearly. And yet I believe there is an unmet need to clarify the nature of investments in business analytics. In the example of a simple case of an investment in software, there is a need to reframe the analysis to consider other factors related to development of new analytic capabilities within the organization. At the same time, though, the current cost-benefit models or views of these investments do not seem large enough to address the true nature of costs, benefits or productivity that will be impacted. Although social factors are often deemed soft savings in classic business case constructions, it seems to me that the opposite is true. I think that the dialogue about these investments needs to be expanded to also consider other views related to the productivity of people and the impact to an organization's analytic capabilities.

With all these issues in mind, the purpose of this study was to explore ways that the business case for business analytics would change if it were made based on other perspectives. To do this, though, it was also important to consider the underlying assumptions about the way concepts such as costs, benefits and productivity are defined and measured. By exploring alternative conceptual views of costs, benefits and productivity, I wanted to clarify what it means to invest in organizational capabilities in business analytics. Furthermore, I wanted to show how assumptions about what constitutes costs, benefits and productivity can influence the measurements that are developed, as well as the way the business case for investments in analytic software might be constructed.

Overview of the Study and Research Questions

Although traditional cost-benefit models are widely used in organizational decision-making processes, they tend to leave out social and organizational factors that may influence overall performance. While the traditional approach to cost-benefit analysis provides important and valuable information for use in decision making, the development of new analytic capabilities within organizations demands additional analysis. I wanted to see if there is a way to add more information about social factors such as the productivity of people, or other socio-economic factors that would take into account the analytic capabilities that would need to be developed in order to improve the overall performance of the organization. To do this, I explored different perspectives about a specific business case that had been developed by a Minneapolis-St. Paul company. I considered three key components of the case:

- Assessment of costs
- Assessment of benefits
- Assessment of productivity

There is significant management research that informed the way that I modeled alternative views of the case, and of course in my review I likely missed some extremely relevant information developed by thoughtful and creative people. I regret those omissions, but hope to continue my learning journey after this paper is completed. I tried to select sources that represent a continuum of ideas about the nature of organizational costs, benefits, and productivity that could be used to develop schematic models.

Model I: The Economic View

Model I provides a brief grounding on the importance of costs as a factor in decision-making about investments in data and analytics. I relied upon the research of Jack Phillip, noted for his scholarship and development of the concept of return on investment (ROI). Phillips advocated that business leaders should take a hard look at the costs associated with investment proposals, and that they also assign accountability for potential benefits. Phillips (2008) acknowledged the debate about the relative strengths and weaknesses associated with an ROI approach, and wrote that "Understanding what drives the ROI methodology and knowing its inherent weaknesses and advantages makes it possible to take a rational approach to the issue and implement an appropriate mix of evaluation strategies that includes ROI" (p. 1).

Model II: The Social View

Development of Model II focused on the social factors associated with data and analytics. Jac Fitz-Enz and Richard Swanson are noted thought leaders about social factors associated with human productivity and motivation. Fitz-Enz (2009) wrote that

> …people are the only element with the inherent power to generate value. All other variables – cash and its cousin credit, materials, plant and equipment, and energy – offer nothing but inert potentials. By their nature, they add nothing, and cannot add anything

> until some human being, be it the lowest-level laborer, the most ingenious professional, or the loftiest executive, leverages that potential by putting it into play. (p. xix)

Productivity, as defined by Fitz-Enz, emphasizes the contributions of people, and also represents contemporary views of job design and performance where productivity can be measured. I relied upon the work of Richard Swanson to develop the model.

Model III: The Socio-economic View

Decades of French management research conducted by the Socio-economic Institute of Firms and Organizations (ISEOR) has recently become accessible in the United States. This research has emphasized the factors associated with the economic potential of the organization, and as such, provides both a social and an economic view of organizations. The Socio-economic Approach to Management (SEAM) emphasizes the concept of hidden costs caused by dysfunctions in the relationships between people and organizational structures. Hidden costs are hidden in the sense that they are not accounted for in financial statements or other performance measures in use by the organization. SEAM scholars hold the view that by eliminating these dysfunctions, there will be immediate results and the creation of economic potential for the organization. As such, Model III provides a *socio-economic* view of the case.

Other Related Research

The models developed as part of this research was based on the sources outlined, along with other literature that is related to the work of the authors. It would of course be possible to identify additional scholarly research that could provide additional perspectives as it relates to the case – and even provide the basis for additional models. However, it was not the point of my research to show a multiplicity of nuanced views associated with the case, but rather to illustrate how different models will illuminate different perspectives about the nature of the investment in

analytics. Use of the models will also illustrate how different perspectives will in turn drive the development of different measures – and ultimately influence a different view of the nature of the investment.

Research Questions and Areas of Focus

My research considered alternative perspectives as it relates to assumptions about the nature of investments in analytic capabilities, and explored the question *how would economic, social and socio-economic perspectives affect the construction of the business case for investments in business analytics?* A key premise of this research is that each of the three frameworks will illuminate different aspects of the discussion about investment in analytics because 1) they highlight some considerations over others, and 2) the measurements associated with each framework are different. For each of the three models, I wanted to explore the following five questions:

1. What are the key considerations or elements that are emphasized as it relates to the case study parameters?
2. What is the nature of productivity assumed as it relates to the case study parameters?
3. How would the costs associated with the case study be assessed and measured?
4. How would the benefits associated with the case study be assessed and measured?
5. What factors or measures would be included in development of the business case?

By developing three different views of the case, I believed that it would be possible to 1) explore differing ideas about the nature of costs vs. benefits; 2) explore differing ideas about the nature of productivity, and 3) explore the elements of each model that are highlighted vs. those that are de-emphasized. Ultimately these findings will be applied to show how the business case associated with each model could be constructed, along with the associated measurements.

Findings from the literature were also incorporated as part of the analysis, especially as it relates to theory developed by organization development theorists and practitioners, as well as socio-economic theory developed by Henri Savall and other ISEOR intervener-researchers.

Chapter 2

Literature Review

The literature shows a range of promise and challenge associated with of application of business analytics. Although there is great possibility associated with use of data within organizations, there are also important organizational barriers related to people, process and technology. In order to generate value for business, the literature suggests that construction of business cases associated with investments in technology will also need to make the link between technology investments and the strategic plans and goals of the organization. At the same time, though, these factors are very difficult to quantify as part of a typical cost-benefit business case construction – especially if those factors include information about the productivity of people, complex organizational processes or strategic goals.

The Challenges and Promise Associated with Big Data

The focus on business analytics is part of a larger trend where many organizations are working through some significant information technology (IT) challenges associated with data management. According to May (2009), "We are now exiting a historical moment of undermanaged and only occasionally acted-upon information to an environment requiring much more active, much more intense, much more aggressive information management" (p. 22). One key driver of this new trend is that a reduction in storage costs has meant that organizations are taking in data faster than ever before. Where IT organizations once focused on holding down costs associated with storing data, they are now creating new, more efficient data warehousing solutions that envision storage of additional data from many non-traditional sources.

Engineers at IBM's Disk Drive Research Center have estimated that one gigabyte of storage – which is the rough equivalent of the storage needed for the scanned contents of two file

cabinets – cost $8.37 in the year 2000, compared to $.01 in 2012 (Gilheany, 2011). There are different costs for different kinds of storage, but – given the ongoing increase in storage densities – storage costs are expected to continue to decrease over time. As storage costs decrease, there will be an associated ability of organizations to take in additional data without increasing costs. The expanding array of data has been referred to in popular management literature as "big data."

McKinsey Global Institute (MGI), a business and economics research arm of McKinsey & Company, defined big data as datasets that are so large that typical database and software tools cannot effectively capture, store, manage or analyze the information (Manyika et al., 2011). The MGI report referred to big data as a "growing torrent," where the amount of global data generated is projected to grow at 40 percent per year. Already, according to the report, 15 out of 17 sectors in the United States have more data stored per company than the United States Library of Congress. According to the MGI authors,

> Digital data is now everywhere – in every sector, in every economy, in every organization and user of digital technology. While this topic might once have concerned only a few data geeks, big data is now relevant for leaders across every sector, and consumers of products and services stand to benefit from this application. (p. 2)

Big data has also become big business, according to technology industry experts. "Driven by the attention-grabbing headlines for big data and over three decades of evolutionary and revolutionary developments in technology and best practices, the business analytics software market has crossed the chasm into the mainstream mass market," noted Dan Vesset, Program Vice President for International Data Corporation's (IDC) Business Analytics Solutions. "IDC expects the business analytics software market to grow at a 10.1% compound annual growth rate over the next five years" (Vesset, McDonough, Wardley, & Schubmehl, 2012).

The big business of big data has also translated into profitability for large information technology companies such as IBM, Microsoft, Adobe Systems, MicroStrategy, SAS, Teradata, Oracle and Informatica – despite notably difficult economic conditions. For example, the SAS annual report highlighted record earnings in 2011. Overall SAS revenue increased 12 percent to $2.725 billion, which the company attributed to high demand for business analytics to capitalize on big data (SAS Institute, 2011). SAS is not alone in its success due to big data. Other large companies such as IBM and Informatica are also attributing growth in their analytics businesses to the emergence of big data and the associated need of organizations to translate that data into powerful new analytic capabilities.

Considering the expense associated with new data warehouse solutions and associated development, it is no wonder that organizations are focused on technology strategy and plans related to big data. In order to offset implementation costs, it makes sense that companies are looking for business analytics to help solve big issues. A key point of the MGI report is that there would be huge potential value if organizations are able to leverage new sources of data, and use the new sources in combination with the data that they already have (Manyika et al., 2011).

Big data, in the view of the MGI authors, has the potential to become the next frontier for innovation, competition and productivity (Manyika et al., 2011). Examples include 1) making data more relevant; 2) segmentation of populations to tailor products and services; 3) replacement/support of human decision making with automated algorithms; 4) creation of new products and services, and enhancement of existing ones, and 5) the invention of entirely new business models. The MGI report also predicted that the use of big data will become a key basis of competition and growth for individual firms: "In the United States, we expect big data to rapidly become a key determinant of competition across sectors" (p. 10).

Big data, according to McAfee and Brynjolfsson (2012), even has the potential to create a management revolution. "Because of big data, managers can measure, and hence know, radically more about their businesses, and directly translate that knowledge into improved decision-making and performance" (p. 62). The authors, along with other academic and business colleagues, surveyed 330 public North American companies. They found that the more companies characterized themselves as data-driven, the better they performed on objective measures of financial and operational results (p. 64). In another study, researchers from the IBM Institute for Business Value partnered with researchers from the MIT *Sloan Management Review* to conduct a survey of nearly 3,000 executives, managers and analysts working across more than 30 industries and 100 countries (LaValle, Hopkins, Lesser, Shockley, & Kruschwitz, 2010). Like the MGI researchers, the IBM and MIT researchers also found that top-performing organizations use analytics five times more than lower performers.

Tyagi (2003) wrote that even incremental developments in analytics are making a visible impact. "Dramatic decreases in computing and data storage costs means most large firms can afford sophisticated analyses" (p. 12).

According to Tyagi (2003),

> Advances in analytics are breathing new life into companies' efforts to create new businesses and line extensions, improve pricing, and cut costs. Successful enterprises are harnessing the power of data for better strategic decision making. The rewards are rapid implementation of new ideas, products, and services, which result in greater profits and shareholder value. (p. 14)

Bose (2008) pointed out that analysis of data allows "enterprises to have a complete or '360 view' of their operations and customers." Bose added that "The insight that they gain is

then used to direct, optimize, and automate their decision making to successfully achieve their organizational goals" (p.155). According to the Bloomberg Businessweek Research Services report (2011), companies are looking to analytics to solve big issues, with the primary focus on money: reducing costs, improving the bottom line, and managing risks.

Effective Use of Information for Competitive Advantage

Davenport (2006) wrote that effective use of analytics may also be used to pull ahead of competitors, especially if analytic capabilities are leveraged to wring value out of business processes. Analytics can be applied to not only differentiate the products that customers want but also how much they are willing to pay. Some analysts have even been able to develop information that shows the factors that keep customers loyal to a brand. Davenport and Harris (2007a) found that the most analytically sophisticated and successful firms had four common key characteristics that they refer to as "the four pillars of analytical competition": 1) "analytics supported a strategic, distinctive organizational capability" (p. 23); 2) "the approach to and management of analytics was enterprise-wide" (p. 27); 3) "senior management was committed to the use of analytics" (p. 30), and 4) "the company made a significant strategic bet on analytics-based competition" (p. 32).

According to Davenport (2006), "Analytics competitors understand that most business functions – even those like marketing that have historically depended on art rather than science – can be improved with sophisticated quantitative techniques" (p. 4). Knowing what your customers want before they do, according to Davenport, Dalle, Mule, and Lucker (2011), is an important marketing objective. A company's data can, in theory, be used to collect detailed information about customers – including attributes such as demographics, psychographics, purchase history, social, mobile, and location information. If information about customers is

combined with other information that the company already has – for example if customer information is combined with other attributes such product location and availability – then analytics can be used to match customers with marketing offers. Analytics can also be used to learn from customer's responses and compare results to what had been predicted. Of course, these new capabilities will also imply new risks, and the ethical behavior of organizations will increasingly be under scrutiny by its customers (Davenport & Harris, 2007b).

Current State of Business Analytics

Despite the promise of analytics touted in popular management literature, there are also important challenges. According to the IBM/ Sloan research, the promise of improved performance has led to the "widespread belief that analytics offers value" (LaValle, Hopkins, Lesser, Shockley, & Kruschwitz, 2010). According to the researchers, "Half of the survey respondents said that improvement of information and analytics was a top priority in their organizations" (p.2). The researchers also reported that "six out of ten respondents cited innovation to achieve competitive differentiation as a top business challenge," yet on the other hand the same percentage also agreed that "their organization has more data than it can use effectively" (p. 2). Ranjan (2008) wrote that "The business success factor for any enterprise is finding ways to bring the vast amount of data that are flowing within and across the business processes together and making sense out of them" (p. 461). McAfee and Brynjolfsson (2012) similarly noted that although new technologies are collecting more data than ever before, many organizations are still looking for better ways to obtain value from their data and compete in the marketplace.

While some organizations have been able to leverage analytics effectively – and even compete on the basis of analytics – other organizations are still in emerging stages and working

to build new capabilities (Davenport &Harris, 2007a). The Bloomberg research sponsored by SAS also found that traditional software tools still prevail, and that spreadsheets are still the number-one tool used for business analytics (Bloomberg Business Research Services, 2011).

Key Organization Development Challenges

While data management and software tools are key technology challenges, there are also important challenges with respect to organizational structures, analytic talent and leadership.

Organization structures. Based on the maturity of analytic capabilities within the organization, decentralized vs. centralized organizational structures can be a key determinant of success. According to Davenport, Harris, De Long and Jacobson (2001), decisions about how to structure analytic resources may depend on a number of factors. Perhaps the most important considerations are the relative sophistication of the analysis, the amount of local or departmental knowledge that is required, and even the cultural orientation of the firm, since some organizations have highly autonomous business units. The authors found that more complex modeling is better done in a centralized group, or even outsourced if the work demands cutting-edge statistical skills. A centralized group may also work better because there is more opportunity to share knowledge and to leverage unique skill sets. This has led some organizations to form a Center of Expertise, more commonly referred to as an Analytics COE, where analysts are centralized in one group.

Analytic talent. Another key organization development issue is the increasing demand for analytic talent.

According to Davenport, Harris, De Long and Jacobson (2001),

> Almost two-thirds of the companies we studied stated that recruiting, developing, and retaining highly skilled employees with analytic capabilities has been a major

> human resource challenge. The particular skills and experience essential for transforming data into knowledge depend, of course, upon individual roles and responsibilities. They also vary with the scope and sophistication of the firm's analytic capability. No one individual can possess all the skills needed to transform data into knowledge. Rather, people in specialized roles work together to achieve this transformation. (p. 122-123)

According to the MGI Report, there will be a shortage of talent necessary for organizations to take advantage of big data (Manyika, et al., 2011). "By 2018, the United States alone could face a shortage of 140,000 to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of big data to make effective decisions" (p. 3).

Management of analytical talent. Even if appropriate analytical talent is in place in an organization, management may lack understanding of the value of data and ways it can be leveraged to take more informed action. Liberatore and Luo (2010) pointed out that "Insights alone have limited value unless they can be translated into managerial actions, such as improving operational decisions, redesigning or changing existing processes, and formulating or adjusting strategies" (p. 315). May (2009) similarly observed that "Most organizations have not yet gone through the organization learning necessary to extract value from these powerful technologies." May added that analytics is a capability built on a range of technologies, practices, and strategic approaches and that "the ability to create value with the technologies of business analytics is a function of culture, organization, and analytical skills" (p.175-176). According to Davenport, Harris, De Long and Jacobson (2001),

> Companies are investing billions of dollars in technologies that generate huge volumes of transaction data. However, these investments will not live up to their potential unless firms are able to broaden capabilities – both technical and human – to convert data into knowledge and then into business results. (p. 120)

Based on this observation, Davenport, Harris, De Long and Jacobson (2001) proposed a model for understanding how transaction data can be turned into knowledge and – ultimately – results. The model includes some key organization development components, including context, transformation and outcomes. With respect to context, the authors pointed out that decisions are not made in a vacuum. Rather, they are made in a context of business strategy, the skills and experience of the people involved, the organization and its culture, technology and data. The authors emphasized that analysis is seen as an iterative way to inform the decision-making process – where the analysis informs decision making, and the decision-making process informs additional information that is needed. Outcomes from improved business analytics are not only seen as financial (in terms of savings or improved profitability), but also as changes in processes or organizational behaviors.

Investments in Business Analytics

According to Davenport, Harris, De Long and Jacobson (2001), articulating a strategic business case for a data-to-knowledge initiative will help create organizational support and can even be used to obtain funding. In the process, the authors say that managers should consider factors such as the relationship between the investment and core business processes and the relevance of the information to the performance of the business. According to the authors, these types of choices constitute the strategic context for investing in new analytic capabilities. The

more clear and detailed an organization's business strategy, the more obvious the data and analytic capabilities it requires.

The literature also implies that evaluation of investments in business analytics should be based on the capabilities that the organization wishes to build. According to Davenport and Harris (2007), key considerations may include such factors as ways that the investment will make the firm more competitive or improve enterprise-wide capabilities. Other considerations – especially with respect to organizational structures, analytical talent, and management of analytical talent – imply that investment in business analytics is as much an organization development problem as it is a technical one.

Chapter 3

Methodology

It has been said that Graham Allison's case study *Essence of Decision: Explaining the Cuban Missile Crisis* (1971) is among the best (and best-known) examples of case study research (Yin, 2009). It may also be, as Yin (1981) noted, that Allison's case study is by now outdated in the sense that the historical events have faded from memory. Still, over fifty years after the thirteen days in October, 1962, when, in Allison's words, "the United States and the Soviet Union paused at the nuclear precipice" (Allison, 1971, p. 1), Allison's brilliant case study provided the inspiration for my own comparatively small investigation of organizational life.

Of course, I know that the issues that I am proposing to address are not those of the life or death consequences of nuclear war that then President John Kennedy faced. I think about what it must have been like for Kennedy to know that missiles were lined up, seemingly on the offense, and yet how he paused and took the time to make sense of the situation, and – more importantly, weigh the consequences of escalating the situation. In a recent dialogue sponsored by the Wilson Center and broadcast by National Public Radio, Allison said that Kennedy had faced the very real possibility that between 40 and 90 million Americans would die if there were a nuclear war (Wilson Center webcast, 2012). Allison quoted Kennedy as saying that the lesson from those events was that "Going forward we must avert confrontations that force an adversary to choose between humiliating retreat and war" (Webcast transcript, page 6).

Allison quoted Kennedy as a way to frame his research and form the title of his book *Essence of Decision: Explaining the Cuban Missile Crisis*, as follows:

> The essence of ultimate decision remains impenetrable to the observer – often, indeed to the decider himself…. There will always be the dark and tangled stretches in the

> decision-making process – mysterious even to those who may be most intimately involved. (p. vi)

Even in more ordinary contexts, though, organizational leaders may similarly struggle to make sense of situations that are fraught with ambiguity and complexity and then weigh the potential consequences of various courses of action. Each course of action, though, is itself a result of a set of assumptions about the situation – with some factors playing a larger role in the decision-making process than others. Borrowing from Allison's approach, my plan to construct three conceptual frameworks (and to show a social, economic and socio-economic perspectives about a software investment proposal) similarly sought to *explore* the business case narrative to illuminate what is emphasized or de-emphasized through the lens of each model. As Allison (1971) wrote, "by comparing and contrasting the three frameworks, we see what each magnifies, highlights, and reveals as well as what each blurs or neglects" (p. v).

While it is important to acknowledge that my own work was patterned after Allison's case study, there is also a key difference in the sense that my purpose was only to *explore*, whereas Allison sought to both *explore* and *explain*. Allison (1971) wrote in the introduction to his book that he had a dual purpose for his research. First, Allison wanted to *explain* the reasons for unexplained questions and events surrounding the Cuban Missile Crisis, which remains, he wrote (quoting Harold McMillan), "a strange and still scarcely explicable affair" (p. 1). Allison noted that at the time he began his research, even some of the most central questions surrounding the events surrounding the Cuban missile crisis had not been answered.

Second, Allison wanted to e*xplore* the influence of unrecognized assumptions upon our thinking about events like the missile crisis. It is Allison's second purpose that inspired my own approach. In the construction of my research, I did not seek to explain why people make the

decisions they made – but rather I wanted to explore ways that different conceptual models could potentially frame a decision-maker's thinking about the nature of the decisions to be made and the way that a case is logically constructed.

As Allison (1971) wrote,

> Answers to questions about why the Soviet Union tried to sneak strategic offensive missiles into Cuba must be affected by the by basic assumptions we make, categories we use, our angle of vision. But what kind of assumptions do we tend to make? How do these assumptions channel our thinking? What alternative perspectives are available? (p. v)

The distinction between the objective to explore vs. explain is an important one, because the objective drives the form of the research. Stake (1995) pointed out that "a distinction between what knowledge to shoot for fundamentally separates quantitative and qualitative inquiry" (p. 37). In this way of thinking, my research is qualitative. As Stake wrote, "Quantitative researchers have pressed for explanation and control; qualitative researchers have pressed for understanding the complex interrelationships among all that exists" (p. 37).

Allison did more than just explore the three models. Allison also wanted to find out whether one of the models did a better job of explaining events of 1962 than another model. Allison ultimately found that each of the models did a better job of explaining certain *aspects* of the crisis, or in framing provocative questions -- but that no one model provided an entirely satisfactory view of events (in the sense that Allison's central questions were definitively answered). My research, in contrast, developed models in order to drive open-ended exploration and discussion about what it means to invest in business analytics and develop new capabilities within organizations.

The Three Models as Paradigms

The research outlined in this proposal was also inspired by Allison's methodology in the sense that a social, economic and socio-economic view of the case is based on a set of basic assumptions that may or may not be explicitly identified by the people involved; indeed, these assumptions may even be taken for granted. For example, it may be that an economic model is generally applied to evaluate investments because there are underlying beliefs about the nature of what is important. In his description of the formulation of one of his models, Allison referred to the concept of an analytic paradigm, "in the technical sense of that term developed by Robert K. Merton for sociological analyses" (p. 32).

Merton, who provided the intellectual underpinnings of so many advancements in the field of sociology – including (among many other concepts) the idea of the self-fulfilling prophecy, the focused interview (later, focus groups), manifest and latent functions, social dysfunctions – wrote extensively about the concept of using analytic paradigms as a way to codify research materials.

In an essay about the codification of sociological theory, Merton (1996) wrote that analysis of paradigms:

> …bring out into the open air for all to see the array of assumptions, concepts, and basic propositions employed in a sociological analysis. They thus reduce the inadvertent tendency to hide the hard core of analysis behind a veil of random, though possibly illuminating, comments and thoughts. (p. 57)

As part of another essay about functional analysis in sociology, Merton added that "above all, it should be noted that the paradigm does not represent a set of categories introduced *de novo*, but

rather a codification of those concepts and problems which have been forced upon our intention by critical scrutiny of current research and theory" (1996, p. 81).

Merton (1957) later wrote that "With the appearance of Thomas S. Kuhn's vastly consequential book, *The Structure of Scientific Revolutions*, the term *paradigm* has acquired a substantially different set of meanings and far wider usage" (p. 61). Merton's narrative goes on to trace various meanings associated with the concept of the paradigm, including historical references to Plato's term *paradeigmata* and the seventeenth century usage to mean *a pattern to follow*. According to Preston (2008), Kuhn used the term paradigm in more than one way; however, the sense of the term that came to public consciousness is what Kuhn referred to as a "disciplinary matrix," meaning a larger more encompassing cognitive structure – "the entire constellation of beliefs, values, techniques and so on shared by members of a given (scientific) community" (p. 23).

Preston (2008) noted that Kuhn later took himself to task for using the term paradigm to refer to a disciplinary matrix – but it is Kuhn's notion of the paradigm as a disciplinary matrix that seems relevant to all three models that I developed as part of my research. If it is true that there is an underlying set of beliefs that informs an analysis of a problem, I wonder if it would be possible to evolve that set of beliefs so that other factors originating within other paradigms could also be considered. For example, could measures of human productivity ever be assimilated in an economic view of a business case? Can management decision-making competencies evolve to flow easily between economic perspectives to other social and socio-economic frameworks? Perhaps more important, can management skills be expanded to flexibly *choose* one frame over another, given the context? Or, I wonder, is it more the case that people

tend to think in one frame of reference or another, and that it's really quite difficult to assimilate various perspectives in one model? Allison (1971) noted that:

> Few analysts proceed exclusively and single-mindedly within a pure conceptual model. Instead, they think predominantly in terms of one model, occasionally shifting from one variant of it to another and sometimes appropriating material that lies entirely outside the boundaries of the model. (p. 8)

Researcher's Bias and the Idea That Measures are Constructions of Meaning

In a postscript related to his original text, Kuhn (2012) revisited his original assumptions about the nature of paradigms because he was worried about what he referred to as "gratuitous difficulties and misunderstandings" (p. 173). Kuhn acknowledged that he had used the term paradigm in two different ways:

> On the one hand, it stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community. On the other, it denotes one sort of element in that constellation, the concrete puzzle solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science. (p. 174)

Kuhn's second view of the paradigm was also relevant to my research with respect to my assumption that different measures will flow out of different assumptions about the nature of costs, benefits, and productivity. In this sense the paradigm is the basis on which other new (yet related) elements are constructed. It may also be the case that new elements are differentiated from other elements as a way to clarify meaning. For the purposes of my research, I thought of measures as elements, and that the elements are part of a paradigm of thought, or – more to the point – a modeled *representation* of a paradigm of thought. In my view, measures are

themselves a codification of beliefs and a symbolic representation of meaning. This comes out of my own experience working with information. I regularly work with people to understand their meaning and then assemble information that is in response to that meaning. In other words, I am biased in my view of the case as I see information as a construction of meaning. In my view, to say that a number is "accurate" or "useful" is only relative to that context or the set of assumptions in play.

Model Labels

Another important way that Allison inspired my proposed research relates to the way he labeled his models. In one of Allison's many detailed footnotes, he added that:

> Earlier drafts of this argument have generated heated discussion about proper names for the models. To choose names from ordinary language is to promote familiarity and to court confusion. Perhaps it is best to think of these models simply as Model I, Model II, and Model III. (p. 5)

Allison's observation about the labels he chose for his models may very well apply to the labels that I have associated with my own research. People may argue, for example, that the models described are not purely economic or social, or they may reasonably argue that a socio-economic construction of the business case should take into account additional external factors. For that reason, it seems important to recognize that the terms Model I, Model II and Model III may be more appropriate labels for each of the conceptual frameworks used in this study as well. There were times, in fact, where my own learning journey led me to understand that the labels were in many respects misleading. They remain here as a counterpoint to all that I learned and hope to convey. In retrospect, I see that it should come as no surprise that I had applied my own paradigms of thought to the construction of this study.

Research Design

The research design that I employed included development of five components or building blocks of analysis:

1) Review of the case to be examined
2) Development of three models or conceptual frameworks (economic, social and socio-economic), each used as a lens or way to view the case
3) Development of units of measure associated with each of the three models
4) Development of a cross-model analysis
5) Discussion about findings as they relate to analytics

Building Block I: Development of the Case

At the time I began my research, management literature was full of information about how companies were able to leverage data and analytic capabilities to improve their competitive position and profitability in the marketplace. Because I have always worked in analytical functions, I found these articles fascinating. I very much wanted to investigate those emerging trends, and began to consider the list of people that I could talk to. Because of the complexity of conditions across organizations, however, it seemed most practical to focus on a specific case study in order to provide context for the analysis. I thought by focusing in on a very specific situation with defined parameters, I could limit the scope of my research to a more practical scale. Having worked through the complexity of issues implied by even a small case, I am very glad that I took that path. I now see the issues associated with development of data and analytics capabilities as more challenging than I originally imagined.

As a first step in my research, I was privileged to learn about the data and analytic planning that was then taking place in a mid-size Minneapolis-St. Paul company. Because of the

competitive environment surrounding use of data and analytics, the company name is confidential. I have referred to the company as the Case Study Company, or CSC for short. In choosing the company, I believed that the issues faced by the business leaders were representative of the issues associated with analytic capability building that was then described in the literature. Like other organizations, CSC was working to develop new data and analytics capabilities, which represented very large investments of its financial resources. At the time – and very likely now – the company had a community-minded focus, and regarded its obligations to its customers to keep its product costs as low as possible. The company also wanted to ensure that customers experienced high product quality and excellent customer service. At the time, the company planned that analytics would aid business leaders to ensure that price, quality and service remained in balance.

As part of my research, I reviewed four artifacts provided by the company. First, I reviewed the proposal outlining the costs associated with the software purchase. A CSC business leader told me that the high costs outlined in the software proposal meant that it received special scrutiny by the company's executives. I also reviewed research conducted by technology consultants, who had conducted a review of the technology that was then in use by the majority of the company's analysts. After careful consideration and discussion, the consultants had recommended an upgrade to the company's software, along with some additional investments. Third, I reviewed the company's Data & Analytics Charter, which was developed as a way to govern the large scope of work that the company envisioned. Finally, I also reviewed the Power Point deck that was presented to CSC executives for discussion.

Building Block II: Development of the Models/ Conceptual Frameworks

In order to develop the models and conceptual frameworks as part of Building Block II, I reviewed the literature associated with each of the three views – economic, social, and socio-economic. For each of the three views, I developed the following themes:

- Narrative describing the literature associated with each view
- Exploration of the ontological and epistemological underpinnings of each view
- Conceptual model or framework that would be applied to business case development

Building Block III: Development of Factors or Measures Associated with Each Model

A third component of my research was to develop the schematic business case derived by each model. In other words, I treated each of the three models as conceptual frameworks. My premise was that each model would emphasize some factors over others, and that each would employ different measures of costs, benefits and productivity. As noted earlier, it is my experience that measures are a construction based on meaning and context. I did find that there were different perspectives about costs, benefits and productivity associated with each model. The measures were also used to develop a schematic view of the business case associated with each model. My premise was that the business case used in decision making is itself a construction of assumptions.

Building Block IV: Cross-Model Analysis

Once the three models were in place, I developed cross-model comparisons. I wanted to show these comparisons schematically. I also wanted to show overlaps between views; for example, I found that both the social and socio-economic views contain elements from the economic view. I found it very interesting to see where those intersections occur. Although I hoped to convey the similarities and differences in a visual way, I did not know at the beginning

if it would be feasible. In this respect I am gratified that I have been able to prepare schematic diagrams that make it easier to see how the business case is framed by alternative perspectives. While my calculations showed that there were differences in the total costs and benefits, I viewed it as most important to show the differences in the factors that were considered, and highlight similarities and differences.

Validity: In order to construct the models so that the structure of the analysis is consistent across all three conceptual frameworks, I relied upon a book written by Jaccard and Jacoby (2010) entitled *Theory Construction and Model-Building Skills*. The authors emphasized the idea of focusing concepts as a way to ensure the validity of analysis. Focusing concepts, as defined by the authors, help to clarify the key ideas that are part of each of the three models. Since the business case commonly in use for decision making weighs costs vs. benefits, I thought that I should work with costs, benefits and productivity as focusing concepts. I thought that the use of focusing concepts would also make the findings more relevant to the discussion about organization capability building as it relates to data and analytics.

Chapter Four

Findings

In retrospect, I see that exploratory research is a journey. As a researcher, I defined my starting point but I did not have enough perspective to know if others had already traveled over the same ground. There was even a point in time when I was concerned that the literature might be too limited, and that I would not be able to find enough information to complete my work. Instead, I encountered the opposite problem: there was so much literature that I realized that I could only provide a schematic view of each of the three models. As I reviewed the scope of work that had already been done, I began to feel that I had become a fellow traveler – part of an expedition that had been underway for years. In this respect, my initial proposal to review the work of Rensis Likert, Henri Savall and Richard Swanson was a lucky break. Their books became a kind of home base for me. Time and again I returned to their writings, and once grounded, headed out on the trail again. After reading their books, I began to think very differently about the cost paradigm that is so much a part of my experience of organizational life. I think that the transformation in my own understanding about costs, benefits and productivity has given me more insight into the meaning of the word paradigm. While I intended to be objective, I also see the way that my own values and beliefs can frame the way that I assess a problem, make decisions, and develop measurements.

The Case Study Company View of the Case

I began my analysis by revisiting a business situation that had occurred within a mid-sized organization in the Minneapolis-St. Paul metropolitan area. The company regards its obligation to customers and other stakeholders to keep costs as low as possible, while maintaining high quality and excellent service. The company's focus on costs meant that any

proposal that had the potential to increase expenditures was scrutinized by leadership. The organization had already debated the relative merit of purchasing software for use by its analysts. At issue was the cost of the software. The organization's leadership had rejected previous proposals, concluding that the software would only add to administrative costs without any expected return on investment. When the proposal was again submitted for review, the company's decision making approach was again used to model and evaluate the costs and benefits associated with purchase of the software. As before, the costs associated with the software were clearly articulated, and offsetting benefits such as improvements in the productivity of people or improvements in analytic capabilities were deemed as soft and not taken into account. The case study company ultimately decided to purchase the software, but the decision-makers emphasized that plans to hire two additional analytic resources would need to be re-evaluated. In other words, the business leaders planned that the cost of the software could be offset by the financial savings associated with elimination of plans to hire two open positions. The savings associated with not hiring two people is considered "hard" savings because projections for administrative expenses (part of overall costs) could be reduced.

Model I: The Economic View

Expenditures for new technology are among the largest investments that an organization will make – and not only because of the money involved, but also because of the implications for change within the organization. Decisions about technology may affect a large number of organizational departments and processes, especially when people are asked to work differently or to accommodate a new process. The changes may also affect external business partners, customers or vendors. Because of these potentially far-reaching impacts, investments in technology maybe distinct from other kinds of investments in fixed assets (Peppard & Ward,

2005). "There is a risk," warned Peppard and Ward, "of bringing the business to a grinding halt if it fails" (p. 53).

Business leaders generally agree that it is important to link investments to business strategy. Although technology improvements are of potentially high strategic value, business leaders typically find themselves in a situation where they have few tools or roadmaps to aid their decision making process (Peppard & Ward, 2005). Traditional approaches such as payback, return on investment (ROI), net present value (NPV) are often used to evaluate technology investments. These tools capture "hard" benefits, which usually relate to cost reduction. Although the tools are specifically designed to assess the bottom-line financial impact of an investment, they largely ignore benefits that are more difficult to quantify (Patel & Irani, 1999). The inability to incorporate important benefits may lead to the dilemma, as Peppard and Ward (2005) pointed out, that the return on investment may be insufficient – at least in the view of company financial managers and other stakeholders.

Ironically, even the benefits associated with strategic innovation – presumably based on plans that emerged out of a careful process of business analysis – are deemed as soft benefits in the sense that there is a risk that the benefits may not materialize. Consider, for example, a potential list of benefits that may be associated with technology investment: improved customer service, better management control, organizational change, facilitation of new management strategies, and competitive advantage (Giaglis, Mylonopoulos, & Doukidis, 1999). These benefits may be deemed as soft, but they are not trivial considerations for business leaders.

In the economic view of the CSC case, the assessment of costs included the expenses for the software license and maintenance fees, consulting fees related to implementation, and training costs, as shown in Table 1.

Table 1

Summary of Costs for New Technology and Training

	Year				Four-Year
	One	Two	Three	Four	Total
Software Cost					
License fees for current software	$ 70,000	$ -	$ -	$ -	$ 70,000
License fees to upgrade software	$ 150,000	$ -	$ -	$ -	$ 150,000
Software license maintenance fees	$ -	$ 40,000	$ 40,000	$ 40,000	$ 120,000
Consulting Fees					
Set up technical environments	$ 200,000	$ -	$ -	$ -	$ 200,000
Implement software upgrade	$ 50,000	$ -	$ -	$ -	$ 50,000
Training Costs					
In-house training	$ 20,000	$ -	$ -	$ -	$ 20,000
Cost Avoidance					
Sunset existing software	$ (10,000)	$ -	$ -	$ -	$ (10,000)
Total	$ 480,000	$ 40,000	$ 40,000	$ 40,000	$ 600,000

An important point about the costs that are summarized in Table 1 is that they are costs that would be incremental to the company. Other costs that might be associated with the investment – most notably the salaries and benefits associated with the people that will use the software – are not considered because they are already included in the company's analysis of net income. If the company leadership agreed to the proposal, the costs in Table 1 would potentially reduce the company's assessment of net income – assuming that all other assumptions stay the same. When the CSC business leaders agreed to the proposal, they also decided to offset the increase in costs shown with a reduction in salary expense. Plans to hire two new staff members were put on hold. In other words, the business leaders considered that the decision to spend the $600,000 for the software would add to administrative expenses, and reduce net income. By putting plans to hire the two analysts on hold, the incremental costs for new technology were neutralized over the four-year period, as shown in Table 2.

Table 2

Neutralization of Incremental Costs

	Year				Four-Year
	One	Two	Three	Four	Total
Technology and training costs	$ 480,000	$ 40,000	$ 40,000	$ 40,000	$ 600,000
Decision to not hire two analysts	$ -	$ (200,000)	$ (200,000)	$ (200,000)	$ (600,000)
Net Expenses	$ 480,000	$ (160,000)	$ (160,000)	$ (160,000)	$ -

Even though the benefits of the proposal were considered soft, the CSC business case did outline a number of ways that the company's analysts would benefit from the investment. Most notably, the proposal identified that there were a number of technical difficulties that analysts encountered because of the need to work with multiple software tools. Implementation of new software would mean that analysts would be able to work within one tool for most tasks. While these benefits were important considerations, they were regarded as "soft" benefits, and not as a potential financial offsets to costs. Roulstone and Phillips (2008) explained that soft benefits are intangible measures, which "cannot or should not be converted to monetary values" (p. 231). In their view, though, that does not mean that they should not be monitored or considered in the evaluation process. "In some projects," the authors wrote, "the intangible benefits can be more important than tangible measures" (p. 231). They added, "The challenge is to efficiently identify and report them" (p. 231).

In addition to the difficulties business leaders face as they attempt to quantify soft benefits, there is also the problem that large scale investments occur in a changing context (Patel & Irani, 1999). Investment in other kinds of assets is more fixed in the sense that there is defined point in time that is being considered. Technology investments, on the other hand, are more contextual and are associated with evolving the business over time.

Technology implementations may also be problem-based or innovation-based (Peppard & Ward, 2005). Problem-based implementation, according to the authors, is generally used to remove constraints or overcome an existing disadvantage against competitors. Innovation-based interventions, in contrast, are "dependent on a combination of the new technology, the organization's technical expertise, and the ability of the organization to change in order to make effective use of the new capabilities" (p. 58). An example of an innovation-based intervention is development of new analytic capabilities, where business leaders work to integrate and leverage diverse sources of information and then apply analytic modeling for competitive advantage.

Alternative decision-making approaches that take into account social, organization and contextual factors have been developed, but are generally regarded as a risky way to make a decision. Most business leaders continue to rely on payback, ROI and NPV approaches. This means that business leaders place more priority on information that they perceive to be objective, as opposed to subjective. Yet problems in evaluating technology investments continue to persist. Business leaders have identified a litany of problems, specifically noting the difficulties in the areas of identification and quantification of costs, opportunity costs, and benefits (Ballentine & Stray, 1999).

Model I in Review: As I began my research, I had labeled Model I as the "economic" view. As I reviewed the literature, I realized that the traditional cost-benefit analysis used in decision-making in organizations is not really economic at all, but rather an accounting construct that I had confused with economics. I had originally reasoned that even introductory economics classes begin by showing the relationship between costs and benefits. In the accounting view, though, it is only certain benefits that can be weighed against certain costs. There is also a distinction between benefits that are associated with tangible vs. intangible accounting standards.

Financial statements of net income are primarily based on tangible assets, which are tangible in the sense that they are physical. Of course, employees are tangible in the sense that they can be seen, but for the purposes of financial reporting in most organizations, employee salary and benefits are considered costs.

Model I reveals some important ways that traditional decision making processes incorporate detailed information about costs, but leave out factors related to potential benefits and improvements in productivity. Table 3 summarizes the Model I decision factors and quantifies the magnitude of each factor. Table 3 also provides a cross-reference to the table that shows the decision factor and magnitude. Figure 1 visually shows the factors related to costs, as well as the factors related to cost avoidance.

Table 3

Summary of Model I Decision Factors

Decision Factor	**Consideration**	**Item**		**Magnitude**	**Cross-Reference Table**
Incremental Costs	The license costs for software, consulting fees, and training costs would be accounted for as expenses within the Case Study Company's financial reports. The costs are incremental in the sense that they add to the company's record of expenses. The additional expenses will reduce net income by a corresponding amount.	Software	$	(340,000)	1
		Consulting fees	$	(250,000)	1
		Training Costs	$	(20,000)	1
Cost Avoidance	If the new software is purchased, some expenses can be eliminated. Incremental costs can be offset if older software is eliminated and new employees are not hired.	Sunset existing software	$	10,000	1
		New hires on hold	$	600,000	2
Benefits	Benefits relate to reduction in costs.	Factor not quantified	$	-	Not applicable
Productivity	The impact of the software and training on employee productivity and value of analytic projects to the organization is not quantified.	Factor not quantified	$	-	Not applicable

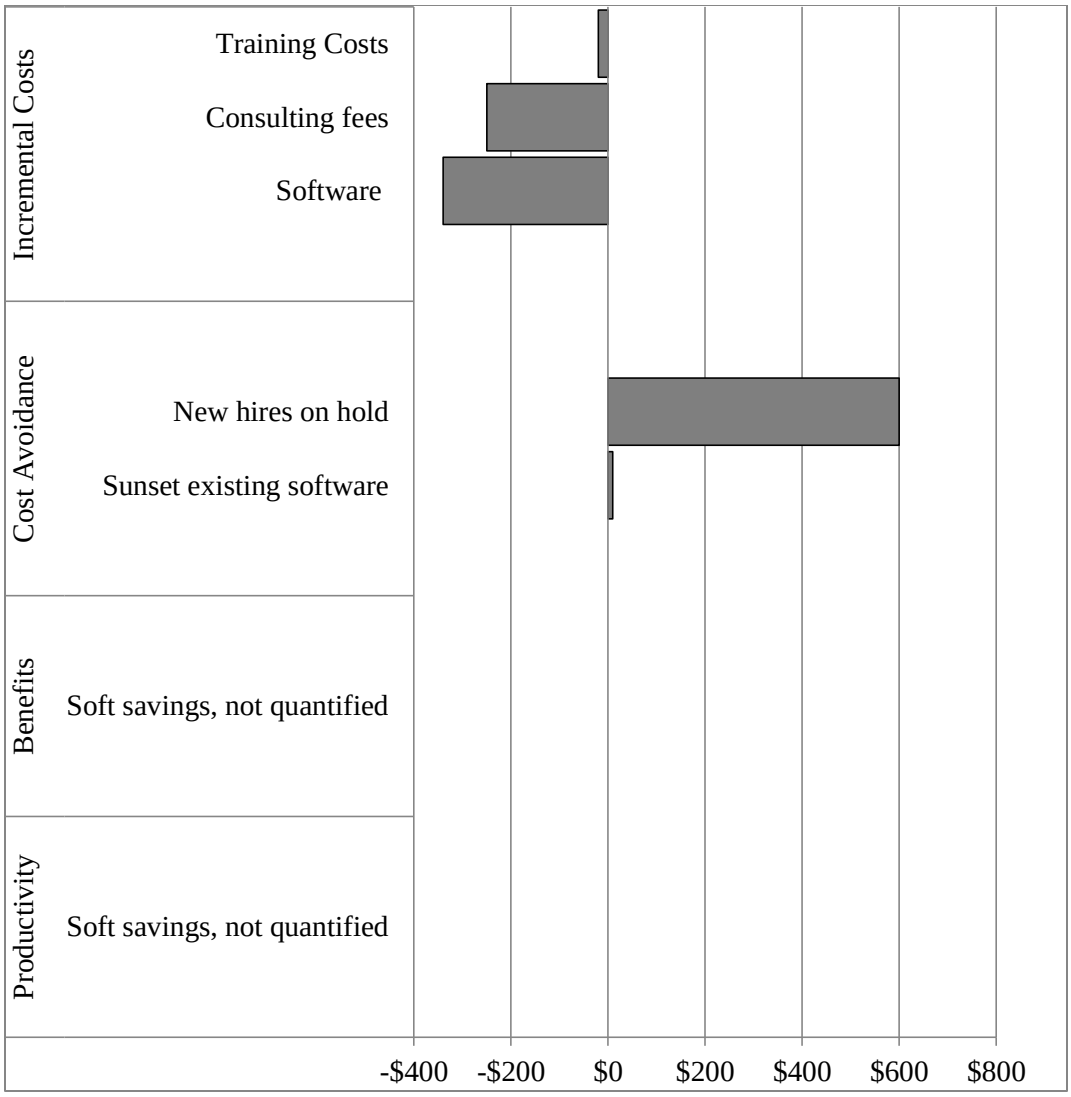

Figure 1. Summary of Model I measurements of costs, benefits and productivity. Measures of costs, benefits, and productivity are represented graphically to show the relative value of the factors used in decision making. Costs affecting net income (modeled as incremental costs) are shown as negative amounts. Offsetting factors that result in cost avoidance are modeled as positive amounts.

Model II: The Social View

In a meeting about upcoming organizational changes, an executive looked out over the large group of employees that had gathered in the auditorium. His gold watch glinting under the lights, he opened the meeting with a sweeping gesture that seemed to dismiss all of us simultaneously. "We like to say," he said, "that our employees are our most valuable asset. But that of course would be disingenuous. Actually, it's our *high-performing* employees that are our *stars* – our most valuable assets. Only fifteen percent of you are in that category. The rest of you need to carefully consider how you can increase your value to the organization."

The meeting had been set up to focus on upcoming organizational changes, but as the group somberly filed out of the meeting it was apparent that the executive had made his point. The meaning of the word "asset" had suddenly taken on a different connotation – and, at least for me, replaced the feeling that I was a valued and respected person in the workplace with the unsettling idea that my salary was a payment for personal performance, and that my personal performance must be sufficient to ensure financial returns for the organization. In my mind at least, there was also an implication that someone somewhere was watching. Back in my work area, I noticed the tension as people went about their work. The days following the warning from the executive wore on in heavy silence. Where there had once been an atmosphere of teamwork and camaraderie, there was now a sense of competition and survival of the fittest. After many months of angst, the organization cut hundreds of people from the payroll in a move to reduce costs.

The seeming disconnect between the assumption that "people are an organization's most valuable asset" and the reality that layoffs of people are "a cost-cutting measure" has perhaps not received the scrutiny that it deserves. How can an employee be referred to as an "asset" one day,

and a "cost" the next? Even Webster's dictionary defines the word "asset" as "anything advantageous" as a primary definition (Morehead & Morehead, 1995). Yet the meaning of the word, according to the dictionary, derives from "the Anglo-French phrase *aver asetz*, to have enough (as enough to pay one's debts)" (p.50). This is the source of the secondary definition of the word asset, which refers to "items of property available" and "total resources." And yet, upon review, the literature is full of references to the concept of employees as assets vs. costs – and has been for decades.

When the executive claimed that "employees are our greatest asset," he really meant that in his organization, expenses for salaries and benefits outweighed the expenses for all other kinds of costs. The idea that accounting systems show salaries and benefits as costs, and not as assets, is consistent with accounting standards that were designed to capture information about financial and physical capital. Financial and physical capital are regarded as *tangible assets* – meaning those expenses that have a physical form. Of course, people have a physical form, but in the accounting view tangible assets include consideration for items such as computer hardware, buildings, land, and equipment. Tangible assets are also described as financial capital and cash.

Accounting standards for *intangible assets,* on the other hand, include a limited set of non-physical items, such as copyrights, patents, computer programs, or other rights that give an organization an exclusive or preferred position in the marketplace (Davidson, Stickney & Weil, 1979). Although these standards are still in practice, a review of the literature shows that there is a large body of commentary about the importance of managing intangible assets. Some of these researchers point out that in companies where costs are predominantly related to the salaries and benefits for people, traditional measures of performance may actually be misleading. For example, Flamholtz, Bullen and Hua (2002) explained that financial accounting treats human

resource costs as current expenses that reduce the net income of the company. Investments are not thought of as related to people, but rather physical assets that will provide future benefits to the company. It is the physical or tangible assets that are recorded on a company's balance sheet, and not the intangible assets. The authors explained that

> Accounting today is still based on an industrial paradigm in which only physical and tangible property is considered an asset. But organizations now need systems that continually assess and re-assess the people they employ, including their skills, talents and behavioral attributes, while paying attention to how human resources impact the bottom line (p. 951).

While it is affirming to think of the value of each person, it may also be true that not all people are perceived to add value in an organization. As many people in organizational life have witnessed, people can be thought of valuable one day and a cost the next. Mayo (2012) explained the difference in perspectives:

> Can we say that people truly are 'the most valuable assets we have'? Or should this engender the cynical response that it often gets? Without people, for sure, no value for stakeholders will be provided and increased. In this sense, they are the foundation of the whole value creation enterprise, whether commercial or public. But the clichéd statement is trite, because it is *some* aspects of *some* people which are the assets. There can be people who actually *subtract* value from stakeholders (p. 52).

Some would go beyond the notion of the value of people to the concept of people as human capital. Human capital is regarded as intangible in the sense that the collective knowledge, skills and expertise of people cannot be seen. At the same time, human capital is regarded as an intangible *asset* because it is the collective knowledge, skills and expertise that

have the potential to add value to the organization. In other research, the term human capital refers to a combination of factors about people, including traits such as intelligence, ability to learn, or motivation to share information and knowledge (Fitz-enz, 2009). "The great irony," wrote Fitz-enz, "is that the only economic component that can add value in and by itself is the one that is the most difficult to evaluate" (p. xviii). In considering people as "human capital" management not only recognizes the importance of people in the organization, but also the need to manage people effectively to improve performance. Fitz-enz explained, "the fundamental question has become, how do we improve the return on investment in human capital?"

Some researchers are advocating that the concept of intangible assets should be expanded to regard *all* forms of knowledge within an organization as an asset. Some would go so far as to include not only the knowledge and skills of the workforce, but also the technological capabilities of the organization, and the nature of the relationship of the organization to its customers (Fitz-enz, 2009). As part of this framework, the sum of all of a company's knowledge, capabilities and relationships would be part of a larger framework called *intellectual capital*. In this view, intellectual capital would be parallel in importance with financial capital, and give managers a new set of tools to manage more effectively. For reference, a representation of the relative alignment of these concepts is shown in Figure 2.

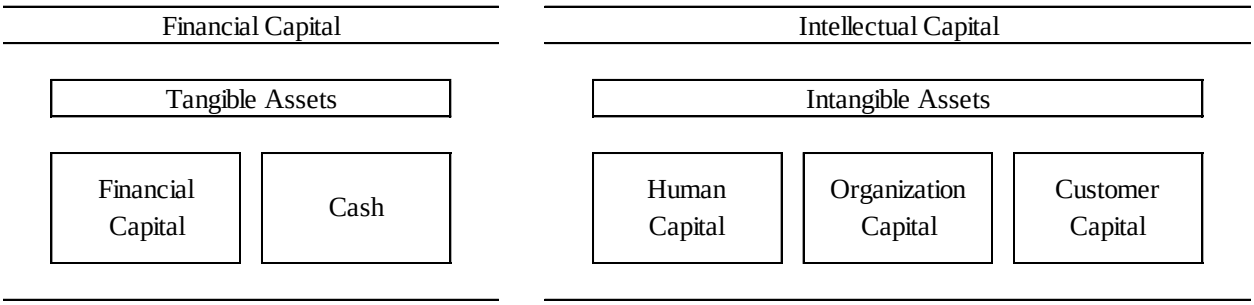

Figure 2. Schematic diagram of the concept of financial vs. intellectual capital. Traditional accounting measures differentiate between tangible assets and intangible assets. Tangible assets include physical items such financial capital, plants and equipment, employee salaries and benefits, and cash. Intangible assets include non-physical properties that are unique to the organization, such as copyrights and patent protections. There is longstanding debate about the need to expand the concept of intangible assets to include measures of the value of the knowledge and skills of people, the organization's capabilities, and customer relationships. Schematically, financial capital would be parallel in importance with intellectual capital.

While the traditional view of intangible assets is still in use in contemporary accounting systems, there is growing recognition that the meaning of intangible assets should be expanded to include human capital, organization capital, and customer capital. For an increasing number of industries, the expenses for employee benefits and salaries have surpassed other kinds of costs (Barber & Strack, 2005). "Strictly defined," wrote Barber and Strack, "these are operations – whether entire companies or business units – with 1) high overall employee costs, 2) a high ratio of employee costs to capital costs, and 3) limited spending on activities, such as R&D, aimed at generating future revenue" (p. 82). In a business where expenses are dominated by people, the authors wrote, capital-oriented metrics developed in an industrial era are not much help. Barber and Strack explained further:

> When a business has relatively high employee costs, traditional capital-oriented performance measures such as return on assets can be irrelevant, if not misleading. An alternative approach, based on a company's existing financial information but focused on

> employees, can tell you how the business is truly doing and suggest ways to improve performance. (p. 88)

Barber and Strack's suggested definition of economic profit would focus on the productivity of people rather than capital. The authors wrote:

> Instead of asking how much capital is used in the business and what the productivity of that capital is compared with its cost, you ask how many employees work in the business and what their productivity is in comparison to their cost. While both methods yield the same measure of economic profit, the employee-oriented calculation, by highlighting the productivity of people rather than capital, isolates the main driver of performance in a people-oriented business. (p. 88)

Management of intangible assets (meaning the knowledge and skills of people) would consider both current and future benefits to the organization. In the majority of people-oriented businesses, where a company's employee costs can be three or more times capital costs, people are generally working to create value in the present. Barber and Strack (2005) pointed out that managing people who are working to create value in the present depends upon use of employee-oriented performance metrics, a focus on operational improvements to drive performance, and short-term variable compensation such as bonuses. In other people-oriented companies, though, people are working to generate value that will occur in the future. Examples of work products that have value might include development of new software, the research needed to formulate a new medication, or the work to build a new brand. In this view, management of people businesses depends on the different ways that people in the organization are working to create value.

The literature also suggests that there may be very significant differences of opinion about the ways that tangible and intangible assets should be measured and monitored, how accounting standards would need to change, and – especially – the measurement problems that would need to be overcome. Kaplan and Norton (2004b) regarded measurement of intangible assets as problematic for a number of reasons. First, value is relative to the organization's objectives in a fast-changing competitive environment. For example, a company may have significant technological capabilities, but those capabilities are viewed as relative to the capabilities of competitors. For example, analytic capabilities do not stand alone in an organization; in order to create value, analytic capabilities must be leveraged in combination with other organizational processes or technology applications.

Ontology. While on the surface it may appear that measurement of organization performance is best left to a company's finance professionals, it is important to consider that the debates about what to measure are, in part, ontological. The division between tangible and intangible assets may represent an ontological dividing line that differentiates between measures that are deemed objective vs. those that are subjective. Managers trained to think from an objectivist perspective may regard "tangible" assets as a knowable reality and "intangible" assets as invisible and therefore subjective. In the objectivist view, financial data and measurements do not require the same critical scrutiny as other forms of information. Managers who view the nature of truth through a social constructionist lens, on the other hand, may be more comfortable with many forms of information – even the accounting measures. Presumably, those trained to manage from a rationalist perspective may be better equipped to critically evaluate the quality of the information, no matter what the source. Yet, ironically, the rationalist paradigm influences the belief that the accounting measures should be accepted as facts, and that other measures

should be dismissed as subjective. The current divide in the accounting debate has likely highlighted the difficulty of turning information about the performance of people into accounting data – and in the process has only reinforced the idea measurement of the value of intangible assets is subjective. A schematic representation of this perspective is shown in Figure 3.

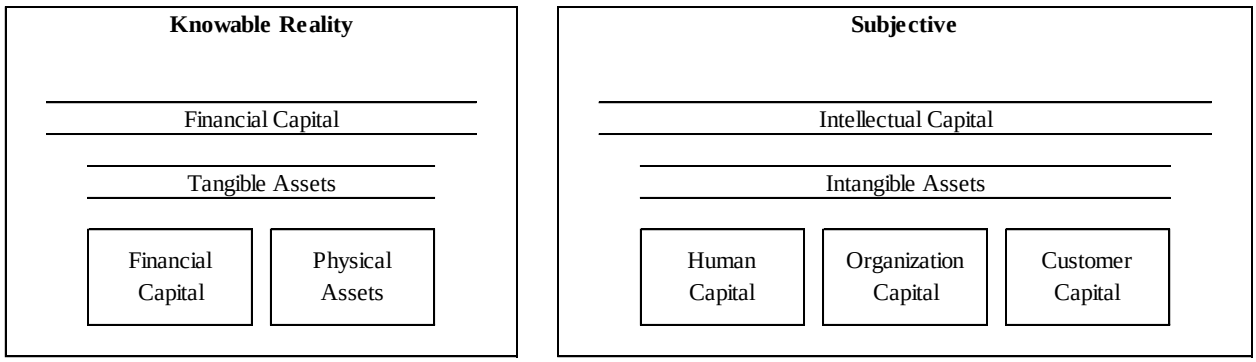

Figure 3. Objectivism and ontological perspectives about the meaning of financial performance measures. The emphasis on rationalism in business management has influenced the perspective that some measures of financial performance can be accepted as truth, while other measures are subjective.

Gowthorpe (2008) pointed to an evolution in the objectivity of financial reporting, from a focus on cash flows to a focus on balance sheets and income statements to the more recent debate about expanding the scope of intangible assets in reporting. One reason that development of intangible assets remains incomplete, the author explained, is that managers are still uncomfortable with subjective judgment. The focus on rational decision making, according to Spender and Marr (2006), has meant that business leaders view knowledge about organizational performance as "a knowable reality," and the organization as "purposive and goal oriented" (p. 11). Yet the increasing complexity and competitiveness of the business environment has meant that as more information becomes available, it can be very difficult to differentiate between objective and subjective information. Accounting debacles such as Enron – and of course the

dramatic and still unfolding impacts of the worldwide economic crisis – may have influenced business leaders to be more skeptical of accounting numbers, and to realize that at least some financial reporting can be more of a construction of assumptions than truth.

But running a business is also a personal quest, and many ethical people work from an inner sense of passion, creativity and artistry. Market conditions are turbulent, and the way forward is, most of the time, unclear. Business leaders have increasingly looked to other sources of knowledge, other indicators, and other perspectives. Most managers have also observed the iterative decision making process displayed by top executives, who – after careful review of objective information – creatively chart a remarkable and inspiring course forward. These decision makers assimilate multiple sources of information and then bring all of it to life to by imbuing it with meaning that is specific to the organization. Strategic plans are developed, and the data is used to support new strategic imperatives for the organization. Having witnessed these critical assessments and other commitments displayed by leadership, most line managers would hesitate to suggest that the strategic plans generated by a review of data are anything less than rational. Paradoxically, the meaning that top executives associate with objective data becomes – at least for those employees that willingly follow the new course – the new rationalist view.

The problem, according to Vlismas and Venieris (2011) is not so much that management is unwilling to make the ontological shift (meaning a shift from objectivism to social constructionism), but rather that there has not been enough exploration of the underlying ontology and epistemology associated with intellectual capital. In addition, the lack of research has stalled development of new theory. According to Vlismas and Venieris, there is a causal relationship between intellectual capital and economic performance that needs to be better

understood. In other words, there is a need to understand whether intellectual capital develops within the organizational context, or whether it is intellectual capital that empowers an organization to achieve performance. Acaniz, Gomez-Bezares and Roslender (2011) similarly pointed to a "continued absence of a critical perspective on intellectual capital" and a "potentially valuable space for a further round of theoretical activity" (p. 104).

Emphasizing the subjective nature of intellectual capital in the literature, O'Donnell (2004) wrote that:

> It is increasingly accepted that intellectual capital is probably becoming the primary source of organizational value – notwithstanding the fact that we have yet to clearly define it. This complex, dynamic and still very fuzzy construction is viewed here as simply a dynamic process of situated collective knowing that is capable of being leveraged into economic and social value. (p. 295)

Referring to concept of intellectual capital, O'Donnell (2004) also wrote about the ambiguity of the term:

> Intellectual capital, similar to other abstractions such as 'economy' or 'organization' or 'management' is a human construction, reproduced by a wide variety of texts, discourses and practices that help us to make some sense, or perhaps nonsense, of our worlds. (p. 296)

Epistemology. If current management debate over ways to account for economic performance is, in part, ontological, there is at least as much controversy over epistemology. The conception of intangible assets as the cumulative knowledge and capabilities of the organization has likely fanned the flames of what can only be described as an epistemological debate. Williams (2008) suggested that there is a need for research that would explain the nature

of knowledge, and explore the concept of knowledge as an asset – as well as the ways that knowledge can be operationalized or leveraged for economic gain. Williams also added that "there is a need to find a way to manage, measure and communicate the value of intellectual capital assets" (p. 83).

Admittedly, the argument that knowledge is a corporate asset can be a bit circular. On one hand, a focus on organizational performance can enhance employee knowledge and capability. On the other hand, employee knowledge and capabilities can enhance organizational performance. Either way, business leaders are also looking for ways to measure the value of knowledge and organizational capabilities, and are seeking to ways to leverage that knowledge to enhance organizational performance. Some researchers have also pointed out that organizational knowledge should be developed in concert with organization capabilities (Moustaghfir, 2009). Moustaghfir wrote that:

> There is a need to explain how knowledge assets, through learning mechanisms, are linked, renewed, and leveraged into socio-technical processes or organization routines, that in turn form the basis of organizational capabilities. As they are socially constructed, these organizational capabilities, when leveraged into products and services, generate value and provide firms with a sustainable advantage and long term superior performance. (p. 339)

Spender (2006) pointed out that there has been a transition in management perspectives about the value of knowledge, and the idea that business leaders are increasingly working with both positivistic and interpretive sources of information in order to understand and enhance the performance of the organization. As business leaders have become more comfortable with various sources of information, they have also begun collecting information that is from external

sources. This has also led to a conception of the organization as a complex system, where business leaders regard knowledge as organic. The new focus on analytics is just one example of ways that business leaders are working to uncover patterns and relationships in data, and leveraging those data relationships for competitive advantage.

Relationship to organization development practice. If organizational development practitioners happened to be listening on the sidelines of these ontological and epistemological debates about the drivers of organizational performance, they may be tempted to join the discussion. As organizational development practitioners know, the inter-relationships between people, organizational structures and organizational performance have been the subject of organization development research for decades. For example, Lewin began to conduct research in organizations in the 1940's, and looked at the nature of resistance as people encountered the need to change (Lewin, 1997). Perhaps more to the point of this research, organizational research has also addressed the problem of measurement. Over fifty years ago, in fact, Likert (1967) observed that the lack of information about the value of people had led to mis-informed decisions about strategies of importance to the organization, such as development of new systems of management, cost reduction strategies, and managerial compensation:

> Accounting procedures at present ignore a substantial proportion of the income-producing assets of firms. As a result, all levels of management are handicapped by the inadequate and at times inaccurate information now available to them. The costs to the firm from the adverse consequences of this inadequate information are greatest at the highest levels in the corporation. (p. 115)

Likert (1958) described two key reasons for the way that accounting processes had evolved. First, traditional theories of management largely ignored motivational and other human

behavior variables. Second, the social sciences were not developed enough to provide methods for measuring the quality of the human organization. Likert explained that the traditional methods were related to the theory of scientific management, cost accounting and related developments, and general administrative concepts taken from military organizational theory. "As a consequence," he wrote, "it (traditional accounting) calls for measurements that are concerned with such end result variables as profits and costs, or with such process variables as productivity" (p. 42-43).

Likert's writings also highlighted social sciences research that showed how management could influence productivity, performance, and earnings. He pointed out that the highest performing organizations had "mobilized both noneconomic motives and economic needs so that all available motivational forces create cooperative behavior focused on achieving organization's objectives" (1967, p. 106). "If human asset accounting were added to the usual accounting process," Likert wrote, "the management of business and governmental organizations would be appreciably improved" (p. 115).

Likert was also engaged in research that evaluated changes in organizational performance over time. He found that traditional measures of accounting, which only show a composite view of earnings and productivity, had obscured the true impact of the changes. The most productive organizations, he wrote, "apparently require an appreciable period of time before the impact of the change is fully manifest in corresponding improvement" (1967, p.81). Likert also pointed to research that showed the positive impact of a shift in managerial behavior to achieve higher productivity and reduce costs. In organizations where only economic needs were considered, he found that cost-reduction had involved a tightening of hierarchical controls and increasing pressure to increase productivity. There was also pressure to lower costs through personnel

limitations, budget cuts, and the introduction or tightening of work standards. Citing numerous studies that had been conducted to evaluate the impact of cost-cutting in organizations, Likert wrote

> When the unfavorable trends in productivity, waste, costs, and labor relations caused by the usual cost-reduction procedures finally becomes evident, there are no measurements which point to the true causes of the adverse shifts. As a consequence, a wrong diagnosis is commonly made; the wrong causes are blamed, and the corrective steps are often focused on the wrong variables. (p. 84)

Likert and Seashore, who studied what they characterized as "the cost-reduction sequence in organizations," showed how changes in management behavior had a long-term effect on employee attitudes and performance, which ultimately deteriorated the quality of products and services, and ultimately customer reactions and loyalty (Likert & Seashore, 1963). The authors pointed to research that showed that the highest producing managers did not believe that successful and sustained cost reduction could be achieved through cost cutting programs. Instead, the high-performing managers focused on high productivity goals where people were motivated to reduce waste and costs, and where cost concern had become a continuous characteristic of the organization.

In other research, Likert (1961) documented an extensive series of studies focused on achievement of organizational goals. Based on this research, Likert emphasized the importance of cooperative relationships, goal setting, and also the idea that the highest levels of productive and cooperative motivation are obtained when noneconomic motives are made compatible with economic motives. Other organizational researchers and scholars had similarly linked the behavior of people to economic performance. Douglas McGregor, who conducted research to

uncover the most effective ways to manage people, may have influenced Rensis Likert's assessments of high performing managers. McGregor's Theory X – which contends that employees must be commanded and controlled in order to perform – and Theory Y – which contends that employees are self-motivated and self-directed – has shifted the thinking from a focus on the productivity of people to an expanded view that the productivity of people is related to the quality of management (McGregor, 2006). Later, Will Schutz – who wrote extensively about simplicity, joy and truth – emphasized the importance of the quality of relationships at work, as well as the relationship between personal empowerment and productivity (1994). Schutz is also noted for the development of Element B (then FIRO-B), which is a survey measuring awareness of self and others that is still in use today.

Given the research showing the relationship between the productivity of people and organizational performance, Likert advocated for human asset accounting as a way to enhance traditional accounting measures. The new measures that Likert proposed were developed to take into account "the productive capacity of a firm's human organization" and also "the value of its customer goodwill" (1967, p. 148). Likert advocated that new procedures could be developed to assess a number of factors, such as the level of intelligence and aptitudes, level of training, level of performance goals, motivation to achieve organizational success, quality of leadership, and quality of decision making.

Likert (1967) had envisioned that it would be necessary to collect data over time so that management could work with the information, understand the meaning of the measures, and also work to build the information sources so that the measures could be computed on a continuous basis. Perhaps even more interesting, Likert also envisioned that human asset accounting, in combination with methodologies and substantive findings from social science research, could

make great contributions to management. In his research, Likert found that high producing managers used a combination of tools. The best managers, in his view, had not only leveraged the cost accounting tools, but they had also integrated other factors such as confidence and trust, motivation, loyalty and communication (Likert, 1958).

At the time Likert proposed human asset accounting, accounting professionals had already recognized the importance and value of people and customer goodwill to organizations. However, the cost to change over to new accounting practices was high, and they had trouble justifying the additional work effort to their business leaders. Likert (1967) responded to these concerns with a concern of his own:

> In considering the desirability and expense of undertaking the work required for human asset accounting, it should be recognized that the present practice of treating, with great precision, a fraction of a firm's assets and completely ignoring assets of roughly the same or greater magnitude represents a serious imbalance. (p. 152)

The cost to develop the new measures and develop new accounting practices was only part of the problem. Accountants were also concerned about the fact that the measures would need to be tracked over time in order to ensure the stability and validity of the new approach. More than that, there was no consensus about the measures themselves. There were many proposals and papers, but there were no approved standards to adhere to. Without standards, many worried, there would be a danger that new measures of performance could be very subjective and could themselves be misleading (Flamholtz, Bullen & Hua, 2002).

Despite the many concerns raised by accounting professionals, Likert continued to develop concepts and methods of accounting for human resources, and began to collaborate with other researchers. One of the outcomes of that research was that idea that human resource

accounting (HRA) could also be leveraged as a managerial tool or way to enhance managerial effectiveness. Additional research focused on HRA as a framework that could be used to facilitate decision making (Flamholtz, Bullen & Hua, 2002). Results from some focused studies showed that HRA data affected managerial decisions, both at the choice and process levels. Flamholtz, Bullen and Hua (2002) also wrote about more contemporary research conducted in Sweden. The authors pointed to findings from that research showed that HRA information is critical for increased accuracy in investment-related decisions -- especially in knowledge-intensive organizations.

During the same timeframe that Likert was working to propose the new performance measures, Theodore Schultz had written about an economic concept that he had termed "human capital" (Fitz-enz, 2009). Schultz, who was then the President of the American Economic Association, structured his presidential address to describe the economic impact of investment in human capital (Schultz, 1961). In his address, Schultz explored the idea that economic growth could not be explained by growth in financial capital alone. Human capital, he wrote, "has surely been increasing at a rate substantially greater than reproducible (nonhuman) capital" (p. 5). Schultz explained that there were two sets of forces that probably accounted for the discrepancy. One, he explained, was increasing returns to scale, and the second was related to improvements in human capacity. Both factors, he added, had been excluded from economic analyses.

Schultz was also careful to address the sensibilities of his 1961 audience, which he recognized had been greatly affected by the social forces that had led to catastrophic world events and the deep spiritual chasms related to discrimination of people. Worried that his use of

the word "human capital" would imply a return to the idea that people were only a commodity – or, worse, a head count in production – Schultz (1961) explained that:

> The failure to treat human resources explicitly as a form of capital, as a produced means of production, as the product of investment, has fostered the retention of the classical notion of labor as a capacity to do manual work requiring little knowledge or skill, a capacity with which, according to this notion laborers are endowed about equally. This notion of labor was wrong in the classical period and it is patently wrong now. Counting individuals who can and want to work and treating such a count as a measure of the quantity of an economic factor is no more meaningful than it would be to count the number of all manner of machines to determine their economic importance either as a stock of capital or as a flow of productive services. (p. 3)

In his speech, Schultz (1961) further explained that laborers had become "capitalists" because of the acquisition of knowledge and skill that have economic value. He added, "This knowledge and skill are in great part the product of investment and, combined with other human investment, predominantly account for the productive superiority of the technically advanced countries" (p. 3). Nearly two decades later in 1979, Schultz won the Nobel Prize for his work on the plight of the world's under-developed countries. His claim was that improving the welfare of poor people did not depend on land, equipment or energy, but rather on knowledge (Fitz-enz, 2009).

The social view as a paradigm. The interaction between people and structure has always been part of the core beliefs of human resource development (HRD) and its underlying theory. Richard Swanson (2001b), a highly respected scholar in the area of HRD, defined HRD as "a process of developing and/ or unleashing human expertise through organization

development and personnel training and development for the purpose of improving performance" (p. 304). In Swanson's view, organization development is "the process of systematically implementing organization change for the purpose of improving performance" (p. 304). In addition, training and development is "the process of systematically developing expertise in individuals for the purpose of improving performance" (p. 304). With organizational performance in mind, Swanson also described a set of core HRD beliefs (2001b):

- Organizations are human-made entities that rely on human expertise in order to establish and achieve their goals.
- Human expertise is developed and maximized through HRD processes and should be done for the mutual long-term and/or short-term benefits of the sponsoring organization and the individuals involved.
- HRD professionals are advocates of individual and group, work process and organizational integrity. (p. 304)

Swanson (2001b) also explained that HR professionals leverage theory from psychology, economics, and systems theory in order to understand, explain and carry out its process and roles. These theories are integrated across people, structure and the external environment and then into disciplined thinking and action. Swanson also differentiated between levels of performance, and considered the organization, work process, and group/ individual as separate, yet related, domains.

Despite the depth of the underlying theory and the integration of core beliefs, there is increasing concern among HRD professionals that there is too much focus on fine-tuning the inter-relationships between people and structure, and not enough focus on leveraging the

collective capabilities of the organization to improve organizational performance. Swanson (2001b) expressed concern that:

> On average, HRD practice does not come close to what we know from sound theory. Systematically filling the performance improvement theory-practice void is fundamental to the maturation of the profession and it is the work of both practitioners and scholars. In conclusion, I contend that the demand for HRD theory is increasing, that our present available theory has taken us about as far as we can go and that what we do is too important to wallow in theoretical explanations. (p. 309)

In another essay, Swanson (1999) also elaborated that:

> The simple need confronting many performance improvement professionals today is to think about performance, with or without the human lens. The willingness to let go temporarily of the human lens in favor of a performance lens is the key to elevating performance improvement to its fullest potential (p. 4).

The implication of setting aside economic theory, in Swanson's view, is a like removing one of the legs of a three-legged stool – where the three legs are economic theory, psychological theory, and systems theory (1999). The economic principles that have been neglected, in Swanson's view, include 1) management of scarce resources, 2) creation of sustainable long-term economic performance, and 3) development of relevant organizational knowledge and expertise in individuals or groups.

Organization development scholars have similarly emphasized the relationship between people and technology, and the idea that is people and not machines that create value. Early organization studies of the impact of technology and job design were focused on the productivity of people. The early depictions of the relationship of people to technology, for example, focused

on productivity as related to a particular job function and job design, and the way that technology could speed up or slow down production or other kinds of processes. In today's conversations about people and technology, it is the focus on organizational performance that is important. In other words, the relationships between people and structure (where technology is one example of structure) produce an economic outcome -- and that outcome should be the focus.

One key problem, Swanson (1999) noted, is that the economic theory so central to performance had, over time, become minimized within OD literature. "As a result," Swanson pointed out, "what is called organization development is reduced to individual development, team development, or the pursuit of change in the hopes of achieving improved organizational performance" (p. 11). Breitfelder and Dowling (2008) acknowledged that "HRD often gets trapped in a policing role, mediating grievances, monitoring compliance with employment laws, and enforcing codes of conduct" (p. 43). The "new" HRD, they emphasized, is more focused on factors that affect performance. They added anecdotally that "What an enlightened consulting or financial services firm does today, most companies will do tomorrow" (p. 43). There is also increasing recognition within among HRD professionals that human resources functions can become both a catalyst and a facilitator of cross-functional development. Within a people-oriented business, business leaders are focused on ways to demonstrate value – even to other stakeholders within the organization.

Although HRD is (or could be) a big part of discussions about performance, there is still an ontological and epistemological division between those measuring economic performance and those managing it. Barber and Strack (2005) wrote that some standard measures offer little information about the real drivers of business performance. "In order to identify where and how value is being created – or squandered – people-intensive businesses need performance metrics

that are as financially rigorous as economic profits but that highlight the productivity of people rather than capital" (p. 81).

The new focus on management of intellectual capital – especially human capital – is more concerned with how the interaction between people and structures drives the organization toward their goals. Fitz-enz (2009) outlined three levels at which the leverage of human capital might be measured. First, and perhaps most important, there is a relationship between human capital and the goals of the organization. Second, there may be changes in quality, innovation, productivity, and service outcomes within business units. Third, there are effects of human resources departments on planning, hiring, compensating, developing, engaging, and retaining the enterprise's human capital. Fitz-enz used this framework to develop a set of metrics that express the link between people and financial results. He has coined this body of work with the term "Human Capital ROI" (2009, p. 50). For example, the calculation of Human Capital Return on Investment (HCROI) looks at the profitability of the firm adjusted for pay and benefits:

$$\text{HCROI} = \frac{\text{Revenue - (Expenses - Pay and Benefits)}}{\text{Pay and Benefits}} \quad \text{(p. 50)}$$

Similarly, Fitz-enz (2009) showed how the same thinking can be applied to measure Human Capital Value Added (HCVA), which essentially shows a measure of profitability adjusted for pay, benefits, and number of FTE's:

$$\text{HCVA} = \frac{\text{Revenue - (Expenses - Pay and Benefits)}}{\text{FTE's}} \quad \text{(p. 49)}$$

The derivation of the value of the work performed by people is another way of formulating return on investment, where "return" is the value-add, and "investment" is the cost of the salaries of people. Although the intent of these calculations is to manage the performance of the

organization overall, some business leaders conceptually apply the formulation to individuals – especially when cost-cutting is under consideration.

The increasing focus on economic value-add in organizations is also part of the reason that some contemporary researchers are also focused on the idea that *processes* can be assets of the enterprise. Again, traditional accounting treats these processes as expenses (Fitz-enz, 2009). As Fitz-enz (2009) pointed out, "This ignores the fact that a process is more accurately an asset if it generates value" (p. 70). It also follows, according to Fitz-enz, that those processes that have the potential to add value should always show a direct link from the process outcome to an organizational goal.

The social view of the CSC proposal. The writings of Rensis Likert, Jac Fitz-enz, and Richard Swanson imply that if economic performance is the key driver of business, then the proposed purchase of analytic software is only relevant in context with the work of people. All three might experts might have rejected the CSC proposal as it was originally submitted, and recommended a future agenda that included discussion about the reasons that the analysts would use the software. "Tell us about the work that the analysts will do," they might have insisted, "and then tell us how the software will help." The problem with the CSC business case, Swanson might have explained, is that the decision-making tools still have a bottom-line orientation – meaning that the decision-making process is focused on the impact of the decision on costs. In an earlier article, Swanson (2001a) had written:

> Lacking the appropriate analysis tools, decision makers attempt to apply to HRD the cost-benefit tools that they have traditionally applied to capital investments, despite the fact that human competence does not depreciate on a scheduled basis. In fact, human knowledge, attitudes, and skills can be expected to grow. (p. 10)

To correct this problem, Swanson emphasized that new measures are needed. Swanson (1999) proposed the Core Financial Analysis Method (FAM). The FAM method includes consideration for (a) the performance value resulting from the performance improvement program, (b) the cost of the program, and (c) the benefit resulting from the program. Although both Fitz-enz and Likert would have had their own performance measures in mind, they might have agreed that it would be easier for the CSC staff to work through the calculations using Swanson's worksheets. The worksheets had been specifically developed for Swanson's students so that they could better understand the formulations. Tables 4 through 8 show the results of this analysis.

Table 4

Summary of Costs for New Analytical Capabilities

Program/ Intervention Cost Worksheet
Program/ Intervention: Technology Investments for Analysts
Internal Time Assessment: Development of Program/ Intervention

Option name:	Technology Investment	Training Investment	Total Investment
Analyze & Contract			
Analyze	$ 5,000		$ 5,000
Contract	$ 1,000	$ 1,000	$ 2,000
Proposal to Management	$ 1,000	$ 1,000	$ 2,000
Diagnose & Feedback			
Diagnosis	$ 20,000	$ 1,000	$ 21,000
Feedback	$ 5,000	$ 1,000	$ 6,000
Plan, Design & Develop			
Plan	$ 5,000	$ 10,000	$ 15,000
Design			
Develop			
Implement			
Manage	$ 40,000	$ 20,000	$ 60,000
Deliver	$ 10,000	$ 10,000	$ 20,000
Evaluate & Institutionalize			
Assess Results			$ -
Report Results			$ -
Institutionalize			$ -
Other - Quarterly User Group	$ 8,000	$ 16,000	$ 24,000
Total Internal Costs	$ 95,000	$ 60,000	$ 155,000

Table 5

Summary of Benefits and Costs, With and Without Technology and Training Investments

Program/ Intervention Summary
Program/ Intervention: Technology Investments for Analysts

Option:	Without Technology Investement	With Technology Investment	With Technology & Training Investment
Performance Value			
Algorithm development	$ -	$ 140,000	$ 280,000
Dashboard development	$ -	$ 105,000	$ 210,000
Research to inform product development	$ -	$ 122,500	$ 245,000
Accelerate processes	$ -	$ 70,000	$ 140,000
Information to support decision making	$ -	$ 35,000	$ 70,000
Identification of cost savings opportunities	$ -	$ 175,000	$ 350,000
Total Performance Value	**$ -**	**$ 647,500**	**$ 1,295,000**
Costs (costs include years 1 through 4)			
Software Cost			
License fees for current software	$ -	$ 70,000	$ 70,000
License fees to upgrade software	$ -	$ 150,000	$ 150,000
Software license maintenance fees	$ -	$ 120,000	$ 120,000
Consulting Fees			
Set up technical environments	$ -	$ 200,000	$ 200,000
Implement software upgrade	$ -	$ 50,000	$ 50,000
Training Costs			
In-house training	$ -	$ -	$ 20,000
Cost Avoidance			
Sunset existing software	$ -	$ (10,000)	$ (10,000)
Internal Time To Develop New Capability	$ 95,000	$ 60,000	$ 155,000
Total Costs		**$ 640,000**	**$ 755,000**
Benefits	**$ -**	**$ 7,500**	**$ 540,000**

Table 6

Contribution of New Technology and Training on Planned Analytic Projects Over Four Years

Analytic Project	Expected Benefits	Potential Value Over Four Years	Cross-Reference Table
Algorithm Development	Development of computer programs that incorporate an agreed-upon set of logic and and other statistical factors; used to identify fraudulent transactions.	$280,000	20
Dashboard Functionality	Develop computer programs that will make dissemination of compay metrics available to additional work groups. Users will also benefit from reporting capabilities that are currently prepared manually.	$210,000	21
Product Performance	Develop analysis of product performance, identifying areas of opportunity for changes in product design and innovation.	$245,000	22
Savings Opportunities	Assess current costs; identify opportunities to reduce costs.	$350,000	23
Process Improvement	Assess current operations; identify opportunities to reduce costs.	$140,000	24
Support Decision Making	Provide financial analysis to executives as part of strategic planning process	$70,000	25
Four-year Total		$1,295,000	

Table 7

Summary of Current vs. Expected Performance Value

Program/ Intervention Summary
Program/ Intervention: Technology Investments for Analysts

Option:	Without Technology Investment	With Technology Investment	With Technology & Training Investment
Current Performance - Value			
Algorithm development	$ 800,000	$ 940,000	$ 1,080,000
Dashboard development	$ 120,000	$ 155,000	$ 190,000
Research to inform product development	$ 420,000	$ 542,500	$ 665,000
Accelerate processes	$ 160,000	$ 230,000	$ 300,000
Information to support decision making	$ 1,600,000	$ 1,635,000	$ 1,670,000
Identification of cost savings opportunities	$ 600,000	$ 775,000	$ 950,000
Total	$ 3,700,000	$ 4,277,500	$ 4,855,000
Expected Preformance - Incremental Impact			
Algorithm development	$ -	$ 140,000	$ 280,000
Dashboard development	$ -	$ 105,000	$ 210,000
Research to inform product development	$ -	$ 122,500	$ 245,000
Accelerate processes	$ -	$ 70,000	$ 140,000
Information to support decision making	$ -	$ 35,000	$ 70,000
Identification of cost savings opportunities	$ -	$ 175,000	$ 350,000
Total	$ -	$ 647,500	$ 1,295,000
Performance Total Value			
Algorithm development	$ 800,000	$ 1,080,000	$ 1,360,000
Dashboard development	$ 120,000	$ 260,000	$ 400,000
Research to inform product development	$ 420,000	$ 665,000	$ 910,000
Accelerate processes	$ 160,000	$ 300,000	$ 440,000
Information to support decision making	$ 1,600,000	$ 1,670,000	$ 1,740,000
Identification of cost savings opportunities	$ 600,000	$ 950,000	$ 1,300,000
Total	$ 3,700,000	$ 4,925,000	$ 6,150,000
Percent Performance Gain	0.00%	15.14%	26.67%

Table 8

Summary of Expected Performance Value vs. Employee Costs

Option:	Without Technology Investement	With Technology Investment	With Technology & Training Investment
Performance vs. Employee Costs			
Performance	$ 3,700,000	$ 4,925,000	$ 6,150,000
Employee Costs	$ 1,500,000	$ 1,500,000	$ 1,500,000
Ratio	2.5	3.3	4.1

Model II in review. The worksheets from Swanson's book, *Assessing the Financial Benefits of Human Resource Development* (2001b), were used to assess the costs, benefits, and productivity associated with the case. Summaries of the analysis are shown in Tables 4 through 8. More detailed analysis related to the performance value of analytics projects is provided in the Appendix in Tables 20 through 25. Overall, the Model II analysis emphasizes the inter-relationship between costs, productivity and benefits. Benefits associated with technology and training investments take into account the expected change in the value of the analytics projects compared to the cost to achieve that additional value.

Model II factors also considered other dimensions of costs – especially as costs relate to organizational capability building. For example, as people begin to plan, design and implement new projects, the Model II analysis would suggest that it is important to ensure that the work people are doing is of high value to the organization. From the Model II perspective, the decisions made by the CSC business leaders would have had more impact if the focus had been on prioritization of the analytic projects than on the incremental costs of the technology and training investments.

Table 9 summarizes the Model II decision factors, and also shows a cross reference to tables 4 through 8, so that the decision factor is associated with the applicable worksheet. Figure 4 visually shows the magnitude of the Model II decision factors. Figure 4 shows that the factors associated with productivity are greater in magnitude than the factors associated with costs.

Table 9

Summary of Model II Decision Factors

Decision Factor	Considerations	Item	Magnitude	Cross-Reference Table
Incremental Costs	The license costs for software, consulting fees, and training costs from Model I are incorporated in Model II, but are de-emphasized as a factor in decision making.	Software	$ (340,000)	1
		Consulting fees	$ (250,000)	1
		Training Costs	$ (20,000)	1
Cost Avoidance	If the new software is purchased, some expenses can be eliminated. The cost avoidance associated with sunset of software shown in Model I is incorporated in Model II, but de-emphasized.	Sunset existing software	$ 10,000	1
Internal Costs	Model II highlights the work effort and associated costs to build new analytical capabilities within the organization.	Analysis and contracting	$ 9,000	4
		Diagnosis and feedback	$ 27,000	4
		Planning	$ 15,000	4
		Implementation	$ 80,000	4
		Institutionalize changes	$ 24,000	4
Benefits	Model II highlights the value of the analytics projects to the organization. The value of these projects, though, is offset by the cost to develop them. The value of the projects less the development costs is defined as a benefit in Model II. There is a relationship between benefits, productivity, and costs. The increase in productivity is offset by the increase in costs.	Project benefits, with technology investment	$ 540,000	5
Productivity	Model II considers that the analytics projects will have value to the organization, even without the investment in new technology. With the investment in new technology, the analytics business leaders believe that projects can be completed sooner -- or that more project scope can be developed than originally planned.	Incremental impact of investment, assuming training	$ 1,295,000	6
	Model II also conceptualizes productivity as related to the knowledge and skills of people. The value of analytics projects relative to costs can be enhanced with investment in technology and training, moving the ratio of value to costs from 2.5 in current state to 4.1.	Ratio performance value to costs, with technology investment and training	4.1	7,8

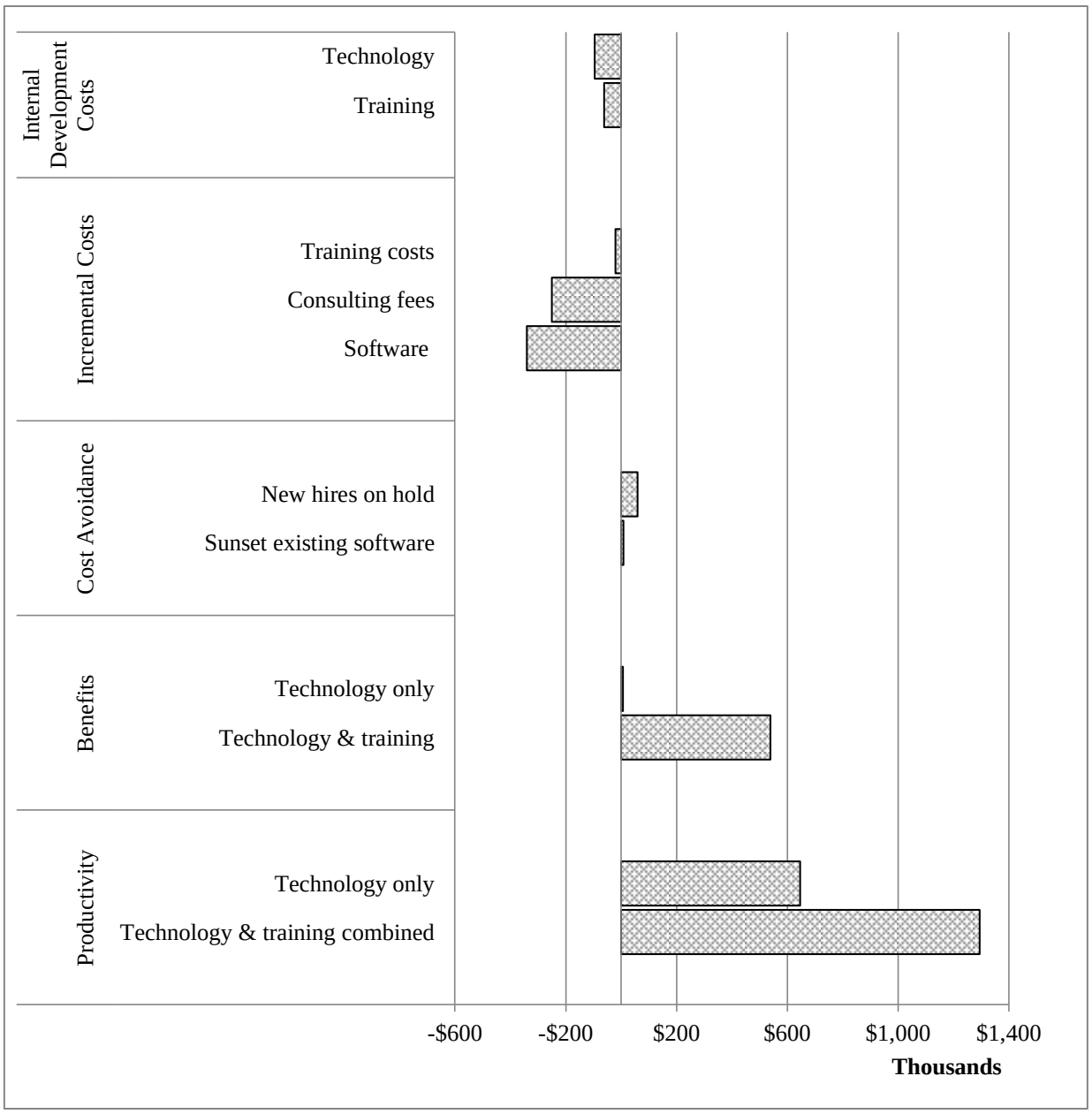

Figure 4. Summary of Model II measurements of costs, benefits and productivity. Measures of costs, benefits, and productivity are represented graphically to show the relative value of the factors used in decision making. Costs affecting net income (modeled as incremental costs) are shown as negative amounts. Offsetting factors that result in enhanced productivity are modeled as positive amounts. Productivity is enhanced with the addition of new technology. Benefits are modeled to show the incremental increase in performance value, relative to the additional investment in technology or training that it would take to achieve that increase.

Model III: The Socio-Economic View

In the early eighties, Peters and Waterman (1983) wrote a best-selling book that predicted "the fall of the rational model" (p. 22) in the United States. Based on extensive research, the authors found that the most successful businesses – those they deemed the "excellent" companies – could not explain their results based on the conventional business rationality taught in business schools. The word "rational" they explained, implied a detached, analytical justification for all decisions – the "right" answer if people could only cut through "all of that messy human stuff" (p. 20). In their book, Peters and Waterman documented ways that leadership in the most successful companies had defied rationalist convention and thought differently about what was most important. "Conventional businesses rationality," they wrote, "simply does not explain what makes the excellent companies work" (p. 25).

Evoking Kuhn's great work *The Structure of Scientific Revolutions*, Peters and Waterman (1983) appealed to business leaders to consider the limitations of the rationalist model, and pointed out that the set of shared beliefs about the importance of rationality was a paradigm. Kuhn, they explained, had put forward the profound idea that "scientists in any field in any time possess a set of shared beliefs about the world, and for that time the set constitutes the dominant paradigm" (p. 22). Even in the early 1980's the rationalist paradigm had already lead to a long list of problems in business – especially the idea that professionalism in management could be equated with hard-headed rationality. Students with little practical experience emerged from business schools with the idea that they could manage anything if they maintained a rationalist mindset. The rationalist view, Peters and Waterman wrote, had also led to a "dramatic imbalance in the way that we think about managing," (p. 29) where social, ethical and innovative ideas had been set aside to focus more narrowly on costs.

The socio-economic view as a paradigm. Ten years earlier, in 1973, Henri Savall had published his ground-breaking book *Work and People* in France (Savall, 2010). Savall presented, in considerable depth, an analysis of the ways that the way that the rationalist model and attendant focus on costs had distracted business leaders from creating value and working to ensure the long term sustainability of the firm. Forty years later, the original argument presented by Savall persists, and the associated values and beliefs are in direct counterpoint to the rationalist paradigm. Three major points of emphasis are still highlighted prominently on the Socio-Economic Institute of Firms and Organizations (ISEOR) website:

- Human potential is the sole active factor in creating added value
- Technical and financial capital are "inert" inner tools
- The complementary nature of capital and labor, as opposed to substitutability

These three points of emphasis are the key tenets of the Socio-Economic Approach to Management, or SEAM. Savall, along with his ISEOR colleagues, has now conducted SEAM research in over 1,300 organizations all over the world (Conbere & Heorhiadi, 2011a). Even after so many years of experience intervening in organizations, Savall is careful to *propose* the SEAM paradigm – knowing first-hand from his research the many ways that the depth and scope of management belief in rationalism manifests itself in management decision-making and planning. Perhaps Savall's use of the word *propose* is also a way for business leaders to become aware that the SEAM approach is an *alternative* view or approach to decision making. As Cristallini (2011) explained,

> A model for analysis and decision making can be regarded as a theory or an ideology that serves as a frame of reference. It covers the major issues that address the performance and survival of an organization. This may include conceptions and representations about

> the strategy of the company, its investment decisions, the involvement of its members, quality, productivity, control, improvement of performance change. Everyone can have an opinion on how to address these issues, aided by multiple theories, concepts and methods, sometimes very old, and in many cases not properly tested and proven. (p. 2)

In Savall's view, the SEAM approach is not just another way to think about managing, but rather part of a larger set of moral, legal, ethical and philanthropic responsibilities of the organization (Savall, 2010). In adopting the rationalist paradigm, business leaders developed models that not only framed the decision-making processes within the firm, but also framed the relationship of the organization to society, to the community, to stakeholders and even to the employees themselves.

Corporate social responsibility. Savall, a scholar of management literature, studied the work of Archie Carroll, who was noted for his writings on business ethics, corporate social performance, and strategic planning. In one article, Carroll (1999) had referenced Howard Bowen's definition of corporate social responsibility, which referred to the obligations of business leaders to "pursue those policies, to make those decisions or to follow those lines of action which are desirable in terms of the objectives and values of our society" (p. 270). Exactly *which* values and objectives should be pursued, however, was a subject of additional academic investigation. Carroll, who traced the evolution of the concept of corporate social responsibility over time, found that in the early 1980's the idea of corporate responsibility had become intertwined with the drive toward profitability. At the time, even noted management theorists such as Peter Drucker had concluded that responsibility was compatible with profitability because profitability had benefitted society with well-paid jobs and personal wealth.

Carroll also documented the work of other researchers who began to question the strength of the relationship between corporate social responsibility and profitability (Aupperle, Carroll, & Hatfield, 1985). Those who did study the relationships found varying results, but noted the difficulty in determining appropriate criteria and standards of corporate performance. Still others began to distinguish between the economic, legal, ethical and even philanthropic domains, and questioned the interrelationships and relative importance to business of each domain (Schwartz & Carroll, 2003). This line of questioning seemed to result in the idea that while economic and legal responsibilities are required, ethical and philanthropic responsibilities were expected and desired – and Carroll's own observation that the most critical tensions were between economic and legal, economic and ethical, and economic and philanthropic (1991). Later, Carroll concluded that each responsibility had a "face" – an aspect of responsibility that contributes to the whole (1998).

Perhaps one of the most relevant contributions of Carroll's work to Savall's framework is that Carroll's research had identified employees as stakeholders, and had emphasized the idea that management has a responsibility to employees. Carroll (1991) even went so far as to distinguish between immoral, amoral, and moral management. Carroll defined immoral management, where employees are viewed as "factors of production to be used, exploited, manipulated for gain" (p. 46). Carroll contrasted immoral management from amoral management, in which employees are treated as the law requires – meaning that "organization structure, pay incentives and reports are all geared toward short and medium-term productivity" (p. 46). Immoral and amoral management, according to Carroll, could be contrasted with moral management, where the goal of management would be to use a leadership style that would result

in mutual confidence and trust. "If management is moral," Carroll wrote, "then employees will be treated with dignity and respect" (p. 46).

Influenced by the idea of moral management, Savall (2010) similarly focused on the idea of human potential and the idea that organizations should create conditions under which people will want to maximize their talents on behalf of the organization. Anthony Buono, referring to contemporary thinking about organization diagnosis and intervention, referenced Savall's concept that there is an interaction between the quality of functioning in an organization and economic performance. According to Buono, Savall emphasized that "the North American tendency to cast people as human 'resources' misses the essential point that human beings cannot be considered as simply another resource at the organization's disposal. People are free to give or withhold their energy as they desire" (p. viii).

Savall (2010) also observed that factors such as educational attainment, affinity for art, literature, language, culture or travel may influence the roles that people play in society, which may be quite different than the roles that people assume in an organization. In Savall's view,

> The whole of a man's life makes capital out of his experience and his know-how but his economic value is the result of a multitude of variables, many of which belong to and which fluctuate with the evolution of the system. A man's productivity depends very largely on his role in society, in the enterprise, and in his environment. (p.173)

The Taylor-Fayol-Weber (TFW) virus. Most U.S. organizations, however, do not seem to regard their employees quite so holistically, and even organizational department labels such as "Human Capital" suggests the idea that people are regarded as commodities. This practice, according to Conbere and Heorhiadi (2011b) comes from Marxist and neo-classical economics, in which the calculation of value is a function of labor or capital. The socio-economic view is, in

this respect, critical theory – a contemporary reassessment of early ideas about labor and capital, and the idea that one could be substituted for the other. In the early 1900's, for example, Frederick Taylor wrote that work could be rationalized by reducing or suppressing initiative and other incentives, except wages (Savall, 2010). Savall, who critically appraised Taylor's work, found both positive and negative ideas, but concluded that Taylor's scientific analysis of work had influenced the idea that labor could be substituted for capital. In addition, Taylor's early concept that productivity could be optimized – the idea of the "best man for the job" – still persists today as business leaders look for people who are the right "fit" for the job, or as job profiles are developed and the scope of accountabilities and responsibilities are defined.

Both Frederick Taylor and Henri Fayol had also presented the concept that work was best communicated and controlled through a hierarchy – a militaristic view in the sense that ultimately one person was thought to be in command and could lead the organization in all its competitive battles. Max Weber, who also influenced the early development of management science, regarded "man at work as an emotionally ascetic being, whose personal motives coincide with the objectives of the enterprise" (Savall, 2010, p. 64). In other words, the assumption was that people were willing to be subservient to the organizational hierarchy, as if they were soldiers in service to their country. As contemporary business leaders know, the romantic notion that people will subordinate themselves to the needs of the organization is, for the most part, far from the reality of the actual case. Yet somehow the perception that people are subordinate to management has persisted -- at least in the psyche of management. Perhaps business leaders, trained as they are to manage as part of the hierarchy, believe that it is their obligation to be in control – and to deal with messy people problems and out-of-control situations as inappropriate displays of insubordination.

From Savall's perspective, the early management views of people, capital, and hierarchical command and control that were put forward by Taylor, Fayol and Weber have led to some perverse effects in the contemporary workplace. Savall (2010) likened these effects to a kind of virus that has, on many levels, infected almost every organization. This is especially true as it relates to the introduction of technology in organizations. Savall pointed out that Taylor's studies of the amount of work that could be done by a single man ultimately made the transfer of work to the machine easier. Savall also noted that paradoxically, the perfection of tools led to more sterile and unfulfilling work for people. The increase in productivity, at least in those early cases, could not be distinguished between the machine and the person working with the machine. Savall wrote:

> Current observation reveals that numerous unskilled workers cannot keep to the imposed work rhythm and this tends to invalidate the programming of work-time. It reveals that many of them resort to absenteeism and job-turnover as a temporary respite from the fact of being programmed. (p. 52)

In addition to the perverse effects of the TFW virus that Savall noted in the early 1970's, the virus has also manifested in cost cutting and layoffs in contemporary times. Most people working as part of large organizations in the United States are subject to "at will" employment policies that permit both the employee and the employer to terminate the employment agreement at any time, and for almost any legal reason. Organizations that are faced with the need to control costs will often cut people because wages make up such a high percentage of an organization's cost structure (Savall, Zardet, & Bonnet, 2008). In the socio-economic view, however, it is management's responsibility to manage the organization effectively. If layoffs are

needed, it is the fault of management and not the employee. "Ironically," as Conbere and Heorhiadi (2011b) pointed out,

> The people who did not make the choices that led to poor organizational performance are fired, but the leaders who made poor decisions and failed to manage well, stay. People in power tend to keep their power, regardless of ethical issues or justice. (p.7)

Even if organizations are financially successful in cutting costs by cutting people, the socio-economic view is that this approach is only a short term solution. Savall, Zardet and Bonnet (2008) argued that even if layoffs enable an enterprise to reduce some visible costs, there are side effects such as loss of know-how, disorganization and a decrease in confidence in the organization. In this sense, the TFW virus is "insidiously dangerous," as Savall and Zardet (2008a) pointed out, because it can have adverse effects on economic performance (p. 10). Savall and Zardet (2008a) explained that they published the book *Mastering Hidden Costs and Socio-economic Performance* as a way to save businesses and jobs:

> Most business strategies were quite alarming, based on downsizing, labor shedding, and cuts and withdrawal – in a word, based on defensiveness. Today, while the context may have changed in an era of globalization and hyper-competition, such defensive strategies are still all too commonplace. Such strategic helplessness may result from errors in strategic analysis and misunderstandings of the underlying sources of economic performance. (p. xvii)

Human potential is the sole active factor in creating added value. A key tenet of the socio-economic view is that human potential is the sole active factor in creating added value. Savall (2010) observed:

> People are animated by the motivations, drives, sympathies and other behavioral traits of emotional existence… (and) above all by the cognitive, perceptual and decision-making processes which form the principal link between man and his work, between the 'psychological' and 'physiological', between individual desires and the execution of a task. (p. 63)

In other words, the behaviors of people result from factors such as the individual's characteristics, the structural characteristics of the individual's environment, and the critical events that have occurred in the organization.

The socio-economic view is that an organization is a complex entity made up of structures and behaviors of people. Organizational structures can take many forms, including physical, technological, organizational, demographic -- and even mental, which would include factors such as the organizational mindset, management styles, and work atmosphere. Behaviors, according to the socio-economic view, are observed human actions that have an impact on the physical and social environment (Savall & Zardet, 2008a). Employees exercise their informal power to either slow down or speed up the pace of change. The interrelationship between behaviors and structures means that there is always a gap between planned and actual functions, which in turn results in unanticipated costs and sub-optimal performance (Savall, Zardet, & Bonnet, 2008). These gaps are considered dysfunctions, which are classified into six categories: working conditions, work organization, time management, communication-coordination-cooperation, integrated training and strategic implementation (Savall & Zardet, 2008a).

Technical and financial capital are "inert" inner tools. While Savall emphasizes the word "active" to convey the idea that it is people who have the capability to add value to the

organization, he uses the word "inert" to convey the idea that financial capital and technology cannot by themselves (without the contributions of people) produce value for the organization. As such, Savall emphasized that technology and financial capital are only tools, and that it is people that add value.

The complementary nature of capital and labor, as opposed to substitutability. When Savall (2010) described the active nature of people vs. the inert qualities of tools such as technology or financial capital, he advocated for an integration of perspectives. The third tenet of the SEAM paradigm emphasizes complimentary relationship between labor and capital, as opposed to the idea of substitutability of labor and capital that is part of the rationalist paradigm. "It is clear," he wrote, "that the purpose and meaning of work in the post-industrial society will be determined through a complex and subtle interplay of human, technological, and economic factors" (p. xii).

Ontology and epistemology. The Socio-economic Approach to Management is multi-faceted and multi-disciplinary approach to transformation and change within organizations that is predicated on research within the organization. SEAM research is conducted is based on epistemological principles, or ways of knowing about the nature of reality (Conbere & Heorhiadi, 2011b). Broad descriptions are summarized in Table 10.

Table 10

Three Key Principles of the SEAM Epistemology

Principles	Definition
Generic Contingency	The information gathered as part of SEAM case studies shows that while many organization development problems may seem to be unique to the organization, many kinds of dysfunctions are common across all organizations.
Contradictory Inter-subjectivity	SEAM intervener-researchers understand that among organizational actors there will be different understandings of what is true and real, and that those differences are acceptable.
Cognitive Interactivity	An interactive process between SEAM intervener-researchers and actors in the organization which builds knowledge about organizational dysfunctions through disciplined inquiry into the organization, and through a succession of feedback loops.

Contradictory Inter-subjectivity. The process used by SEAM intervener/researchers to conduct research in organizations reflects an underlying belief each person sees truth differently, and that different ideas about truth co-exist within the minds of people in the organization. In the first phase of the SEAM process, the intervener/researchers interview participants – generally beginning with the leaders of each functional area. The data is assimilated and themes are developed. The themes, along with actual quotations from people, are then fed back to the participants in a meeting that SEAM has aptly labeled "the mirror effect" because it is a clear reflection of what the participants had to say.

On the surface, the first phase of the process is not so different than other forms of organization development practice, where the practitioner interviews people to find out more about the organization. The clarity about the ontological underpinnings of the intervention is what makes the SEAM process unique. While concepts like objectivity, awareness of self and self as instrument are stressed in most organizational development approaches, most are not as

clear about the ontological roots of the intervention – the nature of reality and what is deemed "truth." The focus on objectivity and consultative behaviors for the organization development practitioner, for example, may give the impression that the practitioner can be neutral and does not have an impact on the intervention or an effect on the data collection and analysis. This thinking may also lead to the idea that differences in viewpoints can be resolved or remediated. For some, the assumptions about the neutrality of the researcher (and the research) may be part of the objectivist ontology, which is based on the belief that reality is unchanging and can be discovered through experimentation.

In the SEAM approach, in contrast, researcher/ interveners are trained to see not only their own truth, but also the very different set of truths held by the people in the organizations that they work with. Conbere and Heorhiadi (2011b) explained that in SEAM interventions, there is a concept of *contradictory inter-subjectivity*, which refers to the idea that "actors perceive truth differently, and they all right, according to their beliefs and perceptions" (p. 4). "*Contradictory inter-subjectivity*," they added, draws on the ontological belief that truth is socially constructed, and therefore not an objective and unchanging fact" (p.4). Conbere and Heorhiadi also found that this aspect of the SEAM approach is rooted in the *social constructionist* ontology. "Social constructionism," according to Conbere and Heorhiadi (2011b), "is the belief that human meaning is created by societies, and thus there is no one true human meaning. Each society creates its own, true understanding of human meaning" (p. 3). SEAM interventions occur in phases over a long period of time, in order to allow time for the participants to think and react to findings that are reflected back to them as part of the process.

Cognitive interactivity. SEAM findings from an intervention in an organization are combined with the findings from similar research conducted in other organizations. To

researchers familiar with case study design, this is impressive because the SEAM database now contains findings from interventions conducted in over 1,300 organizations (Conbere & Heorhiadi, 2011b), or – in other words – the findings from 1,300 case studies where data is collected in a similar manner. The combined set of findings, accumulated over a period of 30 years, has made it possible for SEAM intervener/ researchers to look at common themes emerging from all organizations. Since 1986, the ISEOR team has been modeling knowledge about business dysfunctions, and looking at the costs of those dysfunctions along with potential solutions (Zardet & Harbi, 2007, p. 34). Data elements captured in the database include information about the intervention, the profile of the company, findings, and the innovation projects developed to reduce dysfunctions. The ISEOR researchers can analyze this data to find patterns across organizations, within certain types of organizations, or to conduct a benchmark analysis, where findings from one organization are compared with other similar organizations. The results of innovation projects can be used to assess different ways to reduce costly dysfunctions.

Conbere and Heorhiadi (2011b) explained that the combined findings from organizational interventions can also be used to develop theory. With the benefit of additional findings from other interventions, the theory is either reinforced or challenged. The analysis of the new findings may inform development of new tools or practice used by the SEAM intervener/ researchers, which in turn results in a new cycle of findings, revision of theory, and practice. "In SEAM language," wrote Conbere and Heorhiadi, "the cycle is called *cognitive interactivity*, which is an interactive process (between intervener-researcher and company actors) of knowledge production through successive feedback loops, with the steadfast goal of increasing the value of significant information processed by scientific work" (p. 4).

Generic contingency. Other aspects of the SEAM logic appear to be associated with positivism. The detail that has been accumulated over the years in the SEAMES database (Socio-economic Approach to Management Expert System) makes it possible to see that even though the problems of an organization may seem unique to the actors involved, the dysfunctions exhibited by the organization are common across all organizations. "In SEAM language," explained Conbere and Heorhiadi (2011b), "this is called *generic contingency*, which is the principle that allows for the uniqueness of each organization, and postulates the existence of invariants that constitute generic invariants. We would say that generic contingency and analytic generalization are parallel concepts" (p. 5-6). SEAM employs both positivistic and interpretive approaches are used to understand and assess the organization. Conbere and Heorhiadi explained that "The SEAM approach is a complex theory-building research done in the post-positivistic epistemology within a social constructionist ontology using both qualitative and quantitative methods of data collection and analysis (using the SEAM language, qualimetrics)" (p. 4).

The inter-relationship of behavior and structure. SEAM organizational interventions were developed to address the dysfunctions caused by inter-relationships between structures and behaviors. Savall (2002) wrote that:

> There is an inevitable on-going interaction between the organization structure and the employee's behavior. This interaction is both a driving force, essential to the production of goods or services, as well as the cause of dysfunctions. In other words, it is an explanation of the differences between the observed operations and the operations expected by the actors, who have specific and conflicting objectives. (p. 33)

Savall used the word "inevitable" to describe the idea that every company, no matter how well-run, requires regular maintenance and review. Savall wrote that "The degeneration (atrophy) of structures and behaviors leads to bloated dysfunctions and hidden costs, which handicaps economic performance" (p. 35). SEAM interventions help business leaders to reduce dysfunctions and move the organization to an ideal level of performance, which SEAM intervener/ researchers refer to as *ortho-functioning*.

Structures. The socio-economic view is that organizational structures can be classified into five categories, including physical, technological, organizational, demographic and mental structures. These different structures can themselves be inter-related.

Behaviors. Behavior is the observed human action that has an effect on the physical and social environment (Savall & Zardet, 2008a).

Dysfunctions. The ISEOR analysis of the inter-relationship between behaviors and structures identified six categories of dysfunctions – including working conditions, work organization, communication-coordination-cooperation, time management, integrated training, and strategic implementation.

Hidden costs. The ISEOR researchers conducted research to understand the nature of hidden costs, and found that people spent about a third of their time on unproductive activities. The causes of hidden costs, they discovered, were related to complex patterns of behavior as people interacted with organizational structures. The researchers associated hidden costs with each of the six categories of dysfunctions. There are six categories of hidden costs: excess salary, overconsumption, overtime, non-production, non-creation of potential, and risks.

The ISEOR findings challenged existing theory that claimed a deterministic relationship of structure over behavior. The deterministic view of the importance of structures still persists,

as business leaders regularly reorganize people in order to carry out organization objectives. There are also similar deterministic beliefs about the importance of behavior vs. structure. Savall and Zardet (2008a) explained that in behavioral theory, determinism is shifted to emphasize the relationship between behavior and results. Savall and Zardet pointed out that:

> Management modes inspired by the behaviorist current mainly utilize 'psychological manipulation' techniques under the guise of such 'noble' notions as responsibility, motivation, and professional conscientiousness; that is, they resorted surreptitiously to coercive principles borrowed from certain morality or value systems. (p. 8)

In contrast to the prevailing ideas that the structural or behavioral characteristics of an organization can be deterministic, ISEOR found that it is the *inter-relationship* between structures and behaviors that can cause dysfunctions. Dysfunctions create hidden costs – and hidden costs, it follows, affect economic performance.

The socio-economic view of the case. The socio-economic view conceptualizes costs as a fundamental area of management focus and decision making. Information about organizational expenses recorded as part of accounting processes can be an important determinant of financial performance, as well as identification of areas that require focus and improvement. Cost analysis is used for many purposes; for example, financial managers focus on costs in order to establish product prices, market strategies, and even relationships with clients (Mirian & Adrian, 2009). In fact, the base function of the informational systems within the enterprise is to produce information used in decision making (Mirian & Adrian, 2009).

Visible vs. hidden costs. The socio-economic view takes the position that while accounting systems represent *visible costs* in the organization, there are also *hidden costs* that drive performance. The concept of hidden costs is based on the socio-economic view that there

are always gaps between expected performance and actual performance. Savall and Zardet (2008a) observed that business executives intuitively recognize this difference. For example, a business leader may notice that significant investments have been made without a noticeable improvement in operations or productivity. It may also be that reverse is true; in other words, organizations may invest in innovations and succeed in lowering operating costs; however, the improvement in performance cannot be explained by an analysis of costs alone.

One problem with accounting information is that it oversimplifies the complexity of business situations (Trepo & de Geuser, 2002). Despite the ready availability of data and reports, business leaders make decisions in contexts where there is a great deal of ambiguity. Over 50 years ago, Margolis made the same argument, and stated that "the information and calculability necessary for the management of a firm to move to its equilibrium profit-maximizing price-output combination are clearly not available. Uncertainty and ignorance are omnipresent" (1958, p. 189). Although business leaders generally acknowledge that accounting systems are limited, the reliance on accounting data as the source of truth about costs persists.

The ISEOR research conducted as part of SEAM organizational interventions has reinforced the idea that accounting tools and systems are inadequate to uncover the reasons for variances in expected performance vs. actual performance. Accounting systems, according to Savall and Zardet (2008a), are usually limited to collecting information at the level of work units and departments. Another factor, according to Savall and Zardet, is that accounting systems tend to collect information about costs by their nature (e.g. personnel costs) and object (e.g. production department). In the socio-economic view, these limitations create the need to differentiate between visible costs and hidden costs. Hidden costs may be included in

accounting information, but dispersed across categories, or else diluted as part of aggregate totals. Table 11 summarizes the SEAM conceptualization of visible vs. hidden costs.

Table 11

SEAM Conceptualization of Costs

SEAM Concept of Cost	Definition
Visible Costs	Expenses that appear in the accounting reports, accounts, statement or systems
Hidden Costs	Hidden costs may be explicitly reported as visible costs, but are diluted when costs are aggregated, or else go unnoticed
	Opportunity costs, not included in the visible costs, which represents a loss to the company: for example, the loss of revenue related to sales of items for substandard quality defects

The SEAM literature describes the concept that there is a relationship between the cost of organizational activities and an associated value to the organization of those activities (Savall & Zardet, 2008b). The socio-economic view emphasizes the importance of developing strategies that will create economic value to the organization – whether that value is aimed at development of new products or services, entry into new markets, or finding new ways to meet the needs of customers. The emerging focus on analytics as a way to become more competitive is an example of organization strategy that will create value. Of course, investments in technology have contributed significantly to organizational productivity over the course of many decades. The emphasis on big data – and huge investments in data warehousing, cloud computing, hosted solutions, and emerging hardware and software represent extremely large investments in capital for organizations, relative to other investments of funds. What make the focus on analytics different is that development of new analytic capabilities depends largely on the talents,

knowledge and commitment of people – and the way that the knowledge of people contributes to economic performance.

The CSC business case outlined a technology strategy that would support new corporate goals that depended on analytics. The strategy envisioned development of a new data infrastructure, analytic tools and governance process that would support these new objectives. The organization decided to set aside investment dollars in order to fund these new projects. As new expenses were identified, an executive committee met to discuss each business cases that had been developed. One such business case was developed for analytic software that would be used by the analyst community within the organization.

Costs. The business case considered costs associated with different purchasing options, training, administration of the software, and implementation costs. The socio-economic view would also consider those costs but conceptualize them as visible costs.

*Visible costs***.** Visible costs identified by the case study company included consideration for software license fees, consulting costs to set up technical infrastructure and server environments for analysts, and training costs. The case study company also identified offsetting savings associated with the sunset of software that would become obsolete once the new software was implemented. The socio-economic view would take into account the visible costs listed by the case study company, as summarized Table 12. The overall visible costs are at least $600,000 over a four-year period of time.

Table 12

Summary of Visible Costs

	Year				Four-Year
	One	Two	Three	Four	Total
Software Cost					
License fees for current software	$ 70,000	$ -	$ -	$ -	$ 70,000
License fees to upgrade software	$150,000	$ -	$ -	$ -	$150,000
Software license maintenance fees	$ -	$ 40,000	$ 40,000	$ 40,000	$120,000
Consulting Fees					
Set up technical environments	$200,000	$ -	$ -	$ -	$200,000
Implement software upgrade	$ 50,000	$ -	$ -	$ -	$ 50,000
Training Costs					
In-house training	$ 20,000	$ -	$ -	$ -	$ 20,000
Cost Avoidance					
Sunset existing software	$ (10,000)	$ -	$ -	$ -	$ (10,000)
Total	$480,000	$ 40,000	$ 40,000	$ 40,000	$600,000

Hidden costs. The socio-economic view includes all of the costs shown in Table 12, but conceptualizes them as visible costs. In addition to visible costs, the socio-economic view also conceptualizes a second category of costs called hidden costs. Table 13 shows components of hidden costs along with a description of the way that each hidden cost is conceptualized. Each component of hidden costs represents a dysfunction that creates a drag on the economic performance of the organization.

Table 13

Components of Hidden Costs

Components of Hidden Costs	SEAM Concept
Excess Salary	Excess salary occurs when an employee who could be doing higher value work instead works on lower value activities. There is a cost when the lower value activity is performed by an employee who earns more than another employee who could have done the work.
Overconsumption	Overconsumption refers to the idea that there are costs associated with waste.
Overtime	Overtime is the amount of time that people spend correcting problems due to dsyfunctions, rather than working on other activities that have value to the organization.
Non-production	Non-production refers to the idea that even if machines break down or work stops and products can't be produced, the company still has to pay for fixed costs such as facilities, salaries, and overhead expenses.
Noncreation of potential	Noncreation of potential refers to the idea that people are not spending enough time planning for the future or developing strategies that will ensure the long-term success of the organization.
Risks	Risks to the organization may have associated costs. For example, fines for non-compliance may be imposed.

In the socio-economic view, the conceptualization of hidden costs may take on additional typologies, or conceptual categories. More important to the case study example, there are unique typologies associated with the work involved in technology and software development. Zardet and Harbi (2007) wrote that SEAM diagnostics performed within development teams have identified a number of dysfunctions that could be related back to a lack of rigor at the development conception phase, when “strategic choices of allotment and distribution of human

and financial resources" (p. 358-359) were determined. The lack of precision in roles and responsibilities can also lead to dysfunctions and hidden costs. In addition, Zardet and Harbi found that technical experts involved in computer support experienced a high degree of isolation. On the flip side, non-experts experienced a high degree of dependency on the experts. The quality of the expert and non-expert relationships suffered as a result, and the dysfunctions related to deteriorating quality communications were quantified at one hour per person per day.

Hidden costs associated with technology include both *non-quality* and direct *productivity*. Based on extensive ISEOR research, the hidden costs associated with computer technology are potentially very high in all organizations, with frequent and costly dysfunctions occurring in computer operations, specialized services, support, and information and communications technology. The ISEOR research showed that hidden costs associated with non-quality are between 10,000€ and 50,000€ per person per year (Zardet & Harbi, 2007).

Hidden costs associated with non-quality. Within the case, there are many potential sources of hidden costs associated with non-quality. One of the key concerns of the case study company business leaders in establishing their Data and Analytics strategy was quality and consistency of data, and the need to develop best practices, standardization of processes and use of common data definitions. Although lack of quality was a concern and business leaders acknowledged that problems existed, examples were anecdotal. ISEOR research using the SEAMES database identified a typology of hidden costs for non-quality. The ISEOR typology for hidden costs associated with non-quality is shown in Table 14, along with non-quality examples that had been identified by CSC business leaders. In the socio-economic view, these examples of non-quality merit further investigation and work effort to reduce the hidden costs associated with the problems.

Table 14

Hidden Costs Associated with Non-Quality

Indicator: Nonquality	
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State
Technical documents and instructions not appropriately handled and filed	Limited documentation available to system users
Development tasks reperformed in certain projects due to lack of autonomy	Multiple sources of data; similar data elements with varying meaning; lack of integration
Unreliable software	The software that analysts use to transfer files across servers is unreliable; the data may only partially transfer or the data transferred may be corrupted
Lack of technical mastery of certain hardware and software	Not all analysts have familiarity with all sources of data, and tend to use the sources that they know best -- as opposed to the best source for the project
Difficulties experienced by users	Difficulties may arise from non-quality of the data -- such as invalid, unexpected or missing values
Central computer breakdowns	Applications sometimes down or unavailable
Machine breakdowns (printing, forwarding, unwinding, etc.)	Servers at capacity and frequently crash
Information system breakdowns during certain transactions	Load errors may mean that source systems are incorrect
Central processing incidents	Processing incidents are common, and include (1) abnormal stoppage of programs, (2) job control language errors, (3) beyond capacity files that are corrupt and (4) time wasted in processing
Program errors	Mistakes in programming can result in incorrect data

Hidden costs associated with non-productivity. As with the typology of hidden costs associated with non-quality, ISEOR researchers developed a typology for the hidden costs associated with non-productivity. A summary of all CSC hidden costs associated with the ISEOR typology is shown in Table 15, along with estimated benefits if analysts could leverage the software. This table summarizes costs associated with use of the current set of analytic tools available for use by analysts. Table 15 is based on assumptions that are shown in additional tables in Appendix B. Table 15 also shows a cross-reference to tables in Appendix B that document the assumptions used to estimate hidden costs.

Table 15

Hidden Costs Associated with Non-productivity

Indicator: Direct Productivity Gaps			
Type of Hidden Cost Based on ISEOR Findings		Estimated Hidden Costs	Cross-Reference Table
Excessive maintenance time	$	115,200	26
Program development interrupted	$	322,560	27
Re-edition of reports and lists	$	138,240	28
Frequent interruptions by users	$	5,016	29
Lack of coordination between conception and operation	$	9,216	30
Poor estimation of development and intervention times with internal customers	$	40,000	31
Hardware/ software shared by an entire department	$	4,608	32
Total	$	634,840	

Opportunity costs. Hidden costs represent important opportunities for improvement in organizational performance, and may also be thought of as opportunity costs. In the socio-economic view of the case there are two types of opportunity costs. First, there are potential opportunity costs related to the idea that plans to hire two new analysts would be put on hold. Second, there are potential opportunity costs associated with the decision to reassign analytical resources to CSC's IT group.

The CSC decision to offset technology costs with a potential corresponding decrease in labor costs was described in Model I. The socio-economic view would conceptualize this thinking process as an example of the rationalist view, where the labor costs associated with people are regarded as a form of capital (some may use the word commodity), and therefore interchangeable with technology or financial capital. People, according to the socio-economic view, are the only active and creative factor of sustainable economic value, whereas technology is an inert tool (Savall & Zardet, 2008b). In other words, the costs associated with people are not interchangeable with the costs associated with technology.

In the socio-economic view, the CSC decision to not hire analysts at a time when company objectives and goals depended on analytics suggests a potential opportunity cost. In other words, the two analysts can potentially generate value for the company, but the software by itself would not. To illustrate, Table 16 assumes that the salaries of the two analysts would have generated a 3:1 return – similar to the return generated for other kinds of short term investments of capital. The 3:1 ratio represents the relationship between the expected value of the work produced by the analysts compared to cost of the salaries for the analysts. In other words, for every $100,000 in salary expense there would be a corresponding $300,000 in potential value to the organization, or a value-add of $200,000 for each analyst.

Table 16

Opportunity Cost Associated with not Hiring Two Analysts

	Year				Four-Year
	One	Two	Three	Four	Total
Hidden Costs					
Salaries for two analysts	$ -	$ 200,000	$ 200,000	$ 200,000	$ 600,000
Return, assuming 3:1 ratio	$ -	$ 600,000	$ 600,000	$ 600,000	$ 1,800,000
Net value add	$ -	$ 400,000	$ 400,000	$ 400,000	$ 1,200,000
Opportunity Cost	$ -	$ 400,000	$ 400,000	$ 400,000	$ 1,200,000

A second kind of opportunity cost relates to the redeployment of analyst resources to perform IT functions. In the CSC analysis, it was acknowledged that resources to administer the new software would be absorbed within the IT organization as well as within the analyst community. The CSC business leaders did not regard reassignment of resources as a cost. Instead, CSC thought of the reassignment of resources as neutral to the organization since there was no incremental add to expense.

The socio-economic view, in contrast to the CSC view of the case, would investigate the change in economic value add associated with the person's tasks before and after assuming their new responsibilities for the software. Although there may be additional hidden costs associated with this category, it is difficult to quantify them. Administration of the software may well be a value-add, since the person administering the software could presumably prevent a host of dysfunctions from occurring. For example, an analyst may generate a return of 3:1 for their time doing analytic work and there is a net value-add. If that analyst is reassigned to a software administration role, the analyst may prevent hidden costs associated with dysfunctions from occurring. Instead of generating value through analytics, the analyst is then preventing dysfunctions that create a drag on the performance of other analysts who use the software. The other analysts are able to generate more value than they otherwise would have been able to

generate. On the flip side, if the analyst would have generated more value to the business by continuing to focus on analytic tasks, then there would be hidden costs associated with the change in job duties.

Benefits. In the socio-economic view, benefits are conceptualized as reductions in hidden costs. Each one of the productivity gaps is associated with use of the existing software. By making the investment in new technology, there is a potential that the productivity gaps could be addressed, though not immediately closed. Based on a review of productivity gaps, a separate assessment was conducted to estimate the impact of the new technology on the gap. Additional consideration was given for the adoption of the software across analysts, especially given work demands. Table 17 shows the estimated hidden costs along with the potential reduction in hidden costs that might be achieved within the case study company. Similar to Table 15, Table 17 also provides a cross-reference to tables in Appendix B that contain more detail about the assumptions used to develop the hidden cost estimates related to productivity.

Table 17

Summary: Estimated Hidden Costs and Potential Reduction in Hidden Costs

Indicator: Direct Productivity Gaps		Future State: Proposed Year One		
Type of Hidden Cost Based on ISEOR Findings	Estimated Hidden Costs	Estimated Reduction in Hidden Costs	Adjusted Hidden Costs	Cross-Reference Table
Excessive maintenance time	$ 115,200	$ 38,016	$ 77,184	26
Program development interrupted	$ 322,560	$ 161,280	$ 161,280	27
Re-edition of reports and lists	$ 138,240	$ 37,440	$ 100,800	28
Frequent interruptions by users	$ 5,016	$ 5,016	$ -	29
Lack of coordination between conception and operation	$ 9,216	$ 4,608	$ 4,608	30
Poor estimation of development and intervention times with internal customers	$ 40,000	$ 20,000	$ 20,000	31
Hardware/ software shared by an entire department	$ 4,608	$ 4,608	$ -	32
Total	$ 634,840	$ 270,968	$ 363,872	

Productivity. One of the core beliefs of SEAM intervener/ researchers is that there is significant untapped potential in each organization (Conbere & Heorhiadi, 2011a). Rather than cutting the costs associated with employees, the SEAM focus is on reducing hidden costs. SEAM intervener-researchers also work with business leaders to identify activities that will add economic value to the organization. By reducing hidden costs, business leaders can free up people to focus on projects that will enhance the economic performance of the organization.

The socio-economic view of value considers econometric studies that show that capital and labor account for only a portion of the value of production (Savall & Zardet, 2008b). There are three key factors that create differences in value. First, hidden costs are addressed, so that people can work on higher value-activities. Second, the organization invests in the development of the employees. This is an intangible investment in the capabilities of people. Knowing if people are adding value can be confounded by a multiplicity of factors, but in the socio-economic approach people conduct their own time management assessment and they can see for themselves the amount of time spent on work that is important. SEAM researchers have found that when people analyze their own time, they can find ways to increase time dedicated to value-added work. Third, participants co-create projects that will help the organization to achieve strategic objectives. As part of an in-depth organizational intervention, the activities and plans for each person are periodically negotiated and defined. Investments aimed at improving the productivity of the organization are in effect self-financing in the sense that the company does not need to borrow money or to reallocate resources that would affect revenue (Savall & Zardet, 2007).

Investment in the potential of people. Investment in people is part of an aim to improve the competitiveness of the company and ensure its long term stability. The idea of human potential is central to the discussion of the socio-economic view because people are regarded as the "the only active and creative factor of sustainable economic value" (Savall & Zardet, 2008b, p. 5). In the socio-economic view, investment in people means allowing for the time to study, train on new technologies, and apply what they learn in new ways that will benefit the organization. Savall and Zardet (2007) wrote that each person is likely to contribute to the realization of intangible investment activities. There are offsetting costs associated with these activities, of course, but new innovations may be regarded as an asset – though an intangible one. Ironically, accounting systems do not recognize new capabilities of the organization as an asset, even though the new capabilities are really an outcome of the investments made. In this sense, the new focus on analytics may require active management of intangible assets.

Focus on economic value-add activities. Since there may be many stakeholders in cross-functional, matrixed organizations, alignment of analytic work is a key concern for anyone managing the work of analysts. The key focus is on the value of new analytics projects to the organization, relative to other work that the analyst is already doing. Alignment is not only a matter of agreeing on priorities, but also deciding the scope and depth of the work that will be done to serve those priorities. This is nothing new for information managers who have long supported decision making in organizations with meaningful information. The new focus on analytics, however, is driving more new work in other areas such as strategy development, business process improvements, identification of underlying patterns in data, and performance measurement.

The relative prioritization across these areas of focus represents a kind of cost-to-value relationship for the analyst. Again, this is nothing new: a good analytics manager is aware of the relative priority of each work effort. A good manager is also aware of the salaries of people and the idea that there is a return on the investment in time that the company is making. SEAM intervener/ researchers would be similarly concerned, and would consider not only the salaries associated with the people, but also the value of the work that the people are generating. What *is* new is that the manager would be more supported in their efforts to ensure that their staff members are working on the right thing. Instead of relying on the judgment and experience of analytics managers to use resources wisely, the organization would be more active in deciding how analytics projects align with priorities.

In an organization that has adopted SEAM management principles, the time spent on tasks would be reviewed through an analysis of the way that people are utilizing their time. As part of the SEAM organizational intervention, the mix of tasks would not only be identified but also optimized through an effort to define projects, as part of the Periodically Negotiable Activity Projects assessment. Because of the focus on value as opposed to costs, it is up to management to ensure that the analyst is focused on the right work relative to the needs of the organization. The SEAM principles emphasize that if people are not producing work of value, then that is the responsibility of management – and not the individual employee.

To illustrate the cost-value relationships using the case study company context, Table 18 shows the general alignment of tasks (a) vs. the alignment of tasks that would be possible if the analysts could leverage the software (c). The distribution of tasks can drive an increase in the cost-to-value ratio associated with the work of each analyst. In the example in Table 18, the cost-to-value ratio would increase from 2.75 to 3.15. Assuming that the average salary, benefits

and overhead totals $100,000 for each analyst, then the value of the analyst's work would, in theory, increase from $275,000 to $315,000 if the analyst could leverage the software – a difference of $40,000 per year for each person.

Table 18

Cost to Value Ratio Associated with Alignment of Analytic Projects

	Without the Software		With the Software	
	(a)	(b)	(c)	(d)
Case Study Company Use of Analytics	Percent of Analyst's Time	Assumed Cost-to-Value Ratio	Percent of Analyst's Time	Cost-to-Value Ratio
Decision making	20%	2.70	15%	2.70
Strategy development	15%	3.45	35%	3.45
Development of cost savings strategies	10%	3.30	25%	3.30
Accelerate and/or automate business processes	5%	3.15	15%	3.15
Evaluate and monitor key performance measures	50%	2.40	10%	2.40
Aggregate	100%	2.75	100%	3.15

The application of analytics that is envisioned as part of business strategies from all areas of the case study company points to the potential of increasing value of analytics projects. There is an immediate need to move people to higher value-add tasks. The value to the organization in ensuring this shift is $40,000 per analyst, per year – or $600,000 across the impacted team of 15 analysts. There is also a need to add the two analysts envisioned for year two, which would need an additional $400,000 in net value-add. The net value-add would total $1,000,000, assuming the alignment of people to the strategic projects, and the addition of the two analysts.

Model III in review. The Model III analysis shows that the inter-relationship between behaviors and structures can impact the performance of the organization and create hidden costs, or dysfunctions. From the Model III perspective, the costs associated with the technology and

training investments need to be considered together with hidden costs. The performance of the organization is improved when hidden costs are identified and then reduced through organizational interventions. In Model III, reductions in hidden costs are regarded as benefits. Productivity is enhanced when the work of each employee is aligned with the strategic objectives and goals of the organization.

Table 19 shows a summary of Model III decision factors, along with a cross-reference to the table that shows the corresponding analysis. Figure 5 shows a visual representation of the magnitude of the Model III decision factors. Figure 5 also shows that the factors associated with alignment of the analytics tasks and reduction in hidden costs are greater in magnitude than the factors associated with costs.

Table 19

Summary of Model III Decision Factors

Decision Factors	**Considerations**	**Item**		**Magnitude**	**Cross-Reference Table**
Visible Costs	Visible costs are those costs that can be specifically tracked by business leaders.	Software	$	(340,000)	12
		Consulting fees	$	(250,000)	12
		Training costs	$	(20,000)	12
		Sunset existing software	$	10,000	12
Hidden Costs	Hidden costs associated with the case study are related to the technical difficulties that analysts encounter as they work. Most of the issues relate to the use of antiquated technologies and a mis-match of software tools.	Non-productivity	$	(634,840)	15
Opportunity Costs	Opportunity exists to increase organizational performance with additional analytic capabilities.	Opportunity Costs - New Hires on Hold	$	(1,200,000)	16
Productivity	Organizational performance could be improved if business leaders priortize the work of the analysts, and align projects with organizational objectives and strategies.	Shift work to value-add activities	$	1,000,000	18
Benefits	Reduction in Hidden Costs	Close direct productivity gaps (over 3 years)	$	634,840	15,17
	Reduction in Opportunity Costs	Close opportunity gaps - hire two analysts	$	1,200,000	16

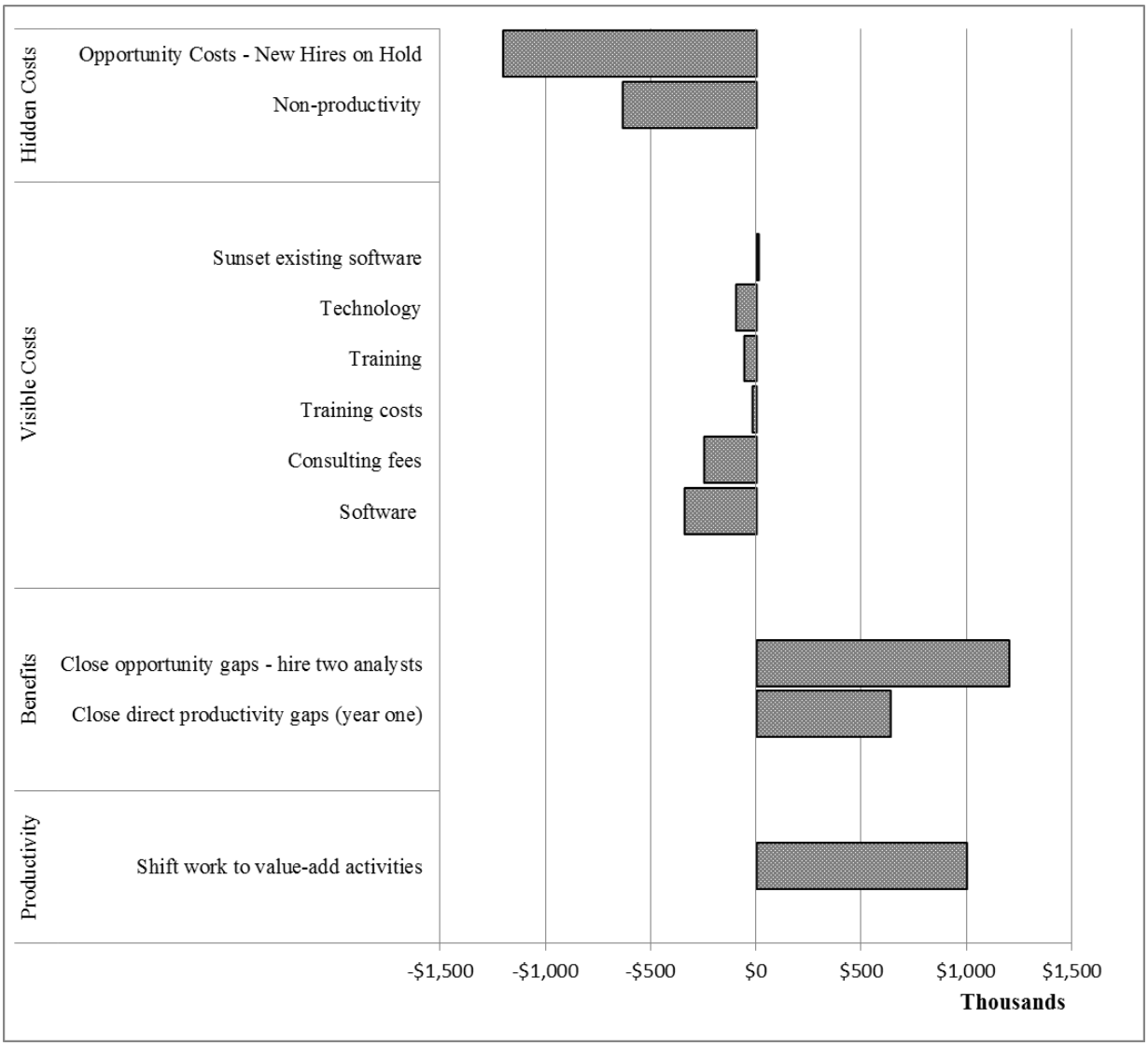

Figure 5. Summary of Model III measures of costs, benefits and productivity. Measures of costs, benefits, and productivity are represented graphically to show the relative value of the factors used in decision making. Costs are differentiated to show visible costs, hidden costs, and opportunity costs. Costs are shown as negative amounts. Offsetting factors that either result in enhanced productivity or reduce costs are modeled as positive amounts. Productivity is enhanced if analytic projects are aligned with organizational objectives and strategies. Benefits are modeled to show the potential reduction in hidden costs if new technology is incorporated in analytic projects, and if plans to hire two additional analysts are reconsidered.

Cross-Model Analysis

When I began this research, I thought that the three models could be categorized as economic, social, and socio-economic. I had thought about the ways that businesses categorize money and people as two mutually exclusive spheres – where cost factors are kept separate from social factors – and naively thought that the socio-economic view would be a kind of reconciliation of the two spheres. It would seem to be ideal, for example, if all of the separate decision factors from each of the three models could be combined into one overall framework. After all, what business leader would not appreciate a more comprehensive approach to decision making? As I developed the models, however, I began to understand that I was trying to fit together pieces that appear on the surface to the same, but – upon closer inspection – I found that each model conceptualized costs, benefits and productivity very differently. I saw that the different conceptualizations were based on different frames or views of the decision to be made. Each model represented a different route to the decision about whether or not to invest in software and training for analytic projects.

I think that the three models represent three different paradigms, where values and beliefs drive conflicting views (or framing) of situations or strategy, and that the decision making process follows from those views. In a parallel sense, I have observed the ways that people sometimes "talk by" each other, each person thinking that the other party has completely understood the conversation, but in reality each person's conceptualization of the topic or issue is completely different. Despite the different conceptualizations, there can of course be agreement over a decision – but the agreement is incomplete in the sense that people just get to the same conclusion via a different mental route. With that simple observation in mind, the cross-case

analysis begins with a comparison of the ways that Model I, II and III decision makers would conceptualize the case. Figures 6, 7 and 8 show the high-level decision frame for each model.

Conceptualization. Each model conceptualized the decision to be made based on a set of values and beliefs about what is most important. Model I, for example, conceptualized the decision making framework as one that is related to costs, and the need to maintain market position in an increasingly competitive environment. The literature suggests that some organizations had been able to cut costs through effective application of analytics. These advances can place considerable cost pressure on an organization, especially if the time involved to replicate the technical advances in analytics is longer in duration. Model II framed the decision as one where new organizational capabilities in analytics would need to be developed in order to maintain market position and competitiveness. Model II also recognized the importance of analytic talent and training, and assumed that an investment in software could not be considered without a corresponding view of the potential impact on the productivity of people. Model III conceptualized the decision making process as strategic, where there was a need to align resources with analytic projects that would add economic value to the organization. In Model III, there was also emphasis was on reduction in dysfunctions that prevented people from doing value-added work.

Decision factors. The three frameworks also show how different conceptualizations of costs, benefits and productivity can result in different decision factors. The models show that the meaning that decision makers associate with organizational context not only influences the way that the decision making process is framed, but also the factors considered. In Model I, for example, where the decision makers framed the decision making process as related to costs, the decision factors considered were related to the costs of the new software and training. In Model

II, the decision factors focused on the value of the analytic projects, relative to the costs involved to achieve that value. In Model III, the decision factors were related to the relative reduction in dysfunctions that could be achieved with additional investment in technology and people.

Codification. The choice about the decision factors that should be included in each of the three models was developed based on the original conceptualization of the decision-making framework. The choice of decision factors also affected the way the factors were quantified within each of the three models. In other words, the quantification of decision factors is essentially a symbolic representation or codification of different conceptualizations of costs, benefits and productivity. Codifications that are represented within each of the three frameworks are expressed as mathematical formulas. The variables that make up the structure of the formulas may appear to be the same because they are similarly labeled, but in fact the variables are different because they are associated with different meanings and conceptualizations. For example, a Model I decision maker who is focused on costs and would want to know all about the license fees and training costs associated with the new software. A Model III decision maker would be similarly interested in the Model I decision factors; however, the Model III decision maker would also assume that any discussion about costs would consider hidden costs, including any existing dysfunctions related to non-quality or productivity. Similarly, a Model II decision maker would not only be interested in the Model I cost factors, but also the internal costs to develop new organizational capabilities. In other words, one could not simply solicit information about costs without a corresponding discussion about the decision to be made and the way that each variable (costs, benefits, productivity) should be quantified.

Monetization. Monetization is also an important consideration, since all three models express the decision factors as dollar values. The monetization of the decision factors creates a

way to express each decision factor relative to the other factors, so that it is easier for the decision maker to assess the magnitude of each separate factor. In the case study example, the Model II and Model III decision factors associated with hidden costs, opportunity costs and productivity were greater in magnitude and impact than the factors related to costs.

Choosing among paradigms. The review of the literature associated with each model also suggests that costs, benefits and productivity are driven by conceptualizations that are part of different paradigms – and based on a different set of thoughts, beliefs and values. In other words, different conceptualizations of costs, benefits and productivity are not complementary views of the case, but rather they are *alternative* views of the case. The cross-case analysis was the most analytically rewarding from the perspective that each model seems to clarify the other two models as paradigms. Looking at each of the three models as alternative views provides critical perspective about the factors used in decision making process. Both Models II and III directly challenge the focus on costs that is so prevalent within mainstream cost-benefit modeling in the sense that they include decision factors related to productivity and benefits. This critical perspective on the relationship between costs and value is what differentiates Models II and III from Model I.

But the point of the cross-case analysis is not so much to prove or disprove the existence of separate paradigms. Rather the point is to show that it just won't work to try to combine the decision factors from one set of values and beliefs, or paradigm, with the set of decision factors from another. Merton (1996) noted the way that paradigms provide a compact arrangement of the central concepts and their interrelationships. He wrote that

> …paradigms lessen the likelihood of inadvertently introducing hidden assumptions and concepts, for each new assumption and each new concept must be either logically derived

> from previous components of the paradigm or explicitly introduced into it. The paradigm thus provides a guide for avoiding ad hoc (i.e. logically irresponsible) hypotheses. (p. 59)

The cross-case analysis also shows that conceptualizations may seem nuanced until the symbolic representation can also be seen. Merton (1996) noted that

> …paradigms make for the codification of the qualitative analysis in a way that approximates the logical if not the empirical rigor of quantitative analysis. The procedures for computing statistical measures and their mathematical bases are codified as a matter of course; their assumptions and procedures are open to critical scrutiny by all. (p. 59)

Model I shows an important view; of course, business leaders have fiduciary responsibility to understand the impact of decisions on the company's financial statements and reports. Yet I think most business leaders would agree that they have also have a responsibility to effectively manage the productivity of the organization, to make sure that people are focused on the right work, to remove barriers so that people can achieve their objectives, and to ensure long-term growth and performance. In other words, the calculations that comprise each of the three models are not as important as the thought process about what is most important. Business leaders have the sophistication and capability to flexibly choose among frameworks of thought that best apply to the business situation or context that they confront. But the case study example implies that traditional decision-making processes that are essentially focused on the costs have created a kind of mindset that omits other discussions about the productivity of people and development of new organizational capabilities, knowledge and skill.

The review of the literature associated with Model I shows that the traditional focus on costs is driven from an industrial-era focus on tangible assets, which emphasize the costs of

production, and treat people as interchangeable with machines. Even for businesses focused on production, this thinking has become obsolete. Of course, it is still true that advances in technology may mean that the work of people can be replaced by machines. However, it is increasingly more the case that people are able to leverage technology in new and important ways. The new focus on big data and analytics shows that there has been a shift, where people who were once subservient to advances in technology are now driving organizational change by applying their knowledge and skill to effectively use tools. In the case study example, Model II calculations showed how analytic projects could have significant potential value for the organization. The value was not achieved solely through technology, but rather the way that people innovatively use that technology to advance the organization's objectives. Figure 9 shows how the decision factors associated with Model I are related to costs – and indirectly, on tangible assets – and essentially leave out decision factors that may point to other potential sources of value. In order to fully benefit from these new capabilities, decision making processes will need to include factors associated productivity and other intangible benefits to the organization.

Model I Decision Frame						
Organizational Context	**Meaning of Organizational Context as Applied to the Case**	**Decision Framework**	**Assumptions About the Decision Factors to be Considered**	**Decision Factors**	**Codification**	**Monetization (From Table 1)**
Actions of competitors Financial performance relative to competitors Customer relationships Strategic plans and objectives	Competitive environment is creating the need to carefully control costs	All new investments should be reviewed to understand the incremental impact on costs	Decision making process must focus on costs; any new or **incremental costs** will reduce net income Rational decision making process is best because it is objective Important to have objective information about **costs; each new proposed cost should be quantified** The **benefits** of the proposal can't be objectively measured until they actually happen The **productivity** of people is confounded by too many factors to be objectively measured	**New proposed costs:** Software costs Consulting fees Training costs Cost avoidance	License fees for software *plus* Consulting fees *plus* Training costs *minus* Cost avoidance *equals* New/ **incremental costs** Review costs over a four-year period to see the impact of the license agreement	*Year one* $ 480,000 *Year two* $ 40,000 *Year three* $ 40,000 *Year four* $ 40,000 *Four-year total* $ 600,000

Figure 6. Model I decision frame. This figure shows how organizational context might inform the beliefs of Model I decision makers. Business leaders create meaning from the organizational context, and frame the situation as one where costs must be carefully controlled. The decision making process is focused on incremental costs that may negatively impact profitability or the organization's financial ability to execute on its objectives. As a result, the analysis used in the decision making process is focused on incremental costs, and sets aside consideration for other factors such as benefits and productivity. Measures of incremental costs are developed for the decision factors to be considered as part of the business case, and codified as a formula. The measures are also monetized in the sense that incremental costs are expressed as dollars.

Model II Decision Frame						
Organizational Context	**Meaning of Organizational Context as Applied to the Case**	**Decision Framework**	**Assumptions About the Decision Factors to be Considered**	**Decision Factors**	**Codification**	**Monetization**
Actions of competitors Financial performance relative to competitors Customer relationships Strategic plans and objectives	Competitive environment is creating the need to compete on analytics There is a need to develop new analytical capabilities within the organization Big data creates new strategic opportunities but also technical challenges for analysts There is a need to retain, develop, and recruit analytic talent	Strategic investments in new organizational analytic capabilities will need to be reviewed and prioritized Decision making about new software tools and training should focus on the analytic projects that are part of strategic plans Analytic processes can become strategic assets, especially if process outcomes are linked to strategic goals	People create value; it is the collective knowledge, skills and expertise that have the most potential to add value to the organization The **productivity** of analysts can be enhanced with new software tools and training The **benefits** of the proposal are related to the value of the analytic projects to the organization, net of the administrative costs associated with the projects	**Project costs** include (a) Cost of software (b) Cost of training (c) Cost of consulting fees (d) Cost of the internal development time to develop new organizational capabilities **Productivity** relates to the expected value of the analtyic projects with investments in technology and training, compared to the value of the projects without the investments **Benefits** relate to the expected performance value to the organization of planned analytic projects, net of costs	**Performance value:** Performance goal (units) *multiplied by* Estimated dollar value/ unit *equals* The expected **performance value** of the analytic project **Productivity:** Performance value of projects with investment *minus* Performance value of projects without investment *equals* **Productivity** **Benefits:** Performance value *minus* Project costs *equals* **Benefits**	**Performance value:** current value without technolgy or training investments (from Table 7) $ 4,855,000 **Productivity**: Impact of technology and training investments on expected performance value (from Table 7) $ 1,295,000 **Benefits:** Impact of technology and training investments on performance value, net of project costs (from Table 5)**:** $ 540,000

Figure 7. Model II decision frame. This figure shows how organizational context might inform the beliefs of Model II decision makers. Business leaders create meaning from the organizational context, and frame the situation as one where the organization needs to develop new analytic capabilities in order to remain competitive. The decision making process is focused on the impact on performance value if the company invests in new software and training for analysts. Assessment of project benefits would consider the incremental performance value, net of the additional costs needed to achieve that value. Decision factors are focused on productivity and benefits.

Model III Decision Frame						
Organizational Context	**Meaning of Organizational Context as Applied to the Case**	**Decision Framework**	**Assumptions About the Decision Factors to be Considered**	**Decision Factors**	**Codification**	**Monetization**
Actions of competitors Financial performance relative to competitors Customer relationships Strategic plans and objectives	There is an ongoing need to boost economic performance and to do work that will ensure the long term sustainability of the organization	There is a need to develop strategic priority action plans, including consideration for analytic projects Time dedicated to analytic projects must be prioritized to ensure that people are working on projects that will create the most value to the organization There are existing gaps in quality and productivity that need to be addressed	People create value; it is the collective knowledge, skills and expertise that have the most potential to add value to the organization The investment in software and training does not by itself create value; people use the tools in order to create value Technology investments must be considered alongside the corresponding need for investments in people It is the responsibility of management to ensure that people are working on value-add activities	**Visible costs** include (a) Cost of software (b) Cost of training (c) Cost of consulting fees **Hidden costs** include an assessment of dysfunctions related to (a) Non-quality (b) Gaps in productivity (c) Opportunity costs **Benefits** relate to reduction in hidden costs if the company invests in new technology and training **Productivity** relates to changes in economic value-add if the company invests in new technology and training, and analytic resources are able to focus on projects with higher economic value to the organization	**Hidden costs:** Frequency/ occurence of problem *multiplied by* Work-around time *multiplied by* the cost per hour of time *equals* the **hidden cost** **Benefits:** Hidden costs with investment *minus* Hidden costs without investment **Productivity** (expressed as a ratio)**:** Value of economic projects with investment, divided by visible costs *divided by* Value of economic projects without investment, divided by visible costs	**Visible costs** (from Table 12)**:** $ 600,000 **Hidden costs** (from table 17): $ 634,840 **Benefits** (from Table 17): $ 270,968 **Productivity** (based on Table 18): $ 600,000 $1,000,000 (if two analysts are hired)

Figure 8. Model III decision frame. This figure shows how organizational context might inform the beliefs of Model III decision makers. Business leaders create meaning from the organizational context, and frame the situation as one where there is a need to boost economic performance in order to remain competitive and to ensure the long term sustainability of the organization. The decision making process is focused on the impact on economic performance value if the company invests in new software and training for analysts. Assessment of project benefits would consider the reduction in hidden costs if there is investment in technology and training. Productivity is concerned with alignment of resources on projects that will add the most economic value. Decision factors are focused on reduction in hidden costs and increases in economic value-add.

Model I Decision Factors	**Considered**		**Not Considered**		
	Tangible Assets		Intangible Assets		
	Financial Capital	Physical Assets	People	Organization	Customers
Productivity					
Increase economic value of analytics projects			x	x	x
Ensure strategic alignment of resources			x	x	x
Benefits					
Reduction in hidden costs			x	x	x
Reduction in opportunity costs			x	x	x
Enhancement of performance relative to costs			x	x	x
Training			x	x	x
Costs					
Staff	x				
Software	x				
Consulting fees	x				
Training Costs	x				

Figure 9. Scope of factors considered in traditional cost-benefit decision models. Model I decision making is focused on incremental costs that impact the net income of the organization. In the case study example, Model I costs included the salary and overhead costs associated with new employees, as well as the investment costs associated with new software, consulting fees, and training costs. Indirectly, the decision making process is focused on management of tangible assets, and regard people as costs. The focus on costs leaves out other decision factors related to the potential productivity of people and benefits to the organization. Contemporary thinking about management would balance the focus on tangible assets with intangible assets, which would include consideration for the knowledge and skills of people, the technology and processes that are unique to the organization, and relationships with customers.

Chapter Five

Discussion/Interpretation

The new focus on data and analytics has prompted the need for alternative decision-making frameworks that take into account the potential value of analytic projects and the productivity of people. More traditional cost-benefit decision frameworks (as represented by Model I) are focused primarily on the costs associated with new investments. Development of alternative models that are meaningful to business leaders will take some time and effort. This study highlights three areas of potential focus, including (a) development of alternative decision models, (b) the relative magnitude and importance of costs, benefits and productivity as decision factors, and (c) the way that the values and beliefs of decision makers can affect development of the decision framework.

Development of alternative decision models. First, the study shows how alternative decision frameworks (as represented by Models II and III) could be developed that would take into account other relevant factors, including the value of analytic projects and the productivity of people. These models were developed in parallel with a more traditional cost-benefit model. As a practical consideration, the models were limited to assessments of costs, benefits and productivity. While the study showed three examples of potential decision frameworks, the decision frameworks actually in use within organizations are highly variable. The point of the development of the three models was not so much prescriptive – in the sense that the intent was not to describe *how* to develop the models – but rather the point was to show alternative views of the same case. By showing alternative views of the same case, the differences between the traditional decision making model and the alternative models are easier to see.

The relative magnitude of costs, benefits and productivity as decision factors. Second, the study shows the relative magnitude of the alternative decision factors, compared to the factors that are part of traditional cost-benefit decision frameworks. The analysis associated with Model I highlighted the way that traditional cost-benefit decision models focus primarily on factors related to costs, and omit factors related to the productivity of people and value of analytic projects to the organization. Models II and III, in contrast, emphasized the productivity of people and value of the analytic projects as the most important decision factors. The Model II and III assessments showed that that the relative magnitude of decision factors associated with productivity and benefits can be more important (in terms of relative monetary value) than the decision factors associated with costs. These models also showed that decision making factors related to alignment of work with the strategic objectives of the organization were among the most meaningful of all the factors considered.

The values and beliefs of decision makers affect the development of decision frameworks. Third, the study illuminated the way that different approaches to business case development may be founded in different paradigms of thought. The cross-model analysis showed how different values and beliefs may affect the way business leaders make sense of context, the way decisions are framed, the choice of decision factors, and even the way the decision factors are defined and calculated. For example, traditional cost-benefit models are primarily focused on costs, but they may also incorporate additional decision factors related to benefits and productivity. However, the meaning associated with those decision factors is different than the meaning associated with similarly-labeled decision factors in the two alternative models.

The different meaning associated with similarly labeled decision factors implies that there may be a danger in mixing the separate decision factors from the three different decision models. While it may be tempting to just append some new decision factors to traditional cost-benefit modeling, the factors associated with each model are not necessarily compatible. The analysis of Models II and III showed that the initial conceptualization of the decision framework – as well as the decision factors associated with the productivity of people and value of projects – belongs to a different set of values and beliefs.

Significance of the Study

The study is significant in three ways. First, it suggests the presence of a cost paradigm in organizations that is manifested in the decision making process. Second, it shows that in order to introduce new areas of organizational focus that are related to the knowledge, skills, and productivity of people, decisions about those investments will require more up-front design of the decision framework. Third, the evolution from industrial to knowledge-based businesses will drive the need to move from a focus on costs to a new focus on economic performance. A focus on the economic performance of the organization will mean that business leaders will be increasingly focused on management of intangible assets, including development of the knowledge and skills of people, technological assets, and relationships with customers and other external entities.

The cost paradigm. The review of the traditional cost-benefit analysis model (as represented schematically by Model I) showed that the factors considered in the decision making process are influenced by accounting for tangible assets. In Model I, the focus of the decision making process was based on decision factors related to new or incremental costs. From an accounting perspective, an increase in costs would result in a corresponding decrease in income,

net of costs. While the traditional decision-making process may acknowledge the possibility of increased productivity of people or other benefits to the organization, those factors are omitted from the cost-benefit analysis because those factors are regarded as intangible.

The Model I analysis would imply that the accounting framework also drives values, beliefs and assumptions about costs, benefits and productivity in the organization – along with an associated set of measures, reporting and professional practice standards that are taught in management classes all over the United States. The entire set of values, beliefs, assumptions, measures, reporting and standards represents a cost paradigm. In this view, the salaries and overhead costs associated with people represent significant expense that must be actively managed.

The Model I analysis also shows that there is no association of salary and overhead costs with the potential productivity of people. The disassociation of the cost of people from the productivity of people in decision making is just one way that traditional decision making models may not work for organizational capability-building in analytics. More important than that, though, the cost paradigm may have perpetuated the industrial-era notion that people are interchangeable with machines – and the related idea that people can be cut in order to improve profitability. The analysis of Models II and III, in contrast, would suggest that the decision factors associated with the productivity of people are more important (in the sense of relative magnitude) than the factors related to costs.

The business literature that glamourizes use of big data and analytics has not been clear about the nature of investment in people that needs to be made. Almost all of the new applications of data and analytics for competitive advantage depend primarily upon the knowledge and skills of people. For many organizations, there is a need to recruit, train and

retain analytic talent – which is also fueling demand for analytic talent in the marketplace. However, if organizations are looking for ways to cut costs, then the need to recruit, train and retain analytic talent may seem to be an incompatible idea. More important, there is no place in the Model I decision framework for an assessment of the productivity gains that could occur if investments in analytics are made.

Design of the decision framework. Given all the issues organizations face in developing new organizational capabilities, there are many potential ways decisions could be framed. The CSC decision was based on a traditional model, but that decision frame fit the decision makers' assessment of the organizational context. The case study decision makers wanted to think about whether additional software and training would be a good investment relative to the considerable investments that had already been made in the company's technology portfolio. The decision makers involved were not focused on the work to build new analytic capabilities, nor were they trying to boost the performance of the company's analytic resources. They were making a decision about the costs for technology and training, and they were working to ensure that (a) the expenditure of funds was not redundant with other technology, (b) the investment was consistent with other technology strategies and investments, and (c) that there was a clear use case related to the new technology vs. other technologies already in use. And so the CSC analysis was focused on costs alone, without other considerations related to potential benefits or improvements in the productivity of people.

While the case study company was equipped with the decision tools that it needed, other decision makers in other organizations may be responsible for executing on analytic strategies that are considered key to the long-term success of the organization. In order to create new analytic capabilities, these business leaders will need a way to make ongoing decisions about the

costs, project benefits and productivity that they are managing. They will need an alternative decision-making framework, along with relevant decision factors.

Some technology vendors point to the need to link analytics with strategy in order to make the business case for investments in software and training, and to ensure that there is a link to the potential value for the organization. This thinking likely assumes that the potential value of strategic initiatives has already been quantified, and that the costs associated with technology improvements would have been considered in the planning process. A vendor may seize upon a strategic initiative with the hope that technology costs will already be a budgeted line item. But again, decisions that link technology investments to strategy are essentially focused on costs. After all, if an organization has already planned for an expense as part of a strategic planning process, then there is no need to discuss the messy issues associated with development of the skills and knowledge of people or to debate the new organizational capabilities that need to be developed. While the focus of this paper has been on software and training investments, it also important to consider that development of new analytic capabilities does not necessarily depend on technology investments – though given all the challenges with big data some analytic leaders may disagree. Rather, the success of analytic projects – with or without technology investments – will largely depend on the talent, commitment and knowledge of people.

Decision frameworks focused on economic performance. For knowledge-based businesses, the decision factors associated with costs are of course critical. But the emerging need to manage intangible assets – especially the knowledge and skills of the workforce – will mean that business leaders will need to design new decision frameworks that are aligned with economic performance, and not just costs. While business leaders may well have the intellectual ability to think more flexibly about the nature of decisions to be made, the strength and

importance of the cost paradigm creates an almost unavoidable basis for both action and inaction. It is as if business leaders must first pass through the Model I gate in order to get to the decision factors that are part of Models II and III. Given the time involved to evaluate new opportunities, the traditional models may create a kind of brake on the organization's ability to evolve work that depends of the knowledge and skills of people. In addition, traditional cost-benefit decision making models that are focused solely on costs will not provide decision makers with information that is appropriate for the kinds of investments in people that are considered. Even more important, Models II and III show that the underlying beliefs about the value of people are different – making it very difficult to reconcile traditional decision making models with other models that include decision factors related to the productivity of people or the value of analytic projects and related work.

A continued focus on Model I decision factors will likely create a kind of creative tension in knowledge-based organizations, where the Model I decision factors no longer seem applicable, but at the same time new decision factors are not compatible because they are founded in a different set of values and beliefs about people. Kuhn wrote extensively about this kind of tension in his essays about scientific history and advances in scientific knowledge. In a famous speech given to The Third University of Utah Research Conference on Identification of Scientific Talent in 1959, Kuhn (1977) described "the essential tension" in innovation and research, and the idea that "convergent thinking is just as essential to scientific advance as divergent" (p. 226). In his speech, Kuhn further explained:

> But revolutionary shifts of a scientific tradition are relatively rare, and extended periods of convergent research are the necessary preliminary to them. …That is why I speak of an "essential tension" implicit in scientific research. To do his job the scientist must

> undertake a complex set of intellectual and manipulative commitments. Yet his claim to fame, if he has the talent and good luck to gain one, may finally rest upon his ability to abandon this net of commitments in favor of another of his own invention. Very often the successful scientist must simultaneously display the characteristics of the traditionalist and of the iconoclast. (p. 227)

Kuhn's observation that an expert can be both a "traditionalist" and an "iconoclast" suggests that it is the people working within an existing paradigm who are in the best position to either perpetuate or change it. On one hand, the traditionalist is an expert in the current state of what is already known and practiced. Because of the traditionalist's expertise, the existing discipline of practice is perpetuated and reinforced. Kuhn (1977) explained that in the sciences, "it is often better to do one's best with the tools at hand than to pause for contemplation of divergent approaches" (p. 225). On the other hand, the traditionalist's practice of objectivity may be expansive enough to take in information that is contrary to what is already known or practiced. Kuhn said that as the scientist assimilates new additions to existing knowledge, he must also discard "some elements of his prior belief and practice while finding new significances in and new relationships between many others" (p. 227). In other words, it is the shift in beliefs and the incremental changes in professional practice that morphs the expert from traditionalist to iconoclast. If there is sufficient acceptance and consensus among the community of experts about suggested changes in practice, then the iconoclast may again be regarded as a traditionalist.

Significance of the Study for Organizational Change and Development

The influence of the cost paradigm on organizational decision making also has significance for the professional practice of organization development. First, the implication is that in order to effect change in organizations, practitioners must acknowledge the underlying

values and beliefs that drive it. Second, and perhaps more important, the values and beliefs of business leaders may be different than the values and beliefs associated with the practice of organization development.

If it is true that an organization is caught in the mental box of the cost paradigm, then organizational change initiatives related to the productivity of people or organizational capability building might be incompatible with the view that people are costs. For example, Model I decision makers may appear to be in agreement as organization development practitioners talk about the importance of productivity and the value of people, but in reality Model I decision makers are working from a different set of values and beliefs. That is, a Model I decision maker might mentally filter the concept of productivity gains as (a) reductions in the number of people and (b) a corresponding increase in net income. The organization development practitioner, in contrast, might be thinking that if employees can be freed up from existing tasks then the employees can take on new projects that will add more value. These differences in underlying beliefs may appear on the surface to be subtle, but in fact may ultimately affect the perceived success of organization change initiatives.

At the same time though, there is increasing recognition that cost-cutting in organizations – while associated with quick financial wins – has not necessarily produced desired results over the long term. In order to ensure the long term sustainability of the organization, some organizations are applying collective brain power to boost economic performance. Some of this new thinking about economic performance is not really new at all, but rather part of a long legacy of research in the field of organization development. The legacy of organization development research includes information about the ways that the economic performance of organizations could be improved. Because mainstream decision making is so focused on costs

and management of tangible assets, however, organization development practitioners have been somewhat marginalized – relegated to executing on change related to reductions in workforce, followed by the seemingly inevitable need to bring in the best talent to deal with unfolding operational problems or drops in the productivity of remaining staff. Given the legacy of the organization development profession, I think that there is a new opportunity to return to a focus on economic performance – especially as it relates to the knowledge, skills and productivity of people. Many business leaders have been trained to manage costs, but have missed out on the significant body of organization development research related to economic performance. The new focus on data and analytics is only one example of an area where economic performance is important, but there are many others.

Recommendations for Action

The review of the three decision frameworks show how factors related to costs, benefits, and productivity can be interrelated and complex. In order to frame decisions related organizational capability building in analytics, there is a need to focus on the value of analytics projects, and to ensure that analysts are equipped with the right tools and training. There is also the need to consider the internal effort involved to develop new capabilities, as the time to develop technology-related projects is longer in duration than most other projects and also very costly. Perhaps one of the most important issues, though, is the importance of challenging the status quo – and essentially challenging prevailing beliefs about costs vs. economic performance.

These challenges imply that data and analytics is an area where organizations would greatly benefit from the socio-economic approach to management. The socio-economic view not only takes on the issue of costs, but expands upon that view by introducing new dimension of costs that may otherwise remain hidden. In addition to the extra scrutiny on costs, the socio-

economic view challenges the status quo. SEAM practitioners intervene in the organization to help business leaders plan and execute projects in alignment with the strategic aims of the organization. The SEAM interventions are more holistic than other, more traditional organization development approaches. The SEAM interventions combine what otherwise may be many separate and disjoint organization interventions into one overall change process. Perhaps even more important, SEAM interventions are informed by a data collected as part of similar interventions all over the world.

Limitations

Although the three models permitted an in-depth exploration of a single case, it is perhaps redundant – and at the same time important – to restate the obvious: the focus of this research was limited to a single case. The decision making process obviously varies greatly – not only across different kinds of organizations, but also across different kinds of proposals – and of course different kinds of decision makers with different kinds of interests. The work here cannot be extrapolated as true and correct for any other case. The intent of this research is simply to show how other approaches to the decision making process would look if they had been fully developed, and to demonstrate the impact of paradigms on the decision making framework, decision factors considered, and calculations of the factors.

An Observation about My Research Process

When I constructed my original research question, I wanted to show how a simple business case would look if it included consideration for not only costs, but also other factors related to the productivity of people and the benefits to the organization. I wanted to do this research because in my role as a business leader I had tried to make the case for investments that would remove technological barriers for my staff members, and make it easier for them to

develop their analytic projects. In showing alternative views of a simple business case related to investment in analytic software and training, I was able to demonstrate that the decision factors related to productivity and benefits that had been deeded as "soft" can be just as important (and even more important) than factors related to costs. Based on a review of relevant literature, I was also able to show how alternative views of the business case could be developed and different decision factors could be developed.

In the process of developing alternative views of the case, I came to see more clearly the cost paradigm that underlies traditional decision making in organizations. As the cost paradigm emerged in my own thinking and reading, I also began to see how my own values and beliefs as a business leader – which had originally inspired the ideas for this research – had, ironically, obscured my ability to see the cost paradigm. In fact, my own sense of personal knowledge and skill is grounded in what I have deemed in this paper to be the Model I approach. Like the Model I business leaders that I wrote about, I would also be reluctant to give up what I know to adopt an alternative set of decision factors. My ability to conceptualize costs vs. benefits represents a kind of knowledge that far surpasses the skill it takes to develop the calculations associated with each of the three models developed for this study. Knowing is not the same as calculating. I say that with humor, but also with the deeper understanding that measures and numbers become familiar in their patterns. Would a physician, for example, throw out the temperature or pulse of patient as relevant metrics just because they do not explain everything about the status of the person's health? In a similar way, I already know the issues that may impact my assessment of costs at different points in time or in specific situations. In my experience, small changes in metrics can be meaningful, and – at times – enough to provoke additional investigation.

While I emphasized that it is not possible to combine the decision factors from the three models, I think it is also true that it is important to be grounded in the Model I decision framework in order to understand the differences in Models II and III. At the same time, I found it very interesting to consider that the literature that underlies Models II and III was developed, in part, as critical theory about the cost paradigm that is driving decision making in organizations. After following the logic of these alternative arguments, I found that my own thinking was transformed. I began to see evidence of the cost paradigm wherever I looked, and in most of what I read about contemporary actions and strategies of organizations. The world-wide economic crisis has created an unprecedented level of cost cutting – and most of the cuts in costs have greatly affected the livelihood of people in all walks of life. I could no longer think of reductions in workforce as reductions in costs, but rather as potential reductions in the overall productivity of the organization. I have since accumulated many anecdotal stories about people who have been cut from organizations, only to be asked back to work when costly problems start to emerge and overall productivity is affected. All of this research and anecdotal evidence led me to challenge my Model I values and beliefs, and to understand the limitations of my thinking as I formulated the models.

Similarly, the Model III concept of hidden costs has also affected my thinking about the definition of costs in an organization. Of course, the concept of opportunity costs has always been part of my traditional view of situations and problems. However, extensive SEAM research has demonstrated that hidden costs manifest themselves in many ways that may not be readily apparent to business leaders. Once I understood the concept of hidden costs, I began to see dysfunctions in many situations – and especially how loyal employees can be in the middle of bad situations and problems that are unaddressed by management. Why, I wondered, do

business leaders assign more people to work on problems, instead of working to improve the underlying technology or process? Model III shows more clearly the ways that people are still regarded as interchangeable with machines. Again, the review of Model III literature and my own subsequent observations of organizational life challenged my traditional beliefs. After reading the relevant literature, I found that I began to see hidden costs everywhere I went.

Given the transformation in my thinking, I can see how my values, beliefs and experiences could have impacted and limited the scope of my research. Living as I do in my own mental box, I may have even missed some essential points that I should have associated with each model. Yet the fact that I am myself grounded in the cost paradigm makes it important for me to translate between Model I and Models II and III: I believe that I have a kind of responsibility to point out the way that the cost paradigm can affect decision making and omit factors that are important to organizational change and development. While I have good and altruistic intentions, I can also see how my grounding in Model I could have affected my analysis and interpretation of findings.

Suggestions for Further Research

There are many areas of additional investigation that I think would be meaningful. First, and perhaps most obvious, is the need to conduct research that will create a deeper understanding of the cost paradigm. Second, given the current focus on data and analytics, it may be helpful to revisit the socio-technical theory that is part of the legacy of organization development research. Third, given that organizations are actively working to develop new analytic capabilities, it would be valuable to learn from their experience and decision making frameworks.

Exploration of the cost paradigm. The early research of Likert and Seashore (1963) is now outdated, but – given the practice of cost cutting – seems more relevant than ever. Have

businesses cut costs at the expense of productivity? With the Likert and Seashore research in mind, there are important research questions that could be developed:

- What are the contextual factors that lead to cost cutting?
- How do organizations know where to cut costs? Are factors related to the productivity of people are considered?
- How do executives assess the impact of cost cutting? What factors are considered? Are there different assessments of the impact of cost cutting in the short term than in the long term?
- Are there organizations that actively manage intangible assets such as the knowledge and skills of the workforce? If so, how are the organizations alike or different than their peers? How are decisions framed?
- What is the experience of people working in organizations that are focused on the productivity of people and other kinds of intangible assets? To what extent do people feel valued for their knowledge, skills and contributions? Are these experiences similar or different than the experiences of people working in organizations focused on costs and tangible assets?
- What is the experience of people who are cut from organizations and then asked to return? Do they choose to return? Why or why not? If they do return, what are their experiences?

Revisit socio-technical theory. The early organization development research about the interrelationships between people and machines was largely focused on the impact of technology on job design, and the impact of technology on the roles and responsibilities of people. There was also a focus on inputs and outputs, and the idea that both could be controlled if only they

were understood. Although there was significant savings in the early days of desktop computing as routine tasks were automated, today's technical environment is far more complicated. Analysts and other technical people work as part of cross-functional teams and contribute to the development of strategy and other initiatives. It is very difficult to isolate changes in economic performance to a single person or group. If anything, technological change has made the work of people more difficult, because people are still doing work that machines cannot do. Yet, based on this study, it seems that the old assumption that cost savings can be achieved through automation of tasks still persists, and only reinforces the problem that people are viewed as interchangeable with machines. With this concern in mind, it would be interesting to revisit socio-technical theory:

- How does existing socio-technical theory inform the new focus on data and analytics? Are there areas where the theory is outdated and needs to be updated?
- How have the interrelationships between people and computers and mobile devices evolved over time? Are people subservient to their machines, or are people are now the masters?

Management of analytic capability-building. Given the projections that indicate that there will be shortage of analytic talent in the future, I think that there needs to be more research to show how to attract and retain the best analytic talent. I also believe that the ability to manage analytic talent is a unique skill set. In my experience, the best analytic managers have been able to create new capabilities, but there is very little information about how they go about it. With all these issues in mind, it would be valuable to find out what the most successful analytic companies are doing.

- How do successful analytic companies go about deciding where and how to build new capabilities?
- How do decision makers decide where to focus analytic talent?
- Given the challenges associated with big data, how do the successful analytic companies decide where to make investments?
- How does organizational structure influence capability building?
- How do organizations work to improve cross-functional processes with analytics?

Conclusions

How can business leaders move beyond current management practices that are based on costs to focus on development of people, structures and customer relationships? The evolution from industrial to knowledge-based businesses may imply that organizations will go through a parallel evolution of management thought, where there is an increasing tension related to management of tangible vs. intangible assets. That is, there will be the need to manage costs and at the same time manage other factors such as the productivity, knowledge and skills of people – as well as relationships with customers and other external partners. As organizations work to build new capabilities, the evolution may begin with a new focus on the decision-making process, along with a renewed understanding of what is being decided and why. But more important, the fact of the separate paradigms of thought associated with costs vs. economic performance implies that the evolution of management decision frameworks will also be ontological. Where accounting measures are now associated with objectivism in that they are regarded as a source of truth, the evolution to new paradigms of management will imply a shift to social constructionism. In this new ontological view, decision making processes will rely not only on accounting measures, but will also rely on other factors that are now considered

intangibles. With this ontological shift, the need for organization capability building will also change, implying a greater need for more holistic approaches to organization development and change management. In order to facilitate the change, however, organization development practitioners will need to hold the creative tension between costs and economic performance, and essentially walk the line between opposing paradigms of thought, values, and beliefs.

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Appendix A

Detailed Tables Constructed as Part of Modeling for the Social View

Table 20

Summary of Expected Performance Value for New Analytical Capabilities: Algorithm Development

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Algorithm Development, page one

Option name:	Without Technology Investement			With Technology Investment			With Technology and Training Investment		
Data required for calculations:									
(a) What unit of performance are you measuring?	*algorithm development* unit name			*algorithm development* unit name			*algorithm development* unit name		
(b) What is the performance goal per worker/ group/ system at the end of your HRD program?	*algorithms* unit name	*5* units	*per year* time	*algorithms* unit name	*6* units	*per year* time	*algorithms* unit name	*7* units	*per year* time
(c) What is the performance per worker/ group/ system at the beginning of the HRD program?	*5* number	*algorithms* units	*per year* time	*5* number	*algorithms* units	*per year* time	*5* number	*algorithms* units	*per year* time
(d) What dollar value is assigned to each performance unit?	*$ 40,000*		*algorithm*	*$ 40,000*		*algorithm*	*$ 40,000*		*algorithm*
(e) What is the development time required to reach the expected performance level?	*1* number		*years* time	*1* number		*years* time	*1* number		*years* time
(f) What is the assessment period? (Enter the longest time (e) of all options being considered.)	*4* number		*years* time	*4* number		*years* time	*4* number		*years* time
(g) How many workers/ groups/ systems will participate in your HRD program?	*1* number of work groups			*1* number of work groups			*1* number of work groups		

Table 20, continued

Summary of Expected Performance Value for New Analytical Capabilities: Algorithm Development

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Algorithm Development, page two

Option name:	Without Technology Investement	With Technology Investment	With Technology and Training Investment
Calculations to determine net performance value:			
(h) Usable units worker/ group/ system produce during the HRD program. If no, enter -0-. If yes, enter known performance rate or calculate average performance reate [(b+c)/2]	5 number *algorithms* units	5.5 number *algorithms* units	6 number *algorithms* units
(i) What are the total units per worker/ group/ system produced during the development time? (h * e)	5	5.5	6
(j) How many units will be produced per worker/ work group/ system during the assessment periord? {[(f - e) * b] + i}	20	23.5	27
(k) What is the value of the worker's/ group's/ system's performance during the assessment period? (j*d)	$ 800,000	$ 940,000	$ 1,080,000
(l) What is the performance value gain per worker/ group/ system? [k - (c * d * f)]	$ -	$ 140,000	$ 280,000
(m) What is the total performance value gain for all workers/ groups/ systems? (l * g)	$ -	$ 140,000	$ 280,000

Table 21

Summary of Expected Performance Value for New Analytical Capabilities: Dashboard Enhancements

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Enhance Dashboard Functionality, page one

Option name:	Without Technology Investement			With Technology Investment			With Technology and Training Investment		
Data required for calculations:									
(a) What unit of performance are you measuring?	*enhancements* unit name			*enhancements* unit name			*enhancements* unit name		
(b) What is the performance goal per worker/ group/ system at the end of your HRD program?	*enhancements* unit name	*3* units	*per year* time	*enhancements* unit name	*4* units	*per year* time	*enhancements* unit name	*5* units	*per year* time
(c) What is the performance per worker/ group/ system at the beginning of the HRD program?	*3* number	*enhancements* units	*per year* time	*3* number	*enhancements* units	*per year* time	*3* number	*enhancements* units	*per year* time
(d) What dollar value is assigned to each performance unit?	*$ 10,000*		*enhancements*	*$ 10,000*		*enhancements*	*$ 10,000*		*enhancements*
(e) What is the development time required to reach the expected performance level?	*1* number		*years* time	*1* number		*years* time	*1* number		*years* time
(f) What is the assessment period? (Enter the longest time (e) of all options being considered.)	*4* number		*years* time	*4* number		*years* time	*4* number		*years* time
(g) How many workers/ groups/ systems will participate in your HRD program?	*3* number of work groups			*3* number of work groups			*3* number of work groups		

Table 21, continued

Summary of Expected Performance Value for New Analytical Capabilities: Dashboard Enhancements

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Enhance Dashboard Functionality, page two

Option name:	Without Technology Investement	With Technology Investment	With Technology and Training Investment
Calculations to determine net performance value:			
(h) Usable units worker/ group/ system produce during the HRD program. If no, enter -0-. If yes, enter known performance rate or calculate average performance reate [(b+c)/2]	3 number *enhancements* units	3.5 number *enhancements* units	4 number *enhancements* units
(i) What are the total units per worker/ group/ system produced during the development time? (h * e)	3	3.5	4
(j) How many units will be produced per worker/ work group/ system during the assessment periord? {[(f - e) * b] + i}	12	15.5	19
(k) What is the value of the worker's/ group's/ system's performance during the assessment period? (j*d)	$ 120,000	$ 155,000	$ 190,000
(l) What is the performance value gain per worker/ group/ system? [k - (c * d * f)]	$ -	$ 35,000	$ 70,000
(m) What is the total performance value gain for all workers/ groups/ systems? (l * g)	$ -	$ 105,000	$ 210,000

Table 22

Summary of Expected Performance Value for New Analytical Capabilities: Product Performance Evaluations

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Product Performance Evaluations, page one

Option name:	Without Technology Investement			With Technology Investment			With Technology and Training Investment		
Data required for calculations:									
(a) What unit of performance are you measuring?	*evaluations* unit name			*evaluations* unit name			*evaluations* unit name		
(b) What is the performance goal per worker/ group/ system at the end of your HRD program?	*evaluations* unit name	*3* units	*per year* time	*evaluations* unit name	*4* units	*evaluations* time	*evaluations* unit name	*5* units	*per year* time
(c) What is the performance per worker/ group/ system at the beginning of the HRD program?	*3* number	*evaluations* units	*per year* time	*3* number	*evaluations* units	*per year* time	*3* number	*evaluations* units	*per year* time
(d) What dollar value is assigned to each performance unit?	*$ 35,000*		*evaluations*	*$ 35,000*		*evaluations*	*$ 35,000*		*evaluations*
(e) What is the development time required to reach the expected performance level?	*1* number		*years* time	*1* number		*years* time	*1* number		*years* time
(f) What is the assessment period? (Enter the longest time (e) of all options being considered.)	*4* number		*years* time	*4* number		*years* time	*4* number		*years* time
(g) How many workers/ groups/ systems will participate in your HRD program?	*1* number of work groups			*1* number of work groups			*1* number of work groups		

Table 22, continued

Summary of Expected Performance Value for New Analytical Capabilities: Product Performance Evaluations

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Product Performance Evaluations, page two

Option name:	Without Technology Investement	With Technology Investment	With Technology and Training Investment
Calculations to determine net performance value:			
(h) Usable units worker/ group/ system produce during the HRD program. If no, enter -0-. If yes, enter known performance rate or calculate average performance reate [(b+c)/2]	3 number *evaluations* units	3.5 number *evaluations* units	4 number *evaluations* units
(i) What are the total units per worker/ group/ system produced during the development time? (h * e)	3	3.5	4
(j) How many units will be produced per worker/ work group/ system during the assessment periord? {[(f - e) * b] + i}	12	15.5	19
(k) What is the value of the worker's/ group's/ system's performance during the assessment period? (j*d)	$ 420,000	$ 542,500	$ 665,000
(l) What is the performance value gain per worker/ group/ system? [k - (c * d * f)]	$ -	$ 122,500	$ 245,000
(m) What is the total performance value gain for all workers/ groups/ systems? (l * g)	$ -	$ 122,500	$ 245,000

Table 23

Summary of Expected Performance Value for New Analytical Capabilities: Assess Savings Opportunities

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Assess Savings Opportunities, page one

Option name:	Without Technology Investement			With Technology Investment			With Technology and Training Investment		
Data required for calculations:									
(a) What unit of performance are you measuring?		*assessments* unit name			*assessments* unit name			*assessments* unit name	
(b) What is the performance goal per worker/ group/ system at the end of your HRD program?	*assessments* unit name	*3* units	*per year* time	*assessments* unit name	*4* units	*per year* time	*assessments* unit name	*5* units	*per year* time
(c) What is the performance per worker/ group/ system at the beginning of the HRD program?	*3* number	*assessments* units	*per year* time	*3* number	*assessments* units	*per year* time	*3* number	*assessments* units	*per year* time
(d) What dollar value is assigned to each performance unit?	*$ 50,000*		*assessments*	*$ 50,000*		*assessments*	*$ 50,000*		*assessments*
(e) What is the development time required to reach the expected performance level?		*1* number	*years* time		*1* number	*years* time		*1* number	*years* time
(f) What is the assessment period? (Enter the longest time (e) of all options being considered.)		*4* number	*years* time		*4* number	*years* time		*4* number	*years* time
(g) How many workers/ groups/ systems will participate in your HRD program?		*1* number of work groups			*1* number of work groups			*1* number of work groups	

Table 23, continued

Summary of Expected Performance Value for New Analytical Capabilities: Assess Savings Opportunities

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Assess Savings Opportunities, page two

Option name:	Without Technology Investement	With Technology Investment	With Technology and Training Investment
Calculations to determine net performance value:			
(h) Usable units worker/ group/ system produce during the HRD program. If no, enter -0-. If yes, enter known performance rate or calculate average performance reate [(b+c)/2]	3 number *assessments* units	3.5 number *assessments* units	4 number *assessments* units
(i) What are the total units per worker/ group/ system produced during the development time? (h * e)	3	3.5	4
(j) How many units will be produced per worker/ work group/ system during the assessment periord? {[(f - e) * b] + i}	12	15.5	19
(k) What is the value of the worker's/ group's/ system's performance during the assessment period? (j*d)	$ 600,000	$ 775,000	$ 950,000
(l) What is the performance value gain per worker/ group/ system? [k - (c * d * f)]	$ -	$ 175,000	$ 350,000
(m) What is the total performance value gain for all workers/ groups/ systems? (l * g)	$ -	$ 175,000	$ 350,000

Table 24
Table 24

Summary of Expected Performance Value for New Analytical Capabilities: Process Accelerations

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Process Accelerations, page one

Option name:	Without Technology Investement			With Technology Investment			With Technology and Training Investment		
Data required for calculations:									
(a) What unit of performance are you measuring?	*process development* unit name			*process development* unit name			*process development* unit name		
(b) What is the performance goal per worker/ group/ system at the end of your HRD program?	*processes* unit name	2 units	*per year* time	*processes* unit name	3 units	*per year* time	*processes* unit name	4 units	*per year* time
(c) What is the performance per worker/ group/ system at the beginning of the HRD program?	2 number	*processes* units	*per year* time	2 number	*processes* units	*per year* time	2 number	*processes* units	*per year* time
(d) What dollar value is assigned to each performance unit?	$ 20,000		*processes*	$ 20,000		*processes*	$ 20,000		*processes*
(e) What is the development time required to reach the expected performance level?	1 number		*years* time	1 number		*years* time	1 number		*years* time
(f) What is the assessment period? (Enter the longest time (e) of all options being considered.)	4 number		*years* time	4 number		*years* time	4 number		*years* time
(g) How many workers/ groups/ systems will participate in your HRD program?	1 number of work groups			1 number of work groups			1 number of work groups		

Table 24, continued

Summary of Expected Performance Value for New Analytical Capabilities: Process Accelerations

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Process Accelerations, page two

Option name:	Without Technology Investement	With Technology Investment	With Technology and Training Investment
Calculations to determine net performance value:			
(h) Usable units worker/ group/ system produce during the HRD program. If no, enter -0-. If yes, enter known performance rate or calculate average performance reate [(b+c)/2]	2 number *processes* units	2.5 number *processes* units	3 number *processes* units
(i) What are the total units per worker/ group/ system produced during the development time? (h * e)	2	2.5	3
(j) How many units will be produced per worker/ work group/ system during the assessment periord? {[(f - e) * b] + i}	8	11.5	15
(k) What is the value of the worker's/ group's/ system's performance during the assessment period? (j*d)	$ 160,000	$ 230,000	$ 300,000
(l) What is the performance value gain per worker/ group/ system? [k - (c * d * f)]	$ -	$ 70,000	$ 140,000
(m) What is the total performance value gain for all workers/ groups/ systems? (l * g)	$ -	$ 70,000	$ 140,000

Table 25

Summary of Expected Performance Value for New Analytical Capabilities: Support Decision Making

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Support Decision Making, page one

Option name:	Without Technology Investement			With Technology Investment			With Technology and Training Investment		
Data required for calculations:									
(a) What unit of performance are you measuring?	*Requests from Management* unit name			*Requests from Management* unit name			*Requests from Management* unit name		
(b) What is the performance goal per worker/ group/ system at the end of your HRD program?	*requests* unit name	*40* units	*per year* time	*requests* unit name	*41* units	*per year* time	*requests* unit name	*42* units	*per year* time
(c) What is the performance per worker/ group/ system at the beginning of the HRD program?	*40* number	*requests* units	*per year* time	*40* number	*requests* units	*per year* time	*40* number	*requests* units	*per year* time
(d) What dollar value is assigned to each performance unit?	*$*	*10,000*	*requests*	*$*	*10,000*	*requests*	*$*	*10,000*	*requests*
(e) What is the development time required to reach the expected performance level?	*1* number		*year* time	*1* number		*year* time	*1* number		*year* time
(f) What is the assessment period? (Enter the longest time (e) of all options being considered.)	*4* number		*years* time	*4* number		*years* time	*4* number		*years* time
(g) How many workers/ groups/ systems will participate in your HRD program?	*1* number of work groups			*1* number of work groups			*1* number of work groups		

Table 25, continued

Summary of Expected Performance Value for New Analytical Capabilities: Support Decision Making

Performance Value Worksheet
Program/ Intervention: Technology Investments for Analytic Capability Building
Support Decision Making, page two

Option name:	Without Technology Investement	With Technology Investment	With Technology and Training Investment
Calculations to determine net performance value:			
(h) Usable units worker/ group/ system produce during the HRD program. If no, enter -0-. If yes, enter known performance rate or calculate average performance reate [(b+c)/2]	40 *requests* number units	40.5 *requests* number units	41 *requests* number units
(i) What are the total units per worker/ group/ system produced during the development time? (h * e)	40	40.5	41
(j) How many units will be produced per worker/ work group/ system during the assessment periord? {[(f - e) * b] + i}	160	163.5	167
(k) What is the value of the worker's/ group's/ system's performance during the assessment period? (j*d)	$ 1,600,000	$ 1,635,000	$ 1,670,000
(l) What is the performance value gain per worker/ group/ system? [k - (c * d * f)]	$ -	$ 35,000	$ 70,000
(m) What is the total performance value gain for all workers/ groups/ systems? (l * g)	$ -	$ 35,000	$ 70,000

Appendix B

Detailed Tables Constructed as Part of Modeling for the Socioeconomic View

Table 26

Hidden Costs Associated with Non-Productivity: Excessive Maintenance Time

Indicator: Direct Productivity Gaps			Regulation of Non-Productivity
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State	Estimated Hidden Costs	Future State
Excessive maintenance time	Some of the most highly skilled analysts spend most of their time on data management tasks, which include preparation of data for analysis and integration of disparate sources of data. As new data structures emerge from this process and new applications are sourced from the data, there is an ongoing need to refresh the data structures. The time involved may be days or weeks.	Once new data structures are well established and stable, the ongoing maintenance should be moved to a production process. However, most data management processes continue to be managed independently by analysts. Not all analysts in the case have responsibility for data management, which creates heavy dependencies on those that do. Estimated hidden costs: $115,200 Hidden Cost Assumptions: (a) Development of analytic data structures average five days per month (b) 12 projects per year * 5 days per month * 8 hours = 480 hours (c) Average analyst salary, benefits and overhead $100,000 / 2,080 = $48 per hour (d) Excess development time 480 hours * $48 = $23,040 per analyst (e) Number of FTEs performing data management is 5 (f) Total costs estimated at 5 * $23,040 = $115,200	The new software language is more easily adapted to production processes. Estimated savings: $38,016 Savings Assumptions: (a) Transition of data management functions to production processes will require some up-front development investments (b) Resources to develop the new production processes may not be available to work on all potential data managemement projects due to other priorities (c) Given time and availability constraints, a third of the costs could be saved by automating development of analytic data structures and moving some data management processes to a scheduled production process (d) Savings would be 0.33 * $115,200 or $38,016.

Table 27

Hidden Costs Associated with Non-Productivity: Program Development Interrupted

Indicator: Direct Productivity Gaps			Regulation of Non-Productivity
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State	Estimated Hidden Costs	Future State
Program development interrupted	Overly complicated interface to the development environment makes it difficult for users to view results of analysis. Iterative nature of the analytic development process means that users are continually re-running programs in order to view results, often waiting in queues for hours for results that should take minutes.	Development effort on complicated projects takes longer than it should: Estimated hidden costs $276,480 Hidden Cost Assumptions: (a) Complicated interface adds three days of development time for each complex project (b) One complex project per month (c) 12 projects * 3 days * 8 hours = 288 hours (d) Average analyst salary, benefits and overhead $100,000 / 2,080 = $48 per hour (e) Excess development time 288 hours * $48 = $13,824 per analyst (f) Number of analysts impacted: 20 (g) Total hidden costs 20 * $13,824 = $276,480	New software has user-friendly development interface. Users can see the data and/ or the results of their analysis. Estimated savings: $138,240 Savings Assumptions: (a) Potential savings of $13,824 per analyst per year. (b) Assume that of the 20 impacted analysts, at least half will adopt use of the new interface in year one. (c) 10 analysts * $13,824 = $138,240

Table 27, continued

Hidden Costs Associated with Non-Productivity: Program Development Interrupted

Indicator: Direct Productivity Gaps			Regulation of Non-Productivity
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State	Estimated Hidden Costs	Future State
Program development interrupted, continued	Analysts depend on multiple tools to complete studies of medium to high complexity.	Use of multiple tools creates additional manual work effort to assimilate results from separate analyses. Estimated hidden costs: $46,080 Hidden Cost Assumptions: (a) Two projects per month medium complexity (b) 24 projects per year * 2 excess hours to assimilate results = 48 hours (c) Average analyst salary, benefits and overhead $100,000/ 2080 = $48 per hour (d) Excess development time 48 hours * $48 = $2,304 per analyst (e) Number of analysts impacted 20 (f) Estimated hidden costs 20 * $2,304 = $46,080	Transition from multiple tools to one tool. New software creates seamless transition between development interface, development environment, statistical analysis and displays of information. Estimated savings: $23,040 Savings Assumptions: (a) Savings of $2,304 per analyst per year (b) Assume 10 analysts migrate to exclusive use of new tool, achieving efficiencies (c) Estimated savings 10 * $2,304 = $23,040

Table 28

Hidden Costs Associated with Non-Productivity: Re-edition of Reports and Lists

Indicator: Direct Productivity Gaps			Regulation of Non-Productivity
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State	Estimated Hidden Costs	Future State
Re-edition of reports and lists	Once processes are developed, they are refreshed on a periodic basis. Given the complexity of the work, analysts need to conduct a technical review of the original processes in order to refresh results.	Technical reviews should be unnecessary if processes are well documented. Estimated hidden costs: $11,520 Hidden Cost Assumptions: (a) One refresh per month (b) Average of 12 projects per year per analyst * 1 excess hour to review and ensure the integrity of the process = 12 hours (c) Average analyst salary, benefits and overhead $100,000 / 2080 = $48 per hour (d) Excess development time 12 hours * $48 = $576 per analyst (e) Assume 20 analysts work to refresh one project monthly (f) Hidden costs 20 * $576 = $11,520	New software makes it possible to store all of the processing steps in sequential order, making it fast and efficient to refresh analyses. The software also provides a visual representation of the processes. Estimated savings: $2,880. Savings Assumptions: (a) Potential savings of $576 per analyst per year. (b) Assume that 5 analysts will adopt the new way of working in year one (c) Estimated savings 5 * $576 = $2,880.

Table 28, continued

Hidden Costs Associated with Non-Productivity: Re-edition of Reports and Lists

Indicator: Direct Productivity Gaps			Regulation of Non-Productivity
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State	Estimated Hidden Costs	Future State
Re-edition of reports and lists, continued	As new analytical projects are developed, there are many situations where existing processes developed by other analysts could be leveraged.	Development of new analytic processes takes longer than it should, since the ability to share programming code or processes is limited. Estimated hidden costs: $34,560 Hidden Cost Assumptions: (a) One modification per month (b) Average of 12 projects per year per analyst * 3 excess hours to develop logic that someone else has already developed = 36 hours (c) Average analyst salary, benefits and overhead $100,000 / 2,080 = $48 per hour (d) Excess development time 36 hours * $48 = $1,728 per analyst (e) Total of 20 analysts modifying proceses each month (f) Hidden costs 20 * $1,728 = $34,560	New software makes it easier to share stored processess and logic. Estimated savings: $17,280. Savings Assumptions: (a) Potential savings of $1,728 per analyst per year. (b) Assume that 10 analysts will work to share processes and code in year one (c) Estimated savings 10 * $1,728 = $17,280

Table 28, continued

Hidden Costs Associated with Non-Productivity: Re-edition of Reports and Lists

Re-edition of reports and lists, continued	Changes to existing processes are requested as business needs evolve.	Excess time to modify analytical applications to meet changing business needs. Estimated hidden costs: $92,160 Hidden Cost Assumptions: (a) One modification per month (b) Average of 12 projects per year per analyst * 8 hours to review and modify existing processes = 96 hours (c) Average analyst salary, benefits and overhead $100,000 / 2,080 = $48 per hour (d) Excess development time 96 hours * $48 = $4,608 per analyst (e) Total of 20 analysts modifying processes (f) Estimated hidden costs 20 * $4,608 = $92,160	New software provides the ability to see a visual representation stored processes, which makes it easier to visualize the design and implementation of changes. Use of one tool vs. multiple tools means that changes occur in one place vs. several. Estimated savings: $17,280 Savings Assumptions: (a) Assume that by using the new software, the number of hours to review and modify existing process changes from 8 to 2. (b) New costs per analyst is 12 * 2 * $48 = $1,152 per year (c) Reduction in costs is $4,608 - $1,152 = $3,456 (d) Total of 5 analysts adopting new approach in year one (e) Estimated savings 5 * $3,456 = $17,280

Table 29

Hidden Costs Associated with Non-Productivity: Frequent Interruptions by Users

Indicator: Direct Productivity Gaps			Regulation of Non-Productivity
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State	Estimated Hidden Costs	Future State
Frequent interruptions by users	The use of multiple tools, complicated development interfaces, lack of supporting technical infrastructure and administrative support results in frequent interruptions within the IT service area -- most of an urgent nature due to priorities within the business areas. Frequently there are problems that can't be resolved because the expertise does not exist within the organization. These interruptions impact not only leadership and technicians within the computer service area, but also leadership in the business who must address delays on priority projects.	Problem-solvingsome technical issues may take hours or days, depending on the situation. Communication of status can be time consuming, especially if the root cause of the problem itself is ambiguous. Estimated hidden costs: $5,016. Hidden Cost Assumptions: (a) One issue per month that is of escalated status. (b) Average management time 2 hours * $65 per hour * 12 = $1,560 per year (c) Average analyst time 6 hours * $48 per hour * 12 = $3,456 per year (d) Total hidden costs = $1,560 + $3,456 = $5,016	More formal adoption of software will mean that there is aditional administrative support of analysts. Through better planning and development of new support processes, users will be able to resolve technical problems faster -- and without interruption. Estimated Savings: $5,016 Savings Assumptions: (a) Defined administrative support eliminates interruptions (b) Total hidden costs of $5,016 eliminated

Table 30

Hidden Costs Associated with Non-Productivity: Lack of Coordination Between Conception and Operation

Indicator: Direct Productivity Gaps			Regulation of Non-Productivity
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State	Estimated Hidden Costs	Future State
Lack of coordination between conception and operation	Analysts who focus on data management have an increasing need for the disk space needed to process large volumes of data as well as disk storage space to store the analytic datasets once they are created. Very often evolving business requirements may result in an unanticipated level of processing or need need for additional storage capacity.	Delays in processing may occur until the required disk capacity and disk storage is in place. There may be other business people waiting for information as part of key initiatives or projects. Estimated hidden costs: $9,216 Hidden Cost Assumptions: (a) Each analyst has 4 projects per year requiring adjustments to infrastructure (b) Estimated number of delays totals 4 * delay of 3 days (c) In addition to the one analyst responsible for the data, there are, on average, 3 other analysts are dependent on the information; however they all work on lower priority tasks while they wait for data (d) Estimated opportunity costs associated with sub-optimal use of the analysts' time is estimated at 50% of time, or 0.5 * $48 per hour * 3 days * 8 hours * 4 analysts * 4 projects per year = $9,21	Adoption of software will mean that there is more formal administrative support of analysts. Through better planning and development of new support processes, users will be able to be more proactive in planning. With added infrastructure support for key initiatives, delays will be minimized. Estimated Savings: $4,608 Savings Assumptions: (a) number of delays due to infrastructure cut in half during year one (b) Total hidden costs of $9,216 * 0.5 = $4,608

Table 31

Hidden Costs Associated with Non-Productivity: Poor Estimation of Development and Intervention Times with Internal Customers

Indicator: Direct Productivity Gaps			Regulation of Non-Productivity
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State	Estimated Hidden Costs	Future State
Poor estimation of development and intervention times with internal customers	Analysts are using multiple tools, and do not follow a standard approach to development of new projects. Development time varies considerably, and there are frequent delays due to unanticipated problems using existing tools.	Uncertainty about development time may lead to miscommunication about status of business priorities, and delay time to market. Estimated hidden costs $40,000 Hidden Cost Assumptions: (a) Ten analysts have has 4 projects per year tied to important business priorities and plans (b) One delay associated with each project * 4 projects per year * 10 analysts (c) Each day of delay creates an opportunity cost for the business, since time to market is delayed. Estimated impact is $1,000 per delay. (d) Total hidden costs 10 analysts * 4 delays * $1,000 per delay = $40,000	Use of the software will provide a way to standardize the development process. With added planning and project focus, the number of delays will be minimized. Estimated Savings: $20,000 Savings Assumptions: (a) Number of delays cut in half during year one (b) Total hidden costs of $40,000 * 0.5 = $20,000

Table 32

Hidden Costs Associated with Non-Productivity: Hardware/ Software Shared by an Entire Department

Indicator: Direct Productivity Gaps			Regulation of Non-Productivity
Type of Hidden Cost Based on ISEOR Findings	CSC Examples - Current State	Estimated Hidden Costs	Future State
Hardware/ software shared by an entire department	A few analysts have a copy of software that is used for specific kinds of studies. The software is loaded directly on the analysts' systems, and is not accessible to others. Even if the software could be accessed by others, the license agreement does not permit sharing of the software.	Other users cannot access the software, and sometimes develop manual work-arounds in order to fulfill the requirements of their project, or else use sub-optimal tools to accomplish required tasks. Use of suboptimal tools results in excess time to develop a project Estimated hidden costs: $4,608 Hidden Cost Assumptions: (a) Number of projects developed with sub-optimal tools 6 (b) Average excess time required 2 days (c) Hidden costs 6 projects * 2 days * 8 hours = 96 hours (d) 96 hours * $48 per hour totals $4,608	New software will negate the need for the specialized software loaded on a few machines. Savings Assumptions: (a) All users will be able to access and use the same software. (b) Estimated savings: $4,608