Plan A Thesis -

An Analysis of the Information Technology (IT) Attitudes, Cognitions, and Anxieties of Corporate Leaders at the Phillips Plastics Corporation.

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By

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Abstract

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An Analysis of the Information Technology (IT) Attitudes, Cognitions, and Anxieties of Corporate Leaders at the Phillips Plastics Corporation.

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This study built the case for examining the little-understood relationship between a corporate leader and information technology. It interrogated over one-hundred resources in the fields of business, technology, and psychology for relevant knowledge, empirical data, and current research methods related to the problem.

Next, this research developed demographic analysis and integrated methods for measuring attitudes, cognitions, and anxieties of leaders towards information technology into the Corporate Leader-IT Relationship Evaluation Instrument. This instrument was administered to nineteen corporate leaders at the Phillips Plastics Corporation. The data was collected, loaded into SPSS, and resulting reports and demographic cross-tabulations were analyzed.

A summary of the study methods, findings, conclusions, and recommendations were delivered to the Phillips Plastics Corporation, thesis committee, and UW Stout graduate college. The results confirmed the little-understood problem of executive technophobia is a legitimate and increasing issue. Recommendations were made for improvement in communication with IT professionals; enhancing IT education and

training with proven, adult-learning based principles; development and implementation of IT effectiveness coaching for leaders; and defining the scope, objectives, and approaches for future research.

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CHAPTER ONE

Introduction

Background

Technology, in all its forms, has had an impact on virtually everyone. Information technology, with its complexity and dramatic change, has arguably had the most profound impact on people. Even our measurement of a year has now changed to "an Internet year" or three months (Vassos, 1997). Today's manufacturing industry reflects this phenomenon and how it affects individuals and organizations within an industry (Manufacturing.Net, 2002).

Technology is reaching the saturation point with many people. A recent issue of U.S. News and World Report (Lardner, LaGesse, Rae-Dupree & Roane, 2001) highlighted the reality of people "Overwhelmed by Tech." While enduring its first bear market, the article noted that technology companies are scrambling to find out why consumers are not falling in love with the latest offerings. The answer derived by the authors is that people are trying to figure out how to work the devices they already have.

Information technology (IT) affects peoples' personal and professional lives. A recent business periodical illustrated the dramatic impact of IT. It described occasional looks on the faces of office workers seeming as if they had seen ghosts or been taken away by an unidentified flying object. In fact, the office was implementing a new computer system and some other new technology (Heverly, 1998).

Research is just beginning to understand that technology is having a significant psychological impact on people. After twenty years of psychotherapy and technology research experience, Dr. Michele Weil and Dr. Larry Rosen developed the term "TechnoStress" to describe the reactions of their clients and research subjects to "Technophobia" (Weil, Rosen, 2001).

Leaders in business have special challenges with technology. A group that heavily influences industry and education are Chief Executive Officers (CEO's), who are advised

that one of the seven warning signs that their job is in danger is technophobia (Martin, 2000). Additionally, research indicates that many executives are actually moving away from technology rather than embracing it (Rosen, 1998). Yet most experts believe information technology can be a critical success factor for organizations to survive or thrive.

Therefore, a seemingly paradoxical relationship exists between corporate leaders and information technology. Understanding and enhancing this relationship could be of significant value to business, education, and public sectors everywhere.

The manufacturing industry and a sub-industry like plastics will provide an excellent starting point to analyze a group of leaders and their relationship with technology. Phillips Plastics Corporation is a recognized leader in the plastics industry. They have invested significantly in information technology and focused on associated issues and challenges. This has resulted in a People Process Culture and an effective integration of people and information technology (Phillips Plastics Website, 2002).

Statement of the Problem

People have professional, interdependent, and personal relationships with information technology (IT). In the case of corporate leaders, their relationships with IT have become more critical than ever to the success of a business. However, the majority of professionals in business, IT, and education, do not understand the real nature (positives and negatives) and impact of the leader's personal relationship with technology. While success stories exist, there are emerging signs of difficulties. The promises of IT and business success are unlikely to be fulfilled unless this relationship is truly understood and significantly enhanced.

Purpose of the study

This research focused on the relationship between corporate leaders and Information Technology (IT) at the Phillips Plastics Corporation. During this study, all key leaders: assessed their IT relationship via three surveys recognized as the standard of the industry; completed a customized survey to establish demographics and key

technology issues; and participated in a review of the research findings and recommendations. This study will build the groundwork for research in other organizations and industries.

Research Objectives

The objectives of this study were to:

1. develop a profile of corporate leaders and the major technology environments in which they function.
2. describe key variables (attitudes, cognitions, and anxieties) in a corporate leader's personal relationship with information technology.
3. develop and apply an analytical method for measuring key relationship variables with actual corporate leaders.
4. identify the issues Phillips Plastics corporate leaders deemed critical in their relationship with information technology.
5. document all study findings and recommendations for enhancing Phillips leaders' relationships with IT.

Justification for Research

During twenty-three years of IT experience with IBM, the author has witnessed hundreds of cases of technophobia. Simple questions like, "How do you get along with technology?" or "What are your personal technology issues?" will invoke lengthy and emotional responses without fail. All informal networking feedback in business, industry, and education elicited strong endorsement and volunteers for such research.

Additionally, this study also evaluated opportunities to leverage or develop special UW-Stout offerings for executive education.

Significance of the Study

This project will evaluate the relatively unknown personal relationship that leaders in an organization have with information technology.

Further, this study provided technology-oriented educators and universities with an intimate understanding of the ultimate technology user and decision-maker in the

businesses and industries they serve. As a result, they can be much more effective in their support roles.

Lastly, the study provided valuable insights to specific educational and industry endeavors such as curriculum development in the College of Technology, Engineering, and Management (CTEM) at the University of Wisconsin-Stout. For example, it may be possible to determine executives' desirability for special coaching to enhance their technology relationship, their organization, and supporting training programs.

Limitations of the Study

The major limitations of this study are:

1. The leader-information technology relationship is analyzed in a selected company within the manufacturing industry; therefore, it may not be indicative of other manufacturers.
2. The sample size (single company) does not permit valid conclusions about larger populations.

Assumptions of the Study

The major assumptions for this study are:

1. Survey respondents will complete their own surveys without collaboration with other respondents.
2. Survey respondents will provide honest and complete responses to the best of their abilities.
3. The statistical and correlation validity of the attitude, cognition, and anxieties survey instruments were previously established by Dr. Weil (Weil, 1990) and Rosen (Rosen, 1993) in their research.

Definition of Terms

Key terms used in the research of the corporate leader-information technology relationship are:

Andragogy is the theories and practices of effective adult learning. Androgogic learning systems emphasize the learner's history of experiences and active involvement in

learning, not "transmittal and absorption”. Proper adult learning orientation is problem or job-centered rather than subject-centered. The instructor functions as a guide or coach, not a lecturer or demonstrator.

Business is any activity that seeks profit by providing goods and services to others thereby satisfying a standard of living or quality of life.

Information is the communication or reception of knowledge or intelligence; knowledge obtained from investigation, study, or instruction; news, data, or factual information (as measurements or statistics) used as a basis for reasoning, discussion, or calculation information in numerical form that can be digitally transmitted or processed

Information Technology (IT) is the branch of technology devoted to the study and application of data and the processing thereof; i.e., the automatic acquisition, storage, manipulation (including transformation), management, movement, control, display, switching, interchange, transmission or reception of data; the development and use of the hardware, software, firmware, and procedures associated with this processing.

Interdependent is 1. depending on each other: unable to exist or survive without each other interdependent organism 2. with mutually dependent elements: relying on mutual assistance, support, cooperation, or interaction among constituent elements or members

Leader is a person who leads as a guide, conductor; a person who directs a military force or unit; a person who has commanding authority or influence; to direct the operations, activity, or performance of people and things.

Leadership is a complex process by which a person influences others to accomplish a mission, task, or objective and directs the organization in a way that makes it more cohesive and coherent. A person carries out this process by applying her leadership attributes (belief, values, ethics, character, knowledge, and skills). Although a position as a manager, supervisor, lead, etc. gives the authority to accomplish certain tasks and objectives in the organization, this power does not make one a leader. It simply

makes them the boss. Leadership makes people want to achieve high goals and objectives, while, on the other hand, bosses tell people to accomplish a task or objective.

Psychology is the study of mind and behavior in relation to a particular field of knowledge or activity.

Relationship is the state of being related or interrelated <studied the relationship between the variables>; the relation connecting or binding participants in a relationship; a significant connection or similarity between two or more things, or the state of being related to something else; the connection between two or more people or groups and their involvement with each other, especially as regards how they behave and feel toward each other and communicate or cooperate.

Technology is the practical application of knowledge especially in a particular area; a capability given by the practical application of knowledge; a manner of accomplishing a task especially using technical processes, methods, or knowledge; a common but inappropriate reference to the more specific term, Information Technology.

TechnoPhobia is a variety of negative emotional reactions (e.g. fear) towards computer technology; derived from Computer Phobia.

TechnoStress is a modern disease of adaptation caused by an inability to cope with the new computer technologies.

Methodology

The planned methodology for this research was to survey a selected group of leaders. The study administered the surveys combining the Computer Anxiety Rating Scale (CARS-C), Computer Thoughts Survey (CTS), General Attitudes Toward Computers Scale (GATCS), and custom demographic survey. The researcher analyzed the data using SPSS Statistical Software (SPSS), resulting reports, and demographic cross-tabulations.

CHAPTER TWO

Review of Literature

This chapter will research and document development of an approach to study the relationship between corporate leaders and Information Technology (IT) and how it relates to existing fields of study.

Chapter Objectives

This review of literature will accomplish the following:

1. establish *the fundamental problem* driving research of the corporate leader-IT relationship and its significance.
2. Develop *a literature search strategy* by evaluating the proper fields of study and associated information resources related to the problem.
3. Analyze and document *relevant knowledge* related to study of the personal corporate leader-IT relationship.
4. Analyze and document *pertinent research and empirical data* applicable to study of the personal corporate leader-IT relationship.
5. Develop a corporate leader-IT relationship *study methodology* and explain its rationale, justification, and intended results.

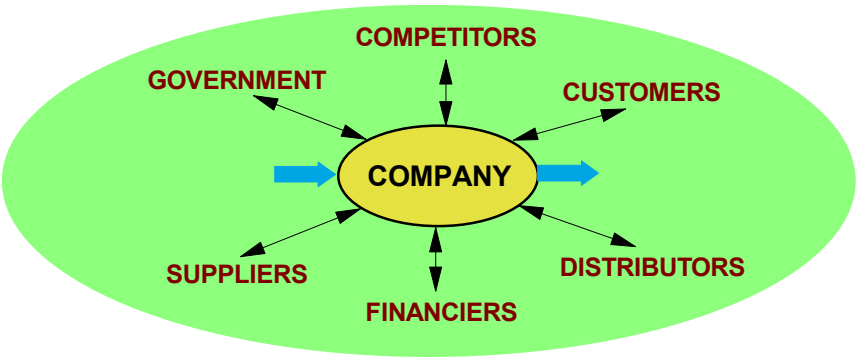
Problem and Literature Review Context

Original Problem Statement

People have professional, interdependent, and personal relationships with information technology (IT). In the case of corporate leaders, their relationships with IT have become more critical than ever to the success of a business. However, the majority of professionals in business, IT, and education, do not understand the real nature (positives and negatives) and impact of the leader's personal relationship with technology. The promises of IT and business success are unlikely be fulfilled unless this relationship is truly understood and significantly enhanced.

A Corporate Leaders World

Corporate leaders must thrive or survive in an increasingly complex and challenging environment.



Today's Business Environment

Competition is extremely intense, typically global, and often comes from new or unexpected sources. Smaller groups of companies compete for tighter profits and market share. Terms like disintermediation develop to describe elimination of players in traditional product or services delivery chains. Even industry definitions change dramatically as illustrated by financial, securities, and insurance companies now pursuing the same market space.

Customers expect the ultimate price performance in the products or services they receive. The timing of their expectations has begun to emulate technology with real-time demands and perpetual coverage implied in the new term 24/7/365 support.

The small or simple boundaries of an organization have been replaced with suppliers, customers, and distributors integrated into a value chain to deliver products or services. These value chains span flexible and dynamic resources from any location and constantly seek an optimum state. Every player has constrained resources yet faces elimination from the value chain if they become non-value add by perception or reality.

The corporate leader manages in a world that is also challenged by government regulations and taxation. Economic, global, and political policies from the public sector affect how and where organizations execute their business in the world.

Perhaps the strongest influence or driving forces in today's business environment are the financial ones. Relentless quarter-to-quarter and bottom line pressures are helping drive some leaders into the Enron-type headlines we see today.

Clearly, corporate leaders face the greatest complexity and challenges ever in business on a daily basis.

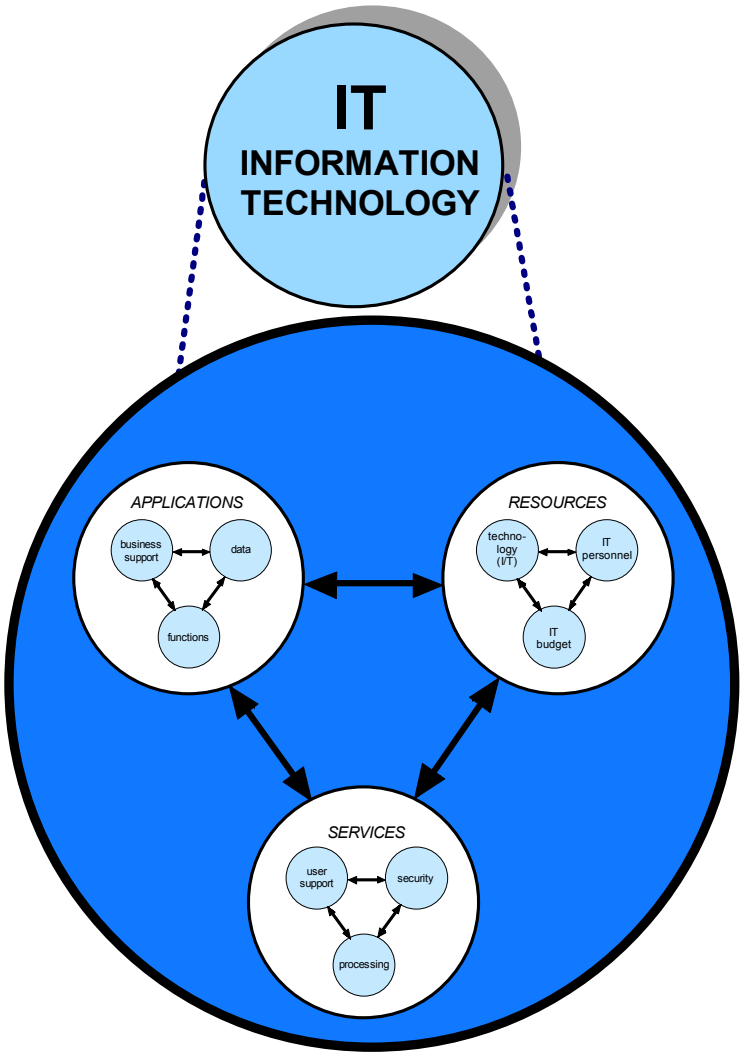
The World of Information Technology (IT)

A standard definition of information technology is that it is the branch of technology for: the study and application of data and the processing thereof; the automatic acquisition, storage, manipulation (including transformation), management, movement, control, display, switching, interchange, transmission or reception of data; and the development and use of the hardware, software, firmware, and procedures associated with this processing.

It should be noted that this typical definition is technical in nature and ignores the people dimensions. It does not permit consideration of the true *nature, results*, *and affects of IT*.

The *nature* or elements of IT are usually complex and constantly changing. Experts often rely on models to describe, educate, or communicate. Technical experts tend to use detailed architecture or flow charts to depict tiers of IT resources, technical properties, and connectivity. Logical models reflect consideration for people and provide the means or techniques for discussing the corporate leader-IT relationship.

Therefore, the following logical model can be used for information technology:



Logical Information Technology (IT) Model

A simple, powerful, but often forgotten premise is that information technology must serve people. When this premise is applied, IT can be distilled down to the applications or tools, resources, and services that support an organization's delivery of products or services. Each of these categories can still be broken down into their most detailed component but remain in a people context.

Information technology applications, resources, and services have generally had positive but mixed *results* in their support of businesses. Enterprise and operational systems greatly enhance the quality and timeliness of products and services being delivered. Some businesses and industries stop functioning during IT outages. Individual productivity has never been higher. The growth and health of the economy or individual

businesses often relies upon the successful and pervasive implementation of information technology.

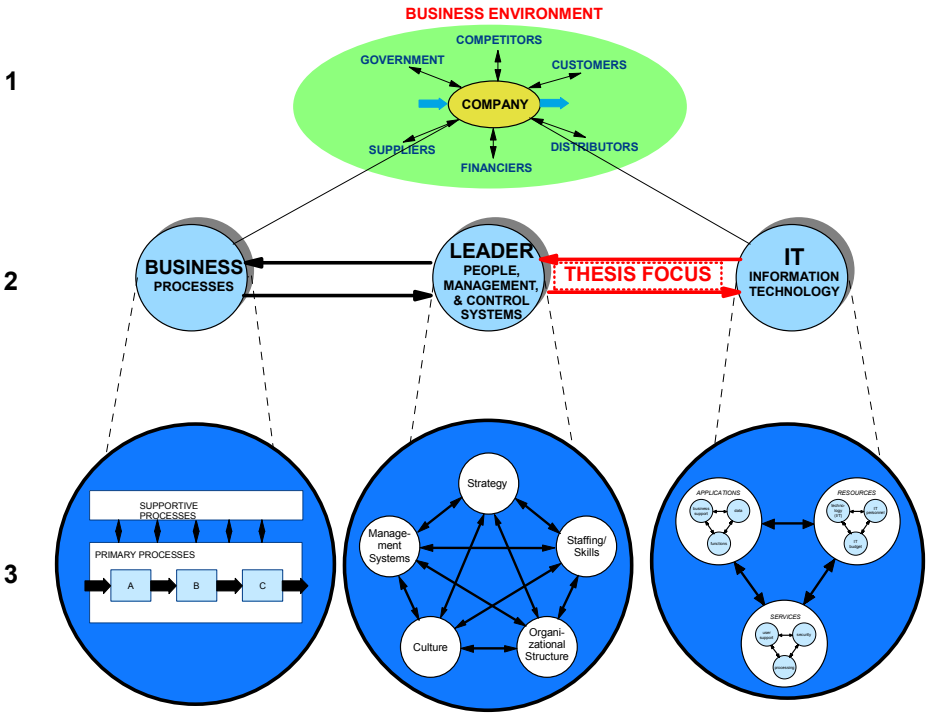
On the other end of the spectrum, it is well documented that over 50% of major IT projects fail, do not deliver timely benefits, or meet expectations. Perhaps the most dramatic illustration of IT's impact on people and organizations was the need for Year 2000 fixes on nearly all computers.

Virtually all people and organizations acutely feel the *affects* of information technology. We feel empowered to do almost anything with the graphics and computing power that is instantly available at our fingertips. We often live in a boundary less, 24/7/365 world in both our professional and personal lives because of IT. The foremost affect is that we have become a people "Overwhelmed by Tech" (Lardner, LaGesse, Rae-Dupree, & Roane, 2001).

Analyzing the Intersection of Leader and IT Worlds

There are a number of ways to represent and analyze the worlds of business, information technology, and their intersections. The following model integrates previously discussed models and depicts their major interrelationships. It also reinforces the critical integration and balance the corporate leader must constantly provide and protect.

INTEGRATED BUSINESS AND INFORMATION TECHNOLOGY MODEL



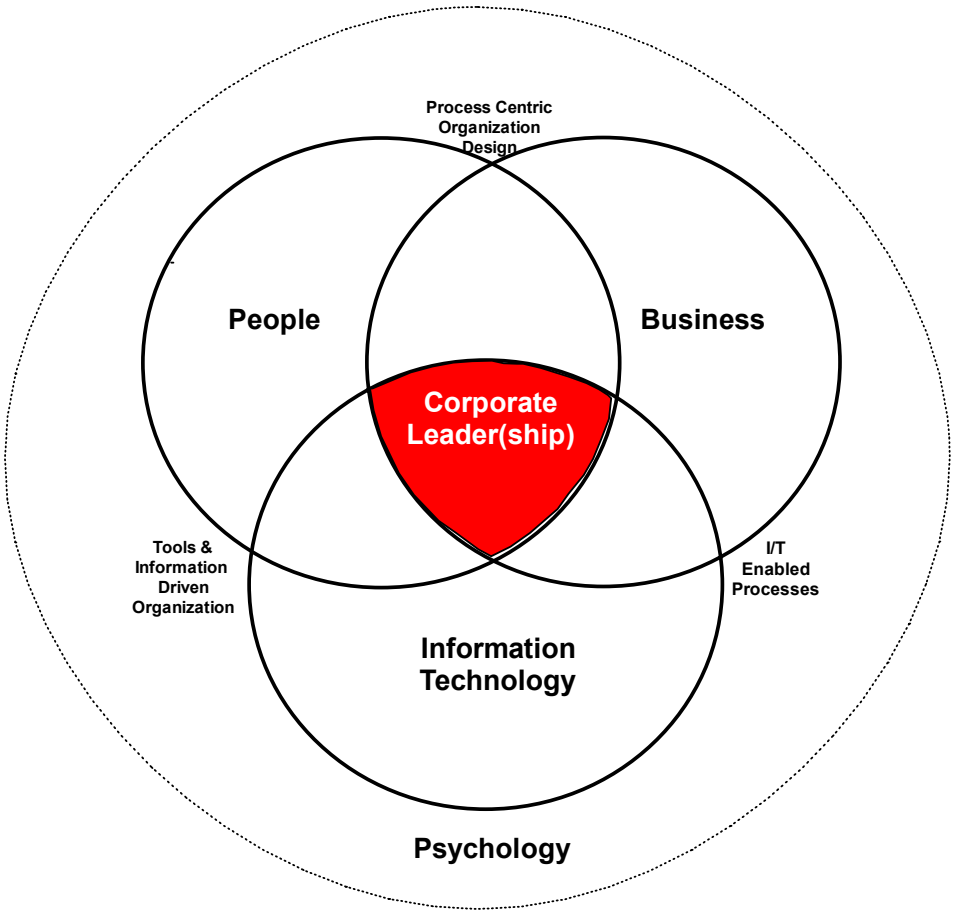
The Corporate Leader-IT Relationship Model

This Corporate Leader-IT Relationship Model will be used to represent and analyze the worlds of business, people, information technology, and their intersections or interrelationships throughout this research study.

Literature Research Strategy

Problem and Literature Review Context

The Corporate Leader-IT Relationship Model provides the basis and organization for a literature review of the research problem. The following simplified version derives the areas of focus and foundation for the research strategy.



Problem and Literature Review Context Model

Psychology, the study of people's minds and behaviors, must be a logical part of research that is evaluating people in conjunction with business and information technology.

Literature Search Strategies

All combinations of pertinent fields and their associated keywords were used to examine literature resources. They included:

- Business- management, enterprise, interfaces, linkages
- Information Technology- computers, IT, technology, tools, applications, technostress
- People- leaders, executives, organizations, users, humans

- Psychology- psychological, phobias, anxieties, cognitions, attitudes, behaviors

The literature resources interrogated for each field were:

- Literature Indexes and Databases
- WWW Sites
- Periodicals
- Stout Library Catalog
- Dictionaries, Encyclopedias, and Handbooks
- Journals
- Professional Directories

The literature search strategy has been detailed here to support a critical finding in the next section.

Relevant Knowledge

Critical Finding and Qualifier

One of the most important findings from this research of literature must also serve as a qualifier or caveat to the reader throughout review of this document. There is limited literature discussion or study of leaders and IT issues, let alone people and technophobia. Several authors chose to analyze the absence of knowledge or discussion on this issue, instead of the issue itself. One other simply stated there is a paucity (or dearth) of literature focusing on management and Information Technology (IT) (Piipers, 2001).

Problem Perspectives

There is a very broad spectrum depicting people's relationships with information technology. It ranges from Luddite's who totally avoid technology and regard it as evil (University of Colorado, 2002) to Swedish workers whose competence and health were reportedly enhanced by appropriate levels of IT (Vinberg, 2000). A research of literature related to the Corporate Leader-IT relationship offered a number of *observations, issues, theories,* and potential *solutions* across this spectrum.

Technology, in all its forms, has had an impact on virtually everyone. Information technology, with its complexity and dramatic change, has arguably had a profound impact on people. Today's manufacturing industry reflects this phenomenon and how it affects individuals and organizations within an industry (Manufacturing.Net, 2002).

Technology is reaching the saturation point with many people. A recent issue of U.S. News and World Report (Lardner, LaGesse, Rae-Dupree, & Roane, 2001) highlighted the reality of people "Overwhelmed by Tech." While enduring its first bear market, the article noted that technology companies are scrambling to find out why consumers are not falling in love with the latest offerings. The answer derived by the authors is that people are trying to figure out how to work the devices they already have.

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Leaders in business have special challenges with technology. A group that heavily influences industry and education are Chief Executive Officers (CEO's) who are advised that one of the seven warning signs that their job tenure is in danger is technophobia (Martin, 2000). Additionally, research indicates that many executives are actually moving away from technology rather than embracing it (Rosen, 1998). Yet most experts believe information technology can be a critical success factor for organizations to survive or thrive. Thus, a seemingly paradoxical relationship can exist between corporate leaders and information technology.

One leader discussed fear and loathing she has for her computer. She even started with the traditional introduction of an Alcoholics Anonymous meeting but substituted technophobe for alcoholic. In her view, it would take more than 12 steps to cure her condition. However, she felt there was plenty of company in high places, with the likes of

GE's Jack Welch confirming his abstinence from using technology himself (Connelly, 1994).

The literature identified some key *issues* that to be addressed to enhance relationships with information technology.

Business leaders have always had issues communicating with technologists, who operate in and tend place a premium on the technology itself instead of the business. These difficulties have been greatly magnified by newer and faster technologies such as the Internet and e-commerce (Pottruck, 2000).

Organizational development specialists believe that the IT community itself is responsible for underperformance, failure, and executives' not embracing technology. This is driven by ignorance of human an organizational factors; self-sustaining technical methods and communication; and no apparent incentives for IT professionals to embrace holistic, people, or business philosophies (McDonagh, 1999).

IT education and training methods are often cited as being ineffective or creating problems for leaders in their relationship with information technology. Leaders and the entire organization can be literally being forced to learn and use technology by their IT staff and trainers (Heverly, 1998).

There are a number of *theories and solutions* proposed to address people or corporate leaders' issues with information technology.

The starting point for improvements and solutions should be communication about information technology itself. Fundamental communication principles such as active listening, empathy with the audience, and clear language are sorely needed in industry today.

Another approach calls for leaders to practice the philosophy where information technology is part of our nervous system, extending our memories and capabilities, creating new information channels, and the vehicle for leadership in an organization. Executives would embrace technology more readily if they really understood it leverages time, communicates, coaches, shapes culture, and enhances personal thinking. The

information systems must also evolve and become relevant to corporate leaders in the core functions of thinking, deciding, and communicating (Boone, 1993).

The most important part of the solution may be proper IT education and training. Executive education could provide leaders with fundamental IT understanding and working knowledge of its benefits. IT training, sensitized to adult learners, could guide leaders in their personal development of information technology skills (Heverly, 1998).

Relevant Research

Technophobia Research Landscape

There is a limited range of research focusing on both information technology and psychology. One effort suggests the connection between hypnotic suggestibility and technology usage (Morgan, 2001). This research shows there is probably a promising connection between high hypnotic suggestibility and extreme computer or technology use. (Ironically, this correlation will help experts understand computer or technology addictions).

There were several other small studies of this persuasion but only four appeared to have relevance to studying the defined problem.

Research Profile 1- Sweden

The Swedish Division of Occupational Medicine at the Karolinska Institute in Stockholm conducted this research. Their studies of employees in high-technology industries suggest that psychosomatic symptoms are related in part to high-perceived mental demands in combination with lack of sufficient skills. Employees with psychosomatic symptoms more commonly report that they are not sufficiently recognized by their employer, as compared with nonsymptomatic peers. In a controlled stress management program, they observed lower mental stress levels among participants, as compared with controls, and lower physiological arousal, measured as circulating levels of prolactin. They suggested that organizational reengineering and the introduction of information technologies constitute potential stressors challenging employees' cognitive

resources. They predicted that psychosomatic syndromes in the workplace will most likely increase in the foreseeable future due to the rapid changes currently transcending working life (Arnetz, 1997).

Research Profile 2- United Kingdom

The UMIST-Manchester School of Management in the United Kingdom conducted this research. This study analyzed reluctance to use technology-related products in order to develop a "Technophobia Scale." They defined techophobia as a condition in which people find themselves feeling mistrustful or even anxious when using new technology. The author created a method to measure people's reactions when using technology, for example measuring simple tasks, such as using an ATM, to more complicated tasks, such as programming a VCR. The sample groups were comprised of 1503 respondents from seven different countries. The countries were: United States, United Kingdom, France, Spain, India, Mexico, and Austria. The instrument targeted negative feelings towards certain products, negative cognitions or diffidence about product usage and a third dimension called "use innovativeness." It was felt that this approach provided much more of an international context compared to computer phobia studies that seem skewed toward America. The findings primarily focused on the instrument itself but indicated that ATM card ownership was pervasive across all seven countries. The United States, France, and United Kingdom were ranked first through third and India last in overall usage and technophobia (Sinkovics, 2002).

Research Profile 3- Swedish Institute

The National Institute for Working Life in Osterund Branch conducted this research. They analyzed the relationship between leaders' and co-workers' change competence development, information technology levels, and performance in ten small business enterprises in Sweden. They mapped competencies and demographics for 20 company leaders and 82 co-workers. Questionnaires and semi-structured interviews established information about IT levels, competition levels, organizational aspects, and health. The study concluded that change competence and IT levels did correlate with

higher levels of educational investment, increase in leader change competence, and ongoing programs, which result in higher profit per capita at the company level. They also found that the higher the rate of IT in a company, the lower the incidence of musculoskeletal problems among employees (Vinberg, 2000).

Research Profile 4- Drs. Weil and Rosen

Dr. Michele Weil and Dr. Larry Rosen have each conducted major research of people and their relationships with computers or information technology since 1987. Their collaborative efforts include the highly acclaimed book *TechnoStress: Coping with technology @WORK @HOME @PLAY* (Weil, Rosen 2001). The successes of fourteen major studies have established their instruments as the industry standard. This includes the Computer Anxiety Rating Scale (CARS-C), Computer Thoughts Survey (CTS), General Attitudes Toward Computers Scale (GATCS), and Personal TechnoStress Indicator (PTSI) (Weil, Rosen, 2001).

The etiology (cause analysis) of computer phobia was the first major installment in their body of work (Weil, 1990). Succeeding studies on treating technophobia (Rosen, 1993) and the psychological impact of technology from a global perspective (Weil, 1995) further solidified their positions as the thought leaders on this subject. The Weil-Rosen methods and instruments have become the defacto standard in many industries (i.e. Myers-Briggs Type Indicator), but have had limited application to the business world.

Corporate Leader-IT Relationship Study Methodology

Rationale

The Corporate Leader-IT Relationship Model in Appendix A describes the environment and requirements for study of the defined problem. None of the existing study methods and instruments fit the scope, scale, or environment of this study as-is. Therefore, a new or hybrid approach was required. After many interactions and negotiations, it was decided to combine three of the Weil-Rosen survey instruments with a concise demographic questionnaire and custom survey. This “one-pager” format in

Appendix C would permit rapid completion by busy corporate leaders while acquiring the needed empirical data.

Relevant Findings

The major findings derived from a review of literature to support conclusions of the study are:

1. There is limited literature discussion or study of leaders and IT issues, let alone people and technophobia. A search of Wall Street Journal resources and archives yielded zero hits on corporate leaders and any kind of relationship with technology.
2. Neutral relationships with IT appear to be rare and typically seem to be love-hate.
3. Some leaders openly discuss their fear and loathing for information technology, but take solace in the fact that executives like GE's Jack Welch is in the same company.
4. IT does not always deliver purported functions or benefits.
5. Adult learner and leaders face more challenges and frustration than their younger counterparts do. Proven adult learning techniques are usually not reflected in IT education and training.
6. There is virtually no evidence of the education field properly addressing technology-related issues of corporate leaders in industry.
7. Leaders often report inability to access information in a timely manner, in desired formats, if at all.
8. Business leaders have always had issues communicating with technologists, who operate in and tend place a premium on the technology itself instead of the business.

CHAPTER THREE

Introduction

The instrument used for this research is shown in Appendix C. This chapter will discuss the study sample; major sections of the survey; design rationale for the instrument; and execution of the study to evaluate the corporate leader-IT relationship.

Sample Selection Rationale

There were a number of study and scope options to evaluate the corporate leader-IT relationship. They ranged from surveying individuals or groups from industry conferences, professional associations, or business enterprises. Each option represented different levels of effort, time, and sample quality. Ultimately, the study of Phillips Plastics Corporation was chosen because they:

- provided the unique opportunity of studying an entire organization.
- are a representative and effective user of information technology.
- provided a proper but manageable scope of study.
- offered access and enthusiastic interest in participating.
- are located at sites that were convenient and cost-effective for both the leaders and research team.
- offer the opportunity for follow-on study because of the strong, mutual relationship between Phillips Plastics Corporation and CTEM.
- could establish an organizational benchmark for comparison to other businesses.

Subjects Description

The subjects of this study were all key leaders of the Phillips Plastics Corporation based in Phillips, Wisconsin. All functional areas and locations were represented in the sample group of nineteen subjects. The subjects were the:

- Chief Executive Officer
- Chief Financial Officer
- Chief Information Officer

- Vice-President - Manufacturing
- Vice-President - People Services
- Vice-President - Quality & Systems
- Vice-President - Purchasing and Facilities
- Vice-President - Sales
- General Manager (6)
- Director - Quality Systems
- Corporate Safety, Health & Environmental Manager
- Organization Development / Training Manager
- R&D Director
- Opportunity Development Manager

Instrumentation Design Rationale

Critical elements of the research objectives in Chapter 1 drove the design of a Corporate Leader-IT Relationship Survey Instrument. It was first necessary to develop a *profile of corporate leaders* and their technology environments. The foundation of the survey and its' analysis was established by capturing the leader's demographics and self-assessment of the major technology environments in which they function.

Next, the study needed an *analytical method* to describe the quantitative nature of a relationship. The choices for this were either custom development, use of standard instruments, or some combination of methods. It was identified that attitude, cognition, and anxieties represented an ideal set of core variables to measure in the corporate leader-IT relationship. This dictated combining several standard instruments used to evaluate mathematics anxiety in education with custom methods and applying them to a business.

Lastly, subjective *critical issues* corporate leaders have information technology were identified by direct questionnaire.

The major components of the Corporate Leader-IT Relationship Survey Instrument were:

Instrumentation Description for Section 1- Subject Demographics

This portion of the survey captured the job title, function, education level, ethnic background, gender, and age of each subject.

Instrumentation Description for Section 2- Subject Environments

The corporate leader-IT relationship primarily exists in several environments were there are varying exposures to and usage of technology. To understand this, subjects described the level of familiarity and usage for their workgroups, family, or family of origin, and personal life.

Instrumentation Description for Section 3- General Attitudes Toward Computers Scale (GATCS-C)

The Weil-Rosen technology survey designs are similar to those used to evaluate mathematics attitudes, cognitions, and anxieties. The General Attitudes Toward Computers Scale GATCS (Form A) was based on features and aspects of attitudes toward computers and technology. Individual statements were generated from these features and items were presented in a five-point Likert format (1 = "Strongly Agree," 2 = "Agree," 3 = "Neutral," 4 = "Disagree," and 5 = "Strongly Disagree"). To avoid response biases, nine items are stated in the negative direction, with the others in the positive direction. After reverse scoring the nine items, the GATCS scale yielded a total scaled score with higher values reflecting more positive attitudes toward computers and technology and lower scores reflecting values that are more negative.

The GATCS instrument from Appendix x includes 20 statements, each addressed on a five-point Likert scale (strongly agree to strongly disagree). Ten items are phrased in the positive direction (1, 4, 6, 7, 10, 11, 13, 18, 19, and 20) and ten in the negative direction (2, 3, 5, 8, 9, 12, 14, 15, 16, and 17). Higher GATCS scores indicate more positive general attitudes toward computers and technology. The GATCS yields a Total General Computer Attitudes score and seven factor scores.

The subscales (and respective questions) for the GATCS instrument indicate:

attitudes toward computers in education (Total from items 1, 7, 11, 13 and 16),

attitudes about computers controlling people (Total from items 5 and 14),

attitudes about inequity in computer ability (Total from items 2, 8 and 15),
attitudes about computers and employment (Total from items 3 and 10),
attitudes about computers solving societal problems (Total from items 4 and 6),
attitudes about computers and future jobs (Total from Item 19), and
attitudes about computers and health risks (Total from Item 12).

Instrumentation Description for Section 4- Computer Thoughts Survey (CTS-C)

The Computer Thoughts Survey (CTS - Form A) was originally created to yield assessment and diagnostic information necessary for a clinical treatment program that focused on technophobes' cognitions and feelings about their abilities with technology rather than on their anxieties about computers and technological devices (Weil 1987; Rosen, 1993). The CTS-C uses a similar five-point scale (not at all, a little, a fair amount, often, very often) reflecting how often the person had each specific thought when working with technology or when thinking about working with technology.

Early subjects were instructed to imagine the first time that they had interacted with the computer in their course and to recall any thoughts that they had. They were encouraged to recall both positive and negative thoughts and to list them in full or partial sentences. The protocols yielded self-statements about computer-technology interaction, 12 of which were negative (e.g., "I am going to make a mistake"; "People will notice that I am nervous") and the remainder positive (e.g., "This will be fun"). Negative items were reverse-scored to yield a summated score with higher numbers reflecting more positive cognitions and lower numbers reflecting more negative cognitions.

The CTS instrument from Appendix x includes 20 statements, each addressed on a five-point Likert scale (strongly agree to strongly disagree). Eleven items are phrased in the positive direction (1, 3, 6, 7, 9, 12, 13, 15, 17, 19, and 20) and nine in the negative direction (2, 4, 5, 8, 10, 11, 14, 16, and 18). Higher CTS scores indicate more positive cognitions and feelings toward computers. The CTS yields a Total Computer Cognitions score and three factor scores.

The subscales (and respective questions) for the CTS instrument indicate:

- negative computer cognitions (Total from items 1, 3, 6, 7, 9, 12, 13, 15, 17, 19, 20),
- positive computer learning cognitions (Total from items 8, 10, 11, 14, and 18), and
- computer enjoyment (Total from items 2, 4, 5, and 16).

Instrumentation Description for Section 5- Computer Anxiety Rating Scale (CARS-C)

The Computer Anxiety Rating Scale (CARS) contains items created to reflect a variety of aspects and features of technological anxiety. This includes anxiety about the machines themselves, their role in society, computer programming, computer use, consumer uses of technology, problems with computers and technology, and technology in the media. The current form of the CARS contains 20 items, including four new items reflecting changes in technology in the five years that elapsed since the creation of the CARS (Form A).

All items on the CARS instrument from Appendix x CARS are scored from 1 to 5 with 1 indicating a response of "not at all" and 5 reflecting a response of "very much." The CARS instrument yields a Total Computer Anxiety Score and three factor scores. In general, higher scores indicate more computer anxiety for all subscales and the total. (Recent cross-cultural research however, has demonstrated marked differences in the factor structure of the CARS across different cultural groups. It would be advisable to use confirmatory factor analytic procedures for future research).

The subscales (and respective questions) for the CARS instrument indicate:

- interactive computer learning anxiety (Total from items 11, 3, 7, 10, 11, 12, 13, 14, 16, 17, 20),
- consumer technology anxiety (Total from items 2, 15, 18, and 19), and
- observational computer learning anxiety (Total from items 4, 5, 6, 8, 9, and 18).

Instrumentation Description for Section 6- Subject's Critical IT Issues

The subjective critical issues corporate leaders have information technology were identified by direct questionnaire. Subjects were asked:

1. What is the most significant issue(s) your workgroup faces in the effective use of information technology?
2. What would be the value of addressing the most significant issue(s) your workgroup faces in the effective use of information technology?
3. What is the most significant issue(s) you personally face in the effective use of information technology?
4. What would be the value of addressing the most significant issue(s) you personally face in the effective use of information technology?

Data Collection Procedures

Upon completion of Human Subjects Review approvals, the Corporate Leader-IT Relationship Survey was administered to two groups of Phillips Plastics leaders. The researcher attended standing executive leadership meetings that occurred on August 25th and September 12th of this year . Twenty-five minutes were allocated on the agendas for the researcher to provide an overview of the research, conduct the survey process, and address questions from the leaders. Each subject received a package containing the survey, overview of the research, and an envelope used to seal his or her completed survey. The sealed envelopes were collected and delivered to Stout Research Services for processing.

Data Analysis Procedures

The University of Wisconsin-Stout Research Support Services tabulated the standard survey data. The research specialist used SPSS software to generate reports showing the scores, frequency counts, percentages, mean, and standard deviation for all items and subscales. Cross tabulation reports of frequency counts and percentages between corporate leader levels and demographic variables were also printed. Critical IT issues information were summarized in Excel and analyzed for major themes or issues.

Instrument Validity and Reliability

The demographic and environment survey items were developed from leading research examples and following research best practices.

The Weil-Rosen instruments have been administered in fourteen major studies to over 12,000 people in the United States and 22 other countries. Subjects primarily include university students, secondary students, and teachers.

According to the authors statistical analysis, the intercorrelations of CARS and the CTS were negatively related in all studies (except Study 14) with correlations ranging from -.36 to -.67. The CARS was also significantly correlated with the GATCS (ranging from -.16 to -.45) in all except Studies 2 and 9. University students showed a Pearson Correlation Coefficient of - .28 ($p<.001$). Finally, the CTS and the GATCS were significantly correlated in all studies in which they were both administered (range: .25 to .68; all university students $r=.39$, $p<.001$). Thus, the three measures are neither independent, nor are they measuring nearly identical constructs. Each measure is assessing a related, but relatively independent construct to indicate levels of technophobia.

This study used the same administration and scoring procedures, but with a group of corporate leaders.

Chapter Summary

This chapter reviewed the study sample; major sections of the survey; design rationale for the instrument; and execution of the study to evaluate the corporate leader-IT relationship.

CHAPTER FOUR

This chapter will document the major findings of the study and analyze the data for significance and correlations. Specifically, it provides evaluation of the study group against past studies and benchmarks; analyzes attitude, cognition, and anxiety scores within the sample group; identifies leader's critical IT issues, and reviews the cross-referencing of key demographics against scores and instrument subscales.

Macro Analysis- Corporate Leader Findings against Past Studies

Findings and Analysis- Study Sample compared to All Sample Groups

The combined view of interpreted scores for the nineteen subjects is summarized in the following table:

ID	TITLE-FUNCTION	GATCS TOTAL	CTS_ TOTAL	CARS_ TOTAL
101	V.P. Purchasing & Facilities	76	64	44
102	R & D Director	72	68	47
103	CEO	76	76	36
104	VP People Services (HR)	63	79	30
105	Vice President Quality & Systems	61	82	26
106	CFO	74	73	34
107	Opportunity Development Manager	70	96	22
108	VP Manufac- turing.	62	75	36
109	Vice President Sales	68	71	26
110	Chief Information Officer	69	86	24
111	Director Quality Systems	70	71	24
112	General Manager	70	70	40
113	General Manager	70	65	29
114	General Manager	69	82	24
115	General Manager	74	81	32
116	General Manager	73	77	23
117	General Manager	68	73	35
118	OD Training Manager	68	76	39
119	Corp. Safety & Environmental Manager	62	81	25
	MEAN	69	76	31

GATCS
No Technophobia 64-100
Low Technophobia 56-63
Moderate/High Technophobia 20-55

CTS_
No Technophobia 69-100
Low Technophobia 61-68
Moderate/High Technophobia 20-60

CARS_
No Technophobia 20-41
Low Technophobia 42-49
Moderate/High Technophobia 50-100

Sample Scores C*ompared to All Sample Groups*

These scores primarily measure the relative positive or negative levels of the three key relationship dimensions (also referred to as technophobia). Based on distributional characteristics developed by Drs. Weil and Rosen, each measure was partitioned into three levels: No Technophobia, Low Technophobia, and Moderate Technophobia. Applying the score cutoff levels listed in the table above to the sample group indicates:

1. twelve subjects were rated as having no technophobia for all three surveys.
2. no subjects are considered to have moderate to high technophobia in any of the three relationship dimensions.
3. seven subjects were rated low for technophobia in at least one of the surveys.
4. only one subject was rated low for technophobia in multiple (two) of the three relationship dimensions.

The interpretation guidelines establish for these instruments state that:

- Any subject who scores in the Moderate/High Technophobia Group on any one measure is considered to possess moderate or high technophobia.
- Any subject who scores in the No Technophobia Group on all measures is considered to have no technophobia.
- Any subject who scores in the Low Technophobia Group on one or more measures, but does not score in the Moderate/High Technophobia Group on any measure is considered to have low technophobia.

Therefore, eighteen subjects are considered to have no technophobia and one has low technophobia. This was less than expected, but microanalysis can still provide further insights or opportunities for improvement.

A comparison of subject corporate leaders' score means and ranges against major studies shows:

Formal Study Name	GATCS		CTS		CARS	
Study 1 Validation	65.13	53-79	ND	ND	38.2	24-78
Study 2 Revalidation	65.52	56-75	ND	ND	42.7	25-71
Study 3 Correlates/Training Effects	66.35	56-75	ND	ND	39.8	24-70
Study 4 Aptitude, Literacy	65.95	59-79	ND	ND	43.7	24-71
Study 5 Aptitude, Literacy	65.8	59-79	ND	ND	41	24-72
Study 6 Hemisphericity	65.53	57-75	ND	ND	40.2	24-78
Study 7 Training Effects	67.43	57-78	ND	ND	37.7	26-78
Study 8 CTS Validation	ND	ND	72.3	45-90	40.9	25-69
Study 9 Model Treatment Program	65.36	50-79	67.5	31-95	47.9	24-85
Study 10 Retention/Attrition	ND	ND	78.7	31-100	35.6	20-100
Study 11 Business Training	66.72	56-77	ND	ND	37.5	24-84
Study 12: Elementary Teachers	69.06	53-87	74.3	33-97	38.8	20-89
Secondary Science Tchrs	68.62	53-82	79.1	48-100	32.9	20-81
Secondary Humanities Tchr	67.56	34-89	75.5	20-100	36.9	20-89
Study 13 International (USA Only)	69.55	44-90	71.4	23-99	37.9	20-98
Study 14: High School (Grade 9-12)	66.91	47-85	71.9	42-98	42	20-95
Middle School (Grade 7-8)	67.61	49-87	72.7	32-96	43.4	20-93
All University Students (N=2,940)	67.12	44-90	76.1	23-100	41.5	20-100
Corporate Leaders (N=19)	69.21	62-76	76.1	65-96	31.4	22-47
Notes:						
ND indicates that no data was collected for this item in the study.						
Subjects for Study 11 were 56 engineers at an aerospace firm.						

Subject Corporate Leaders' Score Means and Ranges against Major Studies

This information shows that scores of corporate leaders:

- in attitudes (GATCS) were higher (less technophobic) than all major study groups except the International sample.
- in cognitions (CTS) were near the median of all previous major sample groups.
- in anxieties (CARS) were lower (less technophobic) than every other major study group.
- in general, scored better than education professionals and students.

This section has presented a comparison and analysis of the corporate leader sample group against all previous sample groups and previously established relationship (technophobia) benchmarks. While it is important to note that the study group has relatively no technophobia within this macro context, the remainder of analysis in this section focuses strictly on this sample group of nineteen corporate leaders. Comparisons

and analysis on this micro level is the focus of this study, will provide insight and ideas on how to enhance their relationship with technology, and establish a benchmark for future groups of corporate leaders.

Micro Analysis- Corporate Leader Findings within the Sample Group

Findings- General Attitudes Toward Computers Scale (GATCS)

The interpreted scores from the GATCS survey are summarized in the following table:

ID	TITLE-FUNCTION	EXEC OR MGR	LEADER TYPE	AGE	AGE_CAT	GATC TOTAL	GATC_ IN EDUC	GAT_ COMPUTER CONTROL	GATC_ INEQUITY IN COMPUTER ABILITY	GATC_EMPLOYMENT	GAT_COMP.SOLVING SOCIETY PROBLEMS	GAT_FUTURE JOBS	GAT_HEALTH IMPACT
101	V.P. Purchasing & Facilities	1	2	55	3	76	21	8	14	7	7	4	2
102	R & D Director	1	2	54	3	72	21	8	12	4	7	5	4
103	CEO	1	1	47	2	76	22	8	11	7	7	4	4
104	VP People Services (HR)	1	2	49	2	63	16	6	12	6	6	4	2
105	Vice President Quality & Systems	1	2	50	2	61	18	8	12	4	6	2	2
106	CFO	1	1	49	2	74	21	5	13	5	7	5	4
107	Opportunity Development Manager	2	4	42	1	70	21	6	13	3	8	4	2
108	VP Manufac- turing.	1	2	37	1	62	20	3	8	6	6	5	2
109	Vice President Sales	1	2	47	2	68	19	7	11	6	7	4	2
110	Chief Information Officer	1	1	48	2	69	22	7	15	5	3	4	2
111	Director Quality Systems	1	2	63	3	70	21	7	12	6	6	4	3
112	General Manager	2	3	53	3	70	20	8	12	4	6	4	4
113	General Manager	2	3	56	3	70	18	8	11	8	6	4	4
114	General Manager	2	3	36	1	69	22	8	9	3	7	3	4
115	General Manager	2	3	40	1	74	18	8	12	6	6	3	4
116	General Manager	2	3	37	1	73	22	7	11	4	8	4	2
117	General Manager	2	3	54	3	68	16	7	11	6	5	4	3
118	OD Training Manager	2	4	43	1	68	23	5	13	4	8	4	1
119	Corp. Safety & Environmental Manager	2	4	36	1	62	19	7	11	5	3	5	1

GATCS Interpreted Scores

Analysis- GATCS Findings within the Sample Group

The GATCS instrument from Appendix x includes 20 statements, each addressed on a five-point Likert scale (strongly agree to strongly disagree). Ten items are phrased in the positive direction (1, 4, 6, 7, 10, 11, 13, 18, 19, and 20) and ten in the negative

direction (2, 3, 5, 8, 9, 12, 14, 15, 16, and 17). Higher GATCS scores indicate more positive general attitudes toward computers and technology. The GATCS yields a Total General Computer Attitudes score and seven factor scores.

The subscales (and respective questions) for the GATCS instrument indicate:

- attitudes toward computers in education (Total from items 1, 7, 11, 13, and 16).
- attitudes about computers controlling people (Total from items 5 and 14).
- attitudes about inequity in computer ability (Total from items 2, 8, and 15).
- attitudes about computers and employment (Total from items 3 and 10).
- attitudes about computers solving societal problems (Total from items 4 and 6).
- attitudes about computers and future jobs (Total from Item 19).
- attitudes about computers and health risks (Total from Item 12).

Therefore, major findings from the GATCS data are:

- Computers seem to be a source of interpersonal conflict. 36.8% agreed, "Computers can ruin interpersonal relationships" while 21.1% were neutral.
- Respondents agreed on computers' benefits. To the statement "Computers save people a lot of time". 57.9 % strongly agreed, and 42.1% agreed. No respondents disagreed.
- Computers are definitely seen as "increasing control over your life" (73.7% agree or strongly agree).
- Respondents did not perceive computers as saviors or villains. Only 10.5% think, "Computer can solve society's problems" and "computer are taking over". 68.4% disagreed with the statement "computers are taking jobs away from people".

Findings- Computer Thoughts Survey (CTS)

The interpreted scores from the CTS survey are summarized in the following table:

ID	TITLE-FUNCTION	CTS_ TOTAL	CTS_ NEGATIVES	CTS_POSITIVES	CTS_ENJOYMENT
101	V.P. Purchasing & Facilities	64	31	19	14
102	R & D Director	68	43	14	11
103	CEO	76	49	16	11
104	VP People Services (HR)	79	49	18	12
105	Vice President Quality & Systems	82	51	19	12
106	CFO	73	43	20	10
107	Opportunity Development Manager	96	55	21	20
108	VP Manufac- turing.	75	54	16	5
109	Vice President Sales	71	55	11	5
110	Chief Information Officer	86	52	21	13
111	Director Quality Systems	71	49	11	11
112	General Manager	70	44	16	10
113	General Manager	65	46	11	8
114	General Manager	82	53	18	11
115	General Manager	81	55	18	8
116	General Manager	77	53	15	9
117	General Manager	73	47	13	13
118	OD Training Manager	76	44	19	13
119	Corp. Safety & Environmental Manager	81	45	21	15

CTS Interpreted Scores

Analysis- CTS Findings within the Sample Group

The CTS instrument from Appendix x includes 20 statements, each addressed on a five-point Likert scale (strongly agree to strongly disagree). Eleven items are phrased in the positive direction (1, 3, 6, 7, 9, 12, 13, 15, 17, 19, and 20) and nine in the negative direction (2, 4, 5, 8, 10, 11, 14, 16, and 18). Higher CTS scores indicate more positive cognitions and feelings toward computers. The CTS yields a Total Computer Cognitions score and three factor scores.

The subscales (and respective questions) for the CTS instrument indicate:

- negative computer cognitions (Total from items 1, 3, 6, 7, 9, 12, 13, 15, 17, 19, 20).
- positive computer learning cognitions (Total from items 8, 10, 11, 14, and 18).
- computer enjoyment (Total from items 2, 4, 5, and 16).

Therefore, major findings from the CTS data are:

- Nearly half of respondents admitted to confusion with and hatred of computers. 47.4% admitted to being totally confused by the computer a "little of the time". 42.1% said they "hate this machine" a fair amount or a little.
- Despite their confusion, over one fourth is too embarrassed to ask for help. 26.3% rate their ability to get "help if I get stuck" as "a little"
- The majority describes their feelings of being overwhelmed. Only 32.8% say they are "not at all" overwhelmed.
- No significant Positive Cognition Finding.
- No significant Enjoyment finding.

Findings- Computer Anxiety Rating Scale (CARS)

The interpreted scores from the CARS survey are summarized in the following table:

ID	TITLE-FUNCTION	CARS_ TOTAL	CARS_INTERACTIVE LEARNING ANXIETY	CARS_CONSUMER TECHNOLOGY ANXIETY	CARS_OBSERVATIONAL LEARNING ANXIETY
101	V.P. Purchasing & Facilities	44	32	4	9
102	R & D Director	47	36	5	7
103	CEO	36	26	4	7
104	VP People Services (HR)	30	20	4	7
105	Vice President Quality & Systems	26	17	4	6
106	CFO	34	22	7	6
107	Opportunity Development Manager	22	13	4	6
108	VP Manufac- turing.	36	23	4	10
109	Vice President Sales	26	17	4	6
110	Chief Information Officer	24	14	5	6
111	Director Quality Systems	24	15	4	6
112	General Manager	40	25	6	11
113	General Manager	29	17	5	8
114	General Manager	24	14	5	6
115	General Manager	32	22	5	7
116	General Manager	23	14	4	6
117	General Manager	35	23	5	8
118	OD Training Manager	39	27	7	6
119	Corp. Safety & Environmental Manager	25	16	4	6

CARS Interpreted Scores

Analysis- CARS Findings within the Sample Group

All items on the CARS instrument from Appendix x CARS are scored from 1 to 5 with 1 indicating a response of "not at all" and 5 reflecting a response of "very much." The CARS instrument yields a Total Computer Anxiety Score and three factor scores. In general, higher scores indicate more computer anxiety for all subscales and the total. (Recent cross-cultural research however, has demonstrated marked differences in the factor structure of the CARS across different cultural groups. It would be advisable to use confirmatory factor analytic procedures for future research).

The subscales (and respective questions) for the CARS instrument indicate:

- interactive computer learning anxiety (Total from items 11, 3, 7, 10, 11, 12, 13, 14, 16, 17, 20).
- consumer technology anxiety (Total from items 2, 15, 18, and 19).
- observational computer learning anxiety (Total from items 4, 5, 6, 8, 9, and 18).

Therefore, major findings from the CARS data are:

- Two respondents had overall scores of 44 and 47, which was close to the moderate to high level of anxiety.
- At least ten subjects said they would not have any anxiety at all to questions 1-6, 8-10, and 14-16.
- The interactive computer learning anxiety was highest with question 11. Six respondents or 31.6% said they had "much" or "very much" anxiety contemplating learning to write computer programs. Another seven respondents or 36.8% said they would have a fair amount of anxiety.
- There were no significant Consumer Technology Anxiety findings.
- There were no significant Observational Computer Learning Anxiety findings.

Custom Analysis- Phillips Corporate Leader's Critical IT Issues

This section describes findings from a Phillips requested survey to better understand what IT issues are on the management's minds. It will also serve as a subjective reference to guide interpretations and benchmark for future corporate studies.

Findings and Analysis- Critical IT Issues

Identification of IT issues deemed critical by this sample of corporate leaders is the only qualitative data gathering in this study. The purpose here is to establish issue identification as part of an ongoing method and provide valuable feedback to Phillips corporate leaders. These subjective insights will summarized but not analyzed for the purposes of this study.

Phillips corporate leaders' responses indicate several key themes highlighted in the following table:

ID	JOB TITLE	JOB FUNCTION	GROUP ISSUE	GROUP ADDRESS	PERSONAL ISSUE	PERSONAL ADDRESS
101	V.P. Purchasing & Facilities	Direct Corp. wide purchasing strategies.	Combining info from multiple disciplines and multiple locations.	Removing duplication of effort.	Need significantly more training.	Upgrading my performance and output.
102	R & D Director	New Product Development, Automation	Linking all the work functions together. Sharing information.	Making good/better decisions.	Staying up to date and keeping pace with my peers.	Being able to communicate and have appropriate info to work with them.
103	CEO		Turning massive amounts of data into useful information.	It becomes a more effective management tool.	Turning massive amounts of data into useful information.	It becomes a more effective management tool.
104	VP People Services (HR)	Oversight of all HR functions.	Training	Good benchmark	Time to learn new programs.	Allow us to be competitive.
105	Vice President Quality & Systems	In charge of corporate quality assurance. Responsible for directing coporate wide business system.	Getting and applying appropriate data.	Better able to focus on issues that affect our company.	Getting and applying appropriate data.	Better able to focus on issues that affect our company.
106	CFO	Finance/Accounting Planning & Budgeting, Customer Financial Services, IT	User group education, particularly in ERP system. Identification of data required to support decisions	Create a better functioning system for less expense.	Need more education and skill.	Personal satisfaction, better leadership within company.
107	Opportunity Development Manager	Review new business opportunities for Phillips Plastics.	Outdates equipment, software.	Increased effectiveness and efficiency.	Need more speed-have to wait for computer to respond.	I could be more efficient/have time to do other things I need to do.
108	VP Manufac-turing.	Responsible for all Plastics Manufacturing facilities.	Ease and timeliness of getting useful information from the business system.	Improved efficiencies in all areas.	Same	Same as previous.
109	Vice President Sales	Manage the Sales Group/Sales process	Knowing what is available, how to access and utilize the information.	Greater productivity.	Agreeing to the validity and need and value of proposed use.	Increased productivity, less wastd time. People in agreement and working together.
110	Chief Information Officer	Manage Information Technology function for the company.	IT related training. Need larger training budget.	Greater skills=improved productivity.	Staying up with changes and integrated solutions.	More effective solutions for business.
111	Director Quality Systems	Corporate Resource in Quality Systems				
112	General Manager	Management of facility.	Learning to apply programs to job.	Lessen the tension in the group.	Time to work on programs.	Able to be more effective.
113	General Manager	Manufacturing, Management of ENG MFG PEOPLE	That the info is accurate and easy to learn.	Much more efficient operation.	Getting the info out.	Better feeling about comp.
114	General Manager	Overall management of the facility including new business and growth, anf total P&L responsibility.	Being able to have available, the latest technology. Getting information on the best technology to assist the workgroup. Then being able to justify the cost.	Save time and increase productivity and efficiency. (Both personal and on the job.)	Having the most current technology available.	Time savings.
115	General Manager	Developing systems to get accurate data in.	Having believable information to make decisions.	Spending time to create structure and reports that will help me.	More time on action versus research.	
116	General Manager		How to equally take advantage of computer tools across the entire group.	Speed!!	Staying current with new tools or new uses of existing tools.	Continuous improvement in cost/speed/quality of the products and services we offer.
117	General Manager		Accuracy and ownership of generated info.	Less info would need to be generated.	Having high confidence in the accuracy.	Better and faster decisions.
118	OD Training Manager	Training & Organization Development	How to automate records that are currently kept manually.	Time saved-fewer people-cost savings.	Time to learn what I should know.	Time saved-fewer people-cost savings.
119	Corporate Safety, Health & Environmental Manager	Management	Willingness to make a change and embrace new technology systems.	Unknown at this point in time.	Willingness to make a change and embrace new technology systems.	Unknown at this point in time.

IT Issues Deemed Critical by the Sample Group

The critical theme for these leaders appears to be easy access to timely accurate information. They also felt that training and ease-of-use were important issues.

Phillips Corporate Leader's Profiles and Environments

Analysis- Demographics and Technology Environments

As noted in the following table, nineteen corporate leaders participated in the study. All subjects happened to be White/Caucasian and three of the leaders were women. They ranged in age from 36 to 63 years old, with an average of 47.16 and median of 48.00 years old.

ID	TITLE & FUNCTION	EDUCATION	ETHNIC	GENDER	AGE	ENVIRON1	ENVIRON2	ENVIRON3	ENVIRON4	ENVIRON5	ENVIRON6
101	V.P. Purchasing & Facilities	3	4	2	55	4	3	4	4	2	2
102	R & D Director	6	4	1	54	3	3	3	3	3	3
103	CEO	6	4	1	47	4	4	3	3	4	3
104	VP People Services (HR)	7	4	1	49	3	4	3	3	3	2
105	Vice President Quality & Systems	6	4	1	50	3	3	3	3	3	3
106	CFO	7	4	1	49	5	4	3	4	3	3
107	Opportunity Development Manager	6	4	2	42	5	5	5	5	5	5
108	VP Manufac-turing.	4	4	2	37	3	3	3	3	3	3
109	Vice President Sales	4	4	1	47	2	2	1	1	3	2
110	Chief Information Officer	6	4	1	48	5	5	3	3	5	5
111	Director Quality Systems	7	4	1	63	3	4	4	3	4	4
112	General Manager	5	4	1	53	3	3	3	3	3	3
113	General Manager	4	4	1	56	3	3	3	3	3	3
114	General Manager	6	4	1	36	4	4	3	3	4	4
115	General Manager	5	4	1	40	2	2	2	1	3	2
116	General Manager	4	4	1	37	4	4	2	2	4	4
117	General Manager	5	4	1	54	3	3	3	3	3	3
118	OD Training Manager	6	4	2	43	3	3	2	2	3	3
119	Corp. Safety & Environmental Manager	6	4	1	36	3	3	2	2	3	4

Phillips Corporate Leader's Profiles and Environments

Analysis- Technology Influencing Environments

Each subject assessed information technology familiarity and usage levels of their workgroup, original or immediate family, and themselves. The frequency responses were:

Levels	Low to None	Some	Moderate	High	Very High
My workgroup's familiarity with IT	0	2	10	4	3
My workgroup's use of IT	0	2	9	6	2
My family's familiarity with IT	1	4	11	2	1
My family's use of IT	2	3	11	2	1
My personal familiarity with IT	0	1	12	4	2
My personal use of IT	0	4	9	4	2

Sample Group *Technology Influencing Environments*

The table above shows that the influencing environments the subjects tend to function in have a moderate to high presence of technology and accompanying usage expectations. This would likely create higher expectations and performance pressures that other influencing environments.

One subject rated every item as a five or very high. Only three subjects indicated low to none in an environment- family or family of origin. The family factor has some influence but not as great as the work group environment.

Analysis- Cross-Tabulation Interpretation of Scores and Subscale Responses

According to SPSS reports generated by Stout Research Services, it was found that:

Education Level. The number of subjects by education level was Technical College Graduate– 1 (5.3%); Some College– 4 (21.1%); College Degree- 3 (15.8%); Postgraduate Work- 8 (42.1%); and Other (MBA) - 3 (15.8%).

Education levels appeared to correlate negatively with levels of "Technophobia". Those respondents who did not complete college were more likely to express anxiety about computer use, versus those who completed college or post-graduate studies. Analyzing CTS mean scores for non-college versus college or better education levels showed a directional difference in thoughts about computers. Specifically, non-college respondents scored at 70.8 versus college or better respondents who scored at 78.1, although both were above the minimum. Directionally, workers with less education were also more likely to think computers can ruin interpersonal relationships, 60% agree versus 33.3% for college graduates and 27.3% for masters/post graduate respondents.

Gender. Except for one female respondent who had the highest total scores of the group for two of the three major instruments, there were no significant differences between scores of male and female leaders.

Age. The number of subjects by age grouping were 36 to 37– 4 (21%); 40 to 43– 3 (15.8%); 47 to 49- 5 (26.3%); 50 to 54- 4 (21%); and 55 to 63- 3 (15.8%).

Age provided one of the stronger determinants of technophobia. Age was the second most important variable in predicting attitudes toward technology. The oldest group (51-63 years of age) was the only group that defined their familiarity with technology as "some". Additionally:

- 51-63 year olds were more likely to resist technology and underestimate their importance. Older respondents were the only group to disagree that "you need to know how to use a computer to get a job" (16.7%). The older respondents were also more likely to agree or strongly agree, "in the future there will be jobs that don't need computers". When asked if "in 5 years all will need to know how to operate a computer", 100% of the youngest agreed or strongly agreed, versus 33.3% for the mid-age group, and 16.7% for the oldest third.
- older respondents were more likely to think others are more competent than they are. Specifically, none of the older group responded "not at all" to the

statement “everyone else knows what they are doing”, while 50% of the mid-age group and 71.4% of the youngest group responded “not at all”. When asked to respond to the statement “I feel stupid”, 85.7% of the youngest group and 50.0% of the mid group said “not at all”, compared to 33.3% of the older group.

- older respondents also feared that their mistakes were more visible. When asked if “people will notice if I make a mistake”, the younger and mid-age groups most often responded “not at all” (71.4% and 66.7%, respectively) versus the older group (16.7%).
- older respondents were less likely to agree to the statement I am not at all “totally confused “. 33.3% of the oldest group responded “not at all” versus 50.0% of the middle group and 71.4% of the oldest group.
- older respondents were more often overwhelmed by what they did not know. 71.4% of the youngest group and 33.3% of the mid group said they were not at all “overwhelmed by how much I do not know. None of the oldest group agreed.
- unwillingness to ask for help compounds the oldest group’s confusion. When asked if they agreed with the statement “I am too embarrassed to ask for help”, 100% of the youngest group, and 83.3% of the mid age group said “not at all”, versus 33.3% for the oldest group.

Leader Type. The number of subjects by leader type were Executives (C-Level) – 3 (15.8%); Other Executives (Vice-Presidents and Directors) – 7 (36.8%); General Managers- 6 (31.6%); and Other Staff Managers- 3 (15.8%).

Overall, Executive scores for the GATCS, CTS, and CARS surveys were significantly higher than the mean and median for the entire group. This was offset by the fact that all three CFO scores were slightly below the group’s mean and median. The CEO (76) had a more positive attitude towards computers than the CIO (69). This reversed on the anxiety scale, where the CEO scored 36 and the CIO came in at 24.

Other Executives had the broadest range in GATCS, CTS, and CARS scores. Every leader in this category had some scores above and below the mean and medians for the entire group. Two Vice-Presidents had the highest GATCS scores and one Director ranked highest on the anxiety scale.

Each of the General Managers also had some scores above and below the mean and medians for the entire group. Two members of this group had some of the highest cognition (CTS) scores. On the anxiety scale, one General Manager had one of the lowest scores and another one of the highest.

In the Other Staff Managers category, the only noteworthy fact was that one respondent had the highest total scores of the group for two of the three major instruments.

Chapter Summary

This chapter evaluated the study group against past studies and benchmarks; analyzed attitude, cognition, and anxiety scores within the sample group; identified leader's critical IT issues, and cross-referenced key demographics against scores and instrument subscales.

The major findings derived from research to support conclusions of the study are:

1. The natures of most users (people) positive or negative relationships are driven primarily by their attitudes, cognitions, and anxieties.
2. Studies of employees in high-technology industries suggest that psychosomatic symptoms are related in part to high-perceived mental demands in combination with lack of sufficient skills.
3. While almost all subjects were considered to have no technophobia, nearly half of study respondents admitted to confusion with and hatred of computers.
4. The majority of study respondents described overall feelings of being overwhelmed by information technology. Yet, the same majority indicated an unwillingness to ask for help.

5. Age provided one of the stronger determinants of technophobia. Age was the second most important variable in predicting attitudes toward technology. The oldest group had the strongest unwillingness to ask for help.
6. Respondents agreed on the benefits of information technology. To the statement “Computers save people a lot of time”, 57.9 % strongly agreed and 42.1% agreed. No respondents disagreed.
7. Executives would embrace information technology more readily *if they really understood how it leverages* time, communicates, coaches, shapes culture, and enhances personal thinking *in their own world*.

CHAPTER FIVE

Summary, Conclusions and Recommendations

This chapter will summarize the study and present overall and major conclusions by research objective. It will also present recommendations for enhancing Phillips or other corporate leader-IT relationships and ideas for similar research in the future .

Summary

This study built the case for examining the little-understood relationship between a corporate leader and information technology. It interrogated over one-hundred resources in the fields of business, technology, and psychology for relevant knowledge, empirical data, and current research methods related to the problem.

Next, this research developed demographic analysis and integrated methods for measuring attitudes, cognitions, and anxieties of leaders towards information technology into the Corporate Leader-IT Relationship Evaluation Instrument. This instrument was administered to nineteen corporate leaders at the Phillips Plastics Corporation. The data was collected, loaded into SPSS, and resulting reports and demographic cross-tabulations were analyzed.

A summary of the study methods, findings, conclusions, and recommendations were delivered to the Phillips Plastics Corporation, thesis committee, and UW Stout graduate college.

Conclusions

Research Objectives

In this section, the major objectives of the study are reiterated with key conclusions derived from the research.

The conclusions for “developing a profile of corporate leaders and the major technology environments in which they function” are:

1. The Corporate Leader-IT Relationship survey did establish a comprehensive profile of Phillips leaders. This included their age,

education level, leader type, technology influencing environments, and ratings for IT attitudes, cognitions, and anxieties.

2. The sample corporate leaders had a very low technophobic relationship when compared to educators and students in past studies.
3. The subjects tend to function in technology influencing environments that have a moderate to high presence of technology and accompanying usage expectations. This would likely create higher expectations and performance pressures that other influencing environments.

The conclusions for "developing and applying an analytical method for measuring key variables in actual corporate leader's personal relationship with information technology" are:

1. There has been very limited research of this problem in business, thereby dictating development of a new or hybrid research method.
2. The nature of most users (people) positive or negative relationships can be described by their associated attitudes, cognitions, and anxieties.
3. Integration of the GATCS, CTS, and CARS surveys into the Corporate Leader-IT Relationship methodology enabled a valid assessment of the problem.

The conclusions for "describing key variables (attitudes, cognitions, and anxieties) in a corporate leader's personal relationship with information technology" are:

1. The sample corporate leaders had a very low technophobic relationship when compared to educators and students in past studies.
2. Respondents agreed on the benefits of computers, but still found them to be a source of interpersonal conflict.
3. Cognitions of approximately half the respondents indicated confusion with and hatred of computers, being totally confused by the computer a "little of the time", and "hating this machine" a fair amount or a little.

4. Anxiety responses were relatively low with only two of nineteen respondents receiving scores of 44 and 47. This was close to the moderate to high level of anxiety.

The conclusions for "identifying the issues Phillips corporate leaders deemed critical in their relationship with information technology" are:

1. Information issues were cited more than any other. Leaders want the massive amounts of data to be turned into something meaningful, accurate, and trustworthy. Several asked for better decision support capabilities.
2. Several leaders felt IT training and resources must be increased to better integrate and leverage the power of Phillips systems.
3. Leaders felt there would be significant value to addressing these critical issues. Nearly all felt that the right solutions would result in much higher productivity, business speed, and quality of decisions and outputs.

The conclusions for "for enhancing Phillips Plastics Corporate leaders' relationships with IT." are:

1. Overall, Phillips corporate leaders' relationships with technology are positive when compared to other study groups.
2. There were several areas of concern. Nearly half of study respondents admitted to confusion with and hatred of computers. The majority of study respondents described overall feelings of being overwhelmed by information technology, yet indicated an unwillingness to ask for help.
3. Phillips corporate leaders might benefit from a personalized Executive education or coaching program employing adult learning principles and new IT effectiveness techniques for leaders.

<u>General</u>

Overall conclusions are:

1. In general, there is very little research and focus on problems with the corporate leader-IT relationship. There is emerging evidence of the issues and consequences, but root causes continue unchecked.
2. Whether corporate leaders are considered to have technophobia or not, it can be beneficial to understand its sub-issues on an individual or organizational basis.
3. IT communities, professionals, culture, and their accepted practices are the primary source for problems in the corporate leader-IT relationship.
4. Adult learners (leaders) face more challenges and frustration than their younger counterparts do. Proven adult learning principles and techniques (i.e. andragogy) are typically not reflected in IT education and training.
5. The promises of IT and business success are unlikely to be fulfilled unless the corporate leader-IT relationship is truly understood and significantly enhanced.

Recommendations

The recommendations of this study focus on understanding and enhancing corporate leader-IT relationships at Phillips Plastics Corporation or possibly other businesses. The recommendations fall into the following categories:

Communication-

The communication of IT related matters in organizations could be greatly enhanced by:

1. insisting that all IT and technical professionals translate their acronyms and jargon into business or people-friendly terms.
2. people and organizations creating and using logical models and people-oriented templates to understand and apply IT. (See Appendix A and B for examples)

3. applying the principles and techniques of Technical Writing to Technical Communication (e.g. textbook from UW Stout's Dr. Daniel Riordan).
4. conducting communication forums for corporate leaders to discuss IT topics with their peers.

Revised IT Practices and Policies-

The practices and policies of IT departments should be audited and revised, including:

1. strong emphasis on the holistic or business nature of IT and the customers it serves.
2. incentives for IT professionals to demonstrate proper attitudes and behaviors towards people (users).
3. increased emphasis on pragmatic management of IT by corporate leaders.
4. providing corporate leaders with custom portals or interfaces to systems.
5. delivery of legitimate Executive Information and Decision Support systems.

IT Education and Training-

The practices and policies of HR and training departments should be audited and revised, including:

1. evaluation of existing Executive IT Education and recommendations for improvement.
2. support professionals being trained in andragogy principles and asked to develop plans to implement adult learning principles in their areas of responsibility.

3. oversight of IT department education and training to ensure people-centric staff are developed.

IT Effectiveness Coaching for Leaders-

Special and confidential mentoring or coaching programs could be developed and delivered to leaders to:

1. respect the negative emotions and anxieties some leaders have towards IT.
2. provide private audits of personal effectiveness for the purpose of improvement programs.
3. provide ongoing advisory or mentoring support to the leader as they manage new and demanding IT issues.

Future Research

There are many options for continuing this important research. The breadth of this study could be expanded to multiple companies within an industry or segment. The scope of this study could be conducted in much greater depth, including measurements before and after treatments intended to address the problem. It might also be possible to form an alliance with Dr. Weil and Rosen and be responsible for technophobia analysis of business on a major scale.

The Corporate Leader-IT Relationship methodology could be enhanced by adding the PTSI (Personal Techno Stress Indicator) survey to pinpoint individual issues. The diagnostic capabilities of the Corporate Leader-IT Relationship approach would be even more comprehensive by cross-referencing and analyzing the leaders MBTI (Myers-Briggs Type Indicator). This describes such things as the leaders preferred ways of taking in information processing, decision-making, and problem solving styles.

REFERENCES

Arnetz, B.B. (1997). Technological stress: Psycho physiological symptoms in modern offices. *Journal of Psychosomatic Research,* 35-42.

Boone, M. (1993). *Leadership and the computer*. Rocklin, CA: Prima Publishing.

Connelly, J. (1994, November 14). Why I fear and loathe my computer. *Fortune Magazine,* 263-266.

Heverly, R. A. (1998). Training helps employees overcome 'technophobia'. *The New York Capital Region Business Review,* 2-3.

Lardner, J., LaGesse D., Rae-Dupree, J., & Roane, K. (2001, January 15). Overwhelmed by tech. *U.S. News and World Report*, 30-36.

Martin, J. (2000,October). CEO's in danger. *Chief Executive, 160*, 22-26, 28.

Manufacturing.Net (2002). *The industry's knowledge network*. Retrieved March 20, 2002 from: http://www.manufacturing.net/index.asp?layout=communityIndustry_V2&vertical=Logistics&verticalid=693&industry=Technology&industryid=19275

McDonagh, J. (1999,Winter).Can O.D. help solve the IT dilemma? O.D. in IT-related change. *Organization-Development-Journal*, *17*(4), 41-48.

Morgan, K. (2001). *Hypnotic suggestibility and technology attitudes*. Retrieved March 20, 2002 from: http://www.natcouncilofpsychotherapists.org.uk/article_2_01.htm

Phillips Plastics Website. (2002). *Corporation timeline for technology focus*. Retrieved March 20, 2002 from: http://www.phillipsplastics.com/capabilities/design/timeline.html

Piipers, G.G.M. (2001). Senior executives' use of information technology. *Information and software technology*, *43 (15),* 959-971.

Pottruck, D. (2000). *Clicks and mortar: Passion driven growth in an internet driven world*. New York: Jossey-Bass.

Rosen, L.D. (1998). How user psychology makes technology projects fail. *Computers in Human Behavior,* 95-133.

Rosen, L.D. (1993) Treating technophobia - A longitudinal evaluation of the computerphobia reduction program. *Computers in human behavior, 9(1),* 27-50.

Sinkovics, R. (2002). Reluctance to use technology-related products: Development of a technophobia scale - "Technophobia." *Thunderbird International Business* R*eview*, *44(4),* 477-494.

University of Colorado at Denver School of Education Website (2002).*Luddism and the Neo-Luddite reaction*. Retrieved March 20, 2002 from: http://carbon.cudenver.edu/~mryder/itc_data/luddite.html

Vassos, T. (1997). Strategic internet marketing. Toronto, Canada: Que Publishers.

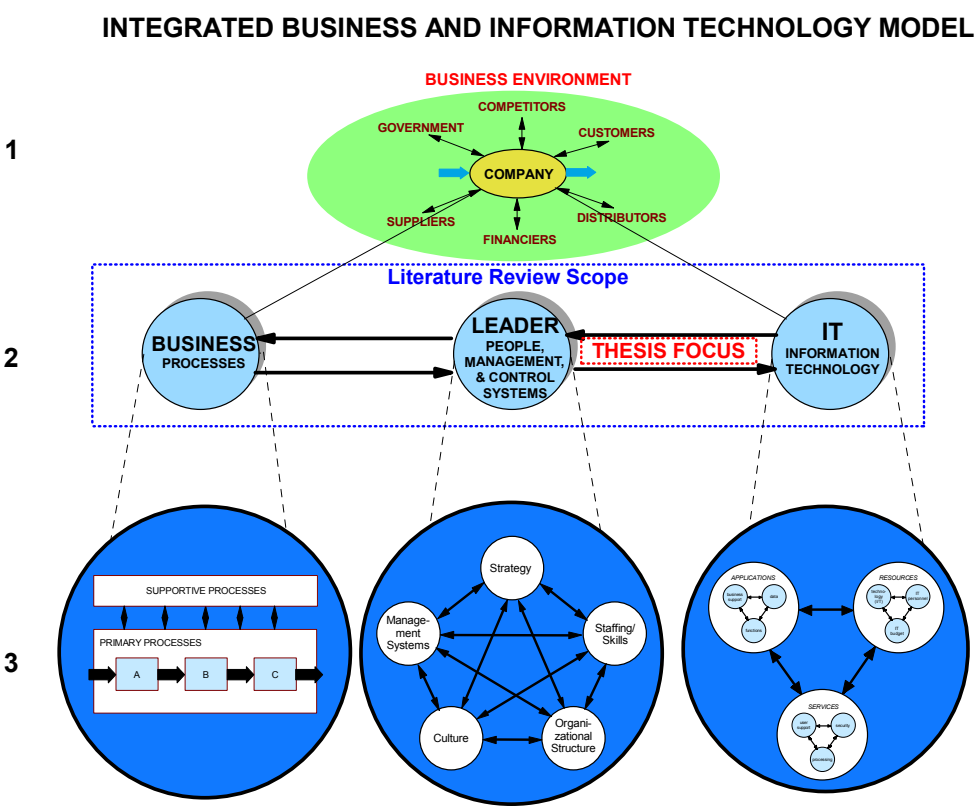
Vinberg, S. (2000, October). Information technology levels, competence development and performance in Swedish small business enterprises. *Behaviour-and-Information-Technology*, *19(3),* 201-210.

Weil, M. M., & Rosen, L.D (2001). *TechnoStress: Coping with technology @WORK @HOME @PLAY.* New York, NY: John Wiley & Sons.

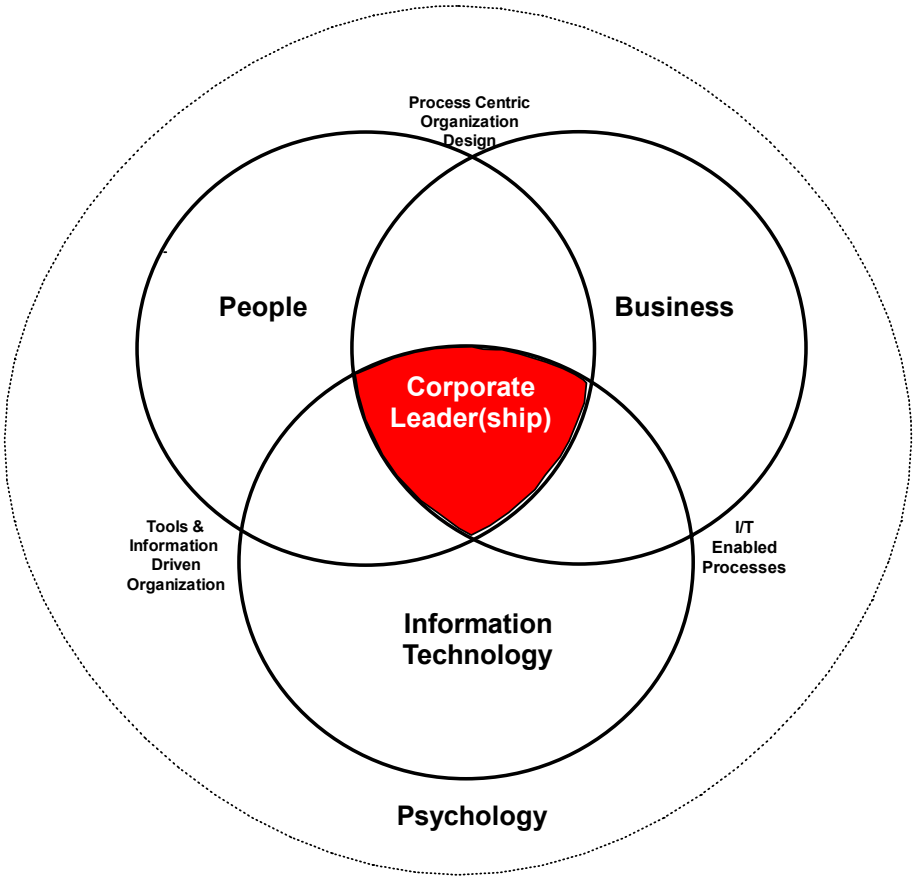
Weil, M.M. (1990). The etiology of computerphobia. *Computers In Human Behavior*, *6(4),* 361-379.

Weil, M.M. (1987). The computerphobia reduction program - year-1 - program-development and preliminary results. *Behavior Research Methods Instruments & Computers*, *19(2),*180-184.

Appendix A- Context of Corporate Leader -IT Research



Appendix B- Detailed Literature Review Scope



Appendix C- Corporate Leader-IT Relationship Survey Instrument

ANALYSIS OF A LEADER'S RELATIONSHIP WITH INFORMATION TECHNOLOGY
A Joint Research Project of Phillips Plastics Corporation & the University of Wisconsin-Stout

Job Title

Job Function(s)

Education-Indicate (X)

- ☐ did not finish high school
- ☐ high school graduate
- ☐ technical school graduate
- ☐ some college
- ☐ college degree
- ☐ postgraduate work
- ☐ Other:_____

Ethnic Background-Indicate (X)

- ☐ Asian
- ☐ Black/African
- ☐ Hispanic/Spanish Descent
- ☐ White/Caucasian
- ☐ Other:_____

Gender

- ☐ Male
- ☐ Female

Birthdate

CURRENT ENVIRONMENT

	Low to None	Some	Moderate	High	Very High
Level of my workgroup's familiarity with information technology	0				
Level of my workgroup's use of information technology	0				
Level of my family's familiarity with information technology	0				
Level of my family's use of information technology	0				
Level of my familiarity with information technology	0				
Level of my use of information technology	0				

GENERAL ATTITUDES TOWARD COMPUTERS SCALE*

The following statements address general attitudes toward computers. Place a check (X) under the column that describes your level of agreement (Strongly Agree, Agree, Neutral, Disagree or Strongly Disagree) to each statement.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Computers can save people a lot of work.					
2. It takes a good math background to learn to use a computer.					
3. You need to know how to use a computer to get a good job.					
4. Computers can help solve society's problems.					
5. Computers are taking over.					
6. Computers can increase control over your own life.					
7. Computers increase the amount of time we have for other activities.					
8. Men are better with computers than women.					
9. Computers may eventually act independently of people.					
10. In the future there will still be jobs that don't require computer skills.					
11. Computers are good teaching tools.					
12. Use of computers can cause physical health problems.					
13. Computers prepare students for the future.					
14. Computers are taking jobs away from people.					
15. Some ethnic groups are better with computers than others.					
16. There is an overemphasis on computer education in this society.					
17. Computers can ruin interpersonal relationships.					
18. In five years everyone will need to know how to operate a computer..					
19. Computers create new jobs for people.					
20. Computers will never be smarter than people.					

(* Developed by Dr. Michele Weil and Dr. Larry Rosen and authorized for use in this research).

COMPUTER THOUGHTS SURVEY*

Please check (X) the box that indicates how often you currently have each of the following thoughts when you use a computer or think about using a computer.

	Not at All	A Little	A Fair Amount	Much	Very Much
1. I am going to make a mistake.					
2. This will be fun.					
3. Everyone else knows what they are doing.					
4. I enjoy learning about this.					
5. I like playing on the computer.					
6. I feel stupid.					
7. People will notice if I make a mistake.					
8. This will shorten my work.					
9. I am totally confused.					
10. I know I can do it.					
11. I am willing to give it a try.					
12. I hate this machine.					
13. I'm afraid I'll wreck the program.					
14. I can get help if I get stuck.					
15. What if I hit the wrong button?					
16. This is really interesting.					
17. I'm too embarrassed to ask for help.					
18. Others have learned this and so can I.					
19. I feel overwhelmed by how much I don't know.					
20. I won't be able to get the computer to do what I want.					

COMPUTER ANXIETY RATING SCALE*

The items in this questionnaire refer to things and experiences that may cause anxiety or apprehension. For each item, place a check (X) under the column that describes how anxious (nervous) each one would make you at this point in your life.

	Not at All	A Little	A Fair Amount	Much	Very Much
1. Thinking about taking a course in a computer language.					
2. Taking a test using a computer scoring sheet.					
3. Applying for a job that requires some computer training.					
4. Sitting in front of a home computer.					
5. Watching a movie about an intelligent computer.					
6. Looking at a computer printout.					
7. Getting "error messages" from the computer.					
8. Using an automated bank teller machine.					
9. Visiting a computer center.					
10. Being unable to receive information because the "computer is down."					
11. Learning to write computer programs.					
12. Thinking about buying a new personal computer.					
13. Erasing or deleting material from a computer file.					
14. Taking a class about the use of computers.					
15. Re-setting a digital clock after the electricity has been off.					
16. Learning computer terminology.					
17. Reading a computer manual.					
18. Watching someone work on a personal computer.					
19. Programming a microwave oven.					
20. Learning how a computer works.					

What is the most significant issue(s) your workgroup faces in the effective use of information technology?

What would be the value of addressing the most significant issue(s) your workgroup faces in the effective use of information technology?