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FORECASTING A COMPETENCY MODEL FOR INNOVATION LEADERS USING A

MODIFIED DELPHI TECHNIQUE

A Thesis in

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ABSTRACT

Leaders are the engines for envisioning and creating innovative products and services in organizations (Reeves-Ellington, 1998). However, some leaders still lack the ability to plan, measure, and implement innovative products and services. Innovation leaders are Roger's (1995) innovators, early adopters, opinion leaders, and change agents. In this study, experts in innovation leadership participated in a Modified Delphi methodology to forecast a competency model that can be used as a foundation for future innovation research from the individualist perspective. As this perspective was the least developed of the three suggested by Slappender (1996), it was necessary to define categories of focus through an extensive literature review and environmental scanning. The three iteration Delphi methodology included two pilot studies. Measures of statistical and Delphic agreement were developed using 50 previous competency studies. Support for Delphic agreement was evident in both iteration two and iteration three; each of the eight proposed hypotheses was supported. An increase in the level of agreement from iteration two to three was initial support for the theory that the Delphi methodology would encourage convergence of the participant ratings. The Mann-Whitney U test showed no difference between the distributions of ratings in iteration three, thus adding support to the Kendall's W measures of increased levels of agreement in iteration three. Krippendorf's alpha reliability and Cronbach's alpha reliability supported the theory that both the content analysis procedure and surveys were reliable. The competency model of innovation leaders establishes and presents three tiers of 98 competencies in ten categories. The individualist perspective, given foundation with this study, is still in its infancy. The researcher suggests future research projects to bring the individualist perspective to fruition. A measurement tool for innovation leaders can

be developed to analyze a leader's competencies and compare them to the competencies set forth

in the model. A selection tool for innovation leaders can be developed for human resource

professionals so that organizations can recruit, hire, and retain talented innovation leaders.

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DEDICATION AND ACKNOWLEDGEMENTS

This dissertation is dedicated to the spirits of David J. Gliddon and Gregory M. Sosinski. For her unending support, love, hugs, and belief in my dreams, Doris E. Gliddon. For providing her imagination, dreams, intellect, love, fate, and a self-discovery experience, Melissa J. Cassel. For his guidance and giving me a path, Dr. William J. Rothwell. To my friends and family, thank you for encouraging me. To Christopher Wolfe, Joel Samuels, Karen Samuels, Jennifer Hrivnak, Mark Regulski, Nicholas Carita, and The Golembeskis, thank you for listening to my unending chatter. To the friends I have lost along the way, find your path. To my Aunts, Uncles, and Cousins, health, happiness, and success. To my committee, thank you for your attention to detail, recommendations, and professional experience. To Ace for being my friend and making me smile. To my students for giving me motivation. To my peers for being supportive and challenging me. To the future, I give this work for new ideas.

Chapter 1

Introduction

The researcher, as a practitioner, has been involved in many competency-based initiatives, including the analysis and development of competencies for all functions of a pharmaceutical company with over 1500 employees. The specific goal for this particular project was to integrate the company's competencies into job descriptions, hiring processes, performance reviews, reward structures, and training initiatives. In doing so, the organization could tailor its programs to individuals in order to ensure the correct person-position/program fit across all human resource functions.

The most difficult task of this particular project was to integrate the organization's core value of innovation into its competency-based system. As the organization worked in a research and development (R&D) environment with high sales and business development expectations, senior leaders wanted to ensure that innovations would diffuse into the organization's social network. Likewise, senior leaders wanted to select employees who could lead the diffusion of innovations. The organization ultimately decided to strengthen the competencies of leaders who were responsible for diffusing innovations into the organization.

The purpose of the research described in this dissertation was to create a model of the competencies of innovation leaders. The model was created by a Delphic panel of experts who had a demonstrated knowledge of innovation in organizations from the individualist perspective. The result was a broad, general, and non-position-specific competency model that can be used by

workplace learning and performance professionals in developing strategies to increase levels of innovation in organizations.

Problem Statement

An innovation is an idea, practice, or object that is perceived to be new by an individual or other unit of adoption such as teams, groups, or departments (Rogers, 1995). To be an innovation, the ideas must add value to the organization. They may lead to new or improved products, services, systems, or work procedures. The ability to be innovative is critical in every industry in order to adapt to changing technologies and working conditions, to come up with new products, to take on new skills and jobs, and to stay competitive (Bingham, 2003; Pagano, 1997). Innovation is subject to influences from the individual, the organization, and the environment (Slappender, 1996). Historically, innovation in organizations has been studied primarily from the organization's point of view (Dramanpour, 1991, 1996; Gifford, 1992; Gruber, 1972; Lee, 1995; Lewis, 1993; Martinsons, 1993; Meyer, 1998; Prather, 2002; Ripley, 1992; Roffe, 1999a; Russel, 1990; Schroenecker, 1995; Tannenbaum, 1994). Research has focused on the improvement of structure, structural relationships, networking, and categorization of types of organizations.

Leaders are the engines for envisioning and creating innovative products and services in organizations (Reeves-Ellington, 1998). In the quest to develop leaders, workplace learning and performance professionals can research and apply programs to foster innovation (Butler, 1996; Kossek, 1989; Roth, 1994). The attributes of effective innovation leaders can be monitored and analyzed and company climates conducive to innovation can be benchmarked and emulated (Fenwick, 2003; Kalliath, 2002). Commitment to innovation as a culture is prevalent in organizations as it is commonly woven directly into mission statements (Karakowski, 1999). However, leaders still lack the ability to plan, measure, and implement innovative products and

services (Waller, 1999). These challenges are exacerbated by the pressures to manage several different and often conflicting roles (Roffe, 1999b). The competencies that underpin these roles can be explored and developed by workplace learning and performance professionals.

The generation and diffusion of innovations can be approached in terms of a socio-technical system developed to explore the relationship between the individual in an organization and the innovations they diffuse (Rogers, 1995). Organizations understand the individual by using competencies (Rothwell, 1998). Therefore, the basis for understanding innovation leaders in this socio-technical system is the creation of a competency model for innovation leaders (Tierney, 1999). The model can be used by the human resource function as part of a competency-based human resource management system.

Significance of Study

As this dissertation was written, the economy of the United States was recovering from (a) a possible recession, (b) unemployment, (c) war, (d) the consequences of one of the largest terrorist attacks in history, (e) elections that divided the nation, and (f) two Gulf Coast hurricanes that caused a natural disaster and emergency evacuations. Consequently, layoffs, outsourcing, and restructuring occurred in a variety of industries (Axcess News, 2006). Americans are seeking employment in an economy that needs sustained growth in order to support displaced workers. Innovation is the backbone of how organizations develop products and processes and increase sales (Avlonitis, 1994). Innovation has been linked to the development of new enterprises and growth of existing enterprises (Bingham, 2003). As new products, services, technologies, and enterprises are created, new opportunities for employment arise. Innovation can support the creation of new jobs in an economy (Pagano, 1997).

There is market interest in companies in the pharmaceutical, high-tech, and networking communications industries (Dorabjee, 1998; Galambos; 1998, Judge, 1997; Morgan, 2001; Nathan, 1999; Pearson, 1993; Ringer, 1998; Shan, 1994; Westwood, 1988; Wolff, 1991). Many of these company's products have recently come into a state of product maturity and companies are seeking new ways to maintain competitiveness. Changing federal regulations, especially among pharmaceutical companies, are forcing organizations to focus on innovation. Because of low levels of public approval, many pharmaceutical companies have come under scrutiny and are currently experiencing more stringent regulation by the United States Food and Drug Administration (Davies, 2005). Multi-billion dollar product licenses have been revoked. Leaders in the pharmaceutical industry have indicated that a focus on innovation is necessary for the industry to survive and industry leaders are seeking research on the topic of innovation (Tidd, 2005). The competency model of innovation leaders addresses these problems and can allow organizations to understand innovation leaders from a human resource management perspective.

In academic research, there is a great interest in the topic of innovation (Dramanpour, 1991; Dramanpour, 1996; Gifford, 1992; Gruber, 1972; Lee, 1995; Lewis, 1993; Martinsons, 1993; Meyer, 1998; Prather, 2002; Ripley, 1992; Roffe, 1999a; Russel, 1990; Schroenecker, 1995; Tannenbaum, 1994;). Innovation has been studied from many perspectives, including: (a) adoption, (b) diffusion, (c) organizational culture, (d) business environment, (e) technology, and (f) the individual (Rogers 1995). Of the perspectives, the least research has been completed on the individualist perspective. The literature review in chapter 2 includes studies of the individual characteristics of innovation leaders. However, no studies have explored innovation in terms of an innovation leader's competencies. Considering the significant gap in research and the

practical significance for the organization, this study used the Delphi methodology to develop a competency model of innovation leaders.

Findings will provide workplace learning and performance researchers and professionals with a more general and synthesized view of the competencies of innovation leaders. Knowledge about innovation leaders can lead to new perspectives for further research. Workplace learning and performance professionals can use the competencies discovered in this study to develop and tailor competency models for their client organizations. Innovation leaders will gain an understanding of their own competencies and how they might improve innovation in their own organization from an individualist perspective.

Research Question

According to a Delphi panel of subject matter experts, what are the competencies of innovation leaders? In measuring agreement in iterations two and three of the Delphi methodology, the following eight hypotheses were tested. The first iteration two hypothesis tested the level of agreement within professional participants. H_0: There is no agreement in regard to competency ratings within the group of professional participants. H_1: There is agreement in regard to competency ratings within the group of professional participants. The second iteration two hypothesis tested the level of agreement among academic participants. H_0: There is no agreement in regard to competency ratings within the group of academic participants. H_2: There is agreement in regard to competency ratings within the group of academic participants. The third iteration two hypothesis tested the level of agreement among all iteration two participants. H_0: There is no agreement in regard to competency ratings within the group of all iteration two participants. H_3: There is agreement in regard to competency ratings within the group of all iteration two participants

The first iteration three hypothesis tested the level of agreement among professional participants. H_0: There is no agreement in regard to competency ratings within the group of professional participants. H_4: There is agreement in regard to competency ratings within the group of professional participants. The second iteration three hypothesis tested the level of agreement among academic participants. H_0: There is no agreement in regard to competency ratings within the group of professional participants. H_5: There is agreement in regard to competency ratings within the group of professional participants. The third iteration three hypothesis tested the change in the level of agreement among professional participants from iteration two to iteration three. H_0: There was no change in the level agreement for competency ratings within the group of professional participants from iteration two to iteration three. H_6: There was an increase in the level agreement for competency ratings within the group of professional participants from iteration two to iteration three. The fourth iteration three hypothesis tested the change in the level of agreement among academic participants from iteration two to iteration three. H_0: There was no change in the level agreement for competency ratings within the group of academic participants from iteration two to iteration three. H_7: There was an increase in the level agreement for competency ratings within the group of academic participants from iteration two to iteration three. The fifth iteration three hypothesis tested the difference between groups of academic and professional participants. H_0: There was a statistically significant difference in competency ratings between the groups of academic and professional participants. H_8: There was no statistically significant difference in competency ratings between the group of academic and professional participants.

Conceptual Framework

A distinction was made among the possible research methodologies that could be employed in this study in the creation of a competency model of innovation leaders. A simple literature review could not provide the robust analysis needed to create a competency model because data synthesis would rely on the researcher. This would create bias and lead to a competency model that is not fully representative of the data (Cooper, 1980). A statistical Glassian meta-analysis provides an excellent way to summarize and synthesize quantitative data (Britten, 2002). The body of quantitative research on this topic represents a fraction of the research gathered. Because a majority of the research was qualitative and the purpose of the study was to develop a competency model that represented all available research, this study could have employed meta-ethnography as a method of analysis and synthesis (Slavin, 1986). However, there is very little support for this methodology among competency-based studies (Rothwell, 1999). The Delphi methodology has been used by over 50 competency-based studies and is a common method of identifying competencies (see Figure 1.1).

The group of interest in this study is innovation leaders. In order to understand this group, their profile will be outlined conceptually, beginning with their role as managers of people and/or process (See Figure 1). Managers of people and/or process manage (a) direct reports, (b) indirect reports, (c) matrix employees, (d) consultants, or (e) have significant impact within an organization's social system (Spencer, 1993). The study is concerned with those managers of people and/or process who can be considered to be (a) innovators, (b) early adopters, (c) opinion leaders, and (d) change agents. Individuals in these categories are involved with leading the diffusion of an innovation within an organization's social system. The categories

Organization's Perspective				
Managers of People and/or Process				← Organizational Population
Innovators	Early Adopters	Opinion Leaders	Change Agents	← Roger's Descriptors
Innovation Leaders				← Group of Interest Defined
Competency Model				← Competency Model
Consensus				← Delphic Iterations
Educators		Professionals		← Delphi Participants
Innovation Experts				← Study Population
Researcher's Perspective				

Figure 1.1: Conceptual Framework

come from the work of Rogers (1995) and exclude the (a) early majority, (b) late majority, and (c) laggards. The decision was made to exclude these categories of individuals because they are either somewhat resistant to an innovation or take a significantly longer amount of time to adopt an innovation. As such, they cannot be considered to be innovation leaders. Therefore, the group of interest in this study, innovation leaders, was comprised of Roger's (a) innovators, (b) early adopters, (c) opinion leaders, and (d) change agents.

A competency model is a description of the (a) knowledge, (b) skills, (c) capabilities and (d) behaviors required to perform a job or function, or to sustain the desired organizational culture. Competencies are internal capabilities that people bring to their jobs, capabilities that

may be expressed in a broad array of behaviors (McLagan, 1989). This demand-oriented or functional approach to skill assessment has the advantage of placing at the forefront the personal and social demands facing individuals. The definition is complemented by a conceptualization of competencies as internal mental structures in the sense of (a) abilities, (b) capacities, or (c) dispositions embedded in the individual. Each competency is built on a combination of (a) interrelated cognitive and practical skills, (b) knowledge, (c) tacit knowledge, (d) motivation, (e) value orientation, (f) attitudes, (g) emotions, and (g) other social and behavioral components (McClelland, 1993). Although cognitive skills and an individual's knowledge base are critical elements, it is important to include other aspects such as motivation and value orientation.

Competencies are acquired and developed throughout life and many can be learned and taught in a variety of institutions and other settings (McDowell, 1996). A favorable stimulus and institutional or social environment is necessary for the development of competencies (Jones, 1997). Competencies are developed through action and interaction in formal and informal educational contexts (Sanchez, 2000). Competencies enable individuals to participate effectively in multiple contexts or work environments, and can contribute to an overall successful career (Prahalad, 1990).

Limitations

This study did not include an analysis of organizational or environmental characteristics linked to innovation. Analysis regarding organizational structure or theoretical adoption or diffusion models was outside the scope of this study. The resulting competency model was broad, general and not linked to specific industries. This study did not seek to develop a new definition of innovation in organizations. The quality of scholarship in this line of research was assessed and synthesized. Processes of (a) training and development, (b) organization

development, (c) competency-based project implementations, and (d) technological advancements that lead to innovation were not explored. The results were not tied to or dependent upon the development of competency-based initiatives for a specific organization.

Definition of Terms

Commitment: "Interaction dominated by obligations. These obligations may or may not be mutual, or self-imposed, or explicitly stated" (Gautam, 2004, p. 303).

Communication: "The sharing of information between two or more individuals or groups to reach a common understanding" (George, 2005, p. 437).

Competencies: "An area of knowledge or skill that is critical for producing key outputs. Competencies are internal capabilities the people bring to their jobs; capabilities which may be expressed in a broad even infinite array of on the job behaviors" (McLagan, 1989, p. 77).

Competency Model: "A competency model is a set of success factors, often called competencies that include the key behaviors required for excellent performance in a particular role. Excellent performers on-the-job demonstrate these behaviors much more consistently than average or poor performers. These characteristics include key behaviors that drive excellent performance. These characteristics are generally presented with a definition and key behavioral indicators" (Sanchez, 2000, p. 510).

Creativity: "Mental phenomena, skills and/or tools capable of originating (and subsequently developing) innovation, inspiration or insight" (Rushton, 1990, p. 1293).

Emotional Intelligence: "The awareness of and ability to manage one's emotions in a healthy and productive manner" (George, 2005, p. 56).

External Environment: "Factors (conditions, trends, and forces) essentially outside the control of organizational members. External environmental scans are conducted to identify important factors in the external environment" (Pagano, 1997, p. 16).

Imagination: "Power or process of producing mental images and ideas" (Rushton, 1990, p. 1292).

Innovation: "An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption such as teams, groups, or departments" (Rogers, 1995, p. 11).

Leading: "A process that takes place in groups in which one member influences and controls the behavior of the other members toward some common goal" (Michener, 1986, p. 343).

Learning: "Gaining knowledge or skills, or developing a behavior, through study, instruction, or experience" (Bassi, 1997, p. 26).

Management: "The activity of strategic planning, setting objectives, managing resources, deploying the human and financial assets needed to achieve objectives, and measuring results" (Lado, 2004, p. 702).

Motivation: "Psychological or physiological forces that determine the direction of a person's behavior, level of effort, and level of persistence" (George, 2005, p. 175).

Networking: "Establishing, maintaining and utilizing a broad network of contacts in order to keep a pulse on public, political and internal issues and to make informed decisions. It includes identifying who to involve, as well as when and how to involve them in order to accomplish objectives and minimize obstacles" (Bergquist, 1995, p. 51).

Organization: "A collection of people who work together to achieve individual and
organizational goals" (George, 2005, p. 3).

Organizational Environment: "The physical and social context within any person,
group or organization is functioning" (Cummings, 1997, p.88).

Workplace Learning and Performance: "The integrated use of learning and other
interventions for the purpose of improving individual and organizational
performance. It uses a systematic process of analyzing performance and
responding to individual, group, and organizational needs. WLP creates positive,
progressive change within organizations by balancing human, ethical,
technological, and operational considerations" (Rothwell, 2000, p. 5).

Organization Development: "A top management-supported, long-range effort to
improve an organization's problem-solving and renewal processes, particularly
through a more effective and collaborative diagnosis and management of
organizational culture emphasizing forma work team, temporary work team,
temporary team, and intergroup culture with the assistance of a consultant-
facilitator and the use of the theory and technology of applied behavioral
science including action research" (French, 1984, p. 17).

Vision: "Relaying a shared mental framework that helps give form to the often abstract
future that lies ahead. Effective mission and vision statements are inspiring, long-term
in nature, and easily understood and communicated" (Niven, 2003, p. 1).

Assumptions

The first assumption of this study was that innovation is a social and interactive process,
as suggested by Rogers (1995). The individual within this social system is the key to

communicating innovations. The individual can be affected by conditions of situational context such as (a) structure, (b) culture, (c) environment, (d) policies, (e) technology, (f) legal environment, and (g) industry competition. When all situational context is stripped, it is still the individual's competencies that dictate whether an innovation can be led within the social system. The situational context merely moderates the rate transmission or effect of the innovation (Gallon, 1995). The innovation leader retains the (a) free will, (b) creativity, and (c) choice to lead the innovation. Exploring the competencies of innovation leaders allows the situational context, realistically inseparable from the individual, to be taken into account. This was the second assumption of the study.

The third assumption of the study was that competencies are only observable in the actual actions taken by individuals in particular situations (Rothwell, 1999). External demands, individual capacities or dispositions, and contexts are all part of the complex nature of competencies. Competencies are manifested in the actions an individual undertakes in particular situations or contexts. This conceptualization is holistic in the sense that it integrates and relates (a) external demands, (b) individual attributes, and (c) context as essential elements of competent performance. As such, experts should be able to identify competencies by their emergent behavior. This was the fourth assumption of the study and supports the use of a Delphi methodology to identify the competencies of innovation leaders.

The fifth assumption of this study was that innovation has a positive influence on the success of an organization, its products, employees, and the economy (Tidd, 2005). The knowledge economy is a global economy characterized by a focus on knowledge, change, and globalization. It is fast and unpredictable and driven by innovative knowledge-based firms. The key sources of innovation include (a) research, (b) systemic innovation, (c) knowledge

management (d) integration, (e) new business venture strategies, and (f) new business models. (Davies, 2005) The innovation leader can support the success of this economy and the organizations, products, and employees it encompasses (Murphy, 2003).

Summary of Chapters

Chapter 2 contains a review of the recent, relevant literature to demonstrate current discussion among researchers who are also exploring this topic. Chapter 3 contains an explanation of the study's methodology. Chapter 4 presents the findings of the study. The dissertation concludes with a summary, conclusion, and recommendations for future research and professional application and a conclusion in chapter 5.

Chapter 2

Literature Review

This review of literature contains an examination of the current line of research on innovation in organizations. It begins with a general overview of innovation. The importance of innovation to economic development and progress in business and industry is then discussed. The three different methods of studying innovation in organizations suggested by current research are presented. They include exploring innovation as (a) a structural phenomenon, (b) an interactive process, and (c) an individualist perspective (Slappeneder, 1996). Suggestions from the literature on the first two perspectives lead directly to the need for further research on the individualist perspective. The literature review continues with an exhaustive analysis of innovation from the individualist perspective in relation to the themes suggested. Themes such as (a) learning, (b) leading groups and teams, (c) motivation and energy level, (d) management and delegation, (e) communication, interpersonal skills, and emotional intelligence, (f) commitment and sense of ownership, (g) creativity and imagination, (h) role identity, power, and politics, (i) mission and vision, and (j) understanding the external environment are explored.

Innovation: A General Overview

This analysis of innovation in organizations begins with a discussion of the work of Rogers (1995). Rogers suggests that diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. Innovations develop as an organization (a) recognizes a problem or need, (b) researches the dimensions of the problem or need, (d) develops or purchases an innovation, (c) commercializes

it for a certain population, and (d) adopts and diffuses it within the organization, and (f) realizes the consequences of the innovation. The individual innovation decision-making process that occurs begins with an awareness of or a need for an innovation. The decision maker perceives the characteristics of the innovation and forms a favorable or unfavorable opinion about the innovation. They then make a decision to adopt the innovation and the innovation is implemented. The innovation is confirmed when the individual understands the impact of the innovation on the organization and is satisfied with its effectiveness.

The critical individuals involved with the innovation adoption are (a) innovators, (b) early adopters, (c) change agents, and (d) opinion leaders (Rogers, 1995). Innovators are venturesome and are almost obsessed with new ideas that arise within private social circles. Early adopters are more integrated within a social network. Potential adopters look toward these individuals for opinion leadership. Opinion leaders are those individuals who have many links within their social network and are able to help others to make innovation adoption decisions. Change agents are individuals who influence client innovation decisions in a direction desired by the change agency. Rogers (1995) presents the characteristics of these individuals in terms of socioeconomic status, personality, communication behavior, and adopter categories. The current study combined these adopter categories into the term innovation leader, focusing not only on Roger's notion of communication behavior, but on all of the individual's behaviors that can be considered competencies.

Kuczmarski (1996) suggests that innovation is the single most important factor in developing strategy and practice in business and industry. It is a mindset, a pervasive attitude, or a way of thinking focused beyond the present into a future vision. The aspect of innovation that is most difficult for professionals to grasp is that it is seen as inseparable from risk. Business

success is linked to organizations that can overcome the potential risk and become true innovators. These organizations have a corporate culture that nurtures individuals who take risks and think creatively. This leads to growth through new products, services, and strategies. The U.S. economy is based on revolutions of innovations (Hirshleifer, 1994). These revolutions are linked directly to innovation because innovation provides the impetus for organizations to increase productivity internally. High internal productivity leads to (a) innovation products, (b) services, and (c) processes that increase the aggregate innovation of an industry. As consumers accept aggregate innovations in the market, organizations are driven to create new innovations.

As an example of this economic process, organizations with certain innovation challenges and characteristics tend to become the organizations that are better able to implement technological innovations. In a survey-based study of 500 employees, Avlonitis (1994) found that those organizations that had (a) high technological challenges, (b) strategic innovativeness, (c) product innovativeness of core machinery, and (d) innovation leadership could implement technological innovations at a higher rate than organizations without these characteristics. Tushman (1990) suggests that improvement of competence gaps within organizations can also contribute to an organization's innovativeness. As business units increase the level of technological innovations that are adopted in an organization, the level of employee competence within these innovations is reduced. This has an impact on (a) work roles, (b) social networking, and (c) organizational structure. Power relations are affected such that those who are early adopters of innovations tend to increase their power base. Workplace learning and performance professionals can address these gaps by focusing on the improvement of individual employees. Ripley (1992) suggests that the competitive strength of a business depends on its ability to innovate internally to close the gaps between employee behaviors and technology. Along with

addressing (a) structural, (b) environmental, and (c) cultural issues, senior management should focus on making employees (a) deliver quality, (b) customize their work processes, and (c) specialize in work behaviors. This will allow the organization to (a) maintain a high variety in its skills and increase its internal innovativeness, and (b) as suggested by Hirshleifer (1994) increase its economic innovation impact on the market.

There are many different ways to frame organizations in order to more specifically understand how gaps arise in innovation competencies. Coglan (2000) presents four of these frames, including: (a) structural, (b) human resource, (c) political, and (d) symbolic. The structural frame analyzes the configurations and forms of organizations. The human resource frame analyzes (a) people, (b) interpersonal dynamics, (c) conflict, and (d) leadership. The political frame analyzes (a) strategies, (b) power, and (c) networking. The symbolic frame analyzes (a) stories, (b) myths, (c) rituals, and (d) drama in organizations. Meyer (1988) studied the adoption of 300 innovations and determined that adoption success depended on three classes of antecedents. Contextual attributes arise from the characteristics of the organization and can be understood in terms of Coglan's four frames. Innovation attributes are the characteristics of the implementation of the innovation, such as adoption method or technological capability. The interaction of context and innovation and of those employees involved in the adoption of the innovation comprises the third antecedent of innovation adoption success. The interaction of context and innovation can be more clearly understood in terms of organizational complexity and adoption contingencies. Fairiborz (1996) suggests that the two indicators of organizational complexity are structural complexity and organizational size. The contingencies in innovation adoption include: (a) environmental uncertainty, (b) sector, (c) type of innovation, and (d)

adoption method. Fairiborz (1996) found that the difference in these contingencies can be better understood by framing the organization.

As supported by this line of research, Slappender (1996) suggests that there are three perspectives on how to understand innovation in organizations. The structuralist perspective suggests that innovation is determined by structural characteristics and antecedents. This perspective conceptualizes innovation as static and objectively defined objects or processes. It suggests that innovation is a simple linear process and focuses on adoptions of innovations. Cross-sectional surveys are used to explore structural characteristics such as: (a) environment, (b) size, (c) complexity, (d) differentiation, (e) formalization, (f) centralization, and (g) strategic type. The innovation process perspective suggests that innovation is produced by the interaction of structural influences and the actions of individuals. Innovations are conceptualized as subjects that are reinvented and reconfigured as they are perceived. They are a complex process that is characterized by (a) shocks, (b) proliferation, (c) innovation capability, and (d) context. The primary methods of inquiry into this perspective of innovation are case studies and case histories (Slappender, 1996).

Innovation: Individual Characteristics

Organizations in the current U.S. economy are trying to innovate with scarce resources and skill shortages (Blaydon, 1999). There is a great need to recruit and retain innovative individuals to create innovative firms. Human resource professionals should seek individuals who (a) are creative, (b) have high levels of energy, (c) have a sense of ownership, and (d) have excellent communication skills (Sheasley, 1999). Employees should expect innovative firms to provide clear expectations. Progress in innovation can be made in times of scarce

resources and skill shortages when organizations give individuals adequate time to learn and germinate these skills.

Managers begin by aligning innovation ambitions with the needs of the business (Bingham, 2003). They must have an awareness of the external business environment. The information gathered from environmental scanning should then be presented to the organization through open communication channels. The manager must be aware of and tailor the skills and capabilities of their employees to meet the needs of the business environment.

Brown (2001) suggests that established business processes, those of hierarchy, command, and control, should be used to create an environment that has rigor without rigidity. In practice, organizations should balance implicit coordination and exploration without a loss in creativity. In multiple interviews conducted at eight biotechnology firms, Judge (1997) found a dialectical balance between (a) freedom and control, (b) flexibility and focus, (c) differentiation and interaction, and (d) instrumentalism and discontinuity. Likewise, as innovations become more radical, management of organizational culture is key. Results suggested that organizations should create a sense of community that provides a balance of (a) autonomy, (b) personalized recognition, and (c) integration of socio-technical systems.

Innovations can grow from the bottom up or diffuse down in an organization (Clarke, 1999). This occurs as individuals engage in learning discussions to share new ideas. Their knowledge is shared and additional members of the organization adopt the innovation. This creates pockets of innovation in the organization through informal processes. Individuals should capture and leverage knowledge and expertise. Once this occurs, individuals must act in response to environmental challenges to diffuse the innovation in the organization.

In a case study of executives in the research and development industry, Slowinski (2002) found increased levels of innovation among managers who had an awareness of their employees' unique skills. These managers typically became involved with the innovation at an early stage and remained involved until its adoption. In their roles as managers, they (a) developed a common vision, (b) used industrial technology, and (c) integrated knowledge and culture. These characteristics were critical to managing the change that occurred during the innovation process.

In periods of turbulent change, Bowen (2001) finds that a highly innovative culture that is supportive but formal maintains the continuity of work. In a case study of periods of mergers and acquisitions in the pharmaceutical industry, managers maintained the innovation culture by focusing on (a) competitiveness, (b) experience, and (c) transfer of knowledge. Likewise, high levels of communication reduced uncertainty in work roles. Employees were challenged to be creative in their individual job tasks.

Persing (1999) also suggests that higher levels of job task creativity help to manage change during periods of downsizing. In this business environment, employees and teams were increasingly pressed to push products to market. The additional (a) task variety, (b) activity, and (c) work roles added to employee responsibility led to a reduction in innovation ventures. Managers instead focused creative efforts on innovating within job tasks rather than creating new ideas. This focus led to higher levels of individual employee innovations rather than organization-wide innovations.

The best innovative ideas can come from any employee at anytime (Prather, 2002). Managers should encourage employee suggestions that improve their job tasks. This removes barriers that can hamper employees' contributions to innovations. The barriers that managers

face include: (a) stealing ideas for reward, (b) evaluating ideas for acceptance, (c) finding an audience for the idea, and (d) implementing the ideas with the desired audience. Managers should support the innovation throughout its implementation process.

In a case study of a production facility in the mid-western United States, Lewis (1993) explored the characteristics of management support in innovations. Managers who had higher levels of motivation and commitment supported innovations. Managerial support likewise depended on: (a) the individual's perception of the organizational goals and mission, (b) personal agenda, (c) skills, and (d) expertise with the innovation. Those managers who showed strong support for the innovation were able to create long-lasting, emergent relationships.

Relationships created through innovations occur in order to see things from a new perspective or to improve what already exists. Innovation revolves around the concepts of creativity and change. In an attitude and activity survey of innovation relationships, Lee (1995) found that management staff aged 21-30 scored higher on creativity measures than those in other age groups. Likewise, those who (a) shared innovation ideas, (b) had higher levels of trust, and (c) used intuition in their work were found to be more creative.

Roffe (1999) suggests that in order to mainstream creativity and innovation in organizations, managers need to develop additional skills and competencies. These skills include: (a) teamwork, (b) communications, (c) coaching, (d) project management, (e) learning, (f) visioning, (g) change management, and (h) leadership. These skills illuminate the connection between the competencies needed to manage and those involved in leading innovation. Managers must use a combined approach that facilitates innovation from the interactive process and structural perspective. As managers of innovation become leaders of innovation, they add the competencies needed to facilitate the individual.

In a qualitative study, Jones (2000) reviewed leadership programs that promoted innovation in organizations. Results suggested that in order to lead others in an innovation, leaders should be trained to promote (a) imagination, (b) community, and (c) the application of the innovation in the workplace. This is consistent with the finding by Lewis (1993) that managers motivate by (a) promoting creativity and commitment to innovation relationships, and (b) focusing on innovations in job tasks. Tailoring these leadership programs to different types of leaders should provide additional effectiveness in facilitating innovations.

Gardner (2002) suggests that transformational leaders are effective at fostering and implementing innovations. In a study of 250 high-level managers, transformational leaders showed higher levels of emotional intelligence. Emotional intelligence is based on the leader's ability to manage the employee's emotions and stress. Leaders must therefore manage a bodily phenomenon that affects employees in a social context (Styhre, 2002). Due to increased levels of emotional intelligence, transformation leaders were able to increase their employees' (a) effort, (b) effectiveness, and (c) satisfaction. Employees with transformational leaders were more motivated to create and diffuse innovations.

Transformational leaders inspire and motivate employees to facilitate an innovation. There are two characteristics to inspirational motivation. Image-based motivation provides employees with a concrete vision of the innovation. Concept-based motivation provides an abstract vision of an innovation. Transformational leaders who use both image-based and concept-based inspirational motivation have employees who increase their efforts and focus on creativity and learning (Densten, 2002).

In a study completed in the pharmaceutical industry, Keller (1995) surveyed and evaluated the performance ratings of 462 scientists to discover how transformational leaders

foster innovation. Study results suggested three ways: by showing employees the importance of the organization's mission; by helping employees to think about projects and tasks in new and creative ways; and by creating a sense of unity by emphasizing group goals.

In a similar study of 78 work teams, Butler (1999) found that trust moderates the transformational leader's ability to facilitate innovation. The transformational leader increased employee trust by improving specific leader behaviors. Leaders who (a) articulated a vision, (b) provided a model, (c) had high performance expectations, (d) provided individual support, and (e) stimulated employees intellectually increased their level of trust. Employees who had higher levels of trust in their leader were more committed to diffusing innovations.

In a study of 244 firms in the metals industry, Dallenbach (1995) found additional individual characteristics that increased commitment to innovations. Innovations supported by managers with a high educational level had higher levels of commitment. Likewise support of CEOs and top management increased commitment to innovation. In some cases, it was found that support from individuals with a diverse background led to increased commitment to innovations. These findings are supported by Rowden (2000). In a study of 245 employees from 6 different organizations, employees' commitment to their leader as a change agent was explored. Leaders (a) showed sensitivity to employee needs, (b) provided a clear vision, and (c) provided clear goals. Employees expressed an increased level of skills transfer as a result of their leader's supportive behaviors.

Leaders can use themselves as an instrument to diagnose the needs of their employees (McCormick, 2002). Leaders should evaluate their behaviors and understand how they affect employee motivation. The creative and integrative processes of their department can be determined by (a) emotional reactions, (b) initial perceptions, (c) bias, (d) judgment, and (e)

focus on learning. As leaders facilitate innovations, they are responsible for instilling creativity to drive innovations.

Tierney (1999) suggests that the leader's cognitive style and ability to motivate are linked to employee creativity. In a study of 191 R&D employees, a cognitive style of divergent thinking was found to be necessary to produce creativity. In this, an innovator will seek to (a) integrate diverse information, (b) redefine problems, and (c) generate ideas that deviate from the norm. These ideas can then be used to fuel organizational innovations.

Creativity can be understood as an act through which new insight may be gained about the solution to an intellectual challenge (Westwood, 1988). It is an intrinsic skill that leads to innovations in organizations. Creative people typically have (a) a diversity of interests, (b) skills in many areas, (c) a high level of enthusiasm, (d) short interest span, (e) disregard for authority, and (e) need for recognition. They work with others on common goals to achieve solutions for the good of the organization but crave individuality.

Creativity has a psychological basis. It can be understood in terms of personality traits and their corresponding behaviors (King, 1995). Organizations can also understand creativity in terms of a continuum of paradigms. Creative individuals seek to (a) maintain paradigms, (b) shift paradigms, or (c) break paradigms. Changes in paradigms occur as leaders (a) express the need for change, (b) associate with others to implement the change, and (c) stimulate the organization to accept the change. McFadzean (1999) suggests that to foster creativity, leaders should provide (a) a vision, (b) participative safety for employees, (c) a climate for excellence, and (d) support for innovations.

In a study of 199 human resource and R&D leaders, the need to get more innovation out of employees was identified as the organization's top human capital concern (Kochanski,

2003). Organizations may establish healthy, creative environments for innovation but still have skills gaps in creativity. In order to fill these gaps, leaders need to understand what creative employees value and the competencies that make them innovative. Organizations should then align their competency needs accordingly in order to foster innovation.

Innovative employees value meaningful work. Cacioppe (2000) suggests that lack of meaning in work leads to stagnant levels of innovation. Specifically, organizations should focus on the meaningfulness of an individual's objectives and goals. If an organization can balance its goals with the goals of its people, greater success with innovations can be achieved. Likewise, innovative employees should also be intellectually engaged. In a case study of the pharmaceutical industry, Scolinick (2000) suggested that intellectual attention to external changes in the industry helped increase the organization's level of innovation. As employees learned about their external environment, they were better able to understand and adapt to changes. Creative thinking led to innovations that helped the organization learn and adapt accordingly.

Innovation has been linked to many additional learning processes. Autonomous individual learning helps to increase the knowledge base of the organization as a whole. Knowledge management tools help to capture and diffuse core process knowledge. Experimentation helps to encourage informal problem-solving. Self-reflective job audits have helped employees adapt to constant change in organizations (Roth, 1994). Gruber (1972) suggests that a commitment to organizational innovation begins with a commitment to learning. Learning enhances the effectiveness of managers and leaders of innovation. The commitment to learning begins with a knowledge-responsive environment. Innovators should encourage high levels of knowledge transfer among those involved in the innovation process. Finally, managers

and leaders should encourage a differentiation of perspectives rather than relying solely on workplace experience.

In a case study of the pharmaceutical industry, Brown (1999) found that knowledge management during the innovation process resided at the individual level. In many cases, organizational culture creates barriers to individual learning. This results in poor feedback and decreased levels of innovation. As a result, an organization should create a culture that is conducive to individual learning. An organization can focus its learning culture on a particular method of inquiry. Organizations with a problem-solving focus innovate by using their learning resources to overcome challenges. These challenges typically arise out of managing change. In contrast, appreciative learning cultures nurture innovation individual actions by (a) fostering an affirmative focus, (b) developing proactive employee competencies, (c) generating systems of meaning, and (d) fostering a collaborative spirit of inquiry among employees (Barrett, 2000).

The capacity to learn must exceed the rate of change in an organization in order for it to remain innovative (Buckler, 1996). An organization maintains its innovativeness by defining individual learning requirements. This is done by assessing individual learning competencies. These needs should then be prioritized. Learning support should be made available to align goals with leadership competencies. Roles will then be more closely aligned with the innovation process.

The need for change can create role conflicts between the individual's competencies and the expectations of their role. If role performance declines, it affects the organization's ability to innovate. Constant learning is therefore critical to maintaining an individual's competencies. If the individual maintains or exceeds their role competence, they can fully participate with teams in the creation or implementation of innovations (Floyd, 2000). In a study

of 124 new product development teams, Akgon (2002) found that team development was correlated with individual learning structures. Variables explored included: (a) information acquisition, (b) information implementation, (c) information dissemination, (d) unlearning, (e) thinking, (f) improvisation, (g) memory, (h) intelligence, and (i) sense-making. The model proposed suggests that a focus on improving individual learning dimension can lead to higher levels of new product innovations.

Tosey (2002) suggests that a collaborative style of leadership is linked to learning in organizations. Collaborative leaders encourage learning by promoting (a) optimism, (b) creativity, and (c) collaboration. They increase levels of innovation by (a) gaining commitment, (b) understanding how to lead change, (c) identifying resistors, and (d) instilling motivation. Effectively managing and leading creative and learning processes can lead to increased levels of innovation. The most critical part of these processes is the leadership of innovations through the organization's social system. Keene (2000) suggests that organizations are adaptive systems. They are subject to constant social evolution and change. Change interacts with individuals and individuals interact with change. Innovations occur due to social interactions and technological revolutions.

The individual is a participant in a socio-technical system. They have the knowledge, skills, and will to contribute to the system. They prepare, regulate, and execute tasks. But they also have a need for learning and control over their social environment. This, in turn, affects the needs of the entire system (Hummels, 2000). When new or unmet needs arise, the organization must innovate in order to meet the social needs of individuals. Individuals who lead innovations within social systems construct an identity (Hummels, 2000). An identity has both changing and enduring qualities. Identities can be created spontaneously or can emerge over time. Individuals

can have multiple identities for different social situations. Identities mold organizational dynamics and help to shape organizational politics.

Individuals who lead innovations in organizations can overcome the ambiguity created by the diffusion of an innovation by using informal group dynamics (Butler, 2000). Individuals need to understand the patterns of communication in an organization. Patterns of communication arise through formal and informal channels. The individual can use informal channels to gain a high level of trust. Once they are trusted, the learning process that occurs during an innovation can be deployed through formal communication channels.

Individuals who lead innovators must also understand the politics of the organization. Power is a perceived property of an individual or relationship within a social structure. Individuals can use (a) conversations, (b) controls, (c) tactics, and (d) impression management to influence others. They should express (a) formed and tacit knowledge, (b) accountability, (c) outcome responsibility, and (d) reputation in order to achieve greater levels of perceived power. The individual must essentially become a political entrepreneur (Coghlan, 2000) who expresses both political astuteness and self-reflection. Elangovan (2000) surveyed 165 graduate business students in a study that linked power and motivation. Results indicated that strong legitimate power when combined with weak coercive power led to increased levels of stress. When strong legitimate power was combined with weak reward power, higher levels of motivation were expressed. When strong reward power was combined with weak legitimate power, higher levels of commitment were expressed.

Chiesa (2000) studied the relationship among choice, partnering, and innovation in a series of case studies. It was found that the choice to innovate was dependent on four factors, including: (a) form of collaboration, (b) type of relations with parties involved in the innovation,

(c) negotiation processes, and (d) the initial priorities set by parties involved. Partnering in the process of innovation can provide quick, affordable access to new capabilities (Thompson, 2001). Partners should seek to achieve respective goals by creating a mutual understanding of the social structure and talent needs of new venture innovations.

New venture innovations, those that create new social entities between or within different social structures, require the individual to take on the role of entrepreneur (Gifford, 1992). They are charged with evaluating and possibly improving the value that the innovation will add to the organization. Those employees who are part of the social structure of the new venture must adapt to new social conditions. Evink (1999) suggests that entrepreneurs of social innovation are needed for three types of situations: (a) changes imposed by business development, (b) changes of necessity, and (c) radical changes of business practices.

One way social innovators change organizations is through organizational affection. Mann (2000) suggests that to increase levels of organizational affection, social innovators need to engage with others to create relationships. Relationships should include (a) trust, (b) loyalty, and (b) individual commitment. Essentially, these characteristics lead to relationships that create learning pathways for innovation diffusion.

Shiller (1999) summarizes relational behavior in organizations across seven factors. These factors are consistent with the findings of this literature review in that they may also suggest some of the characteristics of individuals who lead or manage innovations. Contribution requires the individual to be a full participant in the organization's social structure. Motivation requires the individual to provide challenging and meaningful work. Decisioning requires the individual to be an active part of the decision-making process. Relationship requires the individual to make energized working social connections. Leadership requires the individual to

be worthy of trust. Accountability requires the individual to take individual and collective responsibility. Advocacy requires the individual to provide positive reinforcement and promote other group members.

Competencies: A General Overview

A competency is an area of knowledge or skill that is critical for producing key outputs (McLagan, 1997). They are internal capabilities that people bring to their jobs—capabilities that may be expressed in a broad and even infinite array of on-the-job behaviors. Competencies are the foundation of the modern organization's human resource management function and are typically expressed as a competency model. A competency model is a description of the (a) knowledge, (b) skills, (c) capabilities, and (d) behaviors required to perform a job or function, or to sustain the desired organizational culture. Emphasis is placed on the things that excellent performers do more often, persistently, and effectively than do average performers. An organization may use a competency-based system as a business strategy to determine how competency models are functionally and multi-dimensionally used for (a) hiring and selection, (b) assessment, (c) performance management, (d) training and development, and (e) career development (McLagan, 1997). Likewise, competency-based initiatives are purposeful actions undertaken by institutions directed at (a) defining, (b) teaching, and (c) assessing competencies across their system (Jones, 2000).

The concept of competence for job success was pioneered by White (1953) in a study of assessment tools and bias against minorities. Flanigan (1954) studied the characteristics of the successful completion of job duties in the U.S. military. Authors including Fine, Fleishman, McCormick, and Pimoff also completed related studies on work behaviors (Sanchez, 2000). McClelland (1973) rediscovered competence as an alternative to intelligence testing. In the late

1970s, along with the McBer Company, McClelland completed the first competency study to identify high performers (Stines, 2003).

McLagan (1980) developed the concept of competency modeling for specific job types. Boyatzis (1983) wrote the first academic work about competency model development. Behavioral Event Interviewing was discussed as an early method for competency identification by both Boyatzis (1983) and Spencer (1993). The concept of an organizational competency, one that identifies the behavior of an organization rather than an individual, was identified in Prahalad and Hamel (1990). McLagan (1997) revisited competency modeling and developed six main types of competencies: (a) task competencies, (b) result competencies, (c) output competencies, (d) knowledge, (e) skills, and (f) attitude competencies and super-performer differentiators. Likewise, she and other researchers identified many applications of competency studies; they can be seen in Table 2.1, which is based on the work of Stines (2003).

Competencies: Methods of Identification

Rothwell (1998, 1999) identified three main approaches to competency modeling: (a) the borrowed approach, (b) the tailored approach, and (c) the borrowed and tailored approach. The approaches categorize the 12 major research tools that can be used to identify the competencies of a particular population. Within these approaches are six suggested by Spencer (1993): (a) behavioral event interviews, (b) expert panels, (c) surveys, (d) computer-based expert systems, (e) job analysis, and (f) direct observations. In addition, six were suggested by Rothwell (2000): (g) generic models or lists, (h) adopting or tailor expert panel recommendations, (i) competency inventory, (j) focus group, (k) card sort, and (l) guessing.

Table 2.1

Applications of competency studies by author and year.

Author	Year	Applications of Competency Studies
McLagan	1980	Decision tool for a future time frame.
McLagan	1980	Recruitment and selection
McLagan	1980	Assessment
McLagan	1980	Individual development planning
McLagan	1980	Training curriculum design
McLagan	1980	Individual career planning
McLagan	1980	Coaching, counseling, mentoring, sponsoring
McLagan	1980	Succession planning
McLagan	1980	High potential identification
McLagan	1980	Career pathing
Spencer & Spencer	1993	Performance management
Spencer & Spencer	1993	Competency-based pay
Spencer & Spencer	1993	Integrated human resource management information systems
Spencer & Spencer	1993	Competency-based workforce planning.
Ashkenas, Ulrich, Jick & Kerr	1995	Portable competencies and career planning
McDowell	1996	Strategic planning
Lawler	1996	Compensation
Rothwell	1999	Identifies the difficulties that exemplary workers face
Waller	1999	Gap assessment
Greengard	1999	Competency-based management
Byham	1999	Succession management

According to Stines (2003), the borrowed approach allows the organization to take a pre-existing competency model and use it on those occasions when a competency model is needed. The positions in question are typically similar in function. Competency models can be borrowed from any source; however, the validity of the model depends on its original application. The borrowed approach (a) is very easy to implement, (b) is inexpensive, (c) has rapid results, and (d) has a high degree of credibility. Unfortunately, the borrowed approach does not take into account (a) the model's suitability to the new position, (b) copyright issues, (c) a low level of legal defensibility, and (d) a low rigor approach to competency modeling (Rothwell, 1998).

The tailored approach is the most rigorous approach to competency modeling. A model is developed from scratch and then tailored to the specific needs of a specific organizational population (Stines, 2003). Rothwell (2000) divides the tailored approach into the following methods: (a) process-driven method, (b) outputs-driven method, (c) invented method, (d) trends-driven method and (e) work responsibilities-driven method. The process-driven method attempts to discover competencies by analyzing the traits of high performers; it is the oldest method of competency development. The outputs-driven method involves tools such as job analysis, focus groups, and expert panels, and is categorized by taking into account future duties and responsibilities of high performers (Stines, 2003). The invented method attempts to invent the competencies depending on key stakeholder input. Like the outputs-driven method, the trends-driven method focuses on the trends that will impact the incumbent in the future. The work-responsibilities method identifies the competencies in terms of the incumbent's responsibilities in the organization.

The borrowed and tailored approach takes into account aspects of both of its constituent approaches. Organizations borrow the competency model from a source and then use

one of these methods to tailor it to its organization. One of the most popular forms of the

borrowed and tailor approach, as suggested by Rothwell (2000), is the occupation-based method.

The occupation-based method is used to identify competencies tailored to a specific occupation,

typically by professional associations. The advantages of this method are that (a) competencies

are defined in the jargon of the occupation, (b) it describes the entire occupation, not just

specialty positions, (c) experts identify the competencies, (d) the results are legally defensible

and can be used to develop a customized listing of competencies. However, this approach may

overlook the contributions of the organization's culture and the incumbent's personal

characteristics (Stines, 2003). The borrowed and tailored approach could easily be used at the

conclusion of this study by workplace learning and performance professionals to tailor the

resultant model into a customized competency model of innovation leaders for an organization.

Chapter 3

Methodology

This chapter contains an outline of the methodology (see Figure 3.1) that was used to create a competency model of innovation leaders. The basic Delphi methodology is discussed here in terms of its (a) characteristics, (b) criticism, (c) support, (d) iterations, and (e) use in attaining consensus. The chapter continues with a discussion of (a) the methods of data collection employed in this study; (b) data triangulation; (c) participant selection; (d) survey design; and (e) data analysis. The chapter concludes with a discussion of how the competency model was developed.

Phase 1: Preparation	Phase 2: Delphi	Phase 3 Competency Model
Formulation of Topic	Delphi Iteration 1	Model Development
Literature Review	Qualitative Analysis	Preparation of Findings
Development of Methodology	Development of Instrument 2	Preparation of Discussion
Committee and IRB Approval	Pilot Study 2	Communicate Results
Selection of Participants	Design Instrument 2	
Development of Instrument 1	Delphi Iteration 2	
Pilot Study 1	Quantitative Analysis	
Design Instrument 1	Design Instrument 3	
	Delphi Iteration 3	
	Quantitative Analysis	

Figure 3.1: Overview of research methodology.

The fundamental basis for this study is the use of prospective naturalistic inquiry in combination with pragmatic inductive analysis. A prospective study seeks to study variables naturally as they evolve. Through this procedure, the researcher has control over the data collection process and can do everything possible to ensure the reliability and validity of the data. Because the approach is pragmatic, the concern is about the practical use of results rather than the theory itself. Stines (2003) summarizes this approach by stating that:

> The naturalistic inquiry approach is defined by Patton (1990) as the study of "real-world situations as they unfold naturally; non-manipulative, unobtrusive, and non controlling; openness to whatever emerges – lack of predetermined constraints on outcomes" (p. 40). Naturalistic inquiry is usually combined with an inductive analysis methodology. In the latter, "patterns, themes and categories of analysis come from the data; they emerge out of the data rather than being imposed on them prior to data collection and analysis" (Patton, 1990, p.197, as cited in Stines, 2003, p. 80).

and later that:

> Babbie (1989) describes inductive methods as "the development of generalizations from specific observations". Such an approach allows for a tremendous amount of flexibility and tolerates slight adjustments of the study design based on the data: the researcher can look into new directions that were not anticipated in the initial design of the study (Babbie, 1989, as cited in Stines, 2003, p. 81).

This fundamental approach is commonly used in survey research and especially with a Delphi methodology when causality cannot be appropriately estimated. Since the objective of this study is to examine the competencies of innovation leaders pragmatically, rather than the causes of the competencies, this approach is warranted. The precedent for using a Modified Delphi methodology was established in 50 previous studies (see Table 3.1). The Modified Delphi methodology employed in this study is based upon a content analysis of and descriptive statistics about each of the 50 previous studies that used a Modified Delphi methodology to identify and create a competency model for various populations.

Table 3.2

Delphi competency studies by researcher, competencies defined, and year.

Researcher	Year	Competencies Identified
Delbecq, Van de Ven, & Gustafson	1975	Business Market Management
Rickman	1987	Information Processing Employees
Hein, & Glazer-Waldman	1988	Strategic Planning of Middle Management
Everett	1988	Information Technology
Schumacher	1989	Agricultural Mechanics Specialists
Wunner	1989	Recreation Park & Leisure Professionals
Polanin	1990	Computer Integrated Manufacturing Technicians
Ahmet	1991	Heads of Adult Education in Turkey
Ewing	1991	Secretaries in the state of Illinois.
Amunson	1993	Com. Col. & Continuing Education Directors
Bernotavicz	1994	Child Welfare Caseworkers
Cope	1995	Industrial Teacher Education
National Highway Safety Traffic Admin.	1996	Model Divers
Rothwell	1996	Human Performance Improvement Professionals
Toh	1997	Sports Management
Leou	1998	Mathematics Teachers
Jagodka	1998	International Marketers
Audigier	1998	Education for Democratic Citizenship
Keech	1998	Retail Management
Simmons	1998	Internal Auditing
Bauder	1998	Digital Television Engineers
Rockwell	1998	Distance Education
Scarcella	1998	Plastering Contractors
Hammersley	1998	Entry-level Resort & Recreation Professionals
Wilhelm	1999	Entry-level Employees
Scheffler	1999	Software Trainers
Varney, Worley, Darrow, et. Al.	1999	Organization Development Professionals
Rudolf	1999	Hospitality Graduates
Green	2000	Facilities Management
Bonner	2000	Nephrology Nursing
McNeil	2000	Authoring by Educators
Welch	2001	Veterans Healthcare Administration
Akers	2001	High School Agricultural Competencies
Rainville	2001	School District Nutrition Supervisors & Directors
Lopez	2001	Cross Cultural School Psychology
Hsiao	2001	Mechanical Trade Teachers in China
Staggers	2002	Informatics for Nurses
Getz	2002	Multicultural Ed. for Therapeutic Professionals
Eisen	2002	OD Practices & Practitioners
Williams	2003	Distance Education Programs
Israel	2003	Counselors of Gays, Lesbians, & Bisexuals
Stevens	2003	Air Force Medical Officers
American Dental Education Association	2003	Entry Level Dental Hygienists
National Center for Healthcare Leadership	2003	Health Care Leaders
Carr	2003	Sponsor Monitors of Family Day Care Homes
Stines	2003	Business to Business Marketing Professionals
Tigelaar	2004	Teaching in Higher Education
Razak	2004	IT Competencies of English Teachers
Masberg	2004	Tourism & Training in Washington State
Gatchell	2004	Biomedical Engineers
Hughes	2004	Pubic Health Nutrition Practice
Waher	2005	Biotechnology
Nelson	2005	Vocational Education & Training Practitioners

Delphi Methodology: A General Overview

The Delphi methodology was developed at the RAND Corporation, a Santa Monica, California think tank, in the early 1960s. Olaf Helmer, Nicholas Rescher, Norman Dalkey, and others developed the Delphi methodology to remove conference room impediments to a true expert consensus. The value in a Delphi methodology resides in its ability to forecast trends for the future. Specifically, it forecasts the occurrence of future developments, the desirability of some future state, and the means for achieving or avoiding a future state (Gordon, 1996). The Delphi methodology inherently measures consensus among experts. It is designed not to force opinion among research projects, but rather to discover points of consensus and dissonance. Comparative statistical analyses designed to measure within-group and between-group data provide the foundation for analyzing consensus and dissonance empirically. Thus, the Delphi methodology offers a very definitive consensus of experts (Gordon, 1996). However, Rowe (1999) suggests that more knowledgeable experts are likely not to change their opinions through iterations whereas less knowledgeable experts will tend to move toward the average.

The Delphi methodology is inherently iterative. An iterative research methodology is designed to begin by allowing participants to generate broad categories of data or to answer broad questions about a topic (Delbecq, 1977). Each iteration involves a questionnaire that is (a) sent to experts, (b) completed, and (c) then returned to the researcher. The researcher (a) analyzes data, (b) provides feedback to experts, and (c) offers a second questionnaire based on the results of the first iteration. The expert then completes the second iteration questionnaire, and returns it to the researcher. The researcher again (a) analyzes data, (b) offers feedback to experts, and (c) creates the third iteration questionnaire. The data from the third iteration are analyzed and final results are generated (Stines, 2003). Of the 50 studies that have used a Delphi methodology

to identify competencies (see Table 3.1), the range of iterations was from 2 to 8 rounds. The mean, median, and mode number of iterations was three. Use of three iterations of the Delphi is also supported such that researchers of the Delphi methodology (e.g., Delbecq, 1977) only describe the process of completing a three iteration Delphi. Considering this evidence, the current study also employed a three iteration Delphi methodology.

In order for the Delphi panel to be successful, participants must (a) have adequate time to complete the study, (b) be motivated, and (c) have good written communications skills (Delbecq, 1977). The Delphi methodology provides for an isolated atmosphere from different geographic locations to allow participants to identify ideas. This allows participants to generate a vast number of perspectives on a topic. Likewise, the writing and submission process allows participants more time to generate ideas of high value. The Delphi methodology is also attractive because of its ability to bring experts together who commonly have very conflicting and busy schedules, and to allow the experts to remain anonymous.

The anonymity of the Delphi panel reduces the amount of conformance that would take place if the study were done as a live expert panel. Conformity in a live expert panel reduces the value of expert opinion because the expert is subject to the bias of many other experts (Delbecq, 1977). Anonymity eliminates the emotional aspects of data collection within a conference room, as experts are typically very competitive and/or argumentative. Because of the increased anonymity of the process, the ideas that researchers generate tend to be their own rather than being piggybacked from other participants. However, Delphi panel participants do not receive social rewards for their participation in the study and cannot receive immediate feedback from fellow participants. Thus, the Delphi methodology allows participants to eliminate the pressures of conformity and yet still retain a sense of closure (Delbecq, 1977).

The Delphi methodology has received both criticism and support from methodologists. The primary strength of Delphi methodology is its ability to objectively explore issues that require judgment. The primary weakness is the time it takes to complete a Delphi methodology (Gordon, 1996). Sackman (1974) criticizes the method as being unscientific. Makridakis (1978) summarized the general complaints against the Delphi methodology in terms of (a) a low level reliability of judgments among experts, meaning that forecasts are dependent on the particular judges selected, (b) the sensitivity of results to ambiguity in the questionnaire used for data collection in each round, and (c) the difficulty in assessing the degree of expertise incorporated into the forecast. Martino (1978) reiterates the fact that Delphi methodology is a tool of last resort in dealing with extremely complex problems for which there are no adequate models. He lists major concerns about the Delphi methodology such as its tendency to discount the future and isolate and simplify events. The Delphi methodology also assumes experts can forecast effectively. Likewise, researchers can manage a Delphi panel poorly and manipulate the data to fit a result.

Several studies (Ament, 1970; Armstrong, 1978; Helmer, 1983; Wissema, 1982) support the Delphi methodology. Milkovich (1972) used the Delphi methodology in manpower forecasting. The results of the comparison indicated high agreement between the Delphi panel estimate and the actual number hired. Another study by Basu (1977) reported similar results in a general forecasting problem. Delphi panel forecasts of five-year sales were compared with both unstructured, subjective forecasts and quantitative forecasts that used regression analyses. When compared against actual sales for the first two years, errors of 3-4% were reported for the Delphi methodology, 10-15% for the quantitative methods, and approximately 20% for the previously used unstructured, subjective forecasts. More recently, Robeson (1988) and Ono (1994)

conducted studies that repeated a Delphi panel to test for reliability. In both cases, the results

reflected reliability with the previous Delphi panel, taking into account any changes in trends.

Data Collection and Triangulation

In order to make this study robust three data collection methods were triangulated (see

Figure 3.2). Each data collection method has inherent strengths and weaknesses. Therefore, if

similar results are achieved using different data collection methods, there can be greater

confidence in the results than if a single data collection method was used (Patton, 1990). Use of

more than one data collection method to investigate the same issue can also help highlight

nuances of the issue that might not be noticed using a single method. The triangulated data are

more reliable and valid than those collected merely using one source (Patton, 1990).
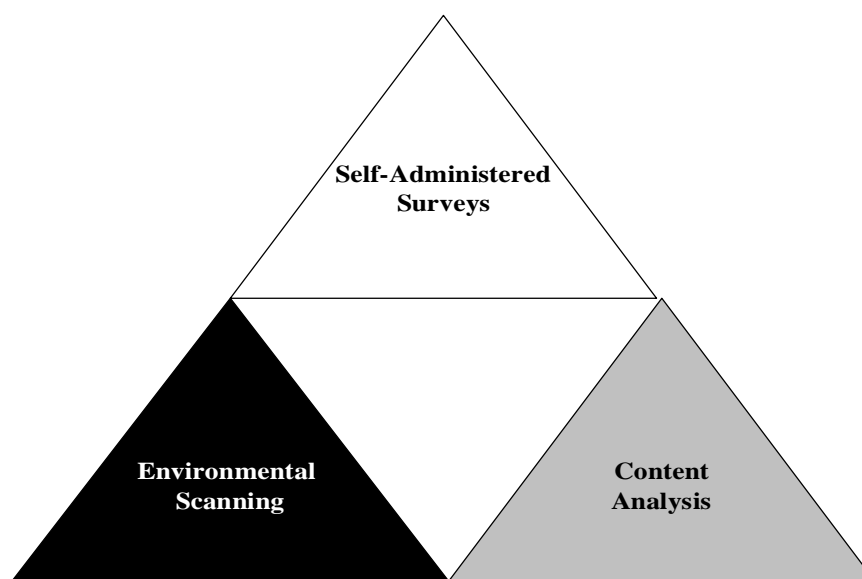
Figure 3.2: Triangulation of data collection techniques

The initial step involved in this study was an environmental scan that was initiated because of the author's experience with competency development and interest in innovation. Stines (2003, p. 94) states that:

> Environmental scanning is the process of monitoring an environment in order to obtain information that can guide decision-making and planning processes (Aguilar, 1967). The approach can be proactive and exploratory when used to anticipate problems or discover opportunities (Choudhury & Sampler, 1997). Additionally, environmental scanning can be used to identify events and trends in an environment; to identify and explain relationships between them and to enhance decision making and planning (Costa 1995; Costa & Teare, 2000).

The trend that was identified was the need for organizations to be innovative in times of economic challenge (as explained in chapter 1 of this dissertation). The environmental scan for this study took place from 2001 to 2004 and included (a) discussions with workplace learning and performance professionals about competency development, (b) being part of competency development initiatives, (c) discovering the industry focus on innovation, (d) following current business events and trends, (e) meeting with high-level pharmaceutical and high-tech industry executives to discuss the need to innovate, and (f) understanding the current academic interests in innovation. Considering this portion of the environmental scan, the researcher decided a study was warranted and began a literature review. The literature review for the current study uncovered more than 1,500 available sources—those sources that were applicable or that did not restate known sources were used in this study. Therefore, the literature discussed in this dissertation should represent an exhaustive approximation of the entire body of literature on the topic.

Content analysis was used to analyze the first iteration in the Modified Delphi methodology. Berelson (1952) defines content analysis as "a research technique for the objective, systematic, and quantitative description of the manifest content of communications"

(p.). The initial step in completing a content analysis is to identify the theory and rationale of the analysis. According to Krippendorff (2004), six questions must be addressed in every content analysis: (a) Which data are analyzed? (b) How are they defined? (c) What is the population from which they are drawn? (d) What is the context relative to which the data are analyzed? (e) What are the boundaries of the analysis? and (f) What is the target of the inferences? The next step is to define the variables conceptually. The variables are then given operational definitions. At this point, a codebook is created and a set of rules is defined based upon the operational definitions. Coders are trained, code the sample, and meet to discuss the results of the analysis (Neuendorf, 2002).

Face validity is the most common measure of validity in content analysis (Stines 2003). Babbie (1998) describes face validity as "particular empirical measures that may or may not jibe with our common agreements and our individual mental images concerning a particular concept" (p. 156). Holsti (1969) suggests that if a study is descriptive, face validity is generally sufficient and is "established through the informed judgment of the investigator" (p. 143). In order to ensure the reliability of the content analysis, this study used Krippendorff's (2004) alpha reliability to measure inter-rater reliability.

Krippendorff's alpha reliability is a reliability coefficient that measures the agreement between coders. It was specifically designed to measure reliability in content analysis where two or more coders are completing the analysis. The measure takes into account (a) the number of observers, (b) the number of categories of analysis, (c) the specific type of data, (d) incomplete or missing data, and (e) sample size. Likewise, the measure evaluates one variable at a time. Krippendorff's alpha reliability is computed in thee steps. First, a reliability data matrix is

constructed indicating the units coded. Second, coincidences within units are tabulated. Finally, alpha reliability is calculated (Krippendorff, 2004).

Self-administered surveys were the primary tool for data collection in iterations two and three of this study. Survey research is one of the (a) oldest, (b) most common, and (c) most accepted forms of research. Likewise, of the 50 Modified Delphi competency study methodologies identified (see Table 3.1) survey research was the most common methodology used. Stines (2003 p.104) states that:

> Babbie (1989) recommends that the researchers set up a systematic process to monitor returns and code the data so that they track the number of non-respondents. He also recommends an organized system to follow up on non-respondents and recommends waiting 2 to 3 weeks before the follow-up. The latter should contain not only a reminder letter but also a new copy of the instrument in case the instrument from the initial mailing was lost or misplaced.

The current study used email rather than the United States Postal Service in following this strategy. The advantages of self-administered surveys are that they: (a) are inexpensive, (b) are less time-consuming when compared to interviews, (c) are standardized for ease of data analysis, and (d) are reliable because the researcher is not directly involved in the data collection process (Babbie, 1989). Unfortunately, self-administered surveys can also: (a) allow for very little flexibility considering the environment, (b) are limited to only the subject's perception, and (c) are reliant on the subject's recollection of the event. The validity of the survey is largely dependent upon a comparison of the participant's responses with the content analysis data and data from environmental scanning and selecting participants who are highly qualified to participate in the Modified Delphi panel.

Participant Selection

Earlier in this chapter (see Table 3.1) 50 studies were listed that have identified the competencies of various populations. The sample sizes of expert panels in the studies had a range

of 3 to 92 experts. The average sample size was 24. Cegles (1998) states that "There appears to be little or no agreement that exists concerning the optimum size of the Delphi panel of experts" (p. 63). However, Brooks (1979) states that "it is unlikely that improved results are achieved with groups of more than 25" (p. 63). The current study used a sample size of 35 participants to: (a) reflect a sample greater than the average of all previous studies, and (b) reflect a sample greater than the minimum suggested by the literature. A pool of 35 participants (17 academic and 18 professional) was identified.

Czinkota and Ronkainen (1997) state that "the selection of the experts is critical to the success of a Delphic study" (p. 152). Likewise, much of the validity of a Delphi methodology is dependent upon the selection of experts. Participants were selected using a purposive non-probabilistic sampling technique (Babbie, 1989; Fowler, 1993; Huck, 2000) mixed with a snowball approach (Patton, 1990). Although not randomized, purposive non-probabilistic sampling is common when identifying experts in a Delphi panel and was common among approximately 95% of the studies listed (see Table 3.1) although not always identified as such. The snowball approach was identified in approximately 75% of the studies. Purposive sampling is useful when identifying participants whot have specific characteristics, such as experts in innovation leadership. Likewise, snowball sampling is especially useful when trying to reach populations that are inaccessible or hard to find. The criteria for inclusion in the study were developed using the literature review in chapter 2, the 50 previous competency studies (see Table 3.1), and the work of Stines (2003) and Daniels (2002).

A pool of participants was identified using (a) the literature, (b) web searches, (c). professional organizations and (d) speaking with currently known experts. An expert, as defined by Daniels (2002), should be verified using the participant's resume or curriculum vita. The

criteria for inclusion were verified by each participant and the researcher by reviewing the participant's resume or curriculum vitae. The resume or curriculum vita was analyzed for both academics and professionals in terms of relevant (a) education, (b) work or consulting experience, (c) professional activities or service, and (d) publications. Care was taken to identify possible inflations of qualifications. The specific criteria for this study appear in Table 3.2. Participants who met the criteria were then asked to nominate other participants whom they felt would also qualify.

Table 3.2

Criteria for participants.

Academic Participants	Professional Participants
Earned PhD. or EdD.	Earned a BS. or BA.
5 years of experience with innovation and leadership initiatives.	10 years of experience with innovation and leadership initiatives.
Membership in at least 1 professional organization.	Membership in at least 1 professional organization.
Presented about innovation and leadership at at least 3 conferences.	Attended at least 3 presentations about innovation and leadership at conferences.
Published at least 3 articles or one book in area of innovation and leadership.	Participated in at least 5 projects in area of innovation and leadership initiatives.

Survey Design

The three iteration Delphi methodology included an initial qualitative survey to discover and categorize the competencies that can be attributed to innovation leaders. Categories for this survey were established using the literature review in chapter 2. According to Dembro (1991), a survey should exhibit the following characteristics: (a) take into account the short-term processing capacity of an adult, (b) have a readable typeface, (c) have clear directions, and (d) have a compatible media and format. The format that was used was a Microsoft Word document, a format that is available to all academics and professionals through their institutions and for each major operating system, including (a) MacOS, (b) Microsoft Windows, (c) Linux, and (d) Unix.

Two pilot studies of the first and second iteration survey were conducted using cognitive interviews to discover and clarify the weaknesses of the instruments. The cognitive interviewing technique is used to evaluate sources of response error in questionnaires. It focuses on the cognitive processes that participants use to answer survey questions (Willis, 1999). A combination of pilot survey questionnaires and follow-up telephone interviews were given to 15 randomly selected participants from the participant pool. During the cognitive interview, participants were asked questions about their (a) comprehension of the question, (b) retrieval of relevant information from memory, (c) decision process, and (d) response process. In the follow-up telephone interviews, the verbal probing technique was used. In this technique, the researcher asks the survey question and then asks follow-up questions to probe more deeply into the meaning of the participant's initial response. Specific probes were scripted before the interviews commenced. The advantages of the verbal probing technique are that (a) the interviewer has greater control over the interview and (b) there is greater ease in training participants to answer probe questions. The interviewer can keep the interview focused in order to avoid irrelevant information. However, participants can come to expect probes and still offer their own spontaneous thoughts or critiques. Scripted probes are advantageous because they provide guidance through a structured protocol and can easily be repeated for multiple participants. Data for the pilot study were analyzed using Willis's (1999) recommendation to aggregate qualitative data on a question by question basis. Probes were included with any other extraneous comments. The final annotated cognitive interviewing questionnaire was the main report on the improvement of the iteration one questionnaire.

The surveys for the second and third iteration included quantitative measures and were tested for inter-rater reliability. The third iteration survey included a version for academics and a

version for professionals. All four surveys were communicated via email to and from the

researchers. Participants were given at least three weeks to complete the survey. Each survey was

designed to be completed in less than one hour. Before participants agreed to complete the

survey, they read and indicated informed consent.

Data Analysis

Data for the first iteration of the study were analyzed using qualitative content analysis to

discover the meanings of patterns and clusters of competencies and were treated as nominal data.

The most effective qualitative approaches to content analysis develop the categories as aspects of

interpretation that are as near as possible to the textual data. Mayring (2000) has developed a

specific procedure for deductive category application that was used to analyze the qualitative

data from the first iteration of the Delphi methodology. The first step in the process after the

development of a research question was to determine the definitions of each category (criterion

of selection). The second step was to create the coding rules and codebook and to train the coders

in their use. In the third step, data were analyzed by the coders. In the fourth step, coders met to

discuss the results of the analysis. This step is considered to be a formative check of reliability of

this method of analysis. The fifth step was to analyze the data again from the beginning,

incorporating any changes that were made to the codebook during the formative check of

reliability. The fifth step is considered to be the summative check of reliability of this method of

analysis. Finally, Krippendorf's (2004) alpha reliability was computed to measure the agreement

between coders. Data from the final set of categories were input into the second iteration

instrument.

Data for the second and third iterations of the study were quantitative and analyzed using

SPSS, Microsoft Excel, and Siegle's (2005) Reliability Calculator, an MS Excel add-on. The

independent variable in the study was the expert group, was nominal data, and appeared in two states: (a) professional and (b) academic. The dependent variable in the study was the competency rating, was ordinal data, and appeared in two categories of states, including (a) 5 states for each Likert-type scale division and (b) 3 states for being an expert competency, core competency, or supplemental competency. The Likert-type scale ranged from 1, most important, to 5, least important. Expert competencies were identified as a Likert-type value of 1 and were defined as necessary for the adoption of an innovation. Core competencies were identified as Likert-type values of 2 and were defined as necessary for the completion of all core job functions. Supplemental competencies were identified as Likert-type values of 3-4 and were defined as not necessary for the completion of core job functions but used quarterly (Likert-type value 3) or not necessary for the completion of core job functions but used yearly (Likert-type value 4). Likert-type values of 5 indicated that the competency should be removed from the model.

Ordinal data suggest the use of non-parametric, non-inferential statistics (Stines, 2003). Central tendency was measured using mean, median, and mode. Dispersion was measured using (a) interquartile range (IQR), (b) standard deviation, (c) variance, and (d) box-and-whisker plots. Level of agreement within groups was measured using Kendall's W coefficient of concordance. Difference between group distributions was measured using the Mann-Whitney U test. Interrater reliability was measured using interclass correlation, or Cronbach's alpha.

The reason for calculating descriptive statistics in iteration two was to provide recommended ratings for iteration three, thus providing a basis for statistical agreement (Stines, 2003). The mean, median, and mode were compared to the interquartile range, using box-and-whisker plots for each competency, resulting in a numerical range of values that could be provided as a recommended rating for iteration three. Competencies that had extensive outlier

ratings were considered controversial competencies. For each controversial competency, a notation was made in the iteration three surveys that a specific number of participants, corresponding directly to the number of outlier ratings, did not agree with the range of values presented.

The reason for calculating descriptive statistics in iteration three was to create a final ranking of competencies for the model. Box-and-whisker plots, variance, and standard deviation provided an initial consideration for the level of agreement, which was then supported by Kendall's coefficient of concordance and the Mann-Whitney U test. Competencies were ranked using Stines' (2003) recommendation to use the sum of mean competency ratings. Ratings for each competency for both professional and academic participants were combined and ranked to one decimal place. Expert competencies included sum mean values from 2 to 3. Core competencies included sum mean values from 3.1 to 5. Supplementary competencies included sum mean values from 5.1 to 9. Competencies were removed from the model if their sum mean value was greater than 9.1.

Chapter 4

Findings

The results of two pilot studies and three iterations of the Delphi methodology are presented chronologically in this chapter. Each step in the Delphi methodology was conducted according to the procedure set forth in chapter 3 (see Figure 3.2). No significant variations to the Delphi methodology occurred during the execution of the study. This chapter begins with an overview of the study participants.

Participants

The participant pool was selected using the criteria and procedures detailed in chapter 3 (see Table 3.2). A pool of 35 participants (17 academic and 18 professional) was identified and participated in iteration one. In iteration two, one academic participant did not complete the survey, creating a pool of 34 participants (16 academic and 18 professional). In iteration three, three professional participants did not complete the survey, creating a pool of 32 participants (17 academic and 15 professional). All participants met at least the minimum requirements, but many far exceeded these requirements.

Participants reported from 5 to 20+ years of work experience. Thirteen participants reported between 5 and 10 years of experience. Ten participants reported between 10 and 15 years of experience. Seven participants reported between 15 and 20 years of experience and five had over 20 years of experience. Regarding level of education, ten participants reported a degree at the bachelor's level, eight participants reported a degree at the master's level, and seventeen participants reported a degree at the doctorate level. Academic participants reported an average

of five publications and four presentations on the topic of innovation. Professional participants reported participation in an average of six projects and attendance of an average of four presentations related to the topic of innovation. All participants reported that they were a member of a professional organization. Fourteen participants reported being an officer or past professional organization officer.

The participant pool represented a wide variety of industries, including: (a) pharmaceutical, (b) software development, (d) telecommunications, (e) higher education, (f) media relations, (e) biotechnology, (f) consumer products, (g) professional organizations, (h) defense, (i) electronics, (j) medical, and (k) financial organizations. Eight incumbent professional participants reported a variety of job titles ranging from four participants at the manager level to two at the VP level. Two professional participants reported director-level positions. Ten professional participants reported that they were consultants working either independently or with an agency. The job titles of seventeen academic participants included: (a) five private researchers, (b) five assistant professors, (c) four associate professors, and (d) three full professors. Thus, the participant pool was assumed to represent a wide variety of perspectives on innovation leaders. This profile of the participants provides the reader with a synopsis regarding the credibility of the participant pool.

Iteration One Pilot Study

Before the first iteration commenced, a pilot study was conducted to test the iteration one survey instrument. Fifteen randomly selected pilot study participants (seven professional and eight academic) were given a pilot survey and follow-up telephone cognitive interview. Pilot study participants were asked nine questions that included eighteen short verbal probes. The

following represents a description of the cognitive interview report that was used to develop the iteration one survey instrument.

In the first pilot question, participants were asked to report on the clarity of the introductory statements in the iteration one survey. Ten participants reported that the introductory statement was clearly written, but did lack depth in the description regarding the point of view respondents should use to identify an innovation leader. A suggestion was made and implemented to clarify whether the descriptions applied to a single leader or to multiple individuals. Clarification was accomplished to distinguish whether a participant was to imagine themselves as an innovation leader or to imagine another individual as an innovation leader, with the latter being the appropriate point of view. If participants were to imagine themselves as an innovation leader, they would lack the third-person point of view necessary to identify behaviors, the key descriptor of competencies. Participants reported three major grammatical errors in the introductory statement that were corrected.

In the second pilot question, participants were asked to report on the possible additions that could be made to the introductory statement. Participants suggested adding information about the desired results of the study and the application of study results. Participants also stressed the importance of the definitions of an innovation leader that were being provided to survey respondents. Care was taken to direct participants to the operational definitions of the study and to use them as the basis for selecting the innovation leader. Participants suggested providing examples of real innovation leaders. This suggestion was not implemented because it would potentially introduce bias into the study. Some participants might not see the examples as truly being able to lead an innovation. Likewise, participants may not have the necessary direct contact with the example to identify their behaviors.

In the third pilot question, participants were asked to report on the clarity of the iteration one directions. Eight participants reported that the directions were clearly written, but clarification was needed on the addition and deletion of categories. Participants reported that this statement should be a separate line item in the directions. Participants reported that they did not know what to do with a category that they had deleted from the study. Participants added only one category of competencies (delegation) and deleted only one category (use of information technology) during the pilot study. Therefore, it was deemed more prudent to eliminate category selection from the iteration one survey and instead use the cognitive interview data to improve and clarify each category. One grammatical error was reported and corrected.

In the fourth pilot study question, participants were asked to report on their comprehension and recall of the directions. Twelve participants reported that they had a clear understanding of the directions, but only after rereading them at least once. Participants reported that they referred back to the directions once they had begun the questionnaire. Participants reread the direction a minimum of one time and a maximum of eight times. Participants reported a second comprehension issue with the addition and deletion of categories. Participants reported that they did not clearly understand whether a category chosen meant a category chosen to remain in the study or a category chosen for deletion from the study. Again, this issue was rectified by eliminating category selection from the iteration one questionnaire.

In the fifth pilot study question, participants were asked to report on how their understanding of innovation leaders was shaped by the operational definitions. Fourteen participants reported that the definitions were well stated and appropriate. Participants reported that the operational definitions were essential to the understanding of an innovation leader and the concept of competencies. Participants reported that they were able to distinguish a

competency from a personality trait or personal characteristics. Likewise, participants reported that a competency can only be understood in terms of behaviors. Most competencies and descriptions generated in the pilot study were behavioral in nature and provided support that the operational definitions shaped participants' understanding of the iteration one survey.

In the sixth pilot study question, participants were asked to report on how they chose categories of competencies and the appropriateness of selecting categories at different stages of the iteration one questionnaire. Ten participants reported that many categories were redundant and that too many categories appeared in the survey. Participants reported that they were unable to generate any additional categories of competencies. Participants reported very few categories that could be deleted from the survey. In verbal probes, participants suggested the following changes to categories: (a) combining creativity and imagination, (b) combining motivation and energy level, (c) combining commitment and sense of ownership, (d) combining communication and emotional intelligence and adding interpersonal skills to the category, (e) combining role identity with power and politics, and (f) adding the category of management and delegation. Changes to each of these categories were made in the final iteration one survey.

In the seventh pilot study question, participants were asked to report on the clarity and understanding of sample competency descriptions. Eleven participants reported that sample competency descriptions were clearly written and were helpful in guiding the generation of competencies. Participants did not agree that the sample competency was appropriate for each category. Considering the suggestions made in pilot study question number six with regard to changing the categories of competencies, verbal probes in question seven focused on identifying the most accurate sample competency description for each new category. Thus, participants identified the sample competencies that were used in the final iteration one survey.

In the eighth pilot study question, participants were asked to report any other issues outside of the previous seven pilot questions that hindered their ability to complete the iteration one questionnaire. Participants were asked verbal probes about the number of slots available for the adding of competencies. Twelve participants reported that an adequate number of slots were provided to list the competencies that were generated. After a review of the pilot study survey, it was found that no participants exceeded the four slots that were provided. Some confusion was again reported about redundant categories. Grammatical errors were reported and corrected. Thirteen participants reported that the survey was thorough and provided adequate guidance to generate the competencies of innovation leaders.

In the final pilot study question, participants were asked to report on how long it took them to complete the iteration one survey. Completion times ranged from 25 minutes to 100 minutes. Ten participants reported that it took between 35 and 45 minutes to complete the survey. Three participants reported that it took over one hour to complete the survey. Two participants took less than 30 minutes to complete the survey. In verbal probes, participants reported that approximately one hour was a sufficient indication of the time it would take to complete the iteration one questionnaire.

Iteration One

The initial draft iteration one survey included 13 categories that were suggested by themes in the literature review. The final iteration one survey included 10 categories that were edited and developed after consideration of the results of pilot study one. In order to begin the content analysis using deductive category application (Mayring, 2000), each category was defined using operational definitions discovered in the review of literature. Using these definitions, a codebook was developed (see Appendix). The codebook included the operational

definition, an sample competency description, and the coding rules for each category. Coding rules were developed by making a distinction between each category that may have similar or overlapping competencies.

Two coders, the primary researcher and a graduate student with two years of experience, were given a one-hour training and discussion session. The coders were trained on (a) the rationale and methodology of the study, (b) general content analysis information, and (c) information about deductive category application, and were given an extensive overview of the codebook. Coders were then given one week to code the competencies in the iteration one survey. Coders met again to discuss the results of the formative check of reliability and to clarify any competencies coded into substantively different categories.

Coding rules were reviewed and agreement was made to clarify where each discrepant competency should be placed. It was agreed to delete competencies that were redundant or that did not have a substantive description. Coders were then given one week to conduct the summative check of reliability using the results of the formative check of reliability. Coders again used the codebook and information from the formative discussion meeting to place competencies in the appropriate category. At the final meeting, coders discussed any discrepancies and finalized the listing of competencies that were used in the iteration two survey. The researcher then edited each competency and description for grammar and clarity and prepared the iteration two survey.

The raw iteration one survey generated a total of 235 competencies in 10 categories. After the formative check of reliability, 206 competencies were coded into 10 categories and 29 competencies were eliminated because they did not have a competency title or did not have a substantive description. Forty-eight unique competencies were identified that had a redundant

description (see Table 4.1). Of these, the range of redundant descriptions was from two to six, and the total number of redundant instances of competencies was 135. Coders agreed to choose the most accurate and clearly written description for each redundant competency (Mayring, 2000). If each redundant competency had substantively different descriptions, core defining elements from each redundant description were identified and synthesized into a single description that represented each different perspective on the competency. Thirty-seven competencies were categorically discrepant. Agreement for placement was discussed by the coders and clarified using the codebook. The final result of the formative check of reliability included a total of 119 unique competencies.

Table 4.1

Reduntant competency descriptions at the formative check of reliability

Competency	Number of Descriptions
Use of technical/professional expertise	3
Curiosity	2
Business Acumen	2
Innovative Thinking	4
Problem Solving	3
Analytical Ability	2
Flexibility	3
Champion New Ideas	2
Motivates Others	5
Passion	2
Tenacity	2
Perseverance	2
Welcomes Challenges	4
Establishes Trust Culture	2
Takes Responsibility	3
Sense of Pride	2
Dedication	6
Visionary Leadership	2
Manages Vision	2
Develops a Global Mission	2
Explores Non-verbal Cues	4
Communication	5
Participates in Active Listening	3
Translates Literal Speech	2
Exemplary Writing Skills	3
Builds Relationships	2
Clarification	2
Feedback	2
Open Door Policy	2
Understands Own Emotions	3
Interpersonal Communication	2
Objectivity	3
Teamwork	3
Group Support	3
Empowerment	3
Team Leader	2
Train or Educate Others	2
Knowledge of Competitors	3
Establishes Common Interests Outside of Work	2
Political Savvy	5
Professionalism	2
Diplomacy	3
Time Management	3
Planning and Project Management	4
Delegation	3
Multitasking	2
Team Motivation	3
Impact and Influence	4

During the summative check of reliability, coders again used the codebook to analyze the 119 competencies developed during the formative check of reliability. Coders met after one week to discuss the results of the summative check of reliability and discovered that 10 unique competencies had a total of 21 redundant descriptions with a range of two to three occurrences (see Table 4.2). Again, coders agreed to choose the most accurate and clearly written description for each redundant competency (Mayring, 2000). If each redundant competency had substantively different descriptions, core defining elements from each redundant description were identified and synthesized into a single description that represented each different perspective for the competency. Coders agreed on the category in which all remaining discrepant competencies should be placed. A final total of 98 competencies were included in the iteration two survey.

Table 4.2

Redundant competency descriptions at the summative check of reliability

Competency	Number of Descriptions
Values Higher Education	2
Knowledge Transfer	3
Generates New Ideas	2
Analytical Thinking	2
Shows Tenacity	2
Takes Responsibility	2
Establishes Feedback Loops	2
Takes Initiative	2
Visionary Leadership	2
Selects and Uses Appropriate Communication Methods	2

Krippendorff's alpha reliability was used to measure category agreement between coders after the summative check of reliability. The measure requires data about (a) the number of observers, (b) the number of categories of analysis (c) the specific type of data, (d) incomplete or

missing data, and (e) sample size. The number of observers/coders was two. The number of

categories was ten. The data was nominal and there was no incomplete or missing data. Each

coder coded the full sample of 98 competencies. Krippendorff's alpha reliability was computed

in three steps using Hayes' (2005) SPSS macro. First, a reliability data matrix was constructed

indicating the competencies coded. Second, coincidences within competencies were input and

tabulated. Finally, alpha reliability was calculated. The range of possible outcomes for alpha

reliability is 0.0 to 1.0 (Krippendorff, 2004). The alpha reliability of the content analysis was

.6832 and represents an acceptable level of reliability.

<center>*Iteration Two Pilot Study*</center>

Before the second iteration commenced, a pilot study was conducted to test the iteration

two survey. Fifteen randomly selected pilot study participants (seven professional and eight

academic) were given a pilot survey and follow-up telephone cognitive interview. Pilot

participants were asked nine major questions that included 18 short verbal probes. The following

represents a description of the cognitive interview report that was used to finalize the iteration

two survey.

In the first pilot question, participants were asked to report on the clarity of the

introductory statement in the iteration two survey. Twelve participants reported that the

introductory statement was worded clearly and concisely. Three participants reported that they

were unsure of the correct perspective to use when identifying an innovation leader. The specific

question identified was, "Should the ratings be based upon an actual innovation leader's

competencies or the informed judgment of the expert participant's experience?" In the interest of

clarity, both of these perspectives were combined in the introductory statement because the

participant's expertise may either be in practice, in theory, or in both practice and theory. A combination of these perspectives provides a synthesis of both practical and theoretical expertise.

In the second pilot question, participants were asked to report on the addition of information to the introductory statement in the iteration two survey. Thirteen participants reported that the introductory statement was sufficient and needed no additional information. Two participants reported that clarification should be made about the purpose and outcome of the study. A statement was added to the introduction of iteration two linking (a) the competency ratings in the iteration two survey, (b) the need for consensus about each of the three iterations of the Delphi methodology, and (c) the development of a competency model of innovation leaders.

In the third pilot question, participants were asked to report on the clarity of the iteration two directions. Fourteen participants felt that the iteration two directions were clearly written. One participant suggested adding a short initial description of the rating scale to clarify the values of the range of possible responses. A statement was added to the iteration two directions to clarify that one was the most important rating and five was the least important rating.

In the fourth pilot question, participants were asked to report on their understanding and comprehension of the iteration two directions. Ten participants reported that they had a clear understanding of the directions after initially reading through them. Participants reported that they referred back to the directions once they had begun to answer the questionnaire. Participants reread the directions a minimum of one time and a maximum of four times. One other comprehension issue dealt with reversing the rating scale. One participant rated the first category of competencies using five as most important and one as least important. Again, this issue was rectified by adding a statement to the directions to clarify that one was the most important rating and five was the least important rating.

In the fifth pilot study question, participants were asked to report on how the participants' understanding of innovation leaders was shaped by the operational definitions. Fourteen pilot participants reported that the operational definitions were well stated and appropriate. Participants reported that the operational definitions: (a) helped them to understand what is expected of an innovation leader, (b) helped them to choose and reflect upon an innovation leader, (c) increased their knowledge about innovation leaders, and (d) helped to clarify the importance of each of the categories of competencies. One participant reported that the operational definitions were adequate but did not have an effect on his/her ratings of competencies because they relied exclusively on his/her envisioned ideal innovation leader. As the participant was an established expert, they already had an extensive understanding of innovation leaders but felt that the operational definitions should be provided.

In the sixth pilot study question, participants were asked to report on the problems they had rating in the competencies and in understanding the rating scale. Nine participants reported that the rating scale was clearly explained and easily understood. Three participants reported that the rating scale should have a value to indicate central tendency. This recommendation was not implemented because the rating scale identifies three specific states of competencies: expert, core and supplementary. Three participants suggested clarification of the rating scale within the expert, core, and supplementary states of competencies. This recommendation was implemented and the layout of the rating scale was streamlined and color-coded to more clearly reflect the differences between values on the rating scale.

In the seventh pilot study question, participants were asked to report on the utility and clarity of competency descriptions in their understanding of the competency. Fifteen pilot study participants reported that the competency descriptions were very clear and useful in rating the

competencies. Participants reported the following positive comments about the competency descriptions: (a) "most competencies I understood without reading the descriptions but they verified my understanding of how to rate the competency," (b) "without the descriptions, I am not sure I could have rated some of the competencies," (c) "I commend whoever created these descriptions, they are clear and concise," and (d) "I will use these descriptions to further clarify competencies and fundamental behaviors in my work." Due to the positive feedback about the competency descriptions, no changes were made to further clarify each competency and description.

The eighth pilot study question asked participants to report on any other issues related to the iteration two survey that hindered their ability to rate the competencies. A majority of 13 pilot participants reported that no other issues hindered their ability to rate the competencies. Two participants suggested narrowing the rating scale from five Likert-type scale divisions to four divisions, combining two categories of supplementary competencies into one category of supplementary competencies. Although this was possible during the final ranking of competencies, this recommendation was not implemented. As suggested by Stines (2003), a Likert-type scale of greater divisions allows a more in-depth rating and provides a much greater dispersion of the data for analysis. Therefore, the survey maintained a Likert-type scale of five divisions.

In the final pilot study question, participants were asked to report on the length of time it took to complete the iteration two survey. Completion times ranged from 21 minutes to 80 minutes. Ten participants reported that it took them between 35 and 50 minutes to complete the questionnaire. Three participants took at least one hour to complete the questionnaire. Two participants took less than 30 minutes to complete the questionnaire. In verbal probes,

participants reported that approximately 45 minutes was a sufficient indication of the time it would take to complete the iteration two survey.

Iteration Two

The iteration two survey provided participants with an initial attempt to rate competencies in terms of importance. A single survey was sent via email to each participant. Participants were asked to rate competencies using a five point, Likert-type scale as developed in pilot study two. Participants were given three weeks to complete the survey. When the researcher received the completed surveys, descriptive and inferential statistics were calculated to prepare the third iteration survey. A total of 34 participants completed the survey, including 16 academic participants and 18 professional participants.

Descriptive statistics included measures of central tendency and standard deviation. In order to develop two versions of the third iteration survey, one for professionals and one for academics, descriptive statistics were presented separately for each population (see Tables 4.3–4.6). Box-and-whisker plots were prepared for each competency to (a) provide a range of the iteration two competency ratings for use in iteration three, and (b) discover any discrepancies between the measures of central tendency and the interquartile range of ratings for each competency. When the SPSS box-and-whisker plot showed substantial major or minor outlier competency ratings, the competency was labeled "controversial" (see Figures 4.1 and 4.2). Once identified, controversial competencies were given special care in the iteration three survey. Not only would the central tendency value and interquartile range be presented as the iteration two competency expert rating, but also the number of experts (outlier ratings), which did not agree within this range.
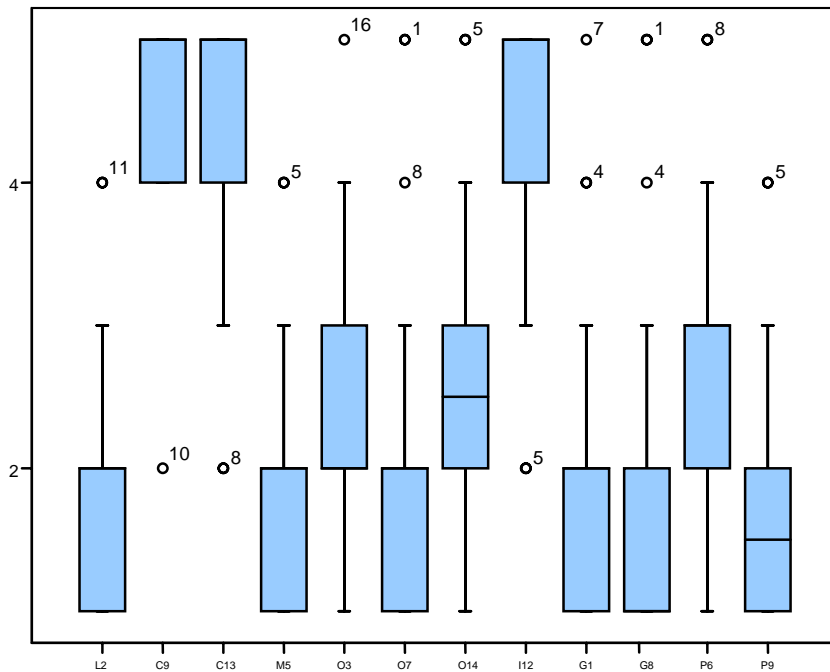
Figure 4.1: Controversial competencies round 2 professional. X-axis: Competency, Y-axis: Rating.
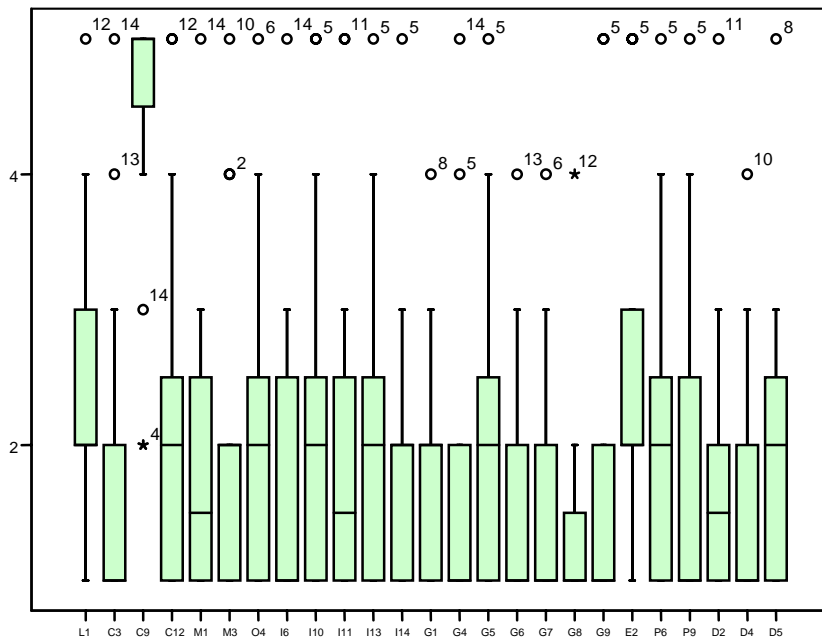
Figure 4.2: Controversial competencies round 2 academic. X-axis: Competency. Y-axis: Rating.

Table 4.3

Iteration 2 descriptive statistics for professionals (part one)

Competency	M	Mdn	Mode	SD
L1	2.38	2.00	2.00	1.31
L2	1.75	2.00	1.00	0.86
L3	2.56	3.00	1.00	1.41
L4	3.13	3.00	3.00	1.20
L5	3.06	3.00	3.00	1.34
L6	2.75	2.50	1.00	1.77
L7	3.25	3.00	5.00	1.44
L8	1.88	1.00	1.00	1.41
L9	3.00	3.00	5.00	1.51
C1	1.88	2.00	1.00	0.81
C2	2.44	2.00	1.00	1.59
C3	2.63	2.00	2.00	1.36
C4	2.94	3.00	5.00	1.48
C5	3.94	4.00	5.00	1.06
C6	2.38	2.50	3.00	1.09
C7	3.50	3.00	3.00	1.26
C8	3.19	3.00	3.00	1.22
C9	4.56	5.00	5.00	0.81
C10	3.88	4.00	4.00	1.09
C11	2.69	2.50	1.00	1.54
C12	2.44	2.00	2.00	1.31
C13	4.44	5.00	5.00	1.09
C14	3.88	5.00	5.00	1.54
M1	2.06	2.00	1.00	1.12
M2	2.56	2.50	1.00	1.50
M3	2.19	2.00	2.00	0.83
M4	2.31	2.00	1.00	1.20
M5	1.88	2.00	1.00	1.02
M6	2.56	2.00	2.00	1.26
M7	2.81	3.00	1.00	1.56
M8	3.13	3.00	2.00	1.41
M9	2.44	2.00	2.00	1.09
O1	3.81	4.00	4.00	0.83
O2	1.88	1.00	1.00	1.26
O3	2.44	2.00	2.00	1.03
O4	2.56	2.00	1.00	1.59
O5	2.06	2.00	1.00	1.18
O6	2.38	1.50	1.00	1.71
O7	2.25	2.00	2.00	1.34
O8	2.63	2.00	1.00	1.59
O9	2.63	2.00	1.00	1.54
O10	2.63	2.00	1.00	1.67
O11	3.19	3.00	5.00	1.56
O12	2.75	2.50	1.00	1.48
O13	3.06	3.00	3.00	0.93
O14	2.50	2.00	2.00	1.32

Table 4.4

Iteration 2 descriptive statistics for professionals (part two)

Competency	M	Mdn	Mode	SD
V1	2.25	2.00	1.00	1.18
V2	2.31	2.50	1.00	1.35
V3	3.50	3.50	5.00	1.55
V4	3.56	4.00	5.00	1.59
V5	2.63	2.50	2.00	1.20
I1	2.81	2.50	1.00	1.56
I2	2.75	3.00	3.00	1.29
I3	2.88	3.00	2.00	1.36
I4	3.38	3.00	5.00	1.54
I5	2.63	2.00	2.00	1.45
I6	2.75	3.00	4.00	1.24
I7	2.75	2.50	4.00	1.44
I8	3.44	4.00	4.00	1.31
I9	2.38	2.00	1.00	1.54
I10	2.75	2.00	2.00	1.29
I11	2.38	2.00	2.00	1.50
I12	4.31	5.00	5.00	1.14
I13	2.38	2.00	1.00	1.31
I14	2.44	2.00	1.00	1.41
I15	3.06	3.00	3.00	1.39
I16	2.94	2.50	1.00	1.61
I17	2.50	2.00	2.00	1.26
I18	2.81	3.00	3.00	1.22
G1	2.00	1.50	1.00	1.32
G2	2.31	2.00	1.00	1.45
G3	2.06	1.50	1.00	1.39
G4	2.44	1.50	1.00	1.63
G5	2.13	2.00	1.00	1.41
G6	2.06	1.50	1.00	1.29
G7	2.00	2.00	1.00	0.97
G8	2.00	1.00	1.00	1.46
G9	2.31	2.00	2.00	1.35
E1	3.44	4.00	4.00	1.36
E2	3.31	3.50	2.00	1.35
E3	3.56	3.50	5.00	1.21
E4	3.38	3.50	2.00	1.50
P1	3.13	3.00	2.00	1.41
P2	2.81	3.00	1.00	1.42
P3	2.88	3.00	3.00	1.20
P4	3.88	4.50	5.00	1.36
P5	3.56	3.50	5.00	1.26
P6	2.69	3.00	3.00	1.30
P7	2.38	2.00	2.00	1.15
P8	3.69	4.00	5.00	1.30
P9	1.81	1.50	1.00	1.05
P10	2.25	2.00	1.00	1.34
D1	2.25	2.00	1.00	1.39
D2	1.94	1.00	1.00	1.29
D3	2.44	2.00	1.00	1.41
D4	2.50	2.00	2.00	1.37
D5	2.69	2.00	2.00	1.54
D6	2.25	1.00	1.00	1.73

Table 4.5

Iteration 2 descriptive statistics for academics (part one)

Competency	M	Mdn	Mode	SD
L1	2.43	2.00	2.00	1.15
L2	1.63	2.00	2.00	0.62
L3	2.44	2.00	2.00	1.41
L4	2.44	2.50	1.00	1.26
L5	2.63	2.00	2.00	1.15
L6	2.19	2.00	1.00	1.38
L7	3.25	3.00	3.00	1.39
L8	2.38	2.00	1.00	1.20
L9	3.69	4.00	5.00	1.45
C1	2.31	2.00	1.00	1.25
C2	2.44	2.00	1.00	1.36
C3	1.69	1.00	1.00	1.25
C4	2.06	1.50	1.00	1.29
C5	3.00	2.50	2.00	1.55
C6	2.31	2.00	1.00	1.30
C7	2.63	2.50	1.00	1.50
C8	2.81	3.00	4.00	1.42
C9	4.44	5.00	5.00	1.09
C10	3.31	3.00	5.00	1.62
C11	2.56	2.50	2.00	1.26
C12	2.13	2.00	1.00	1.41
C13	4.56	5.00	5.00	0.89
C14	4.19	4.00	5.00	0.91
M1	1.88	1.50	1.00	1.15
M2	2.19	2.00	1.00	1.42
M3	2.06	2.00	2.00	1.24
M4	2.31	2.00	1.00	1.25
M5	1.63	1.50	1.00	0.72
M6	2.13	2.00	1.00	1.36
M7	3.13	3.00	5.00	1.63
M8	2.75	2.00	2.00	1.44
M9	2.13	2.00	2.00	1.09
O1	2.44	2.00	2.00	1.26
O2	2.38	2.00	1.00	1.59
O3	2.13	2.00	1.00	1.41
O4	2.19	2.00	2.00	1.22
O5	2.19	1.00	1.00	1.60
O6	2.38	2.00	1.00	1.50
O7	2.13	2.00	1.00	1.50
O8	2.00	1.00	1.00	1.41
O9	2.69	2.00	1.00	1.89
O10	2.19	2.00	1.00	1.28
O11	2.13	1.50	1.00	1.45
O12	2.69	3.00	1.00	1.66
O13	2.50	2.00	1.00	1.51
O14	2.13	2.00	1.00	1.20

Table 4.6

Iteration 2 descriptive statistics for academics (part two)

Competency	M	Mdn	Mode	SD
V1	2.56	2.00	2.00	1.36
V2	2.00	2.00	2.00	0.89
V3	2.50	2.00	1.00	1.55
V4	2.63	2.50	1.00	1.59
V5	2.56	2.00	2.00	1.03
I1	2.94	3.00	1.00	1.53
I2	2.44	2.00	1.00	1.36
I3	2.38	2.00	1.00	1.45
I4	3.25	3.50	4.00	1.44
I5	1.94	1.00	1.00	1.39
I6	1.81	1.00	1.00	1.17
I7	1.88	2.00	1.00	0.96
I8	2.56	2.00	2.00	1.55
I9	1.94	2.00	1.00	1.06
I10	2.19	2.00	2.00	1.38
I11	2.00	1.50	1.00	1.37
I12	3.69	3.50	5.00	1.35
I13	2.06	2.00	1.00	1.29
I14	1.94	2.00	2.00	1.06
I15	2.75	2.00	2.00	1.53
I16	2.50	2.00	1.00	1.55
I17	2.56	2.00	1.00	1.55
I18	2.63	2.50	1.00	1.63
G1	1.81	2.00	1.00	0.91
G2	1.44	1.00	1.00	0.63
G3	2.06	1.50	1.00	1.24
G4	1.75	1.00	1.00	1.18
G5	2.00	2.00	1.00	1.21
G6	1.69	1.00	1.00	0.95
G7	1.63	1.00	1.00	0.89
G8	1.38	1.00	1.00	0.81
G9	1.81	1.00	1.00	1.33
E1	2.56	2.00	1.00	1.50
E2	2.63	2.00	2.00	1.36
E3	2.63	2.00	2.00	1.54
E4	3.69	4.00	5.00	1.30
P1	2.69	3.00	3.00	1.35
P2	2.75	3.00	2.00	1.13
P3	2.50	2.00	1.00	1.41
P4	2.81	3.00	3.00	1.38
P5	2.56	2.00	2.00	1.55
P6	2.06	2.00	1.00	1.29
P7	2.00	1.50	1.00	1.41
P8	2.44	2.00	1.00	1.71
P9	1.75	1.00	1.00	1.29
P10	2.13	1.00	1.00	1.50
D1	1.56	1.50	1.00	0.63
D2	1.75	1.50	1.00	1.06
D3	1.69	2.00	1.00	0.70
D4	1.63	1.00	1.00	0.89
D5	1.94	2.00	1.00	1.12
D6	1.50	1.00	1.00	0.73

Consideration of the inferential statistics in iteration two led to three hypotheses. Each used Kendall's W statistic to calculate the level of agreement within groups for professional participants and academic participants using SPSS. The first iteration two hypothesis tested the level of agreement among professional participants. H_0: There is no agreement in regard to competency ratings within the group of professional participants (W=0, p<.01). H_1: There is agreement with regard to competency ratings within the group of professional participants (W>0, p<.01). For professional participants in iteration two, H_0 was rejected (W=.184, p<.01). However, it should be noted that the W value indicates a low level of agreement among professional participants.

The second iteration two hypothesis tested the level of agreement among academic participants. H_0: There is no agreement with regard to competency ratings within the group of academic participants (W=0, p<.01). H_2: There is agreement with regard to competency ratings within the group of academic participants (W>0, p<.01). For academic participants in iteration two, H_0 was rejected (W=.216, p<.01). However, it should be noted that the W value indicates a low level of agreement among academic participants but a slightly higher level of agreement than for professional participants in iteration two.

The third iteration two hypothesis tested the level of agreement among all iteration two participants. H_0: There is no agreement in regard to competency ratings within the group of all iteration two participants (W=0, p<.01). H_3: There is agreement in regard to competency ratings within the group of all iteration two participants (W>0, p<.01). For participants in iteration two, H_0 was rejected (W=.176, p<.01). However, it should be noted that the W value indicates a low level of agreement and that the overall level of agreement was lowest for the grouping of all participants when compared to professional or academic participants alone. These measures were

used later to compare the level of agreement within groups in iterations two and three for both professional participants and academic participants to discover if the Delphi method encouraged a higher level of agreement in iteration three. Therefore, low levels of agreement within groups in iteration two were anticipated. Cronbach's alpha was calculated to test the reliability of the iteration two survey. Siegle's (2005) Reliability Calculator, an MS Excel add-on, was used to calculate this statistic. The reliability using data sets from both professional and academic participants was .96, a high value for this measure.

Iteration Three

The iteration three survey provided participants with the opportunity to rate competencies in terms of importance, knowing the results of the iteration two survey. A single survey was sent via email to each participant. Two versions of the iteration three survey were prepared—one for academic participants and one for professional participants. Participants were asked to rate competencies using a five point, Likert-type scale as developed in pilot study two. Participants were given three weeks to complete the survey. When the researcher received the completed surveys, descriptive and inferential statistics were calculated to prepare the competency model for innovation leaders. A total of 32 participants completed the survey, including 17 academic participants and 15 professional participants.

Descriptive statistics included measures of central tendency and standard deviation. Because there were two versions of the iteration three survey, one for professionals and one for academics, descriptive statistics were presented separately for each population (see Tables 4.7–4.10). Box-and-whisker plots were prepared for each competency to discover any discrepancies between the measures of central tendency and the interquartile range of ratings for each competency. Box-and-whisker plots showed no substantial major or minor outlier competency

ratings that would affect the final ranking of competencies. Likewise, interquartile ranges for

each competency indicated no major range deviations when compared to measures of central

tendency, as expected, considering the inherent focus on agreement of a Delphi study.

Table 4.7

Iteration 3 descriptive statistics for professionals (part one)

Competency	M	Mdn	Mode	SD
L1	2.07	2.00	2.00	0.26
L2	1.33	1.00	1.00	0.49
L3	2.53	3.00	3.00	0.64
L4	2.87	3.00	3.00	0.74
L5	2.60	3.00	2.00	0.63
L6	2.80	3.00	3.00	0.86
L7	2.93	3.00	3.00	0.70
L8	2.13	2.00	2.00	0.35
L9	2.27	2.00	2.00	0.59
C1	1.93	2.00	2.00	0.46
C2	2.47	3.00	3.00	0.64
C3	2.13	2.00	2.00	0.74
C4	2.40	2.00	2.00	0.74
C5	4.07	4.00	4.00	0.70
C6	2.33	2.00	2.00	0.62
C7	3.20	3.00	3.00	0.56
C8	2.93	3.00	3.00	0.46
C9	4.80	5.00	5.00	0.41
C10	3.87	4.00	4.00	0.64
C11	2.40	2.00	2.00	0.91
C12	2.27	2.00	2.00	0.59
C13	4.80	5.00	5.00	0.56
C14	4.27	4.00	4.00	0.70
M1	2.00	2.00	2.00	0.53
M2	1.80	2.00	2.00	0.68
M3	2.00	2.00	2.00	0.53
M4	2.20	2.00	2.00	0.41
M5	1.60	2.00	2.00	0.51
M6	2.33	2.00	2.00	0.62
M7	2.87	3.00	3.00	0.52
M8	3.00	3.00	3.00	0.53
M9	2.60	3.00	3.00	0.51
O1	2.47	2.00	2.00	0.52
O2	1.87	2.00	2.00	0.74
O3	2.00	2.00	2.00	0.53
O4	2.07	2.00	2.00	0.46
O5	1.80	2.00	2.00	0.56
O6	1.93	2.00	2.00	0.59
O7	2.00	2.00	2.00	0.38
O8	1.93	2.00	2.00	0.70
O9	2.40	2.00	2.00	0.63
O10	2.07	2.00	2.00	0.26
O11	2.07	2.00	2.00	0.26
O12	2.60	3.00	3.00	0.83
O13	2.80	3.00	3.00	0.56
O14	2.47	3.00	3.00	0.64

Table 4.8

Iteration 3 descriptive statistics for professionals (part two)

Competency	M	Mdn	Mode	SD
V1	2.13	2.00	2.00	0.35
V2	2.13	2.00	2.00	0.52
V3	3.20	3.00	3.00	0.68
V4	3.13	3.00	4.00	0.83
V5	2.60	3.00	3.00	0.51
I1	2.53	3.00	3.00	0.52
I2	2.33	2.00	2.00	0.49
I3	2.47	2.00	2.00	0.74
I4	3.33	3.00	4.00	0.90
I5	2.87	3.00	3.00	0.64
I6	2.27	2.00	2.00	0.46
I7	2.13	2.00	2.00	0.52
I8	2.13	2.00	2.00	0.83
I9	3.00	3.00	4.00	0.85
I10	2.20	2.00	2.00	0.68
I11	2.20	2.00	2.00	0.68
I12	2.20	2.00	3.00	0.77
I13	4.47	5.00	5.00	0.74
I14	2.27	2.00	2.00	0.70
I15	2.13	2.00	2.00	0.35
I16	2.67	3.00	3.00	0.62
I17	2.53	3.00	3.00	0.52
I18	2.27	2.00	2.00	0.70
G1	2.00	2.00	2.00	0.38
G2	2.33	2.00	2.00	0.49
G3	2.00	2.00	2.00	0.53
G4	2.40	2.00	2.00	0.51
G5	3.87	4.00	3.00	0.92
G6	2.27	2.00	2.00	0.46
G7	1.73	2.00	2.00	0.46
G8	1.80	2.00	2.00	0.56
G9	2.60	3.00	3.00	0.51
E1	2.80	3.00	2.00	0.77
E2	3.27	3.00	3.00	0.59
E3	3.20	3.00	3.00	0.77
E4	3.53	3.00	3.00	0.64
P1	2.80	3.00	3.00	0.41
P2	2.67	3.00	3.00	0.62
P3	2.53	3.00	3.00	0.52
P4	3.73	4.00	4.00	0.80
P5	3.00	3.00	3.00	0.76
P6	2.47	2.00	2.00	0.52
P7	1.80	2.00	2.00	0.41
P8	3.40	3.00	3.00	0.91
P9	1.93	2.00	2.00	0.46
P10	1.60	2.00	2.00	0.51
D1	1.87	2.00	2.00	0.52
D2	1.87	2.00	2.00	0.35
D3	2.27	2.00	2.00	0.46
D4	2.20	2.00	2.00	0.41
D5	2.33	2.00	2.00	0.62
D6	2.00	2.00	2.00	0.00

Table 4.9

Iteration 3 descriptive statistics for academics (part one)

Competency	M	Mdn	Mode	SD
L1	1.59	2.00	2.00	0.62
L2	1.53	1.00	1.00	0.62
L3	2.06	2.00	2.00	0.66
L4	2.29	2.00	2.00	0.59
L5	2.41	2.00	2.00	0.80
L6	1.94	2.00	2.00	0.66
L7	2.82	3.00	3.00	0.64
L8	2.06	2.00	2.00	0.56
L9	2.88	3.00	4.00	1.05
C1	1.59	2.00	2.00	0.51
C2	2.06	2.00	2.00	0.66
C3	1.12	1.00	1.00	0.33
C4	1.82	2.00	2.00	0.64
C5	2.47	2.00	2.00	0.51
C6	1.53	1.00	1.00	0.62
C7	2.29	2.00	2.00	0.69
C8	2.12	2.00	2.00	0.60
C9	4.35	5.00	5.00	0.79
C10	2.94	3.00	3.00	0.66
C11	1.94	2.00	2.00	0.75
C12	1.88	2.00	2.00	0.49
C13	4.35	5.00	5.00	1.00
C14	3.88	4.00	4.00	0.60
M1	1.59	2.00	2.00	0.51
M2	1.53	2.00	2.00	0.51
M3	1.82	2.00	2.00	0.53
M4	1.53	2.00	2.00	0.51
M5	1.35	1.00	1.00	0.49
M6	1.88	2.00	2.00	0.60
M7	2.35	2.00	2.00	0.70
M8	2.29	2.00	2.00	0.47
M9	1.71	2.00	2.00	0.59
O1	2.59	3.00	2.00	0.62
O2	2.06	2.00	2.00	0.56
O3	1.82	2.00	2.00	0.64
O4	1.71	2.00	2.00	0.47
O5	1.65	2.00	2.00	0.61
O6	2.00	2.00	2.00	0.35
O7	1.88	2.00	2.00	0.60
O8	1.47	1.00	1.00	0.62
O9	2.18	2.00	2.00	0.81
O10	1.94	2.00	2.00	0.24
O11	1.88	2.00	2.00	0.49
O12	2.18	2.00	2.00	0.88
O13	2.24	2.00	2.00	0.56
O14	1.71	2.00	2.00	0.47

Table 4.10

Iteration 3 descriptive statistics for academics (part two)

Competency	M	Mdn	Mode	SD
V1	2.12	2.00	2.00	0.70
V2	1.94	2.00	2.00	0.43
V3	2.47	3.00	3.00	0.62
V4	2.59	3.00	3.00	0.87
V5	2.24	2.00	2.00	0.66
I1	2.88	3.00	3.00	0.86
I2	2.06	2.00	2.00	0.66
I3	1.82	2.00	2.00	0.39
I4	3.41	4.00	4.00	0.80
I5	2.35	2.00	2.00	0.49
I6	1.88	2.00	2.00	0.60
I7	2.00	2.00	2.00	0.35
I8	1.47	1.00	1.00	0.51
I9	2.35	2.00	2.00	0.61
I10	1.82	2.00	2.00	0.53
I11	1.94	2.00	2.00	0.24
I12	1.82	2.00	2.00	0.53
I13	3.47	4.00	4.00	0.72
I14	1.88	2.00	2.00	0.49
I15	2.00	2.00	2.00	0.35
I16	2.94	3.00	3.00	0.66
I17	2.59	3.00	3.00	0.62
I18	2.41	2.00	2.00	0.51
G1	1.76	2.00	2.00	0.44
G2	1.18	1.00	1.00	0.39
G3	1.65	2.00	2.00	0.49
G4	1.18	1.00	1.00	0.39
G5	1.82	2.00	2.00	0.53
G6	1.41	1.00	1.00	0.51
G7	1.18	1.00	1.00	0.39
G8	1.06	1.00	1.00	0.24
G9	1.76	2.00	2.00	0.44
E1	2.12	2.00	2.00	0.70
E2	2.47	2.00	2.00	0.62
E3	2.53	3.00	3.00	0.72
E4	3.94	4.00	4.00	0.83
P1	2.65	3.00	3.00	0.49
P2	3.18	3.00	3.00	0.64
P3	2.41	2.00	3.00	0.62
P4	3.12	3.00	3.00	0.70
P5	2.65	3.00	3.00	0.49
P6	2.12	2.00	2.00	0.49
P7	1.94	2.00	2.00	0.43
P8	2.18	2.00	2.00	0.73
P9	1.18	1.00	1.00	0.39
P10	1.76	2.00	2.00	0.44
D1	1.24	1.00	1.00	0.44
D2	1.12	1.00	1.00	0.33
D3	1.18	1.00	1.00	0.39
D4	1.24	1.00	1.00	0.44
D5	1.65	2.00	2.00	0.49
D6	1.18	1.00	1.00	0.39

Considering the inferential statistics in iteration three, five hypotheses were suggested. Four hypotheses used Kendall's W statistic to measure (a) the level of agreement within groups for professional participants, (b) the level of agreement within groups for academic participants, (c) the change in the level of agreement within groups from iterations two and three for professional participants, and (d) the change in the level of agreement within groups from iterations two and three for academic participants. One hypothesis used the Mann-Whitney U test to measure the difference in competency ratings between professional and academic participants. The first iteration three hypothesis tested the level of agreement among professional participants. H_0: There is no agreement in regard to competency ratings within the group of professional participants (W=0, p<.01). H_4: There is agreement in regard to competency ratings within the group of professional participants (W>0, p<.01). For professional participants in iteration three, H_0 was rejected (W=.525, p<.01). It should be noted that the W value indicates an average level of agreement among professional participants.

The second iteration three hypothesis tested the level of agreement among academic participants. H_0: There is no agreement in regard to competency ratings within the group of professional participants (W=0, p<.01). H_5: There is agreement in regard to competency ratings within the group of professional participants (W>0, p<.01). For academic participants in iteration three, H_0 was rejected (W=.539, p<.01). It should be noted that the W value indicates an average level of agreement among academic participants.

The third iteration three hypothesis tested the change in level of agreement among professional participants from iteration two to iteration three. H_0: There was no change in the level agreement for competency ratings within the group of professional participants from iteration two to iteration three (W=.184, p<.01). H_6: There was an increase in the level agreement

for competency ratings within the group of professional participants from iteration two to iteration three (W>.184, p<.001). For professional participants in iteration three, H_0 was rejected (W=.525, p<.01). It should be noted that the result of this hypothesis test indicates a change from a low level of agreement to an average level of agreement among professional participants from iterations two to three.

The fourth iteration three hypothesis tested the change in level of agreement among academic participants from iterations two to three. H_0: There was no change in the level agreement for competency ratings within the group of academic participants from iteration two to iteration three (W=.216, p<.01). H_7: There was an increase in the level agreement for competency ratings within the group of academic participants from iteration two to iteration three (W>.216, p<.01). For professional participants in iteration three, H_0 was rejected (W=.539, p<.001). It should be noted that the result of this hypothesis test indicates a change from a low level of agreement to an average level of agreement among academic participants from iteration two to iteration three.

The fifth iteration three hypothesis tested the difference between groups of academic and professional participants. H_0: There was a statistically significant difference in competency ratings between the groups of academic and professional participants (p>.01). H_8: There was no statistically significant difference in competency ratings between the group of academic and professional participants (p<.01). For academic and professional participants in iteration three, H_0 was rejected (U=6799, z=-5.03 p<.001). It should be noted that the result of this hypothesis test indicates that there is not a statistically significant difference between the distribution of competency ratings for academic and professional participants. Thus, there is support for the overall level of agreement between academic and professional participants.

Cronbach's alpha was calculated to test the reliability of both the professional and academic versions of the iteration three survey. Siegle's (2005) Reliability Calculator, an MS Excel add-on, was used to calculate this statistic. Reliability, using the data set for professional participants, was .88, an acceptable value for this measure. The interrater reliability, using the data set for academic participants, was .83, an acceptable value for this measure. However, it should be noted that even though the reliability value for the second iteration survey was greater at .96, the iteration three survey had two versions that were only completed by roughly half of the number of participants as compared to the iteration two survey. This may account for the decrease in reliability of each version of the third iteration survey.

Chapter 5

Summary, Conclusions, and Recommendations

The competency model of innovation leaders was developed in two and one-half years. Research began with an initial literature review and environmental scan in the summer of 2003. A second environmental scan and literature review were completed in 2004. The study's methodology was developed during the winter of 2004 and spring of 2005. The study received committee and institutional review board approval in late spring of 2005. Three iterations of the Delphi methodology, data analysis, and two pilot studies were completed in six months, beginning in July 2005 and ending in early December 2005. Ranking of competencies was completed in December 2005 and January 2006.

The model represents a rigorous attempt to fill the gaps in and to develop a foundation for future innovation research from the individualist perspective. As this perspective was the least developed of the three suggested by Slappender (1996), it was necessary to define the categories of focus through extensive literature review and environmental scanning, hence the need to conduct these processes twice during the study. Both pilot study one and iteration one allowed innovation experts to further develop the categories of focus into conceptual representations of competencies that could be useful in encouraging the thought processes of study participants. A second pilot study was conducted to refine the rating scale and clarity of the iteration two and three surveys. Special attention was paid to capturing the true meaning of statistical results, especially when developing the rating scale. Defining the true meaning of each of the five points

on the rating scale essentially defined the meaning of the competency model itself as a statistical and organized synthesis of participant data.

The measures of statistical and Delphic agreement were developed using the 50 previous competency studies identified in chapter 3 (see Table 3.1). An attempt was made to streamline the Delphic agreement process while instilling analytical depth by using both qualitative and quantitative data. This entailed choosing a methodology for content analysis of the qualitative data, such as deductive category application (Mayring, 2000). Likewise, care was taken in selecting statistical measures that would most closely match the types of data that would be analyzed. As suggested by Stines (2003), non-parametric statistics provided both the clear analysis of ordinal data and statistical measure of Delphic agreement.

Statistical support for Delphic agreement was evident in both iteration two and iteration three. Each of the eight hypotheses was supported. Although levels of agreement were not high, the change in level of agreement from iteration two to three from a low level of agreement to an average level of agreement was initial support that the Delphi methodology did encourage participant ratings to converge. The Mann-Whitney U test showed no difference between the distributions of participants' ratings, thus adding support to the Kendall's W measures of increased levels of agreement in iteration three. Thus, there is support that the Delphi methodology encouraged agreement with both groups of participants.

Considering the overall strength of the content analysis and survey instruments, Krippendorf's alpha reliability and Cronbach's alpha reliability provided support that both the content analysis procedure and surveys were reliable. Part of this success is due to the completion of two pilot studies. Both pilot studies helped to streamline the directions, operational definitions, rating scale, time requirements for participants, and clarity of the survey

for participants. Thus, the survey reflected Dembro's (1991) recommendations for the requirements of a self-administered survey.

Conclusions

The competency model of innovation leaders establishes and presents three tiers of 98 competencies: (a) expert, (b) core, and (c) supplementary. The model was presented by category and discussed in terms of the relevant literature by category topic. The expert competencies identified suggested a focus on the categories of (a) learning, (b) leading groups and teams, (c) motivation and energy level, and (d) management and delegation. This is a slight departure from Fenwick's (2003) suggestion that focus characteristics from the individualist perspective are (a) learning, (b) creativity, (c) autonomy, and (d) communication, and Sheasley's (1999) suggestion that human resource professionals should seek individuals who (a) are creative, (b) have high energy levels, (c) have a sense of ownership, and (d) have excellent communication skills. The differences in these foci are due to the fact that Fenwick (2003) and Sheasley (1991) assessed the inherent characteristics of innovation leaders rather than these leaders' competence in leading innovation in an organization. However, overall, these categories are in line with the additional categories presented in the model, including: (a) communication, interpersonal skills, and emotional intelligence, (b) commitment and sense of ownership, (c) creativity, (d) power, politics, and role identity, (e) mission and vision, and (f) understanding the external environment.

Of the three highest ranked expert competencies, focus must be placed upon identifying innovations (see Table 4.11). As suggested by Roth (1994), autonomous individual learning and self-reflection help in adapting to constant change and expanding the knowledge base of the organization. Identification of innovations serves both of these purposes by leading to the discovery of new ideas. It is not necessarily the innovation leader who creates these new ideas.

Rather, they are identified through self-directed learning and reflected upon in terms of their usefulness to the organization. The core competency of curiosity also supports identification of innovations and reflection such that if the innovation leader probes deeper into questions, they may find broader applications for the identified innovations.

Table 4.11

Competency model for innovative leaders: Learning

Competency	Description	Rank
Expert		
Identifies Innovations	Seeks out new approaches, tools, methods, and technologies in own field of expertise by reading, talking to others inside and outside the organization, and attending seminars/conferences. Anticipates applicability to the company.	2.9
Core		
Focuses on Fundamentals	Refreshes core knowledge of the profession to stay sharp. Is not afraid to question assumptions at the foundation of their disciple.	3.7
Knowledge Transfer	Routinely provides training and/or assistance to less-experienced staff. Educates decision-makers. Can learn from observing the new knowledge and skills being implemented.	4.2
Use of Technical/Professional Expertise	Is an expert at applying technical and professional innovations. Uses knowledge of technical/professional developments to influence the strategic direction.	4.6
Curiosity	Asks probing questions in order to gather a large body of information. Understands and believes that new lessons can be learned every day and seeks to find each day's lesson.	4.7
Business Acumen	Has a complete understanding of and is capable of expressing the strengths, weaknesses, opportunities, and threats of their discipline.	5.0
Supplementary		
Conducts Needs Analysis	Identifies strengths, weaknesses, opportunities and threats of their discipline by performing in-depth needs analysis.	5.2
Values Higher Education	Seeks and engages in appropriate formal higher education opportunities. Encourages peers and subordinates to seek advanced degrees where applicable.	5.1
Employs Research Methods	Searches academic and professional article databases on people, products, companies, etc. Reads academic and professional journals. Conducts surveys and questionnaires. Analyzes and interprets data.	5.8

According to Clarke (1999), knowledge transfer occurs as individuals engage in learning discussions with peers to share new ideas. The application of the knowledge transfer competency can become another barrier to the adoption of an innovation. An innovation can be identified at any level of the organization. However, when poor feedback is an aspect of the organization's culture, the innovation may not be identified or transferred within the innovation leader's social network. This may be overcome by instilling a problem-solving focus and collaborative spirit of inquiry in the innovation leader's team (Barret, 2000).

Leading groups and teams after the innovation has been identified is critical to that innovation's adoption within the social system (see Table 4.12). Innovation leaders must be able to both manage the expectations of followers and lead by example. These two expert competencies are supported by Jones (2000) such that innovation leaders must (a) promote creativity and commitment to work relationships, and (b) focus on innovations in specific job tasks. As innovation leaders set clear expectations of followers, they can identify and share innovations to help followers meet those expectations, establishing team rapport and encouraging team problem solving.

Table 4.12

Competency model for innovative leaders: Leading groups and teams

Competency	Description	Rank
Expert		
Manages Expectations	Establishes and communicates clear expectations of team members.	2.9
Leads by Example	Makes the expectations of team members the same as the expectations of themselves. Actions match with communications.	2.9
Core		
Knows the Strengths and Weaknesses of the Team	Can assess and capitalize on team strengths and work to downplay or even improve team weaknesses.	3.5
Teamwork	Works collaboratively, demonstrates openness, ensures conflict resolution and partners to achieve results.	3.6
Team Commitment	Is committed to the team and the team's role in the organization.	3.6
Empowerment	Empowers individuals and team members to make decisions in their areas of responsibility. Ensures that others participate and contribute.	3.7
Establishes Team Rapport	Understands and communicates with team members to let them know that they are valued as individuals and allows them to share in the team's vision and successes.	3.8
Team Problem Solving	Allows challenges to be shared by the team. Facilitates discussion with the team to come up with collectively generated solutions.	4.4
Supplementary		
Cultivates Loyalty	Encourages team members to commit to the team. Seeks honest communications between team members. Provides appropriate level of financial reward.	5.7

When an innovation leader leads by example, they collaboratively interact with their followers and support high levels of teamwork, providing opportunities to share innovations. Likewise, they develop a commitment to the team and cultivate loyalty. Once an innovation has been shared, the follower should be empowered to then adopt the innovation if it is useful. With these competencies in place, the innovation leader has created a strong relationship with their

team. The team, once empowered, can then support the innovation leader by (a) becoming one of the first groups in the social network to adopt the innovation, and (b) helping the innovation leader to diffuse the innovation throughout the rest of the organization's social system.

Motivation and energy level was a common theme throughout much of the literature reviewed in chapter 2. The expert competency in this category is sense of urgency (see Table 4.13). Once the innovation leader has established a strong relationship with his/her team, s/he must convey the timelessness of the innovation's adoption. This is another product of leading by example. The innovation leader must be able to raise the energy level of their team by first understanding their own motivation.

Table 4.13

Competency model for innovative leaders: Energy level and motivation

Competency	Description	Rank
Expert		
Sense of Urgency	Understands timelines and priorities and appropriately raises the energy level in the group through example.	3.0
Core		
Stress Management	Balances work responsibilities and personal duties. Seeks appropriate ways to let go of anxiety. Celebrates successes.	3.3
Motivates Others	Works to find the motivators of peers and subordinates, offers the encouragement and direction needed. Helps people feel positive about adversity.	3.6
Ambition	Takes on the toughest assignments. Likes to do stimulating work. Looks for and obtains new responsibilities.	3.7
Passion Driven	Exhibits boundless enthusiasm for the task and outcome. Seeks excellence in results.	3.8
Shows Tenacity	Possesses an inner sense of obligation to tasks of high value.	4.2
Perseverance	Performance is significantly unaffected by difficult, complex, or unexpected situations.	4.3
Supplementary		
Success Driven	Motivated by positive feedback and either external or internal encouragement.	5.2
Competitiveness	Identifies and seeks to have a higher level of performance than prospective internal challengers.	5.3

The innovation leader's personal motivation comes primarily from ambition, passion, tenacity, and perseverance. They are ambitious because they are willing to take on the toughest assignments; ones that commonly require the identification of innovations for success. They are driven by passion and exhibit boundless enthusiasm for the task and outcome to their followers.

They show tenacity in their commitment to the task and to followers. Their perseverance means that their performance remains high even though they have chosen the toughest assignments, which commonly are complex and subject to unexpected situations. They may also be driven by success through positive feedback and a competitive environment.

The innovation leader must also be an effective manager. Primarily, they should exhibit the expert competency of planning and project management (see Table 4.14). However, Brown (2001) warns that organizations should balance implicit coordination and exploration without a loss in creativity. By balancing team and individual priorities, the innovation leader understands when the team's needs outweigh their own and can be careful not to stifle their followers' creative pursuits. As has occurred many times in the past, it may be the follower's creativity that generates an innovation.

Table 4.14

Competency model for innovative leaders: Management and delegation

Competency	Description	Rank
Expert		
Planning and Project Management	Monitors the progress of complex projects or initiatives which involve coordinating several different areas. Assesses the overall design of projects to ensure that resources are being maximized. Makes adjustments to budgets, personnel, etc., as circumstances may require.	3.0
Core		
Time Management	Understands deadlines, keeps an organized schedule, and provides workers with reminders for critical tasks.	3.1
Encourages Accountability	Holds workers responsible for their own delegated work.	3.2
Delegation	Gives tasks to employees based on their strengths and weakness.	3.4
Knows and Utilizes Resources	Is capable of meeting needs/demands by knowing and making use of both the internal and external resources available	3.4
Balances Team and Individual Priorities	Understands when the team's needs outweigh self's. Defends priorities as needed. Shields team members from the lobbying and jockeying.	4.0

In order to effectively plan and manage projects, the innovation leader has to have a keen sense of time management, keeping in mind the sense of urgency that must be established to promote the adoption of an innovation. The innovation leader must know and utilize the resources they have available and delegate resources and tasks to followers to ensure their ability

to complete a task. These resources may include innovations that have been identified by the innovation leader. In this case, the followers can again help the innovation leader to diffuse the innovation throughout the organization's social system.

As innovations are diffused through the organization's social system, the innovation leader must be capable of leading the innovation by communicating the new idea, technology, or process and its usefulness. Likewise, innovations can be identified as innovation leaders communicate with team members, other members of the organization, or contacts outside the organization. Keene (2000) suggests that organizations are adaptive systems subject to constant social evolution and change. As needs for change arise, the need for innovations becomes more evident. Thus, the innovation leader must possess competence in a wide array of communication and interpersonal skills, and an understanding of emotional intelligence (see Table 4.15).

Regarding communication, the innovation leader should choose appropriate communications based upon a well-defined communication strategy. They must address their audience by correctly building strong relationships and establishing feedback loops. They must clarify any questions members of the organization may have about the innovation. They must also ask opened-ended questions as part of the feedback loop in order to gather information about the innovation's usefulness or effectiveness. Through this, they may spark discussion that may lead to new innovations or refinements on a currently adopted innovation. However, they must maintain objectivity in regard to feedback, especially if there is organizational resistance to the innovation.

With regard to interpersonal relationships and emotional intelligence, the innovation leader should seek to understand the psychological profile of others and exhibit empathy by treating others with courtesy and sensitivity. They should exhibit tact by maintaining a

professional demeanor at all times. An open door policy may help to maintain open interpersonal relationships by allowing followers and other organizational members to voice feelings and concerns about an innovation. When communicating with others directly, the innovation leader should speak fluently to communicate ideas. They should actively listen to others' responses and be able to translate the actual meaning of language from literal meaning.

Table 4.15

Competency model for innovative leaders: Communication, interpersonal skills, and emotional intelligence

Competency	Description	Rank
Core		
Understands Non-verbal Cues	Grasps body language and reacts sensitively. Knows how to bring out unspoken thoughts or concerns. Takes action accordingly.	3.6
Seeks to Understand Psyche of Others	Develops overall psychological profile of others.	4.0
Empathy	Treats (even internal) others with courtesy and sensitivity. Makes an effort to address needs and concerns.	4.0
Objectivity	Does not let personal feelings interfere with evaluation of feedback. Maintains a professional demeanor in decision making. Is not timid with regard to stating "the hard things". Welcomes feedback.	4.1
Fluency	Has the ability to effectively communicate ideas and generate the interest and support of others	4.1
Translates Literal Speech	Listens carefully to choice of words and intonation to translate actual meaning from literal meaning.	4.1
Clarification	Ensures the speaker and listener are on the same page. Checks for gaps in communications.	4.1
Establishes Feedback Loops	Provides positive input. Gives people a chance to respond to feedback. Keeps participants informed throughout the process.	4.1
Addresses the Correct Audience.	Understands that a message is lost on the wrong people. Uses the right level of detail and language.	4.3
Selects and Uses Appropriate Communications	Draws upon insights about other people's perspectives to formulate a communication strategy that will get others to support one's ideas. Is thoughtful in determining most appropriate medium, timing, etc., considering the impact at both the individual and organizational level.	4.4
Asks Open-ended Questions	Seeks detailed explanations and expansion of ideas and concerns.	4.7
Supplementary		
Builds Relationships	Builds positive rapport. Keeps in touch with key stakeholders, even after the reason for interacting with them has elapsed.	5.1
Open Door Policy	Encourages team members to voice concerns. Takes the time to really listen to staff members and also explains their own feelings and comments	5.2
Exemplary Writing Skills	Writes high quality reports, business correspondence and procedural manuals. Drafts, re-drafts, edits, and has work reviewed by others. Pays attention to cc:'s on memos or email.	5.4
Participates in Active Listening	Makes eye contact, doesn't interrupt. Communicates well, verbally and non-verbally. Is able to get to the heart of the matter; beneath the surface of what is said.	5.4
Sparks Discussion	Ability to initiate and mediate discussion between individuals with widely differing perceptions.	5.6
Gate-keeping	Controls the level and flow of information to subordinates	6.7
Tact	Reacts to situations in an appropriate and professional manner.	7.9

Commitment and sense of ownership (see Table 4.16) was another common theme throughout much of the literature reviewed in chapter 2. Innovation leaders must initially take personal responsibility for and be dedicated to projects that require innovations. Cacioppe (2000) suggests that organizations focus on the meaningfulness of an individual's objectives and goals. Therefore, innovation leaders must establish a trust culture and maintain relationships based on trust. They must display initiative, set challenging project goals, and link those goals to the needs of the department, organization, and customer.

Table 4.16

Competency model for innovative leaders: Commitment and sense of ownership

Competency	Description	Rank
Core		
Takes Responsibility	Assumes personal responsibility for projects regardless of the projected outcome.	3.4
Establishes a Trust Culture	Establishes and builds trust among employees and the organization. Participates in relationships based on trust.	3.4
Goal Setting	Sets challenging goals beyond targets set by management and encourages goal setting for staff members to achieve project and professional goals	3.8
Links Corporate, Department, and Team Goals	Understands and explains the relationship between organization, department, and project goals.	3.8
Concern for Customer	Seeks out the voice of the customer at all stages of a project.	3.9
Constantly Seeks Improvement.	Understands the difference between what is and what can be. Encourages improvement through increased commitment.	3.9
Displays Initiative	Acts first to set projects in motion. Plans beyond expected results to achieve the extraordinary.	3.9
Self Confidence	Reflects upon past performance and uses achievements to guide future challenges.	3.9
Sets High Standards	Expects the best possible work from peers and subordinates. Does not make standards unattainable.	4.0
Dedication	Shows a long-term commitment to the ideals of the organization and does not display a fickle attitude.	4.2
Sense of Pride	Works diligently to maintain/improve image of one's professional reputation and that of his/her organization	4.6
Commitment to Ethics	Seeks out and implements ethical policies from legislation, professional organizations, and industry standards.	4.8
Develops Focus	Clarifies the details of goals, reduces interruptions, and encourages an atmosphere free of distraction.	5.0

A commitment to ethics is also necessary in a trust relationship and to maintain a sense of pride in an innovation leader's professional reputation. Rowden (2000) suggests that employees express an increased level of knowledge transfer because of their leader's supportive behaviors.

The innovation leader should therefore set high, but not unattainable, standards to ensure the best possible work from employees, and to maintain the ethical standards set forth by legislation, professional organizations, or industry regulations. With these standards in place, the innovation leader should constantly seek improvement to ensure that they and their employees maintain commitment to projects and the innovations that they may require.

Persing (1999) suggests that managers who focus creative efforts on innovating within job tasks rather than creating new ideas lead employees to higher levels of individual innovation. This is critical aspect of understanding the innovation leader's responsibility to their followers' creativity. It is not necessarily the innovation leader who must generate new ideas; rather, they must understand what creative employees value (see Table 4.17). They must encourage new ideas by seeking active input from their followers. Innovation leaders can employ creative exercises such as brainstorming, role plays, and benchmarks to encourage their followers' creativity.

Even though focus is placed upon leading innovation, the innovation leader can also generate new ideas by displaying independent creativity and analytical thinking. The innovation leader should be able to understand complex problems, understand critical issues and success factors, and generate varied solutions to problems. However, they must identify problems early so that they do not become insurmountable later. They must encourage eccentricity and not be afraid to explore outside of mainstream thought to find solutions that are cutting-edge. With these new solutions come innovations and a need for change. An innovation leader should champion change by advocating it in a positive manner. They must foster an environment in which followers are free to experiment with new ideas. They must be flexible and adapt to change as it happens.

Table 4.17

Competency model for innovative leaders: Creativity and imagination

Competency	Description	Rank
Core		
Identifies Problems Early	Seeks to anticipate and identify problems before they arise so that they do not become insurmountable.	3.5
Encourages New ideas	Understands that new ideas come from all levels of staff not just at the senior level. Seeks active input from staff.	3.3
Analytical Thinking	Understands complex problems, identifies critical issues, and generates varied solutions to problems	3.9
Champions Change	Advocates change in a positive manner. Fosters an environment where team members feel free to experiment with new ideas. Shows enthusiasm for opportunities for improvement in processes.	4.1
Eccentricity	Is not afraid to explore outside of mainstream thought. Does not become stalled in "the way things are done" but moves to find solutions that are cutting edge.	4.2
Flexibility	Adapts to change, shifts thought processes easily, and conforms to environmental changes.	4.3
Generates New Ideas	Demonstrates independent creativity to develop new approaches/systems that go beyond one's experience or do not exist.	4.5
Supplementary		
Employs Brainstorming	Facilitates the creative processes of peers and subordinates, records ideas, uses and applies results of session.	5.1
Finds and Uses Analogues/Benchmarks	Identifies similar situations in other organizations or disciplines. Applies ideas to the company's field of expertise.	5.5
Accepts Bad Ideas	Is willing to make mistakes on the path to a good idea. Is not afraid to make a less than stellar suggestion.	6.5
Employs Alternate Scenarios and Role Plays	Stages a hypothetical situation, identifies and explains roles, observes the behavior of participants, interprets and discusses results.	6.8
Risk-seeking	Leverages and exploits the utility of uncertain situations.	8.1

The need for change can create role conflicts, political challenges, and power struggles as the organization moves to its future state during the adoption of an innovation. An innovation leader who shows professionalism behaves in a manner indicative of their role (see Table 4.18). The innovation leader must therefore show integrity by expecting honesty in all business dealings. They must show humility by understanding that despite having the power they received through leadership, this power is useless without supportive relationships with followers. This is in line with Thompson's (2001) suggestion that innovation leaders and followers should seek to achieve respective goals by creating a mutual understanding of the organization's social structure.

This understanding should be developed strategically as the innovation leader understands their influence upon followers, customers, the organization, and its politics.

Table 4.18

Competency model for innovative leaders: Role identity, power, and politics

Competency	Description	Rank
Core		
Integrity	Expects honesty in all business dealings. Is trustworthy, and sincere in demeanor.	3.1
Professionalism	Behaves in a manner indicative of their role. Dresses appropriate to business expectations. Practices good grooming and hygiene.	3.4
Humility	Comes to terms with the fact that despite the power and the position of leadership, the answer may be neither obvious nor easily reached. Not afraid to seek advice from subordinates. Acknowledges that having power without supportive relationships with superiors, equals, and subordinates is useless.	3.7
Negotiation	Resolves disputes, finds agreement on courses of action, understands the advantages and disadvantages of alternatives.	4.6
Impact and Influence	Strategically plans out influence approach and timing based on in-depth understanding of the people, customers, organization, politics, etc. Carefully thinks through impact of influencing in the current moment as compared to holding off for a more broad based result which will better help meet long term business objectives.	4.9
Supplementary		
Political Savvy	Recognizes and accepts different roles and the impact of internal structures. Uses differences in positive ways.	5.4
Diplomacy	Does not take no for an answer and seeks to find solutions to challenges that require mutual benefit for key stakeholders. Encourages win/win situations.	5.6
Courage and Conviction	Is willing to put one's job at risk for reasons of sound principle. Challenges powerful others to act on espoused values.	5.6
Salesmanship	Brings people on board with designs or plans. Maneuvers so that the people make a positive decision themselves. Tries not to force a good idea.	5.8
Employs Game Theory	Understand that achievement of mission or completion of strategic decision is analogous to a game that can be won. Anticipates others' responses as if playing chess.	6.9

Innovation leaders need political savvy to recognize and accept differences in roles and internal organizational structures. They can use negotiation to resolve disputes and find mutual agreement on courses of action. An innovation leader should be diplomatic in seeking this agreement, encouraging solutions that provide mutual benefit for key stakeholders focusing on creating win/win situations. This requires the innovation leader to have courage and conviction when supporting sound principles and challenging powerful leaders, followers, and peers during the adoption of an innovation. Game theory can also be employed by the innovation leader to

anticipate others' responses to their actions while trying to fulfill the mission and vision of the organization.

Table 4.19

Competency model for innovative leaders: Mission and vision

Competency	Description	Rank
Core		
Visionary Leadership	Establishes credibility for the vision by communicating it in the broader context of the industry and marketplace within which the organization is operating. Shares both internal and external trends and how they provide the foundation for the group's direction.	4.1
Strategy Development	Contributes to the development of the mission and vision. Develops and implements long-term alternative strategies for achieving success.	4.3
Encourages Systems Thinking	Expands upon and explains critical/systems thinking, value-analysis, and strategic planning skills.	4.8
Supplementary		
Employs Multiple Perspectives	Sees the mission/vision in a variety of ways in order to interpret it's true meaning to the organization.	5.7
Organizational Citizenship	Acts as though the mission and vision are part of an employee's daily conduct.	5.7

The innovation leader has a responsibility to help create, uphold, explain, and convey the mission and vision of the organization (see Table 4.19). They should exhibit visionary leadership by communicating the organization's mission and vision in the broader content of the industry and marketplace and sharing both internal and external trends as a foundation for the adoption of an innovation. They should be able to employ multiple perspectives in order to interpret the mission and vision. The innovation leader should encourage organizational citizenship by acting as though the mission and vision are part of a follower's daily conduct. The innovation leader's contribution to the development of the organization's mission and vision should focus on the adoption of innovations in terms of long-term alternative strategies for the success of the organization as suggested by Slowinski (2002). Likewise, the innovation leader should encourage systems thinking and value analysis in the light of the organization's mission and vision when planning their strategy to diffuse the innovation.

Table 4.20

Competency model for innovative leaders: Understanding the external environment

Competency	Description	Rank
Core		
Knowledge of Competitors	Knows how competitors do their business and acts to combat threats.	4.9
Supplementary		
Organizational Awareness	Talks regularly with finance, accounting, marketing and other internal departments. Demonstrates an ability to interact with investors to provide or obtain information relevant to the company's interests.	5.7
Market and Industry Awareness	Monitors news at federal, state and local level. Keeps up to date, maintains awareness of market trends, analyzes trends, makes recommendations, develops information network.	5.7
Cultivates Cosmopolite Relationships	Seeks to meet people, attend events, and have professional relationships that are outside direct work focus.	7.5

The development of strategy also depends upon an innovation leader's ability to understand the external environment, as suggested by Bingham (2003). The innovation leader should have knowledge of their competitor's business and act to combat threats (See Table 4.20). Likewise, they should monitor news at the federal, state, and local levels to keep up to date with market trends. They should be able to analyze these trends and make recommendations to the organization. The innovation leader should also have a keen awareness of their organization. They should speak regularly with internal departments and interact with investors to provide or obtain information relevant to the company's success. Innovation leaders should cultivate cosmopolite relationships such as meeting peers, having professional recreational relationships that are outside of the direct work focus, and attending conferences. Thus, innovation leaders should develop an information network that spans internal and external barriers in order to discover and identify innovations that may be useful in their organization.

Recommendations

The competency model of innovation leaders, as created and described in this dissertation, provides a worthy contribution to existing innovation theory. The model reflects and expands themes present in the literature on the individualist perspective. These themes were utilized as a basis for the participants' generation and rating of competencies. Therefore, the model provides expert reflection upon existing innovation theory. As the individualist perspective was the least developed and researched, this study was necessary to create a foundation for the perspective so that further research in innovation leaders could be completed.

The interactive process perspective, with a foundation in Rogers (1995), has been strengthened by the creation of a competency model of innovation leaders. The model synthesized Rogers' (a) innovators, (b) early adopters, (c) change agents, and (d) opinion leaders into one entity, the innovation leader. In doing this, the model constructed a framework for and described those who are responsible for identifying and leading the diffusion of an innovation. It provided specific competencies necessary for an innovation to be diffused throughout the organization's social system. Further research can be completed to understand how an innovation leader's competence affects the success of the diffusion and adoption of an innovation.

The Delphi methodology has been used extensively to identify and rank competencies in terms of importance to create a competency model for many different populations (see Table 3.1). These researchers have used many variations and modifications of the Delphi methodology. However, in very few of the previous competency studies was there an overt attempt to review, consolidate, and streamline the Delphi methodology specifically for the identification of competencies (Amunson, 1993; Delbecq, 1975; Eisen, 2002; Everett, 1988; Rothwell, 1996; Stines, 2003; Varney, 1999). Special care was taken by the researcher to make sound

methodological decisions regarding the (a) reliability of survey instruments, (b) selection and recruiting of participants, (c) rating scale, (d) hypothesis testing of agreement, (e) analysis and use of both qualitative and quantitative data, and (e) development of meaning from the competency model. Measures of reliability showed strong support for the methodology used in this study. Therefore, the methodology should be useful for other competency researchers and can be applied to a wide array of populations.

The competency model of innovation leaders is general in nature and reflects expert opinion from at least 12 different industries. Thus, it can be comfortably applied to many different types of organizations. The application of the model rests with organization development consultants and incumbent professionals. If it is discovered during the diagnosis stage of the action research model that an organization has a need for innovation, the organization development professional can recommend the competency model of innovation leaders as a possible intervention. The model can then be used to (a) enhance job descriptions of those positions in which the identification and diffusion of innovations is critical, (b) focus succession planning efforts for innovation leaders, (c) discover gaps in an innovation leader's competence during training needs analysis, (d) develop competency-based training to fill competence gaps, and (e) incorporate the innovation leader's competence requirements into the organization's performance management system.

Many organization development professionals use the borrowed and tailored approach to implement a competency model as part of an organization development intervention (Rothwell, 2000) as described in chapter 2. However, with the current increased focus in industry on intellectual property rights, piracy, and copyright infringement, special caution should be taken to avoid litigation (Davies, 2005). Therefore, competency researchers should focus efforts on

creating a licensing strategy for competency models similar to the formalized licensing standard used to protect the rights of software developers. By maintaining these rights, the competency researcher can (a) oversee the proper tailoring, implementation, and use of their model, (b) gather success data on the usefulness of their model, (c) troubleshoot the model if it is unsuccessful, and (d) control all rights regarding the financial profitability of their model.

The creation of the competency model for innovation leaders was an attempt by the researcher to elevate the status of innovation in the minds of innovation researchers, organization development professionals, workplace learning and performance professionals, industry leaders, and political leaders. The individualist perspective, although given foundation with this study, is still in its infancy. Therefore, the researcher suggests a few very critical research projects that need to be accomplished to bring the individualist perspective to fruition. Using the competency model of innovation leaders, a selection tool for innovation leaders needs to be developed for human resource professionals so that organizations can recruit, hire, and retain talented innovation leaders. Before this can be accomplished, a measurement tool for innovation leaders should be developed to analyze a leader's behaviors and compare them to the behaviors set forth in the competency model.

The competency model of innovation leaders can be tailored to specific populations or industries to allow the model to more accurately reflect that population's or industry's specific needs. Likewise, the competency model can be researched in light of many common topics in the field of organizational behavior, such as the innovation leader's personality type or level of job satisfaction. Researchers can explore the links between innovation leaders and (a) path/goal theory, (b) leader member exchange theory, (c) charismatic leadership, and (d) transformational leadership. However, special attention needs to be paid to two critical areas of research.

Researchers should focus initially on discovering whether the model, combined with Rogers'

(1995) diffusion theory, (a) leads to successful adoptions of innovations and (b) leads to higher

levels of performance in the organization. This will shed light on the true value of both the

interactive process perspective and the individualist perspective.

A constant throughout the two and one-half years it took to develop the competency

model of innovation leaders was the increased focus on innovation in business and industry in

the United States. Google (2006), which represents a revolution in search technology and human

information organization, has "persistently pursued innovation to push the limits of existing

technology" (p. 1). Apple's CEO Steve Jobs suggests that the reason for the iPod's success in

revolutionizing the distribution of media was innovation (Barrows, 2004). Nintendo Executive

VP Reggie Fils-Aime suggests that innovation will be the deciding differentiation in its next

generation gaming console's success (Terdiman, 2006). Mercedes-Benz (2006) is currently

preparing the first fuel-cell vehicles, an innovation that may help to reduce reliance on fossil

fuels. Ford Motor Company's new mission is innovation (Ford Motor Company, 2006).

According to Kamarck (2003), "Government reform and innovation involves the reform of an

old bureaucracy in the context of a newly democratic state" (p. 17). In his recent State of the

Union Address, U.S. President George W. Bush (2006, p. 1) stated:

> And to keep America competitive, one commitment is necessary above all: We must continue to lead the world in human talent and creativity. Our greatest advantage in the world has always been our educated, hardworking, ambitious people and we're going to keep that edge. Tonight I announce an American Competitiveness Initiative, to encourage innovation throughout our economy, and to give our nation's children a firm grounding in math and science.

Herceptin, a new and highly successful treatment for women with breast cancer, has brought

attention to the achievement and challenges of medical innovation (Jack, 2005). The researcher

is personally grateful for this innovation because it helped to save the life of a family member. It

is therefore the researcher's hope that research will continue on the topic of innovation leaders.

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APPENDIX A

IRB Approval and Implied Consent

Implied Informed Consent Form for Social Science Research
The Pennsylvania State University

Title of Project: *Developing a Competency Model for*
Innovation Leaders Using a Modified Delphi Technique

Principal Investigator: David G. Gliddon, Graduate Student
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> ORP USE ONLY: IRB# 21216
> The Pennsylvania State University
> Office for Research Protections
> Approval Date: 07-07-2005 DWM
> Expiration Date: 06-26-2005 DWM

1. **Purpose of the Study:** The purpose of this study is to create a model of the competencies of innovation leaders. The model proposed will be driven by a Delphi of experts that have a demonstrated knowledge of innovation in organizations. The result will be a broad, general, and non-position-specific competency model.

2. **Procedures to be followed:** The Delphi will use 3 rounds of questionnaires. Iteration 1 will be a word document sent to participants via email. Participants will fill out the questionnaire and return it to the principal investigator via email. Iteration 2 and 3 of the study will be conducted in the same manner.

3. **Discomforts and Risks:** There are no risks in participating in this research beyond those experienced in everyday life.

    Benefits: When this study is complete, workplace learning and performance researchers and professionals will be able to have a more general and synthesized view of competencies that are linked to innovation leaders. Likewise this study will apply competency research with a new insight into innovation. Knowledge about how individuals innovate in organization will be analyzed and synthesized and can lead to new perspectives for further research. Finally, those who are innovation can further understand their own competencies and how they might improve innovation in their organization from an individualist perspective.

4. **Duration:** It will take about 1 hour to complete each iteration of the Delphi for a total of 3 hours.

5. **Statement of Confidentiality:** The survey does not ask for any information that would identify who the responses belong to. Your responses are recorded anonymously. The Office for Research Protections may review records related to this project. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared because your name is in no way linked to your responses. Your confidentiality will be kept to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties.

6. **Right to Ask Questions:** You can ask questions about this research. Contact David G. Gliddon at 570-814-4846 with questions. If you have questions about your rights as a research participant, contact The Pennsylvania State University's Office for Research Protections at (814) 865-1775.

7. **Compensation:** Unfortunately, participants will not receive compensation for completing this survey.

8. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer.

You must be 18 years of age or older to take part in this research study.
Completion and return of the survey implies that you have read the information in this form and consent to take part in the research. Please keep this form for your records or future reference.

APPENDIX B

Recruitment Email for Participants

RECRUITMENT EMAIL FOR PARTICIPANTS

Dear Participant:

My name is David G. Gliddon and I am a researcher from Penn State University in the Department of Learning and Performance Systems under the tutelage of Dr. William J. Rothwell. As part of my doctoral program and dissertation, I am conducting a study entitled Forecasting a Competency Model for Innovation Leaders using a Modified Delphi Technique. Because of your expertise, I would like you to be a participant in my study.

The purpose of this study is to create a model of the competencies of innovation leaders. When this study is complete, workplace learning and performance researchers and professionals will be able to have a more general and synthesized view of competencies that are linked to innovation leaders. Likewise this study will apply competency research with a new insight into innovation. Knowledge about how individuals innovate in organization will be analyzed and synthesized and can lead to new perspectives for further research. Finally, those who are innovation can further understand their own competencies and how they might improve innovation in their organization from an individualist perspective.

The study will consist of three rounds of surveys conducted over approximately a 3 month period. The first survey will identify the competencies and the latter 2 surveys will rank the competencies in terms of importance. Each survey will be communicated via email and will take approximately 1 hour to complete. You will be given at least 2 weeks to complete each iteration of the survey. A total of three hours of your time will be required. All survey responses will be anonymous and confidential. Your participation is voluntary and unfortunately, no compensation can be offered.

If you would like to participate in this study, you must verify the following criteria for either professional or academic participants by replying to this email and attaching a short summary of your qualifications or resume/CV.

Academic Participants	Professional Participants
Earned PhD. or EdD.	Earned a BS. or BA.
5 years of experience with innovation and leadership initiatives.	10 years of experience with innovation and leadership initiatives.
Membership in at least 1 professional organization.	Membership in at least 1 professional organization.
Presented about innovation and leadership at at least 3 conferences.	Attended at least 3 presentations about innovation and leadership at conferences.
Published at least 3 articles or one book in area of innovation and leadership.	Participated in at least 5 projects in area of innovation and leadership initiatives.

Again, if you are interested in participating please reply to this email within one week attaching a short summary of your qualifications or resume/CV. You will be contacted with further instructions promptly.

Thank you and Warmest Regards,

David G. Gliddon

APPENDIX C

Pilot Study One Survey

FORECASTING A COMPETENCY MODEL FOR INNOVATION LEADERS USING A

MODIFIED DELPHI TECHNIQUE

Pilot Study 1 Directions:

Now that you have completed the innovation leader survey, please answer the following critique questions. Try to write at least a 1 paragraph response for each question. Keep in mind that your input will help to improve this survey for other participants. Your feedback is very valuable!

After the Survey

When all pilot study 1 surveys have been received by the Researcher, you will receive a short telephone follow-up call to review any issues that you may have identified that need further clarification.

Notes:

This document is best viewed in "Print Layout" and may be changed by clicking on View, Print Layout on your MS Word toolbar. If you have any questions about this survey you can contact David Gliddon (Researcher) in the follow ways:

Phone: xxx-xxx-xxxx
Email: xxxxxx@psu.edu

Thank you very much for participating in the study!

1. Which statements in the introduction of the innovation leader survey could be reworded or restated more clearly for study participants?

    a) Which specific statements?
    b) How would you reword them?

2. What additional information could be added to the introductory statement of the innovation leader survey about nature of the study?

    a) How does this information help the participant?

3. Which sentences in the directions of the innovation leader survey could be more clearly written?

    a) What are the specific statements that might confuse participants, why?
    b) How would you reword them?

4. After reading the directions, what did you not understand about how to complete the innovation leader survey?

    a) Did you have to reread the directions?
    b) If so, at what point did you reread the directions?
    c) How many times?

5. How was your understanding of the innovation leader survey shaped by the operational definitions?

    a) Which operational definitions could be added?
    b) Which operational definitions need further clarification?

6. What problems did you have rating the competencies in the innovation leader survey?

      a) Did you understand the rating scale?
      b) If not, what did you not understand about it?
      c) What could be more clearly explained about the rating scale?

7. Which competency descriptions were not helpful in rating the competencies in innovation leader survey?

      a) Were you able to understand the competency by reading its description?
      b) Which competency descriptions are unclear or confusing?

8. Were there any other issues caused by the innovation leader survey that hindered your ability to rate the competencies?

      a) Could anything be added to the survey to make it easier to rate the competencies?
      b) Should anything be removed from the study to make it easier to rate the competencies?

9. How long did it take you to complete the innovation leader survey?

APPENDIX D

Iteration One Survey

FORECASTING A COMPETENCY MODEL FOR INNOVATION LEADERS USING A

MODIFIED DELPHI TECHNIQUE

Iteration 1 Directions:

Your assistance is needed to identify the competencies of a successful Innovation Leader. Envision a star performer other than yourself that is the best of the best, and an exceptionally talented and outstandingly competent Innovation Leader in any function of an organization. Focus on the behaviors that such an individual would exhibit in the next five years. These behaviors should be evidence of the Innovation Leader's competence in a specific area of knowledge or skill. You may comment based on your experience or research. In order to help you generate a competency listing, sample competency statements, and operational definitions will be provided. Your data will be used to develop a competency model for Innovation Leaders.

Please complete the survey in the following manner:

1. Browse the entire survey to gain a general sense of the material.
2. Review the operational definitions for all terms used in this survey.
3. For each category, generate two or more competencies for the successful Innovation Leader that you have envisioned. Provide a description of the behaviors that are linked to each competency that you have generated. Please save often.
4. When you have completed the survey, please save the completed document and email the survey as an attachment to xxxxxx@psu.edu.

After the Survey

When all Iteration 1 surveys have been received by the Researcher, they will be analyzed qualitatively. From this data, a second iteration survey will be created. In the Iteration 2 survey you will be asked to rank the competencies that were generated in the survey that you are currently completing.

Notes:

This document is best viewed in "Print Layout" and may be changed by clicking on View, Print Layout on your MS Word toolbar. The categories listed in this survey are based on a literature review and the results of a pilot study. If you have any questions about this survey you can contact David Gliddon (Researcher) in the follow ways:

Phone: xxx-xxx-xxxx
Email: xxxxxx@psu.edu

Thank you very much for participating in the study!

Operational Definitions:

Innovation:

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption such as teams, groups, or departments.

Innovation Leader:

The critical individuals involved with the generation or adoption of an innovation. They are innovators, early adopters, change agents, or opinion leaders.

>   Innovators are venturesome and have almost an obsession with new ideas that occur within private social circles.

>   Early adopters are somewhat integrated within a social network. Potential adopters look toward these individuals for initial opinions about the innovation.

>   Opinion leaders are those individuals who have many established links within their social network and are able to help others to make innovation adoption decisions.

>   Change agents are individuals who influence client innovation decisions in a direction desired by the change agency or organization.

Competencies:

An area of knowledge or skill that is critical for producing key outputs. Competencies are specific internal capabilities that people bring to their jobs; capabilities that are expressed by specific workplace behaviors.

Competency Model:

A full listing of competencies that describes the knowledge, skills, capabilities and behaviors required to perform a specific job or function. Emphasis should be placed on the things that excellent performers do more often, more persistently, and more effectively than do average performers.

CATEGORY 1: Learning

Name of Competency	Description
Keeps Current in Own Field of Expertise. (SAMPLE)	Seeks out new approaches, tools, methods and technologies in own field of expertise by reading, talking to others inside and outside the organization, and attending seminars/conferences.

CATEGORY 2: Creativity and Imagination

Name of Competency	Description
Thinks Laterally. (SAMPLE)	Generates varied solutions to problems. Will consider the radical or unconventional. Is prepared to look beyond the data for solutions.

CATEGORY 3: Energy Level and Motivation

Name of Competency	Description
Chooses Challenges. (SAMPLE)	Likes to do stimulating work and eagerly anticipates challenges. Looks for and gets new responsibilities.

CATEGORY 4: Commitment and Sense of Ownership

Name of Competency	Description
Creates His or Her own Measures of Excellence. (SAMPLE)	Plans beyond targets set by management, sets personal objectives that are truly challenging, yet realistic and attainable.

CATEGORY 5: Mission and Vision

Name of Competency	Description
Contributes to Strategic Direction. (SAMPLE)	Contributes to the development of the department vision, mandate and long-term strategy. Develops and implements long-term alternative strategies for achieving success at the departmental level in own area of responsibility.

CATEGORY 6: Communication, Interpersonal Skills, and Emotional Intelligence

Name of Competency	Description
Understands Non-verbal Cues.. (SAMPLE)	In addition to listening with empathy, grasps non-verbal cues (such as body language) and reacts sensitively. Knows how to bring out unspoken thoughts or concerns. Takes action accordingly.

CATEGORY 7: Leading Groups and Teams

Name of Competency	Description
Provides Effective Group Feedback. (SAMPLE)	Is involved in team assessments of performance. Analyzes data, and communicates results to team in order to strengthen the team's cohesiveness.

CATEGORY 8: Understanding the External Environment

Name of Competency	Description
Formulates Strategic External Alliances. (SAMPLE)	Actively addresses long-term issues, opportunities, and external forces affecting the department.

CATEGORY 9: Role Identity, Power, and Politics

Name of Competency	Description
Influences and persuades through complex political maneuvering. (SAMPLE)	Arranges situations or jobs, or even changes larger structures, to bring about the desired behavior. Also uses governing bodies to reach a goal or create an impact.

CATEGORY 10: Management and Delegation

Name of Competency	Description
Effective Time Management. (SAMPLE)	Understands deadlines; keeps an organized schedule; and provides workers with reminders for critical tasks.

If you would like to add any categories that were not listed above, please do so below and generate the corresponding competencies for that category.

ADD NEW CATEGORY: _____
(Please type the title of the category you would like to add.)

Name of Competency	Description

ADD NEW CATEGORY: _____
Please type the title of the category you would like to add.

Name of Competency	Description

ADD NEW CATEGORY: _____
Please type the title of the category you would like to add.

Name of Competency	Description

APPENDIX E

Codebook for Content Analysis

Codebook for content analysis

Category	Definition	Example	Coding Rules
L: Learning	Gaining knowledge or skills, or developing a behavior, through study, instruction, or experience (Bassi, 1997).	Seeks out new approaches, tools, methods and technologies in own field of expertise by reading, talking to others inside and outside the organization, and attending seminars/conferences.	Distinction should be made to differentiate between L and the application of learning activities. Specific applications should be included in categories where the behavior takes place.
C: Creativity and Imagination	Creativity is a mental phenomena, skills and/or tools capable of originating (and subsequently developing) innovation, inspiration or insight. Imagination is, in general, the power or process of producing mental images and ideas (Rushton, 1990).	Generates varied solutions to problems. Will consider the radical or unconventional. Is prepared to look beyond the data for solutions.	Distinction should be made to differentiate between behaviors of C and L. Typically creativity and imagination are preclusive of or foundational to learning activities.
M: Energy Level and Motivation	Psychological or physiological forces that determine the direction of a person's behavior, level of effort, and level of persistence (George, 2005).	Likes to do stimulating work and eagerly anticipates challenges. Looks for and gets new responsibilities.	Distinction should be made to differentiate between behaviors of M and G. Individual motivation should be included in M and motivation of a group should be included in G.
O: Commitment and Sense of Ownership	Interaction dominated by obligations. These obligations may or may not be mutual, or self-imposed, or explicitly stated (Gautam, 2004).	Plans beyond targets set by management, sets personal objectives that are truly challenging, yet realistic and attainable.	Distinction should be made to differentiate between behaviors associated with O and G. Behaviors of sharing commitment or ownership in terms of mission and vision should be included in O.
V: Mission and Vision	Relaying a shared mental framework that helps give form to the often abstract future that lies ahead. Effective mission and vision statements are inspiring, long-term in nature, and easily understood and communicated (Niven, 2003).	Contributes to the development of the department vision, mandate and long-term strategy. Develops and implements long-term alternative strategies for achieving success at the departmental level in own area of responsibility.	Disctinction should be made to differentiate between behaviors associated V and O. Behaviors of relaying commitment to mission and vision should be included in O.
I: Communication, Interpersonal Skills, and Emotional Intelligence	The sharing of information between two or more individuals or groups to reach a common understanding. The awareness of and ability to manage one's emotions in a healthy and productive manner (George, 2005).	In addition to listening with empathy, grasps non-verbal cues (such as body language) and reacts sensitively. Knows how to bring out unspoken thoughts or concerns. Takes action accordingly.	Distinction should be made to differentiate between I and G. Leading communication behaviors should be included in G.
G: Leading Groups and Teams	A process that takes place in groups in which one member influences and controls the behavior of the other members toward some common goal (Michener, 1986).	Is involved in team assessments of performance. Analyzes data, and communicates results to team in order to strengthen the team's cohesiveness.	Disctinction should be made to differentiate between behaviors associated with P and G. Behaviors linked to a goal should be included in G. Behaviors linked to a change in policy should be included in P.
E: Understanding the External Environment	Factors (conditions, trends, and forces) essentially outside the control of organizational members. External environmental scans are conducted to identify important factors in the external environment (Pagano, 1997).	Actively addresses long-term issues, opportunities, and external forces affecting the department.	Distinction should be made to differentiate of behaviors associated with L and E. Behaviors of learning from the environment should be included in L. Behaviors associated with understanding and applying principles from the environment should be included in E.
P: Role Identity, Power, and Politics	Observable behaviors performed by an individual to fulfill the organization's expectations of the position. These expectations include using influence to create, preserve and amend the policies by which the organization is governed (Collier, 2001).	Arranges situations or jobs, or even changes larger structures, to bring about the desired behavior. Also uses governing bodies to reach a goal or create an impact.	Distinction should be made to differentiate between behaviors associated with P and G. Behaviors linked to a goal should be included in G. Behaviors linked to a change in policy should be included in P.
D: Management and Delegation	The activity of strategic planning, setting objectives, managing resources, deploying the human and financial assets needed to achieve objectives, and measuring results (Mumford, 2004).	Understands deadlines; keeps an organized schedule; and provides workers with reminders for critical tasks.	Distinction should be made between behaviors associated with G and D. Behaviors linked to a goal should be included in G. Behaviors linked to completing day to day or project job tasks should be included in D.

APPENDIX F

Pilot Study Two Survey

FORECASTING A COMPETENCY MODEL FOR INNOVATION LEADERS USING A

MODIFIED DELPHI TECHNIQUE

Pilot Study 2 Directions:

Now that you have completed the innovation leader survey, please answer the following critique questions. Try to write at least a 1 paragraph response for each question. Keep in mind that your input will help to improve this survey for other participants. Your feedback is very valuable!

After the Survey

When all pilot study 2 surveys have been received by the Researcher, you will receive a short telephone follow-up call to review any issues that you may have identified that need further clarification.

Notes:

This document is best viewed in "Print Layout" and may be changed by clicking on View, Print Layout on your MS Word toolbar. If you have any questions about this survey you can contact David Gliddon (Researcher) in the follow ways:

Phone: xxx-xxx-xxxx
Email: xxxxxx@psu.edu

Thank you very much for participating in the study!

1. Which statements in the introduction of the innovation leader survey could be reworded or restated more clearly for study participants?

     a) Which specific statements?
     b) How would you reword them?

2. What additional information could be added to the introductory statement of the innovation leader survey about nature of the study?

     a) How does this information help the participant?

3. Which sentences in the directions of the innovation leader survey could be more clearly written?

     a) What are the specific statements that might confuse participants, why?
     b) How would you reword them?

4. After reading the directions, what did you not understand about how to complete the innovation leader survey?

     a) Did you have to reread the directions?
     b) If so, at what point did you reread the directions?
     c) How many times?

5. How was your understanding of the innovation leader survey shaped by the operational definitions?

     a) Which operational definitions could be added?
     b) Which operational definitions need further clarification?

6. What problems did you have rating the competencies in the innovation leader survey?

      a) Did you understand the rating scale?
      b) If not, what did you not understand about it?
      c) What could be more clearly explained about the rating scale?

---

7. Which competency descriptions were not helpful in rating the competencies in innovation leader survey?

      a) Were you able to understand the competency by reading its description?
      b) Which competency descriptions are unclear or confusing?

---

8. Were there any other issues caused by the innovation leader survey that hindered your ability to rate the competencies?

      a) Could anything be added to the survey to make it easier to rate the competencies?
      b) Should anything be removed from the study to make it easier to rate the competencies?

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9. How long did it take you to complete the innovation leader survey?

APPENDIX G

Iteration Two Survey

FORECASTING A COMPETENCY MODEL FOR INNOVATION LEADERS USING A

MODIFIED DELPHI TECHNIQUE

Iteration 2 Directions:

Your assistance is needed to rate the competencies of a successful Innovation Leader. Envision a star performer, the best of the best, and an exceptionally talented and outstandingly competent Innovation Leader in any function of an organization. Focus on the behaviors that such an individual would exhibit in the next five years. These behaviors should be evidence of the Innovation Leader's competence in a specific area of knowledge or skill. Ratings should be based on your experience or research.

Please complete the survey in the following manner:

1. Browse the entire survey to gain a general sense of the material.
2. Review the operational definitions for all terms used in this survey.
3. Using the rating scale on the bottom of each page, rate each competency in terms of importance by inputting a number between 1 and 5 into the *Rating* column with 1 being the most important and 5 being the least important. Please save often.
4. When you have completed the survey, please save the completed document and email the survey as an attachment to xxxxxx@psu.edu.

After the Survey

When all Iteration 2 surveys have been received by the Researcher, they will be analyzed quantitatively. From this data, a third iteration survey will be created. In the Iteration 3 survey you will be asked to rate the competencies again knowing the results of Iteration 2.

Notes:

This document is best viewed in "Print Layout" and may be changed by clicking on View, Print Layout on your MS Word toolbar. The categories listed in this survey are based on a literature review and the results of a pilot study. If you have any questions about this survey you can contact David Gliddon (Researcher) in the follow ways:

Phone: xxx-xxx-xxxx
Email: xxxxxx@psu.edu

Thank you very much for participating in the study!

Operational Definitions:

Innovation:

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption such as teams, groups, or departments.

Innovation Leader:

The critical individuals involved with the generation or adoption of an innovation. They are innovators, early adopters, change agents, or opinion leaders.

> Innovators are venturesome and have almost an obsession with new ideas that occur within private social circles.

> Early adopters are somewhat integrated within a social network. Potential adopters look toward these individuals for initial opinions about the innovation.

> Opinion leaders are those individuals who have many established links within their social network and are able to help others to make innovation adoption decisions.

> Change agents are individuals who influence client innovation decisions in a direction desired by the change agency or organization.

Competencies:

An area of knowledge or skill that is critical for producing key outputs. Competencies are specific internal capabilities that people bring to their jobs; capabilities that are expressed by specific workplace behaviors.

Competency Model:

A full listing of competencies that describes the knowledge, skills, capabilities and behaviors required to perform a specific job or function. Emphasis should be placed on the things that excellent performers do more often, more persistently, and more effectively than do average performers.

CATEGORY 1: Learning

Name of Competency	Description	Rating
Focuses on Fundamentals	Refreshes core knowledge of the profession to stay sharp. Is not afraid to question assumptions at the foundation of their disciple.	
Identifies Innovations	Seeks out new approaches, tools, methods, and technologies in own field of expertise by reading, talking to others inside and outside the organization, and attending seminars/conferences. Anticipates applicability to the company.	
Use of Technical/Professional Expertise	Is an expert at applying technical and professional innovations. Uses knowledge of technical/professional developments to influence the strategic direction.	
Conducts Needs Analysis	Identifies strengths, weaknesses, opportunities and threats of their discipline by performing in-depth needs analysis.	
Business Acumen	Has a complete understanding of and is capable of expressing the strengths, weaknesses, opportunities, and threats of their discipline.	
Curiosity	Asks probing questions in order to gather a large body of information. Understands and believes that new lessons can be learned every day and seeks to find each day's lesson.	
Employs Research Methods	Searches academic and professional article databases on people, products, companies, etc. Reads academic and professional journals. Conducts surveys and questionnaires. Analyzes and interprets data.	
Knowledge Transfer	Routinely provides training and/or assistance to less-experienced staff. Educates decision-makers. Can learn from observing the new knowledge and skills being implemented.	
Values Higher Education	Seeks and engages in appropriate formal higher education opportunities. Encourages peers and subordinates to seek advanced degrees where applicable.	

Rating Scale				
Expert	**Core**	**Supplementary**		**Remove**
Competency is necessary for the adoption of an innovation.	Competency is necessary for the completion of all core job functions.	Competency is not necessary for the completion of core job functions but is useful quarterly.	Competency is not necessary for the completion of core job functions but is useful yearly.	Competency is not useful for an innovation leader.
1	**2**	**3**	**4**	**5**
Highest Importance			Least Importance	

CATEGORY 2: Creativity and Imagination

Name of Competency	Description	Rating
Identifies Problems Early	Seeks to anticipate and identify problems before they arise so that they do not become insurmountable.	
Generates New Ideas	Demonstrates independent creativity to develop new approaches/systems that go beyond one's experience or do not exist.	
Encourages New ideas	Understands that new ideas come from all levels of staff not just at the senior level. Seeks active input from staff.	
Eccentricity	Is not afraid to explore outside of mainstream thought. Does not become stalled in "the way things are done" but moves to find solutions that are cutting edge.	
Accepts Bad Ideas	Is willing to make mistakes on the path to a good idea. Is not afraid to make a less than stellar suggestion.	
Analytical Thinking	Understands complex problems, identifies critical issues, and generates varied solutions to problems	
Finds and Uses Analogues/Benchmarks	Identifies similar situations in other organizations or disciplines. Applies ideas to the company's field of expertise.	
Employs Brainstorming	Facilitates the creative processes of peers and subordinates, records ideas, uses and applies results of session.	
Builds Visuals	Uses sugar packets, flatware, salt and pepper shakers etc. to describe dynamic processes.	
Employs Alternate Scenarios and Role Plays	Stages a hypothetical situation, identifies and explains roles, observes the behavior of participants, interprets and discusses results.	
Flexibility	Adapts to change, shifts thought processes easily, and conforms to environmental changes.	
Champions Change	Advocates change in a positive manner. Fosters an environment where team members feel free to experiment with new ideas. Shows enthusiasm for opportunities for improvement in processes.	
Takes Time to Muse	Sits quietly in a pleasant area and thinks about anything.	
Risk-seeking	Leverages and exploits the utility of uncertain situations.	

Rating Scale				
Expert	**Core**	**Supplementary**		**Remove**
Competency is necessary for the adoption of an innovation.	Competency is necessary for the completion of all core job functions.	Competency is not necessary for the completion of core job functions but is useful quarterly.	Competency is not necessary for the completion of core job functions but is useful yearly.	Competency is not useful for an innovation leader.
1	**2**	**3**	**4**	**5**
Highest Importance			Least Importance	

CATEGORY 3: Energy Level and Motivation

Name of Competency	Description	Rating
Motivates Others	Works to find the motivators of peers and subordinates, offers the encouragement and direction needed. Helps people feel positive about adversity.	
Stress Management	Balances work responsibilities and personal duties. Seeks appropriate ways to let go of anxiety. Celebrates successes.	
Passion Driven	Exhibits boundless enthusiasm for the task and outcome. Seeks excellence in results.	
Ambition	Takes on the toughest assignments. Likes to do stimulating work. Looks for and obtains new responsibilities.	
Sense of Urgency	Understands timelines and priorities and appropriately raises the energy level in the group through example.	
Shows Tenacity	Possesses an inner sense of obligation to tasks of high value.	
Success Driven	Motivated by positive feedback and either external or internal encouragement.	
Competitiveness	Identifies and seeks to have a higher level of performance than prospective internal challengers.	
Perseverance	Performance is significantly unaffected by difficult, complex, or unexpected situations.	

Rating Scale				
Expert	**Core**	**Supplementary**		**Remove**
Competency is necessary for the adoption of an innovation.	Competency is necessary for the completion of all core job functions.	Competency is not necessary for the completion of core job functions but is useful quarterly.	Competency is not necessary for the completion of core job functions but is useful yearly.	Competency is not useful for an innovation leader.
1	2	3	4	5
Highest Importance			Least Importance	

CATEGORY 4: Commitment and Sense of Ownership

Name of Competency	Description	Rating
Audacity	Aggressively capitalizes on opportunities.	
Concern for Customer	Seeks out the voice of the customer at all stages of a project.	
Goal Setting	Sets challenging goals beyond targets set by management and encourages goal setting for staff members to achieve project and professional goals	
Links Corporate, Department, and Team Goals	Understands and explains the relationship between organization, department, and project goals.	
Establishes a Trust Culture	Establishes and builds trust among employees and the organization. Participates in relationships based on trust.	
Constantly Seeks Improvement.	Understands the difference between what is and what can be. Encourages improvement through increased commitment.	
Displays Initiative	Acts first to set projects in motion. Plans beyond expected results to achieve the extraordinary.	
Takes Responsibility	Assumes personal responsibility for projects regardless of the projected outcome.	
Sense of Pride	Works diligently to maintain/improve image of one's professional reputation and that of his/her organization	
Sets High Standards	Expects the best possible work from peers and subordinates. Does not make standards unattainable.	
Self Confidence	Reflects upon past performance and uses achievements to guide future challenges.	
Commitment to Ethics	Seeks out and implements ethical policies from legislation, professional organizations, and industry standards.	
Develops Focus	Clarifies the details of goals, reduces interruptions, and encourages an atmosphere free of distraction.	
Dedication	Shows a long-term commitment to the ideals of the organization and does not display a fickle attitude.	

Rating Scale				
Expert	**Core**	**Supplementary**		**Remove**
Competency is necessary for the adoption of an innovation.	Competency is necessary for the completion of all core job functions.	Competency is not necessary for the completion of core job functions but is useful quarterly.	Competency is not necessary for the completion of core job functions but is useful yearly.	Competency is not useful for an innovation leader.
1	**2**	**3**	**4**	**5**
Highest Importance			Least Importance	

CATEGORY 5: Mission and Vision

Name of Competency	Description	Rating
Strategy Development	Contributes to the development of the mission and vision. Develops and implements long-term alternative strategies for achieving success.	
Visionary Leadership	Establishes credibility for the vision by communicating it in the broader context of the industry and marketplace within which the organization is operating. Shares both internal and external trends and how they provide the foundation for the group's direction.	
Employs Multiple Perspectives	Sees the mission/vision in a variety of ways in order to interpret it's true meaning to the organization.	
Organizational Citizenship	Acts as though the mission and vision are part of an employee's daily conduct.	
Encourages Systems Thinking	Expands upon and explains critical/systems thinking, value-analysis, and strategic planning skills.	

Rating Scale				
Expert	**Core**	**Supplementary**		**Remove**
Competency is necessary for the adoption of an innovation.	Competency is necessary for the completion of all core job functions.	Competency is not necessary for the completion of core job functions but is useful quarterly.	Competency is not necessary for the completion of core job functions but is useful yearly.	Competency is not useful for an innovation leader.
1	**2**	**3**	**4**	**5**
Highest Importance			Least Importance	

CATEGORY 6: Communication, Interpersonal Skills, and Emotional Intelligence

Name of Competency	Description	Rating
Exemplary Writing Skills	Writes high quality reports, business correspondence and procedural manuals. Drafts, re-drafts, edits, and has work reviewed by others. Pays attention to cc:'s on memos or email.	
Selects and Uses Appropriate Communication Methods	Draws upon insights about other people's perspectives to formulate a communication strategy that will get others to support one's ideas. Is thoughtful in determining most appropriate medium, timing, etc., considering the impact at both the individual and organizational level.	
Addresses the Correct Audience.	Understands that a message is lost on the wrong people. Uses the right level of detail and language.	
Gate-keeping	Controls the level and flow of information to subordinates	
Asks Open-ended Questions	Seeks detailed explanations and expansion of ideas and concerns.	
Clarification	Ensures the speaker and listener are on the same page. Checks for gaps in communications.	
Establishes Feedback Loops	Provides positive input. Gives people a chance to respond to feedback. Keeps participants informed throughout the process.	
Open Door Policy	Encourages team members to voice concerns. Takes the time to really listen to staff members and also explains their own feelings and comments	
Understands Non-verbal Cues	Grasps body language and reacts sensitively. Knows how to bring out unspoken thoughts or concerns. Takes action accordingly.	
Participates in Active Listening	Makes eye contact, doesn't interrupt. Communicates well, verbally and non-verbally. Is able to get to the heart of the matter; beneath the surface of what is said.	
Empathy	Treats (even internal) others with courtesy and sensitivity. Makes an effort to address needs and concerns.	
Objectivity	Does not let personal feelings interfere with evaluation of feedback. Maintains a professional demeanor in decision making. Is not timid with regard to stating "the hard things". Welcomes feedback.	
Seeks to Understand Psyche of Others	Develops overall psychological profile of others.	
Tact	Reacts to situations in an appropriate and professional manner.	
Fluency	Has the ability to effectively communicate ideas and generate the interest and support of others	
Translates Literal Speech	Listens carefully to choice of words and intonation to translate actual meaning from literal meaning.	
Sparks Discussion	Ability to initiate and mediate discussion between individuals with widely differing perceptions.	
Builds Relationships	Builds positive rapport. Keeps in touch with key stakeholders, even after the reason for interacting with them has elapsed.	

Rating Scale				
Expert	**Core**	**Supplementary**		**Remove**
Competency is necessary for the adoption of an innovation.	Competency is necessary for the completion of all core job functions.	Competency is not necessary for the completion of core job functions but is useful quarterly.	Competency is not necessary for the completion of core job functions but is useful yearly.	Competency is not useful for an innovation leader.
1	**2**	**3**	**4**	**5**
Highest Importance			Least Importance	

CATEGORY 7: Leading Groups and Teams

Name of Competency	Description	Rating
Establishes Team Rapport	Understands and communicates with team members to let them know that they are valued as individuals and allows them to share in the team's vision and successes.	
Knows the Strengths and Weaknesses of the Team	Can assess and capitalize on team strengths and work to downplay or even improve team weaknesses.	
Teamwork	Works collaboratively, demonstrates openness, ensures conflict resolution and partners to achieve results.	
Team Commitment	Is committed to the team and the team's role in the organization.	
Cultivates Loyalty	Encourages team members to commit to the team. Seeks honest communications between team members. Provides appropriate level of financial reward.	
Empowerment	Empowers individuals and team members to make decisions in their areas of responsibility. Ensures that others participate and contribute.	
Manages Expectations	Establishes and communicates clear expectations of team members.	
Leads by Example	Makes the expectations of team members the same as the expectations of themselves. Actions match with communications.	
Team Problem Solving	Allows challenges to be shared by the team. Facilitates discussion with the team to come up with collectively generated solutions.	

CATEGORY 8: Understanding the External Environment

Name of Competency	Description	Rating
Knowledge of Competitors	Knows how competitors do their business and acts to combat threats.	
Organizational Awareness	Talks regularly with finance, accounting, marketing and other internal departments. Demonstrates an ability to interact with investors to provide or obtain information relevant to the company's interests.	
Market and Industry Awareness	Monitors news at federal, state and local level. Keeps up to date, maintains awareness of market trends, analyzes trends, makes recommendations, develops information network.	
Cultivates Cosmopolite Relationships	Seeks to meet people, attend events, and have professional relationships that are outside direct work focus.	

Rating Scale				
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Highest Importance			Least Importance	

CATEGORY 9: Role Identity, Power, and Politics

Name of Competency	Description	Rating
Political Savvy	Recognizes and accepts different roles and the impact of internal structures. Uses differences in positive ways.	
Salesmanship	Brings people on board with designs or plans. Maneuvers so that the people make a positive decision themselves. Tries not to force a good idea.	
Impact and Influence	Strategically plans out influence approach and timing based on in-depth understanding of the people, customers, organization, politics, etc. Carefully thinks through impact of influencing in the current moment as compared to holding off for a more broad based result which will better help meet long term business objectives.	
Employs Game Theory	Understand that achievement of mission or completion of strategic decision is analogous to a game that can be won. Anticipates others' responses as if playing chess.	
Diplomacy	Does not take no for an answer and seeks to find solutions to challenges that require mutual benefit for key stakeholders. Encourages win/win situations.	
Negotiation	Resolves disputes, finds agreement on courses of action, understands the advantages and disadvantages of alternatives.	
Humility	Comes to terms with the fact that despite the power and the position of leadership, the answer may be neither obvious nor easily reached. Not afraid to seek advice from subordinates. Acknowledges that having power without supportive relationships with superiors, equals, and subordinates is useless.	
Courage and Conviction	Is willing to put one's job at risk for reasons of sound principle. Challenges powerful others to act on espoused values.	
Integrity	Expects honesty in all business dealings. Is trustworthy, and sincere in demeanor.	
Professionalism	Behaves in a manner indicative of their role. Dresses appropriate to business expectations. Practices good grooming and hygiene.	

Rating Scale				
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Highest Importance			Least Importance	

CATEGORY 10: Management and Delegation

Name of Competency	Description	Rating
Time Management	Understands deadlines, keeps an organized schedule, and provides workers with reminders for critical tasks.	
Planning and Project Management	Monitors the progress of complex projects or initiatives which involve coordinating several different areas. Assesses the overall design of projects to ensure that resources are being maximized. Makes adjustments to budgets, personnel, etc., as circumstances may require.	
Delegation	Gives tasks to employees based on their strengths and weakness.	
Knows and Utilizes Resources	Is capable of meeting needs/demands by knowing and making use of both the internal and external resources available	
Balances Team and Individual Priorities	Understands when the team's needs outweigh self's. Defends priorities as needed. Shields team members from the lobbying and jockeying.	
Encourages Accountability	Holds workers responsible for their own delegated work.	

Rating Scale				
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APPENDIX H

Iteration Three Survey for Academic Participants

FORECASTING A COMPETENCY MODEL FOR INNOVATION LEADERS USING A

MODIFIED DELPHI TECHNIQUE

Iteration 3 Directions:

Your assistance is needed to rate the competencies of a successful Innovation Leader. Envision a star performer, the best of the best, and an exceptionally talented and outstandingly competent Innovation Leader in any function of an organization. Focus on the behaviors that such an individual would exhibit in the next five years. These behaviors should be evidence of the Innovation Leader's competence in a specific area of knowledge or skill. Ratings should be based on your experience or research.

Please complete the survey in the following manner:

1. Browse the entire survey to gain a general sense of the material.
2. Review the operational definitions for all terms used in this survey.
3. Using the rating scale on the bottom of each page, rate each competency in terms of importance by inputting a number between 1 and 5 into the *Rating* column with 1 being the most important and 5 being the least important. The *Recommended* column lists the rating results of experts who have already completed this study. Please note that recommended ratings with an asterix* indicate that 5 or more expert participants did not agree with this rating. You may use this information as a basis for your own rating if you agree with the expert's opinion. Please save often.
4. When you have completed the survey, please save the completed document and email the survey as an attachment to xxxxxx@psu.edu.

After the Survey

When all Iteration 2 surveys have been received by the Researcher, they will be analyzed quantitatively. From this data, a third iteration survey will be created. In the Iteration 3 survey you will be asked to rate the competencies again knowing the results of Iteration 2.

Notes:

This document is best viewed in "Print Layout" and may be changed by clicking on View, Print Layout on your MS Word toolbar. The categories listed in this survey are based on a literature review and the results of a pilot study. If you have any questions about this survey you can contact David Gliddon (Researcher) in the follow ways:

Phone: xxx-xxx-xxxx
Email: xxxxxx@psu.edu

Operational Definitions:

Innovation:

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption such as teams, groups, or departments.

Innovation Leader:

The critical individuals involved with the generation or adoption of an innovation. They are innovators, early adopters, change agents, or opinion leaders.

> Innovators are venturesome and have almost an obsession with new ideas that occur within private social circles.

> Early adopters are somewhat integrated within a social network. Potential adopters look toward these individuals for initial opinions about the innovation.

> Opinion leaders are those individuals who have many established links within their social network and are able to help others to make innovation adoption decisions.

> Change agents are individuals who influence client innovation decisions in a direction desired by the change agency or organization.

Competencies:

An area of knowledge or skill that is critical for producing key outputs. Competencies are specific internal capabilities that people bring to their jobs; capabilities that are expressed by specific workplace behaviors.

Competency Model:

A full listing of competencies that describes the knowledge, skills, capabilities and behaviors required to perform a specific job or function. Emphasis should be placed on the things that excellent performers do more often, more persistently, and more effectively than do average performers.

CATEGORY 1: Learning

Name of Competency	Description	Recommended	Rating
Focuses on Fundamentals	Refreshes core knowledge of the profession to stay sharp. Is not afraid to question assumptions at the foundation of their disciple.	**2***	
Identifies Innovations	Seeks out new approaches, tools, methods, and technologies in own field of expertise by reading, talking to others inside and outside the organization, and attending seminars/conferences. Anticipates applicability to the company.	**1-2**	
Use of Technical/Professional Expertise	Is an expert at applying technical and professional innovations. Uses knowledge of technical/professional developments to influence the strategic direction.	**2-3**	
Conducts Needs Analysis	Identifies strengths, weaknesses, opportunities and threats of their discipline by performing in-depth needs analysis.	**2-3**	
Business Acumen	Has a complete understanding of and is capable of expressing the strengths, weaknesses, opportunities, and threats of their discipline.	**2-3**	
Curiosity	Asks probing questions in order to gather a large body of information. Understands and believes that new lessons can be learned every day and seeks to find each day's lesson.	**2-3**	
Employs Research Methods	Searches academic and professional article databases on people, products, companies, etc. Reads academic and professional journals. Conducts surveys and questionnaires. Analyzes and interprets data.	**3-4**	
Knowledge Transfer	Routinely provides training and/or assistance to less-experienced staff. Educates decision-makers. Can learn from observing the new knowledge and skills being implemented.	**2**	
Values Higher Education	Seeks and engages in appropriate formal higher education opportunities. Encourages peers and subordinates to seek advanced degrees where applicable.	**3-4**	

Rating Scale				
Expert	**Core**	**Supplementary**		**Remove**
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Highest Importance			Least Importance	

CATEGORY 2: Creativity and Imagination

Name of Competency	Description	Recommended	Rating
Identifies Problems Early	Seeks to anticipate and identify problems before they arise so that they do not become insurmountable.	**2**	
Generates New Ideas	Demonstrates independent creativity to develop new approaches/systems that go beyond one's experience or do not exist.	**2-3**	
Encourages New ideas	Understands that new ideas come from all levels of staff not just at the senior level. Seeks active input from staff.	**1-2***	
Eccentricity	Is not afraid to explore outside of mainstream thought. Does not become stalled in "the way things are done" but moves to find solutions that are cutting edge.	**2**	
Accepts Bad Ideas	Is willing to make mistakes on the path to a good idea. Is not afraid to make a less than stellar suggestion.	**3**	
Analytical Thinking	Understands complex problems, identifies critical issues, and generates varied solutions to problems	**2**	
Finds and Uses Analogues/Benchmarks	Identifies similar situations in other organizations or disciplines. Applies ideas to the company's field of expertise.	**2-3**	
Employs Brainstorming	Facilitates the creative processes of peers and subordinates, records ideas, uses and applies results of session.	**3**	
Builds Visuals	Uses sugar packets, flatware, salt and pepper shakers etc. to describe dynamic processes.	**4-5***	
Employs Alternate Scenarios and Role Plays	Stages a hypothetical situation, identifies and explains roles, observes the behavior of participants, interprets and discusses results.	**3**	
Flexibility	Adapts to change, shifts thought processes easily, and conforms to environmental changes.	**2-3**	
Champions Change	Advocates change in a positive manner. Fosters an environment where team members feel free to experiment with new ideas. Shows enthusiasm for opportunities for improvement in processes.	**2***	
Takes Time to Muse	Sits quietly in a pleasant area and thinks about anything.	**4-5**	
Risk-seeking	Leverages and exploits the utility of uncertain situations.	**4**	

Rating Scale				
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Highest Importance			Least Importance	

CATEGORY 3: Energy Level and Motivation

Name of Competency	Description	Recommended	Rating
Motivates Others	Works to find the motivators of peers and subordinates, offers the encouragement and direction needed. Helps people feel positive about adversity.	**2***	
Stress Management	Balances work responsibilities and personal duties. Seeks appropriate ways to let go of anxiety. Celebrates successes.	**2**	
Passion Driven	Exhibits boundless enthusiasm for the task and outcome. Seeks excellence in results.	**2***	
Ambition	Takes on the toughest assignments. Likes to do stimulating work. Looks for and obtains new responsibilities.	**2**	
Sense of Urgency	Understands timelines and priorities and appropriately raises the energy level in the group through example.	**1-2**	
Shows Tenacity	Possesses an inner sense of obligation to tasks of high value.	**2**	
Success Driven	Motivated by positive feedback and either external or internal encouragement.	**3**	
Competitiveness	Identifies and seeks to have a higher level of performance than prospective internal challengers.	**3**	
Perseverance	Performance is significantly unaffected by difficult, complex, or unexpected situations.	**2**	

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Highest Importance			Least Importance	

CATEGORY 4: Commitment and Sense of Ownership

Name of Competency	Description	Recommended	Rating
Audacity	Aggressively capitalizes on opportunities.	**2-3**	
Concern for Customer	Seeks out the voice of the customer at all stages of a project.	**2-3**	
Goal Setting	Sets challenging goals beyond targets set by management and encourages goal setting for staff members to achieve project and professional goals	**2**	
Links Corporate, Department, and Team Goals	Understands and explains the relationship between organization, department, and project goals.	**2***	
Establishes a Trust Culture	Establishes and builds trust among employees and the organization. Participates in relationships based on trust.	**2**	
Constantly Seeks Improvement.	Understands the difference between what is and what can be. Encourages improvement through increased commitment.	**2-3**	
Displays Initiative	Acts first to set projects in motion. Plans beyond expected results to achieve the extraordinary.	**2**	
Takes Responsibility	Assumes personal responsibility for projects regardless of the projected outcome.	**2**	
Sense of Pride	Works diligently to maintain/improve image of one's professional reputation and that of his/her organization	**2-3**	
Sets High Standards	Expects the best possible work from peers and subordinates. Does not make standards unattainable.	**2**	
Self Confidence	Reflects upon past performance and uses achievements to guide future challenges.	**2**	
Commitment to Ethics	Seeks out and implements ethical policies from legislation, professional organizations, and industry standards.	**2-3**	
Develops Focus	Clarifies the details of goals, reduces interruptions, and encourages an atmosphere free of distraction.	**2-3**	
Dedication	Shows a long-term commitment to the ideals of the organization and does not display a fickle attitude.	**2**	

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Highest Importance			Least Importance	

CATEGORY 5: Mission and Vision

Name of Competency	Description	Recommended	Rating
Strategy Development	Contributes to the development of the mission and vision. Develops and implements long-term alternative strategies for achieving success.	**2-3**	
Visionary Leadership	Establishes credibility for the vision by communicating it in the broader context of the industry and marketplace within which the organization is operating. Shares both internal and external trends and how they provide the foundation for the group's direction.	**2**	
Employs Multiple Perspectives	Sees the mission/vision in a variety of ways in order to interpret it's true meaning to the organization.	**2-3**	
Organizational Citizenship	Acts as though the mission and vision are part of an employee's daily conduct.	**2-3**	
Encourages Systems Thinking	Expands upon and explains critical/systems thinking, value-analysis, and strategic planning skills.	**2-3**	

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Highest Importance			Least Importance	

CATEGORY 6: Communication, Interpersonal Skills, and Emotional Intelligence

Name of Competency	Description	Recommended	Rating
Exemplary Writing Skills	Writes high quality reports, business correspondence and procedural manuals. Drafts, re-drafts, edits, and has work reviewed by others. Pays attention to cc:'s on memos or email.	3	
Selects and Uses Appropriate Communication Methods	Draws upon insights about other people's perspectives to formulate a communication strategy that will get others to support one's ideas. Is thoughtful in determining most appropriate medium, timing, etc., considering the impact at both the individual and organizational level.	2-3	
Addresses the Correct Audience.	Understands that a message is lost on the wrong people. Uses the right level of detail and language.	2	
Gate-keeping	Controls the level and flow of information to subordinates	3-4	
Asks Open-ended Questions	Seeks detailed explanations and expansion of ideas and concerns.	2-3	
Clarification	Ensures the speaker and listener are on the same page. Checks for gaps in communications.	2*	
Establishes Feedback Loops	Provides positive input. Gives people a chance to respond to feedback. Keeps participants informed throughout the process.	2	
Open Door Policy	Encourages team members to voice concerns. Takes the time to really listen to staff members and also explains their own feelings and comments	2	
Understands Non-verbal Cues	Grasps body language and reacts sensitively. Knows how to bring out unspoken thoughts or concerns. Takes action accordingly.	2-3	
Participates in Active Listening	Makes eye contact, doesn't interrupt. Communicates well, verbally and non-verbally. Is able to get to the heart of the matter; beneath the surface of what is said.	2*	
Empathy	Treats (even internal) others with courtesy and sensitivity. Makes an effort to address needs and concerns.	2*	
Objectivity	Does not let personal feelings interfere with evaluation of feedback. Maintains a professional demeanor in decision making. Is not timid with regard to stating "the hard things". Welcomes feedback.	2	
Seeks to Understand Psyche of Others	Develops overall psychological profile of others.	3-4*	
Tact	Reacts to situations in an appropriate and professional manner.	2*	
Fluency	Has the ability to effectively communicate ideas and generate the interest and support of others	2	
Translates Literal Speech	Listens carefully to choice of words and intonation to translate actual meaning from literal meaning.	3	
Sparks Discussion	Ability to initiate and mediate discussion between individuals with widely differing perceptions.	2-3	
Builds Relationships	Builds positive rapport. Keeps in touch with key stakeholders, even after the reason for interacting with them has elapsed.	2-3	

CATEGORY 7: Leading Groups and Teams

Name of Competency	Description	Recommended	Rating
Establishes Team Rapport	Understands and communicates with team members to let them know that they are valued as individuals and allows them to share in the team's vision and successes.	2*	
Knows the Strengths and Weaknesses of the Team	Can assess and capitalize on team strengths and work to downplay or even improve team weaknesses.	1-2	
Teamwork	Works collaboratively, demonstrates openness, ensures conflict resolution and partners to achieve results.	2	
Team Commitment	Is committed to the team and the team's role in the organization.	1-2*	
Cultivates Loyalty	Encourages team members to commit to the team. Seeks honest communications between team members. Provides appropriate level of financial reward.	2*	
Empowerment	Empowers individuals and team members to make decisions in their areas of responsibility. Ensures that others participate and contribute.	1-2*	
Manages Expectations	Establishes and communicates clear expectations of team members.	1-2*	
Leads by Example	Makes the expectations of team members the same as the expectations of themselves. Actions match with communications.	1*	
Team Problem Solving	Allows challenges to be shared by the team. Facilitates discussion with the team to come up with collectively generated solutions.	2*	

CATEGORY 8: Understanding the External Environment

Name of Competency	Description	Recommended	Rating
Knowledge of Competitors	Knows how competitors do their business and acts to combat threats.	2-3	
Organizational Awareness	Talks regularly with finance, accounting, marketing and other internal departments. Demonstrates an ability to interact with investors to provide or obtain information relevant to the company's interests.	2-3*	
Market and Industry Awareness	Monitors news at federal, state and local level. Keeps up to date, maintains awareness of market trends, analyzes trends, makes recommendations, develops information network.	2-3	
Cultivates Cosmopolite Relationships	Seeks to meet people, attend events, and have professional relationships that are outside direct work focus.	4	

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CATEGORY 9: Role Identity, Power, and Politics

Name of Competency	Description	Recommended	Rating
Political Savvy	Recognizes and accepts different roles and the impact of internal structures. Uses differences in positive ways.	**2-3**	
Salesmanship	Brings people on board with designs or plans. Maneuvers so that the people make a positive decision themselves. Tries not to force a good idea.	**3**	
Impact and Influence	Strategically plans out influence approach and timing based on in-depth understanding of the people, customers, organization, politics, etc. Carefully thinks through impact of influencing in the current moment as compared to holding off for a more broad based result which will better help meet long term business objectives.	**2-3**	
Employs Game Theory	Understand that achievement of mission or completion of strategic decision is analogous to a game that can be won. Anticipates others' responses as if playing chess.	**3**	
Diplomacy	Does not take no for an answer and seeks to find solutions to challenges that require mutual benefit for key stakeholders. Encourages win/win situations.	**2-3**	
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Courage and Conviction	Is willing to put one's job at risk for reasons of sound principle. Challenges powerful others to act on espoused values.	**2-3**	
Integrity	Expects honesty in all business dealings. Is trustworthy, and sincere in demeanor.	**1-2***	
Professionalism	Behaves in a manner indicative of their role. Dresses appropriate to business expectations. Practices good grooming and hygiene.	**2**	

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CATEGORY 10: Management and Delegation

Name of Competency	Description	Recommended	Rating
Time Management	Understands deadlines, keeps an organized schedule, and provides workers with reminders for critical tasks.	**1-2**	
Planning and Project Management	Monitors the progress of complex projects or initiatives which involve coordinating several different areas. Assesses the overall design of projects to ensure that resources are being maximized. Makes adjustments to budgets, personnel, etc., as circumstances may require.	**1-2***	
Delegation	Gives tasks to employees based on their strengths and weakness.	**1-2**	
Knows and Utilizes Resources	Is capable of meeting needs/demands by knowing and making use of both the internal and external resources available	**1-2***	
Balances Team and Individual Priorities	Understands when the team's needs outweigh self's. Defends priorities as needed. Shields team members from the lobbying and jockeying.	**2***	
Encourages Accountability	Holds workers responsible for their own delegated work.	**1-2**	

Rating Scale				
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When all Iteration 2 surveys have been received by the Researcher, they will be analyzed quantitatively. From this data, a third iteration survey will be created. In the Iteration 3 survey you will be asked to rate the competencies again knowing the results of Iteration 2.

Notes:

This document is best viewed in "Print Layout" and may be changed by clicking on View, Print Layout on your MS Word toolbar. The categories listed in this survey are based on a literature review and the results of a pilot study. If you have any questions about this survey you can contact David Gliddon (Researcher) in the follow ways:

Phone: xxx-xxx-xxxx
Email: xxxxxx@psu.edu

Operational Definitions:

Innovation:

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption such as teams, groups, or departments.

Innovation Leader:

The critical individuals involved with the generation or adoption of an innovation. They are innovators, early adopters, change agents, or opinion leaders.

> Innovators are venturesome and have almost an obsession with new ideas that occur within private social circles.

> Early adopters are somewhat integrated within a social network. Potential adopters look toward these individuals for initial opinions about the innovation.

> Opinion leaders are those individuals who have many established links within their social network and are able to help others to make innovation adoption decisions.

> Change agents are individuals who influence client innovation decisions in a direction desired by the change agency or organization.

Competencies:

An area of knowledge or skill that is critical for producing key outputs. Competencies are specific internal capabilities that people bring to their jobs; capabilities that are expressed by specific workplace behaviors.

Competency Model:

A full listing of competencies that describes the knowledge, skills, capabilities and behaviors required to perform a specific job or function. Emphasis should be placed on the things that excellent performers do more often, more persistently, and more effectively than do average performers.

CATEGORY 1: Learning

Name of Competency	Description	Recommended	Rating
Focuses on Fundamentals	Refreshes core knowledge of the profession to stay sharp. Is not afraid to question assumptions at the foundation of their disciple.	**2-3**	
Identifies Innovations	Seeks out new approaches, tools, methods, and technologies in own field of expertise by reading, talking to others inside and outside the organization, and attending seminars/conferences. Anticipates applicability to the company.	**1***	
Use of Technical/Professional Expertise	Is an expert at applying technical and professional innovations. Uses knowledge of technical/professional developments to influence the strategic direction.	**2-3**	
Conducts Needs Analysis	Identifies strengths, weaknesses, opportunities and threats of their discipline by performing in-depth needs analysis.	**3**	
Business Acumen	Has a complete understanding of and is capable of expressing the strengths, weaknesses, opportunities, and threats of their discipline.	**3**	
Curiosity	Asks probing questions in order to gather a large body of information. Understands and believes that new lessons can be learned every day and seeks to find each day's lesson.	**3**	
Employs Research Methods	Searches academic and professional article databases on people, products, companies, etc. Reads academic and professional journals. Conducts surveys and questionnaires. Analyzes and interprets data.	**3**	
Knowledge Transfer	Routinely provides training and/or assistance to less-experienced staff. Educates decision-makers. Can learn from observing the new knowledge and skills being implemented.	**2**	
Values Higher Education	Seeks and engages in appropriate formal higher education opportunities. Encourages peers and subordinates to seek advanced degrees where applicable.	**3**	

Rating Scale				
Expert	**Core**	**Supplementary**		**Remove**
Competency is necessary for the adoption of an innovation.	Competency is necessary for the completion of all core job functions.	Competency is not necessary for the completion of core job functions but is useful quarterly.	Competency is not necessary for the completion of core job functions but is useful yearly.	Competency is not useful for an innovation leader.
1	**2**	**3**	**4**	**5**
Highest Importance			Least Importance	

CATEGORY 2: Creativity and Imagination

Name of Competency	Description	Recommended	Rating
Identifies Problems Early	Seeks to anticipate and identify problems before they arise so that they do not become insurmountable.	**2**	
Generates New Ideas	Demonstrates independent creativity to develop new approaches/systems that go beyond one's experience or do not exist.	**2-3**	
Encourages New ideas	Understands that new ideas come from all levels of staff not just at the senior level. Seeks active input from staff.	**2-3**	
Eccentricity	Is not afraid to explore outside of mainstream thought. Does not become stalled in "the way things are done" but moves to find solutions that are cutting edge.	**3**	
Accepts Bad Ideas	Is willing to make mistakes on the path to a good idea. Is not afraid to make a less than stellar suggestion.	**4**	
Analytical Thinking	Understands complex problems, identifies critical issues, and generates varied solutions to problems	**2-3**	
Finds and Uses Analogues/Benchmarks	Identifies similar situations in other organizations or disciplines. Applies ideas to the company's field of expertise.	**3-4**	
Employs Brainstorming	Facilitates the creative processes of peers and subordinates, records ideas, uses and applies results of session.	**3**	
Builds Visuals	Uses sugar packets, flatware, salt and pepper shakers etc. to describe dynamic processes.	**4-5***	
Employs Alternate Scenarios and Role Plays	Stages a hypothetical situation, identifies and explains roles, observes the behavior of participants, interprets and discusses results.	**4**	
Flexibility	Adapts to change, shifts thought processes easily, and conforms to environmental changes.	**2-3**	
Champions Change	Advocates change in a positive manner. Fosters an environment where team members feel free to experiment with new ideas. Shows enthusiasm for opportunities for improvement in processes.	**2-3**	
Takes Time to Muse	Sits quietly in a pleasant area and thinks about anything.	**4-5***	
Risk-seeking	Leverages and exploits the utility of uncertain situations.	**4**	

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Highest Importance				Least Importance

CATEGORY 3: Energy Level and Motivation

Name of Competency	Description	Recommended	Rating
Motivates Others	Works to find the motivators of peers and subordinates, offers the encouragement and direction needed. Helps people feel positive about adversity.	2	
Stress Management	Balances work responsibilities and personal duties. Seeks appropriate ways to let go of anxiety. Celebrates successes.	2	
Passion Driven	Exhibits boundless enthusiasm for the task and outcome. Seeks excellence in results.	2	
Ambition	Takes on the toughest assignments. Likes to do stimulating work. Looks for and obtains new responsibilities.	2	
Sense of Urgency	Understands timelines and priorities and appropriately raises the energy level in the group through example.	1-2*	
Shows Tenacity	Possesses an inner sense of obligation to tasks of high value.	2-3	
Success Driven	Motivated by positive feedback and either external or internal encouragement.	3	
Competitiveness	Identifies and seeks to have a higher level of performance than prospective internal challengers.	3	
Perseverance	Performance is significantly unaffected by difficult, complex, or unexpected situations.	2-3	

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Highest Importance			Least Importance	

CATEGORY 4: Commitment and Sense of Ownership

Name of Competency	Description	Recommended	Rating
Audacity	Aggressively capitalizes on opportunities.	**2-3**	
Concern for Customer	Seeks out the voice of the customer at all stages of a project.	**2**	
Goal Setting	Sets challenging goals beyond targets set by management and encourages goal setting for staff members to achieve project and professional goals	**2***	
Links Corporate, Department, and Team Goals	Understands and explains the relationship between organization, department, and project goals.	**2**	
Establishes a Trust Culture	Establishes and builds trust among employees and the organization. Participates in relationships based on trust.	**2**	
Constantly Seeks Improvement.	Understands the difference between what is and what can be. Encourages improvement through increased commitment.	**2**	
Displays Initiative	Acts first to set projects in motion. Plans beyond expected results to achieve the extraordinary.	**2***	
Takes Responsibility	Assumes personal responsibility for projects regardless of the projected outcome.	**2**	
Sense of Pride	Works diligently to maintain/improve image of one's professional reputation and that of his/her organization	**2-3**	
Sets High Standards	Expects the best possible work from peers and subordinates. Does not make standards unattainable.	**2**	
Self Confidence	Reflects upon past performance and uses achievements to guide future challenges.	**2**	
Commitment to Ethics	Seeks out and implements ethical policies from legislation, professional organizations, and industry standards.	**2-3**	
Develops Focus	Clarifies the details of goals, reduces interruptions, and encourages an atmosphere free of distraction.	**3**	
Dedication	Shows a long-term commitment to the ideals of the organization and does not display a fickle attitude.	**2-3***	

Rating Scale				
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Highest Importance			Least Importance	

CATEGORY 5: Mission and Vision

Name of Competency	Description	Recommended	Rating
Strategy Development	Contributes to the development of the mission and vision. Develops and implements long-term alternative strategies for achieving success.	**2**	
Visionary Leadership	Establishes credibility for the vision by communicating it in the broader context of the industry and marketplace within which the organization is operating. Shares both internal and external trends and how they provide the foundation for the group's direction.	**2**	
Employs Multiple Perspectives	Sees the mission/vision in a variety of ways in order to interpret it's true meaning to the organization.	**3-4**	
Organizational Citizenship	Acts as though the mission and vision are part of an employee's daily conduct.	**3-4**	
Encourages Systems Thinking	Expands upon and explains critical/systems thinking, value-analysis, and strategic planning skills.	**2-3**	

Rating Scale				
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Highest Importance			Least Importance	

CATEGORY 6: Communication, Interpersonal Skills, and Emotional Intelligence

Name of Competency	Description	Recommended	Rating
Exemplary Writing Skills	Writes high quality reports, business correspondence and procedural manuals. Drafts, re-drafts, edits, and has work reviewed by others. Pays attention to cc:'s on memos or email.	**3**	
Selects and Uses Appropriate Communication Methods	Draws upon insights about other people's perspectives to formulate a communication strategy that will get others to support one's ideas. Is thoughtful in determining most appropriate medium, timing, etc., considering the impact at both the individual and organizational level.	**2-3**	
Addresses the Correct Audience.	Understands that a message is lost on the wrong people. Uses the right level of detail and language.	**3**	
Gate-keeping	Controls the level and flow of information to subordinates	**3-4**	
Asks Open-ended Questions	Seeks detailed explanations and expansion of ideas and concerns.	**3**	
Clarification	Ensures the speaker and listener are on the same page. Checks for gaps in communications.	**2-3**	
Establishes Feedback Loops	Provides positive input. Gives people a chance to respond to feedback. Keeps participants informed throughout the process.	**2-3**	
Open Door Policy	Encourages team members to voice concerns. Takes the time to really listen to staff members and also explains their own feelings and comments	**2-3**	
Understands Non-verbal Cues	Grasps body language and reacts sensitively. Knows how to bring out unspoken thoughts or concerns. Takes action accordingly.	**3-4**	
Participates in Active Listening	Makes eye contact, doesn't interrupt. Communicates well, verbally and non-verbally. Is able to get to the heart of the matter; beneath the surface of what is said.	**2-3**	
Empathy	Treats (even internal) others with courtesy and sensitivity. Makes an effort to address needs and concerns.	**2-3**	
Objectivity	Does not let personal feelings interfere with evaluation of feedback. Maintains a professional demeanor in decision making. Is not timid with regard to stating "the hard things". Welcomes feedback.	**2-3***	
Seeks to Understand Psyche of Others	Develops overall psychological profile of others.	**4-5**	
Tact	Reacts to situations in an appropriate and professional manner.	**2-3**	
Fluency	Has the ability to effectively communicate ideas and generate the interest and support of others	**2-3**	
Translates Literal Speech	Listens carefully to choice of words and intonation to translate actual meaning from literal meaning.	**3**	
Sparks Discussion	Ability to initiate and mediate discussion between individuals with widely differing perceptions.	**3**	
Builds Relationships	Builds positive rapport. Keeps in touch with key stakeholders, even after the reason for interacting with them has elapsed.	**2-3**	

CATEGORY 7: Leading Groups and Teams

Name of Competency	Description	Recommended	Rating
Establishes Team Rapport	Understands and communicates with team members to let them know that they are valued as individuals and allows them to share in the team's vision and successes.	2*	
Knows the Strengths and Weaknesses of the Team	Can assess and capitalize on team strengths and work to downplay or even improve team weaknesses.	2-3	
Teamwork	Works collaboratively, demonstrates openness, ensures conflict resolution and partners to achieve results.	2	
Team Commitment	Is committed to the team and the team's role in the organization.	2-3	
Cultivates Loyalty	Encourages team members to commit to the team. Seeks honest communications between team members. Provides appropriate level of financial reward.	4-5	
Empowerment	Empowers individuals and team members to make decisions in their areas of responsibility. Ensures that others participate and contribute.	2	
Manages Expectations	Establishes and communicates clear expectations of team members.	2	
Leads by Example	Makes the expectations of team members the same as the expectations of themselves. Actions match with communications.	2*	
Team Problem Solving	Allows challenges to be shared by the team. Facilitates discussion with the team to come up with collectively generated solutions.	2-3	

CATEGORY 8: Understanding the External Environment

Name of Competency	Description	Recommended	Rating
Knowledge of Competitors	Knows how competitors do their business and acts to combat threats.	3-4	
Organizational Awareness	Talks regularly with finance, accounting, marketing and other internal departments. Demonstrates an ability to interact with investors to provide or obtain information relevant to the company's interests.	3-4	
Market and Industry Awareness	Monitors news at federal, state and local level. Keeps up to date, maintains awareness of market trends, analyzes trends, makes recommendations, develops information network.	3-4	
Cultivates Cosmopolite Relationships	Seeks to meet people, attend events, and have professional relationships that are outside direct work focus.	3-4	

CATEGORY 9: Role Identity, Power, and Politics

Name of Competency	Description	Recommended	Rating
Political Savvy	Recognizes and accepts different roles and the impact of internal structures. Uses differences in positive ways.	**3**	
Salesmanship	Brings people on board with designs or plans. Maneuvers so that the people make a positive decision themselves. Tries not to force a good idea.	**3**	
Impact and Influence	Strategically plans out influence approach and timing based on in-depth understanding of the people, customers, organization, politics, etc. Carefully thinks through impact of influencing in the current moment as compared to holding off for a more broad based result which will better help meet long term business objectives.	**2-3**	
Employs Game Theory	Understand that achievement of mission or completion of strategic decision is analogous to a game that can be won. Anticipates others' responses as if playing chess.	**4**	
Diplomacy	Does not take no for an answer and seeks to find solutions to challenges that require mutual benefit for key stakeholders. Encourages win/win situations.	**3-4**	
Negotiation	Resolves disputes, finds agreement on courses of action, understands the advantages and disadvantages of alternatives.	**2-3***	
Humility	Comes to terms with the fact that despite the power and the position of leadership, the answer may be neither obvious nor easily reached. Not afraid to seek advice from subordinates. Acknowledges that having power without supportive relationships with superiors, equals, and subordinates is useless.	**2**	
Courage and Conviction	Is willing to put one's job at risk for reasons of sound principle. Challenges powerful others to act on espoused values.	**3-4**	
Integrity	Expects honesty in all business dealings. Is trustworthy, and sincere in demeanor.	**2***	
Professionalism	Behaves in a manner indicative of their role. Dresses appropriate to business expectations. Practices good grooming and hygiene.	**2**	

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Highest Importance			Least Importance	

CATEGORY 10: Management and Delegation

Name of Competency	Description	Recommended	Rating
Time Management	Understands deadlines, keeps an organized schedule, and provides workers with reminders for critical tasks.	**2**	
Planning and Project Management	Monitors the progress of complex projects or initiatives which involve coordinating several different areas. Assesses the overall design of projects to ensure that resources are being maximized. Makes adjustments to budgets, personnel, etc., as circumstances may require.	**2**	
Delegation	Gives tasks to employees based on their strengths and weakness.	**2-3**	
Knows and Utilizes Resources	Is capable of meeting needs/demands by knowing and making use of both the internal and external resources available	**2-3**	
Balances Team and Individual Priorities	Understands when the team's needs outweigh self's. Defends priorities as needed. Shields team members from the lobbying and jockeying.	**2-3**	
Encourages Accountability	Holds workers responsible for their own delegated work.	**2**	

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1	**2**	**3**	**4**	**5**
Highest Importance			Least Importance	

VITA

DAVID G. GLIDDON

Education

Pennsylvania State University: University Park, PA, 2002-Present
Major: PhD. (ABD) Workforce Education and Development. Specialization: Training/Human Resources

The University of Scranton: Scranton PA. 1999-2001
Major: MS. Human Resource Administration. Specialization: Human Resource Development

Pennsylvania State University: University Park, PA. 1995-1999
Major: BS. Psychology. Minor: Philosophy

Work Experience

Colorado Technical University: Colorado Springs, CO. 2004-Present
Adjunct Professor, School of Business

The Pennsylvania State University, Outreach Program Resources: University Park, PA. 2002-2003
Program Consultant

Sanofi Pasteur: Swiftwater, PA. 2001-2002
Human Resource Consultant

Lehigh Valley College: Center Valley, PA. 2000-2001
Regional Public Relations Director/Recruiter

Northeast Counseling Services: Nanticoke, PA. 1999-2000
Activities Director

Publications

Gliddon, D. (2004). Effective performance management systems: Current criticisms and new ideas for employee evaluation. *Performance Improvement, 27* (October).

Gliddon, D. (2004). Youth workforce investment initiatives. *Workforce Education Forum, 31*(1).

Gliddon, D. (2005). Sexual harassment. HR Encyclopedia, online at www.hr-dictionary.com

Awards

Faculty Service Award
Colorado Technical University, 2005.

Pi Lambda Theta National Honor Society in Education
Inducted at The Pennsylvania State University, Member Since 2003

Psi Chi National Honor Society in Psychology
Inducted at The Pennsylvania State University, Member Since 1998
Eagle Scout 1994