



HOOD COLLEGE



Roles of Knowledge Diffusion, Emotional Intelligence, and Locus of Control in Facilitating  
Incremental Innovation Among Middle Managers: An Empirical Investigation

A DISSERTATION

Submitted to the Faculty of the  
George B. Delaplaine Jr. School of Business  
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for the degree  
Doctor of Business Administration

by

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Frederick, Maryland

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## DOCTORAL COMMITTEE

The members of the committee appointed to examine the dissertation of Jonathan N. Spaans find that this dissertation fulfills the requirements and meets the standards of the Hood College George B. Delaplaine Jr. School of Business Doctoral Program in Business Administration and recommend that it be approved.

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## TABLE OF CONTENTS

Page	
List of Tables .....	vi
List of Figures .....	viii
Dedication .....	ix
Acknowledgements .....	x
Abstract .....	xi
1. INTRODUCTION .....	1
Background .....	1
Middle Management .....	2
Organizational Learning .....	3
Knowledge Diffusion .....	4
Personality .....	6
Innovation .....	7
Leadership .....	7
Statement of the Problem .....	8
Theoretical Framework .....	10
Purpose of the Study .....	12
Research Questions .....	13
(Alternate) Hypotheses .....	13
Overview of Research Methodology .....	14
Significance and Justification .....	14
Limitations .....	16

Definitions of Key Terms .....	17
Chapter Summary .....	18
Preview of the Study.....	20
<b>2. THEORETICAL FOUNDATIONS.....</b>	<b>22</b>
Introduction.....	22
Middle Management .....	22
Knowledge Diffusion.....	26
Middle Managers and Knowledge Management .....	32
Incremental Innovation .....	37
Personality– Locus of Control .....	48
Emotional Intelligence .....	53
Literature Synthesis .....	57
Major Works That Influenced the Study .....	61
<b>3. RESEARCH METHODOLOGY.....</b>	<b>63</b>
Introduction.....	63
Research Design and Perspective .....	63
Sampling Plan .....	64
Variables and Operational Definitions.....	66
Data Collection Procedures.....	67
The Questionnaire: Perception of Middle Managers About Incremental Innovation and its Antecedents 2018 .....	68
Questionnaire Testing (SurveyMonkey).....	69
Incremental Innovation .....	69

Organizational Knowledge Diffusion .....	72
Individual Propensity to Use Information Technology .....	73
Emotional Intelligence .....	74
Demographics .....	75
Data Analytical Techniques .....	75
Data Qualification Testing .....	79
Overall Reliability and Validity .....	81
Construct Validity .....	82
Internal Validity .....	82
External Validity .....	83
Sampling Bias .....	84
Researcher Bias .....	84
Chapter Summary .....	84
<b>4. RESULTS .....</b>	<b>86</b>
Introduction .....	86
Summary of the Methods .....	86
Participant Characteristics .....	89
Results of the Study .....	93
Descriptive Statistics .....	93
Internal Reliability .....	94
Data Eligibility of Multiple Regression .....	95
Preliminary Statistical Analysis .....	99
Results of Hierarchical Multiple Regression .....	104

Summary .....	112
5. CONCLUSIONS AND IMPLICATIONS.....	114
Introduction.....	114
Summary of the Study .....	114
Discussion.....	115
Organizational Knowledge Diffusion Impacts Incremental Innovation.....	116
Individual Propensity for Information Technology Does Not Moderate the Relationship Between OKD and II .....	118
Continuous Improvement Training Does Not Moderate the Relationship Between OKD and II .....	119
Locus of Control Positively Influences Incremental Innovation .....	119
Emotional Intelligence Positively Influences Incremental Innovation.....	120
Limitations .....	120
Practical Implications.....	122
Upper Management Support.....	123
Enhance Knowledge Infrastructure.....	123
Information Technology Investment.....	124
The Importance of Emotional Intelligence .....	126
Robust Continuous Improvement Policy .....	126
Theoretical Implications and Future Research Opportunities .....	127
Conclusions.....	130
References.....	132

Appendices

A. SurveyMonkey Questions and Results– Demographic and Continuous Improvement

Training..... 155

B. Delphi Panel Protocol ..... 163

C. Delphi Panel Results ..... 166

## LIST OF TABLES

Table	Page
1. Summary of Chapter 1 .....	20
2. Major Works That Influenced the Study .....	61
3. Incremental innovation panel members .....	70
4. Summary of Hypotheses .....	78
5. Summary of Variables .....	81
6. Summary of Variables Used for Hierarchical Regression Analysis .....	89
7. Job Category .....	90
8. Respondent Generation/Age .....	91
9. Company Size (Employee Count) .....	91
10. Years Serviced As Manager.....	92
11. Job Category (N = 90) .....	92
12. Respondent Generation/Age (N = 90) .....	92
13. Company Size (Employee Count; N = 90) .....	93
14. Years Serviced As Managed (N = 90) .....	93
15. Summary of Descriptive Statistics for Scale Variables .....	94
16. Internal Reliability, Skewness, and Kurtosis .....	95
17. Coefficients– Dependent Variable Incremental Innovation (TotIncInn).....	97
18. Tests of Normality .....	99
19. Correlations (N = 90).....	100
20. Survey Questions Measuring OKD .....	101
21. Survey Questions Measuring IPIT.....	101

22. Survey Questions Measuring LOC .....	102
23. Survey Questions Measuring EI .....	103
24. Survey Questions Measuring II .....	103
25. Summary of Hypotheses .....	104
26. Summary of Controls .....	105
27. Hierarchical Regression Model of Incremental Innovation .....	107
28. ANOVA Model .....	107
29. Coefficients Represented for Each Model .....	108
30. Model Summary of Individual Predictor Contribution .....	108
31. Coefficients for Individual Propensity for Information Technology .....	109
32. Coefficients for Continuous Improvement Training .....	110
33. Summary of Results .....	112

## LIST OF FIGURES

Figure	Page
1. Theoretical model. (General literature suggestion, not strict causation.).....	12
2. Conceptual model. ....	12
3. Theoretical model on personal and organizational variables influencing incremental innovation. ....	58
4. Moderation.....	66
5. Measurement model.....	67
6. Algebraic equation for multiple regression for five predictors.....	76
7. Scatterplot of Regression Standardized Residual and Predicted Value.....	97
8. Plot of Regression Standardized Residual. ....	98

## **DEDICATION**

This dissertation is dedicated to managers of integrity who constantly strive to add value, construct knowledge, and manage innovation, especially when no one is looking or paying attention...

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# Roles of Organizational Knowledge Diffusion, Emotional Intelligence, and Locus of Control in Facilitating Incremental Innovation Among Middle Managers: An Empirical Investigation

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## **ABSTRACT**

The main purpose of this study is to examine middle manager influence on incremental innovation from the standpoint of organizational knowledge diffusion and personality. Middle management plays an important role in fueling innovation, which is required to maintain or gain market share. In this cross-sectional study, a customized survey was administered to a convenience sample of managers. Hierarchical regression was used to test several hypotheses regarding middle manager influence on incremental innovation. The following findings suggest that middle managers play an important role in influencing incremental innovation. Middle managers' emotional intelligence and locus of control influence incremental innovation. Among the personality variables, emotional intelligence influences incremental innovation to a larger extent. Organizational knowledge diffusion, as perceived by middle management, influences incremental innovation more than the tested personality factors. In this study, emotional intelligence and organizational knowledge diffusion accounted for over half of the variance of incremental innovation. The role of middle managers' emotional intelligence and organizational knowledge diffusion on influencing incremental innovation adds a measure of breadth and perspective to the current literature. The results of this study should inform business leaders of the importance of the role of personality and knowledge sharing on incremental innovation.

# CHAPTER 1

## INTRODUCTION

### Background

In the competitive environment of service industries, companies need to ensure their organizations are positioned to grow and remain competitive. One way to ensure continued growth is to focus on how organizations learn. Organizational learning requires companies to coordinate resources in such a way as to maximize learning (Collinson & Cook, 2007).

Organizational learning is defined as “a system of actions, actors, symbols, and processes that enables an organization to transform information into valued knowledge that in turn increases its long-run adaptive capacity” (Schwandt & Marquardt, 2000, p. 43).

An organization is formed to address needs that cannot be handled by one individual. Optimal learning requires organizations to ensure individuals work together toward common goals. It is important to understand knowledge making, innovation, and decision-making are not an exclusive prerogative of top management (Collinson & Cook, 2007). Multiple management layers of an organization as well as various levels of subject matter experts and operation personnel participate in activity that supports innovation. Management ranges from senior leadership charged with setting strategic direction and providing resources down to line management who execute plans or put policy into operation. There is also a level of management that operates somewhere in between the senior leadership team and line leadership. This leadership, commonly misunderstood in practice and understudied within the research community, is known as middle management.

## **Middle Management**

Middle management is described as two levels below the chief executive officer (CEO) and one level above a line supervisor (Al-Hakim & Hassan, 2011). This level of management is engaged in the function that connects goals and strategy to appropriate resources (Haneberg, 2010). Middle managers (MM) currently hold a broad range of responsibilities within the service sector including planning, evaluating, and executing strategy and managing quality systems. The range of responsibilities and tasks can make this level of management difficult to comprehend. In contrast, upper level management or senior leadership teams are seen as leaders charged with articulating strategy and reacting to actionable metrics to ensure direction is maintained. Line managers or supervisors execute procedures and ensure service stations are appropriately staffed. Middle managers have complex job descriptions that are not as clear; MM can be involved in many different aspects of a service or manufacturing-based company. One consequence of operating under such nebulous job descriptions is widespread misunderstanding. Middle management as well as the surrounding leadership teams may require extensive training on standard practices. Tools for continued productivity may also be little understood and marginalized.

Middle managers have been associated with the stigma of being nonproductive (Nonaka & Takeushi, 1995). Oftentimes, MM find themselves grounded and fastened within work that appears to be urgent rather than important (Haneberg, 2010). For example, a manager may need to correct immediate problems rather than focus on the business landscape or strategic direction. The middle manager's job can be more challenging than that of the line manager or senior leadership (Haneberg, 2010). The work can have more direct impacts on results, so it is important that resources and training are made available for the middle manager (Haneberg,

2010). Middle managers retain a high level of organizational involvement and are connected to many different operations. These operations can require significant and challenging teamwork and communication skills which pose a challenge to the training systems. Middle managers are also highly involved in the management of organizational knowledge. Whether it is transitioning information to knowledge or transferring knowledge from one part of the company to another, the influence of MM is ubiquitous. Recently, extensive research into knowledge management has aided the understanding of MM contributions to organizational success, and has raised questions regarding MM involvement in maintaining market share.

### **Organizational Learning**

Regardless of management type, each level of management is involved in organizational learning. Argyris and Schon (1978) proposed two general types of learning: single-loop learning and double-loop learning. Single-loop learning involves modification of procedures without changing the overall theory or policy (Argyris & Schon, 1978). It is usually enacted when small corrections or improvements are made to service or product delivery. Double-loop learning involves a change in a theory or way of thinking (Argyris & Schon, 1978). Modification in the approach to the problem may involve reexamination of fundamental assumptions. In practice, decisions are weighed against feedback from customers. This feedback influences mental model construction and consequently decision-making rules. This type of learning is employed when major business course corrections are made or by reacting to new technology. Mental models are held by individuals and represent a personal framework for real-world relationships (Johnson-Laird, 1983). Mental models are strengthened by many different environmental factors such as education, events, assumptions, and ongoing imagery. Mental models are a central concept to understanding perception, comprehension, and imagination (Johnson-Laird, 1983). This concept

is useful when considering the challenges of training in any industry as well as the profusion of knowledge, which is knowledge transfer between employees or groups (Collinson & Cook, 2007).

### **Knowledge Diffusion**

Knowledge transfer or knowledge diffusion is important in ensuring an organization maintains a culture of learning. Before knowledge can be diffused within an organization, it is important to understand how knowledge is generated. Knowledge is associated with insight, which is gained from acquiring information (Davenport & Prusak, 1998). Information is acquired from tiny bits of data (Davenport & Prusak, 1998). For example, warning lights or signals seen on a car dashboard can be interpreted as information compiled from data acquired from the engine (e.g., empty fuel). The insight gained from the dashboard information is interpreted by a human as knowledge. Driving a car fast will increase fuel consumption. Knowledge can be created by integrating old knowledge with new information. Companies have a wide range of synthesizing and filtering information to add context to information that eventually yields knowledge (Davenport & Prusak, 1998). Notably, knowledge is not solely owned by the individual. Companies can own knowledge when the information does not depend on the presence of a single person (Floyd, 1999). For example, knowledge or technology is not lost as people leave the company. Explicit knowledge is retained by the company by means such as standard procedures, training systems, and the general culture, as discussed further in the literature review.

In practice, organizations generate creative alternatives from information acquired from numerous sources. Quality management systems accumulate data regarding compliance problems or initiatives. Clients or customers provide valuable feedback, which is incorporated

into the product. New knowledge from information is translated into policy and action. Information and knowledge can transfer between functions or people and eventually modify standard practice (Janczak, 2004). Knowledge diffusion is extensively researched, as discussed in the literature review. However, to understand how knowledge diffusion influences innovation, it is important to provide a brief description here.

Knowledge diffusion, a major component of knowledge management, plays an increasingly significant role in how knowledge is acquired, shared, and assimilated (Janczak, 2004). “Knowledge management implementation has become increasingly important to enhance innovation” (Al-Hakim & Hassan, 2011). Some critical success factors, such as information technology (IT) and flexible organizational structure influence knowledge diffusion processes, which, in turn, have a positive effect on innovation. A flexible organizational structure includes less emphasis on a rigid organizational reporting structure. However, there is a gap in the literature regarding the perspective of business sectors and organizational cultures in facilitating innovation (Al-Hakim & Hassan, 2011). The research is limited to particular cultures and types of organizations. This study adds to the knowledge diffusion literature regarding the influence of MM on incremental innovation in multiple industries. Organizational knowledge diffusion (OKD) is made up of three important factors: (a) propensity to use IT, (b) people-focused knowledge sharing, and (c) day-to-day management processes (Saenz, Aramburu, & Rivera, 2009). There is a lack of attention in the literature regarding MM knowledge diffusion and how it may contribute to incremental innovation (II). An organization’s II process may be influenced by factors such as personality as well as OKD.

## **Personality**

Personality characteristics of MM have been studied to gain insight into impact to innovation. To illustrate, locus of control (LOC) offers a significant degree of insight into knowledge diffusion and innovation. People with internal LOC help to provide managerial effectiveness (Yukl, 2013). People with internal LOC perform better in organizations that depend on innovations to products (Yukl, 2013). Emotional intelligence (EI) may also offer significant insight into the role of the manager. Emotional intelligence is a function of how well a manager integrates socially (Brackett & Rivers, 2006; Mayor & Salovey, 1997). It is not sufficient to be an intelligent leader (Suliman & Al-Shaikh, 2007). Emotional intelligence enhances manager performance (Suliman & Al-Shaikh, 2007). The regulation of emotions is required to manage social behavior and relations properly (Brackett & Rivers, 2006; Keltner & Haidt, 2001; Salovey, 1997). Emotion regulation is important for maintaining productive relationships. Social functioning aided by strong EI helps to maintain a positive work environment (Brackett & Rivers, 2006).

Social integration impacts how knowledge is diffused within an organization (Tsakalerou, 2016). Personality factors such as EI may help to facilitate social integration. However, little research has examined EI and innovation despite its growing importance (Audretsch, Martinez-Fuentes, & Pardo Del Val, 2011). A more thorough understanding of the relationship between EI and II may help management to enhance productivity. As innovation is important for staying in business, it is important to understand when innovation occurs and who is involved.

## **Innovation**

In the context of business management, innovation has evolved to include how organizations adopt, grow, and survive by the modification of products or inventions of new products (Manimala, Jose, & Thomas, 2005). There are two major distinctions mentioned in the innovation literature: radical and incremental innovation. Radical innovation involves major departures from existing engineering technologies and is often associated with increased risk to the organization (Ettlie, Bridges & O'keefe, 1984; Dewar and Dutton, 1986; Manimala et al., 2005). Incremental innovation is associated with smaller and gradual performance improvement. It can reinforce capabilities and exploit product or service potential (Dewar and Dutton, 1986; Henderson, 1990). In business organizations, most innovation is incremental in nature (Manimala et al., 2005). Incremental innovation generally utilizes existing organizational competencies and technology and poses less risk to the organization.

## **Leadership**

Leadership characteristics are beyond the scope of this study; however, I discuss leadership here briefly to illustrate other organizational performance factors. Incremental innovation can be influenced by leadership type. For example, transformational and transactional leadership have been extensively researched and connected to II. Transformational leadership is perhaps the most researched leadership type in the context of innovation. This type of leadership is associated with increasing employee self-efficacy, motivation, and empowerment (Paulsen, 2013). Transactional leadership is best suited for monitoring the implemented system, and sometimes utilizes rewards and punishments as incentives and sanctions (Howell & Avolio, 1993). Transactional leadership may contribute to innovative culture, which may complement the contributions of transformational leadership. Organizational leadership not only sets

organizational direction, but also facilitates and promotes problem solving. Leaders can do this by cultivating an environment of innovation. Leadership plays a key role in the process of innovation management (Nadler & Tushman, 2002; Tierney, Farmer, & Graen, 1999; Yadav, 2015).

### **Statement of the Problem**

Innovation is the lifeblood of the organization. Without innovation, a company cannot maintain market share and will eventually be outcompeted by other more innovative companies. Radical innovation involves pronounced technological modifications to create new markets. However, this type of innovation involves extensive resources and risk, which may not positively impact productivity. Projects considered high in risk typically require high cost and heavy resource involvement. Incremental innovation, the most common type of innovation, can enhance product and process characteristics with comparatively little resource commitment. Middle management plays an important role in aiding organizational processes linked to knowledge management. The MM role in facilitating knowledge management and influencing II is not well understood. Furthermore, little research has examined personality characteristics of MM in facilitating II. The role of EI in influencing II has similarly not been adequately studied.

Research on characteristics affecting II is limited due to its specificity. The literature contains case studies that examine specific companies and/or industries. Information regarding EI, II, and OKD is limited to the context of the specific environment. For example, data on the impact of EI on II are limited to a Chinese construction company (Zhang, Chen, & Sun, 2015). Similar EI research has been conducted using data from the United Arab Emirates (Suliman & Al-Shaikh, 2007). Research on knowledge sharing or diffusion and innovation has been limited to Spanish firms (Saenz et al., 2009). These studies, as well as others within the research

community, have not addressed the generalizability of the variables. By not targeting a specific industry or company, the data from this study may apply to a wider context and characterize middle management as a role within several industries.

Organizational and individual characteristics supporting effective II vary considerably in the literature. Organizational characteristics include (but are not limited to) learning methods, culture, and change management. It is therefore difficult to pinpoint moderating factors that encourage or challenge MM contributions to II. Subsequently, it is not clear whether MM is utilized optimally to ensure knowledge is generated and implemented to support II. A gap in the literature indicates a lack of knowledge regarding the value created by MM. A moderator of individual propensity to utilize IT (IPIT) was added to study the impact of MM IT usage over OKD, which was the main predictor variable. Research indicates IT is a critical component of knowledge diffusion (Al-Hakim & Hassan, 2011). Knowledge management or diffusion serves as a critical foundation or antecedent to innovation (Al-Hakim & Hassan, 2011; Saenz et al., 2009; Xu, 2014).

To meet organizational needs to stay competitive in the market, MM training should be optimized to ensure timely and robust innovation. Training should involve knowledge management principles, such as knowledge diffusion and orientation. Little, if any, investment into knowledge diffusion is made. “Most organizations have invested heavily in technology and possibly training, but hardly at all in knowledge sharing and creation” (Fullan, 2001). Continuous improvement training (CIT) was included in this study to examine any moderating effects to OKD. It is also important to identify and recruit managers that have specific emotional characteristics that support knowledge management and II. Research suggests perceived emotions reveal manager intentions and convey behavior characteristics that can support (or

hurt) optimal learning environments (Keltner & Haidt, 2001). This can help convey meaning and promote a trusting relationship. Emotional intelligence also contributes to good social abilities and helps management work more effectively with employees (Brackett & Rivers, 2006; Humphrey, 2013). This can help managers to become more attuned to their employees and customers' needs.

The literature indicates a problem with leveraging training to business requirements. Businesses are not getting acceptable return or value for the effort put into training. Only about 10% of training expenditure is transferred to the job (Locke, 2010). This problem suggests training is not effective. Management should leverage MM research to focus on variables that can help organizational productivity. Research also suggests management needs to focus more on strategy development and communicate the role innovation plays. It is important to not stop with articulating the definition of innovation, but to place the strategy into operation (Oke, 2004).

To summarize the problem, a more thorough understanding of MM impact to organizational productivity and innovation is hitherto insufficient in the literature. A more complete understanding of MM perspective and contribution may emerge from studying personality characteristics and aspects of knowledge diffusion known to MM. More insight on propensity for IT (IPIT) usage and effectiveness of training (CIT) may also provide organizations with additional understanding of the contribution of MM to II.

### **Framework – Theoretical and Conceptual**

Several factors within a corporation influence innovation. Research indicates an organization should foster a culture sufficient for organizational learning. Personality factors, such as LOC and EI, have been linked to enhanced social relations and management

performance. Research indicates EI capabilities support effective leadership and overall employee happiness (Goleman, Boyatzis, & McKee, 2001). These conditions or adaptive behaviors have been linked to organizational knowledge sharing. Locus of control, specifically internal LOC, has been linked to higher work involvement, which also leads to knowledge sharing. The increase in communication, augmented by knowledge sharing, can increase the propensity for innovation. Innovative ideas may increase as knowledge is increased within the community.

The framework depicted in Figure 1 captures the activities that support an innovative business community and ultimately inspired the conceptual model (see Figure 2). Middle managers are highly involved in daily operations and therefore require regular access to multiple levels of management. This level of involvement suggests heavy exposure to the innovative infrastructure. The infrastructure, composed mainly of constructs such as knowledge management and LOC, is constantly in operation to add value to a company. The ideas from management enrich a community and contribute to a productive learning environment. This learning environment encourages employees to contribute knowledge and support. The maturity and overall support for this model may result in a continuous stream of ideas to enhance and grow the company. Middle managers play a pivotal role within the company to support the individual components or constructs. A deficiency in any of the components listed in Figure 1 may adversely impact the cycle that yields company value and innovation. Incremental innovation, the dependent variable of this study, is influenced by several factors. This study examined the influence of two personality factors and an organizational factor, as well as two moderating factors (see Figure 2).

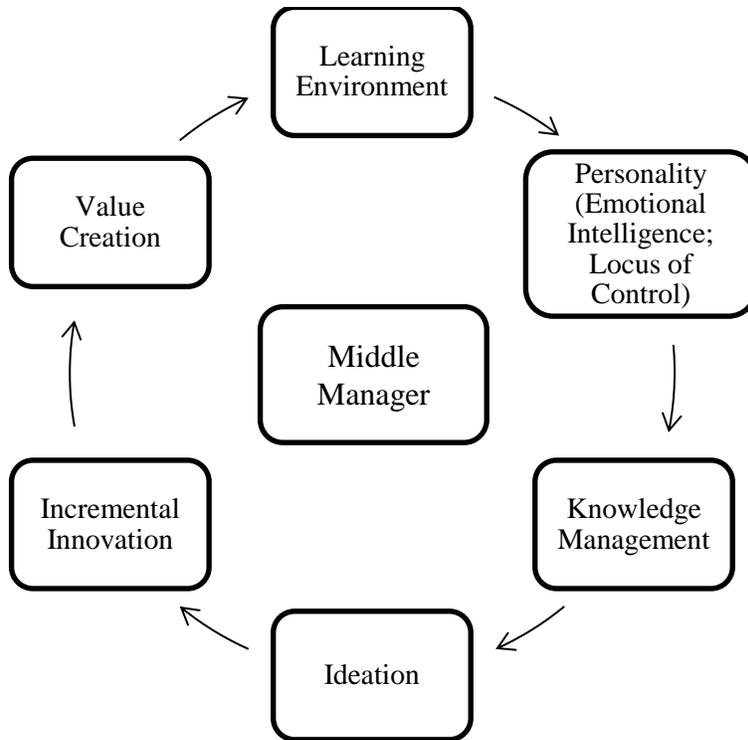


Figure 1. Theoretical model. (General literature suggestion, not strict causation.)

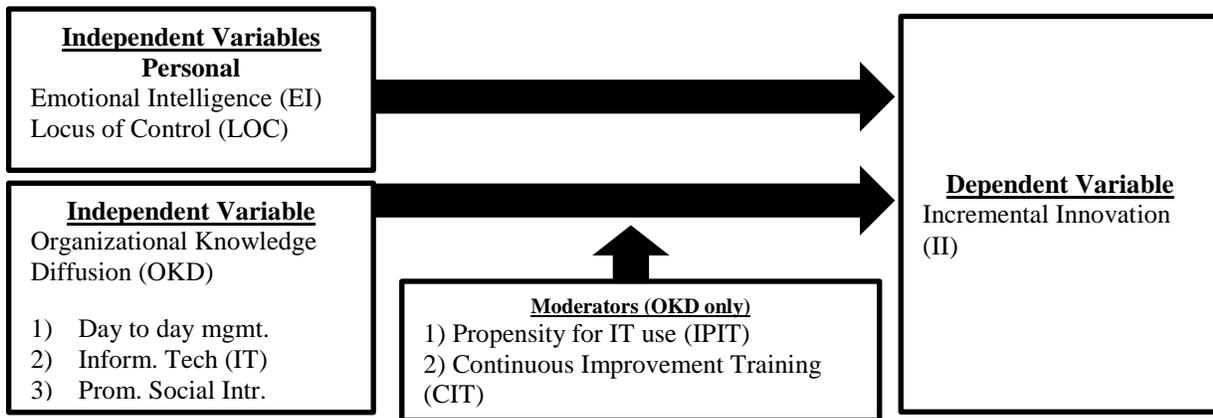


Figure 2. Conceptual model.

The Conceptual model depicted in Figure 2 provides the framework for the study. This model provides the testing relationship between the variables of interest. Each of the three independent variables is measured to determine the influence on the measured dependent variable. The interaction between OKD and II will be further studied utilizing two proposed

moderators. This model provides the foundational concepts for the measurement model depicted in Figure 5 in chapter 3.

### **Purpose of the Study**

This research provides insight into how MM facilitate II. There were three specific objectives: (a) to examine the role of OKD, EI, and LOC in facilitating II among MM. Specifically, I aimed to examine the three factors that support knowledge diffusion such as organizational propensity to use IT, day-to-day management practices, and people-focused knowledge sharing. The final objective was to examine the moderating role of middle management propensity to use IT as well as the moderating role of CIT to influence II. This research yields insights of middle management operation and how it can be used to establish a competitive advantage by influencing II.

### **Research Questions**

RQ1. What are the roles of OKD, EI, and LOC in facilitating II among MM?

RQ2. Do CIT and IPIT moderate the relationship between OKD and II?

### **(Alternate) Hypotheses**

1. Organizational knowledge diffusion has a positive impact/influence on the extent of II among MM.
2. Individual propensity to use IT moderates the relationship between OKD and II among MM.
3. Training moderates the relationship between OKD and II among MM.
4. Locus of control has a positive effect/influence on the extent of II among MM.
5. Emotional intelligence has a positive influence/impact on the extent of II among MM.

6. Organizational knowledge diffusion has the strongest influence on II.

### **Overview of Research Methodology**

I designed this quantitative study to measure the perspectives of MM in various industries. I collected data from a convenience sampling from my LinkedIn and Hood College graduate school networks via a confidential electronic survey approach. Taking the survey was strictly voluntary and survey results were confidential. Although I was aware of the participants' industries and organizations, I did not review individual survey data. The survey instructions detailed confidentiality processes as well as the option to receive general results. I uploaded the data into SPSS Version 25 and analyzed the data utilizing hierarchical multiple regression (HRM) and moderated regression. I then evaluated the hypotheses and reported the results, and generated the discussion of implications and recommendations for future research.

### **Significance and Justification**

Middle management touches many types of projects ranging from project and financial planning to organizational financial commitments (e.g., investment). Middle managers connect goals and people with the stated business strategy (Haneberg, 2010). For example, senior leaders formulate the strategy of the organization. Middle managers help employees to connect goals to the stated strategy. Middle managers can manage a small group of individual contributors to a large team designed to improve a process. Middle management is dynamic in scope, ranging from the management of people to the management of projects. As MM are involved in many aspects of an organization (service or manufacturing oriented), it is important to understand their contributions and limitations. Incremental innovation may contribute to a company's success especially in a turbulent and competitive business climate. However, there is "little empirical research where innovation in services is analyzed" (Audretsch et al., 2011, p. 1922). Continued

research into II may yield further knowledge regarding optimal MM utilization and/or contribution.

Middle management is involved in several common business processes: organizational learning, culture, effective leadership, and change management. There are varying uses for MM. Middle management may be defined differently in practice. For example, in the biotechnology service industry, MM are involved in most major operations. Midlevel managers are oftentimes tasked with executing overall strategy, establishing training systems, and executing change strategy. Since there is a wide range of expectations for MM, exploring how they help companies influence II is meaningful.

This research provides company leadership additional middle management context from which to base their staffing decisions as well as team leadership positions. This context may involve a deeper understanding for how middle management should be utilized to maximize organizational learning or knowledge diffusion. A more informed decision regarding middle management resources may benefit productivity, goal attainment, and cost savings. Management, especially senior leadership, should review this research to be more informed on how to provide appropriate funding for training and acquisition of skillsets. Leadership may also achieve a better understanding of the value of MM and their development needs. The additional knowledge gained may be useful in understanding how MM can be utilized more effectively. Senior leadership may also be informed on optimal organizational design to leverage the knowledge used for II.

This research is significant because it offers a deeper understanding of MM and their contributions to II. It also offers a holistic understanding of systems in operation that positively impact value creation (see Figure 1). Middle managers' personal characteristics impact the social

dynamics of the organization. For example, MM may positively influence knowledge management by promoting team formation or IT tool usage, which promotes knowledge diffusion. Knowledge management and organizational learning has been the subject of research studies for decades. However, there is a lack of research focus and insight on MM involvement in knowledge diffusion and how they leverage knowledge to influence productivity. Senior leadership may not have the information needed to make informed decisions (Goleman et al., 2001). The lack of robust communication to senior-level management can involve serious financial consequences.

Locus of control has been extensively researched. Previous research on LOC suggests internal LOC is correlated with innovation. However, EI has only recently been studied as a major personality factor that can impact innovation. Emotional intelligence, part of the Big Five personality traits, has emerged as an important individual characteristic to explain employee behavior and enhance organizational performance. Research has found “an alarming number of leaders do not really know if they have resonance with their organization” (Goleman et al., 2001, p. 47). Emotional intelligence can help management become more connected with employees and find success (Humphrey, 2013). Middle managers’ level of EI can help the organization share knowledge and increase the propensity for continuous improvement.

### **Limitations**

The study was limited to a convenience sample of employees within my personal network. I was unable to gain special access to one or several organizations in an effort to control for various organizational cultures. Organizations have special policies that limit researcher access to employees. This research was expanded to include multiple industries and company cultures. As I had extensive experience in the biopharmaceutical industry, most of the

respondents within this network likely had similar backgrounds. The only mitigation for the convenience sample approach was to maximize the number of respondents. To maximize the amount of data, I designed the survey to be user-friendly to ensure respondents answered all available questions. Questions left unanswered limit the ability to measure variables appropriately and as designed.

Although an adequate number of employees responded to the survey (113 out of a total of 250 requests sent), I added subject matter experts (SME) or professionals to the group of declared MM. This addition resulted in a higher number of valid respondents from which to analyze data. The majority of the respondents (76 out of 90) reported they were MM. The balance (14 professionals) were made up of experienced SME whose roles were similar to MM.

### **Definitions of Key Terms**

*Emotional intelligence* (EI). The ability to address or distinguish emotions (Salovey, et al, 1995).

*Explicit knowledge*. More objective knowledge of rationality. Explicit knowledge reflects what happened in the past rather than perceptions (tacit) of what should happen in the future (Nonaka & Takeushi, 1995).

*Incremental innovation* (II). Ideas that are new to a company and deliver gradual performance improvement to existing competencies and technologies. There is lower risk associated with II as the following remain unchanged: (a) business model, (b) product offering, (c) social practices, and (d) status quo not challenged.

*Internal locus of control* (LOC). Attribute outcomes to personal behavior (Rotter, 1990; Yukl, 2013).

*Intrapreneur (entrepreneur)*. An employee who takes advantage of organizational opportunity to create a competitive advantage (Jones, 2005).

*Knowledge diffusion*. A component of knowledge management that involves voluntary sharing of information (Casimir, Lee, & Loon, 2012).

*Knowledge society*. A group that generates and shares knowledge gained on a continuous basis (Drucker, 1988).

*Organizational learning*. A process of planning, reflection, judgment, and evaluation which lead to the modification of norms and behaviors (Collison & Cook, 2007). Learning can be haphazard or accidental.

*Profusion of knowledge*. Knowledge transfer between employees or groups (Collinson & Cook, 2007).

*Single-loop learning and double-loop learning*. Single-loop learning describes problem solving; correction of the immediate problem. Double-loop learning takes a step further to question the fundamental assumptions that lead to the problem situation (Argyris & Schon, 1996).

*Systemic thinking*. The cognitive process of studying systems or interacting elements (Kikoski & Kikoski, 2004).

*Tacit knowledge*. Personal knowledge left unspoken from experiences and assumptions (Kikoski & Kikoski, 2004). This type of knowledge is more subjective and relies on technical skills, and is associated with perception of what things ought to be (Nonaka & Takeushi, 1995).

## **Chapter Summary**

In this chapter, I explained the purpose and objectives of the study (see Table 1). The purpose of this research was to investigate the role of organizational knowledge diffusion

(OKD), emotional intelligence (EI), and locus of control (LOC) in incremental innovation (II) among middle managers (MM). I collected data via administering a survey to MM in a convenience sample. I developed the survey questions utilizing previous methods from the research to measure the predictor and dependent variables. This study also investigated the moderating effects of IPIT and CIT on II.

Table 1

*Summary of Chapter 1*

Section	Summary
Purpose of the Study	To investigate how II is impacted by OKD, EI, and LOC among MM.
Justification	Middle managers are involved in many aspects of private industry. It is important to understand how to leverage their potential to ensure consistent productivity. Their role supports the processing of information promptly and the subsequent creation of knowledge. Emotional intelligence might predict the degree to which the MM contribute to II. This information may subsequently determine the role of EI in II. This information would add a basis and justification for training or selection of future managers.
Contribution to the Field of Business	Research has explored the impact of the role of OKD, EI, and LOC on II. The literature indicates a strong relationship between knowledge sharing and innovation. There is also existing literature regarding the role of MM in innovation. This study confirms current research and adds knowledge regarding middle management participation. There are aforementioned gaps in the research to address, including: <ul style="list-style-type: none"> <li>• How personality of MM impact II;</li> <li>• The role of EI in impacting II;</li> <li>• The general impact of EI, LOC, and OKD on II;</li> <li>• Moderating factors that impact II; and</li> <li>• The role of experience and training on II among MM.</li> </ul>
Contribution to Practice	Understanding the role of MM in facilitating II to bolster competitive position. <ul style="list-style-type: none"> <li>• Inform practitioners how MM contribute to II.</li> <li>• Human resource management can benefit with increased insight of personality and influence on II.</li> <li>• Focus training objectives to include factors that contribute to higher levels of II.</li> <li>• Understanding the role of OKD and competitive advantage.</li> <li>• Helps to support the role of IT in continuous improvement efforts.</li> </ul>

*Note.* II = incremental innovation, OKD = organizational knowledge diffusion, EI = emotional intelligence, LOC = locus of control, MM = middle managers.

**Preview of the Study**

This chapter provided a synopsis of the study and background information on the context in which MM operate. In Chapter 2, I review the existing literature related to the study on organizational learning, MM, and knowledge management. The review concludes with a discussion of contemporary research issues such as innovation, LOC, and EI. I further identify gaps in knowledge that provide a source for continued study. In Chapter 3, I present the research methodology and detail data collection and analysis procedures. In Chapter 4, I report the results

of the study, followed by a discussion of the implications and limitations of the findings in Chapter 5.

## **CHAPTER 2**

### **THEORETICAL FOUNDATIONS**

#### **Introduction**

The literature review includes knowledge gained from various fields of study that support MM activity. I reviewed organizational learning as the foundation of the research to aid in understanding the middle manager milieu. I explored knowledge management and innovation to gain insight into the manipulation of information and competing strategy. I also examined personality dimensions such as LOC and EI. The aforementioned concepts are interrelated to the organization's propensity for idea creation, innovation, and eventual market share (see Figure 1). Locus of control has been extensively researched since approximately the 1960s. More contemporary literature suggests EI has emerged as an important individual characteristic to help explain personality impact on individual productivity and innovation.

#### **Middle Management**

Middle managers play a role in not only ensuring stability in an organization, but also generating creative ideas and innovation (Janczak, 2004). Middle managers also play an important role in making sure plans are carried out, appropriate behaviors are maintained, and goals are followed up with actions (Huy, 2002). In fact, they play a unique role separate from that of upper management (Huy, 2002). According to Nonaka and Takeuchi (1995), MM play the role of "knowledge engineers" (p. 128). They are increasingly seen less as a simple conduit between upper management and line workers (Al-Hakim & Hassan, 2011). Instead, they synthesize information into new knowledge and facilitate knowledge exchange (Al-Hakim & Hassan, 2001; Nonaka & Takeuchi, 1995). Information is acquired by leveraging internal and external resources and maintaining communication channels. Middle managers are a

fundamental component of the aforementioned “middle-up-down” model (Nonaka & Takeushi, 1995). Middle managers process implicit information from both upper- and lower-level managers to help create important operational knowledge (Al-Hakim & Hassan, 2001; Nonaka & Takeushi, 1995). This model places MM between the strategy-formulating general management and the strategy-implementing line management. Managers bring people together from other departments to create knowledge (Nonaka & Takeushi, 1995). They do more than just monitor and report on behalf of top management. They spot opportunities for improvement and integrate ideas within the organization (Jones, 2005). Improvement activity, such as identifying improvement opportunities, suggests MM are involved in innovation. Middle managers support the environment that cultivates creative thinking and innovation (Lasson, Waehrens, & Boer, 2009).

Improvement operations require MM to employ different skillsets and behaviors (Bryant & Stensaker, 2011). This research provides further evidence that MM do not simply execute or implement upper management plans. Furthermore, this research suggests innovative policies do not happen automatically. Rather, they must be socially negotiated (Lasson et al., 2009). Middle managers reach beyond their formal jobs and engage in organizational sensemaking. Various skillsets are required to process information from multiple sources (Al-Hakim & Hassan, 2001). For example, MM must be able to communicate strategy to lower-level employees as well as to interpret the strategy from upper-level management. Middle managers’ role is dynamic in that there are multiple tasks to employ while the company grows and changes (Bryant & Stensaker, 2011). Middle managers must be able to receive and process change (Balogun & Johnson, 2004). When change is processed, MM must then direct the implementation of the change (Floyd & Lane, 2000). Part of this implementation includes incorporation into the collective organizational

knowledge. For example, change may necessitate procedural updates and further training to ensure organizational incorporation. Essentially, MM must lead and direct the strategy (Hope, 2010; Woolridge, & Floyd, 1990). However, the implementation process, mostly directly by MM, is not straightforward.

The implementation of strategy can be problematic if middle managers' commitment is low (Guth & Macmillan, 1986). Differences in individual goals and commitments can lead to alternative interpretations of the overall strategy handed down from upper management. Differences in causal attributes and limitation of information available to MM can also impact strategy implementation (Guth & Macmillan, 1986). Delay or even sabotage among MM can result in differences in strategy interpretation. Research suggests unless middle managers' self-interests are aligned with that of the organization, their commitment to effective implementation will be impacted (Guth & Macmillan, 1986). Programs improperly implemented may be viewed as a threat to existing management influence. For example, most quality control programs are designed to build power structures among lower-level workers and line managers. This distribution of decision-making authority may be viewed as a threat to middle managers' traditional power and influence (Connors & Romberg, 1991). The distribution of power may be viewed as punitive toward MM (Connors & Romberg, 1991). It can also be viewed as an upper management attempt to replace MM. Ineffective implementation may also result in inconsistent enforcement by MM (Connors & Romberg, 1991). Research suggests programs designed to distribute influence or power require early middle management involvement for effective implementation (Connors & Romberg, 1991).

As company strategy is articulated from the ranks of upper management, MM must employ various mechanisms to assimilate a process and implement the strategy in a way that

motivates employees. Oftentimes, MM must employ sensemaking (Hope, 2010). Sensemaking can influence the meaning of information. As MM receive information from operations or external environment, they must make sense of the information in the context of the operation. This is also true for interpreting information from other MM or upper management. The middle managers' sensemaking skills can change the way information is interpreted by policymakers (Hope, 2010). In the case of change management, sensemakers can influence direction by interpreting information through stories or even jokes (Hope, 2010). This coincides with sense-giving, where MM attempt to influence the interpreters (Hope, 2010). Sensemaking of information from either lower-level management or upper-level management is consistent with the theory that MM are essentially knowledge engineers. Middle managers can take implicit knowledge and synthesis into explicit knowledge (Nonaka & Takeushi, 1995).

Managers contribute in large measure by leveraging knowledge resources for II (Birkinshaw, Hamel, & Mol, 2008; Viljoen, 2015). To contribute to company performance, MM facilitate knowledge sources via training and communication (Viljoen, 2015). Training and communication ability are key characteristics demonstrated by MM (Viljoen, 2015). This research supports middle managers' ability to facilitate knowledge resources to enhance the performance of the organization (Birkinshaw et al., 2008). Recent research suggests MM represent an important function of healthcare organizations (Belasen, 2016). Specifically, they address a vital need for leadership succession planning (Belasen, 2016). However, as corporate hierarchy structure becomes flatter, middle management opportunity and value decrease (Belasen, 2016). Much of the research explores the functional role of MM. Researchers and practitioners are interested in the role of MM in adding value despite flatter organizational structures. Personality also impacts middle managers' functionality, as discussed below.

## **Knowledge Diffusion**

To understand the evolution of knowledge, a review of data and information is required. Data is a “set of discrete objective facts about an event” (Davenport & Prusak, 1998, p. 20). Information is “data endowed with relevance and purpose” (Drucker, 1988, p. 4). Knowledge is made by adding context and perspective to information (Davenport & Prusak, 1998). Knowledge can be defined as information coupled with contextualization (Davenport & Prusak, 1998). Companies require people with special knowledge to process data and information into workable knowledge (Drucker, 1988). For example, in a laboratory, scientists may conduct an experiment designed to indicate the presence of a chemical. The results of the experiment would give the scientists data. A green indicator may mean the chemical in question is present, and blue for absence of the chemical. If the color is associated with a chemical, then the scientist now has information. Knowledge is associated with the study design. The presence of a chemical can indicate whether a group of animals have tested positive for a virus. The reaction and presence of the chemical would then convey meaning or knowledge to the scientist. The knowledge can be transferred to reports or management systems to trend data. Knowledge stored can be managed depending on the purpose of the business or organization. Knowledge management has emerged as a discipline that supports competitive advantage, which can be sustained in the form of innovation (Darroch & McNaughton, 2003). Firms with knowledge management capability are better able to use resources more efficiently (Darroch, 2005). When firms use resources efficiently, they tend to have increased capacity for innovation (Darroch, 2005).

There are several definitions available for knowledge management. “Knowledge management involves the identification and analysis of available and required knowledge, and the subsequent planning and control of actions to develop knowledge assets so as to fulfil

organizations objectives” (Macintosh, 1996, p. 5). Petrash indicated knowledge management “is getting the right knowledge to the right people at the right time so they can make the best decision” (as cited in Liebowitz, 2012, pp. 1–6). Knowledge management is used to describe methods for utilizing a company’s capital (intellectual or physical) effectively (Darroch & McNaughton, 2003). Intellectual capital is augmented by pulling in external knowledge, standardization, patent creation, and risk assessment (Wigg, 1999). Companies may have multiple systems in effect to collect, manage, and communicate knowledge. Employment of these systems depends on the corporation’s knowledge management strategy. Modern information-based organizations concentrate knowledge where work is conducted rather than within upper management (Drucker, 1988).

According to Gloet and Terziovski (2004), there are two different approaches when considering knowledge management strategy. Information technology resources, the culmination of hardware and software, are used to codify and process data and information. This IT approach is mainly designed for collection and manipulation of data and information utilizing purchased capital. Information technology can be used to code or organize information. There is also a more personal knowledge management strategy that originates from human resources (Gloet & Terziovski, 2004; Hansen, Nohria, & Tierney, 1999). Social relations are the center of the humanist approach.

One aspect of the individual humanist approach requires a level of trust to ensure effective transfer of knowledge (Casimir et al., 2012). Affective trust moderates the relationship between affective commitment and knowledge sharing (Casimir et al., 2012). Affective trust is activated when there are reduced feelings that imparted knowledge will be used opportunistically by the receiver (Bijlsma & Koopman, 2003). Affective commitment refers to the employees’

emotional connection with the organization. This connection provides motivation to the employee to do more for the organization than is formally required (Casimir et al., 2012). Affective commitment benefits the corporation especially in light of knowledge intensive firms. Management of knowledge capital is dependent, in part, on employees who are committed to the corporation (Robertson & O'Malley-Hammersley, 2000). The knowledge sharing activity is bolstered by committed employees (Priestley & Samaddar, 2007). As employees build trust within the organization, voluntary communication increases the propensity for knowledge sharing (Casimir et al., 2012).

People are a significant influence on the processing of information. Experience, motivations, values, and beliefs influence how information and knowledge are processed (Lin, 2007). Individual employees utilize their own knowledge to make improvements or to inform others. Employee willingness to donate or collect knowledge enables a company to improve innovative capacity (Lin, 2007). Knowledge self-efficacy can have a positive impact on knowledge sharing (Lin, 2007). Additionally, if people believe their knowledge can benefit other employees, knowledge sharing will likely occur (Wasko & Faraj, 2005). Knowledge sharing can occur if the proper organizational compensation system is in place. Research suggests innovators respond to both financial and nonfinancial incentives (Liebowitz, 2012). Innovators respond to challenges, freedom, and recognition (Liebowitz, 2012). Sharing and cooperation can lead to personal knowledge and expertise, high performance, and satisfied customers.

Organizational factors and technology also play a large role in how information is processed (Lin, 2007). Organizational factors include reward systems and management support. Extrinsic and intrinsic rewards promote knowledge diffusion, which is critical to the knowledge creation process (Bartol & Srivastava, 2002). The perception of gaining something of value may

motivate people within the organization to share information and knowledge. Organizational conditions may influence the outcome of knowledge management initiatives, not least of which is a healthy organizational culture and infrastructure, proactive leadership, and empowerment of employees (Beckman, 1999; Davenport & Prusak, 1998; Gloet & Terziovski, 2004).

Leaders of teams should possess honesty and ensure people receive correct information. Honesty establishes interpersonal trust, which establishes cooperative behavior (McAllister, 1995; Jassawalla & Sashittal, 1999). Trust helps to improve innovative performance through the free exchange of ideas (Sankowska, 2013). Trust mitigates fear and risk associated with projects (Sankowska, 2013). Procedural fairness also promotes a supervisor–employee relationship (Lind & Tyler, 1988). Established and fair procedures communicate to the employee they are valued within the community (Greenberg, 1990). The perception of being valued may inspire knowledge sharing (Greenberg, 1990).

Knowledge management systems that support knowledge sharing can be explicit or implicit in nature (Gloet & Terziovski, 2004). By engaging in implicit and explicit communication or knowledge sharing, employees are better equipped to identify or delineate a problem (Saenz et al., 2009). Implicit or tacit knowledge is primarily understood as knowledge gained from experience and practice (Nonaka & Takeushi, 1995). Tacit knowledge is also knowledge found to distinguish cultures (Collins, 1995). For example, social norms may be understood within a group and not necessarily captured in formal doctrine. Explicit knowledge, on the other hand, is the knowledge generated from rationality (Nonaka & Takeushi, 1995). Knowledge that is sorted into specific sequences of events is also characterized as explicit knowledge (Nonaka & Takeushi, 1995). Tacit knowledge is accessible through socialization and/or querying with a person or group. Explicit knowledge is more readily accessible and more

likely to be formally documented (Nonaka & Takeushi, 1995). Knowledge management, in part, is concerned about the process of tacit to explicit knowledge exchange. Factors impacting the efficiency of transferring tacit to explicit knowledge include narrative richness, or adequacy of content, and structure of the content (Herschel, Nemati, & Steiger, 2001). To address this challenge, research has demonstrated knowledge exchange protocols increase the ability to articulate what has been learned from the narrative. The transfer of tacit to explicit knowledge may be aided by a structured recall method (Herschel et al., 2001). Structure may help information flow by introducing more focus on the narrative. For example, medical doctors and scientists may use a method that helps with a three-step process: (a) observations of a patient or system, (b) filling gaps or addressing problems, and finally (c) the creation of an action plan. This structured protocol helps people make sense of an unfamiliar system, create knowledge based on previous observations, and formulate an action plan (Herschel et al., 2001).

To understand the literature in knowledge diffusion, it is important to review organizational learning. Organizational learning is dependent on individual learning. Organizational learning provides strategic advantage to companies (Maula, 2006). Individuals learn and diffuse information to other persons and/or groups, which in turn is used to influence how individuals learn in the future. Learning and individual interactions to promote organizational learning depend on the individuals' environment (Collinson & Cook, 2007). For example, there are political, social, and intellectual environments from which individuals obtain knowledge. The social environment influences the degree of human interaction and feedback (Collinson & Cook, 2007). Collinson and Cook (2007) defined organizational learning as “the deliberate use of individual, group, and system learning to embed new thinking, and practices that continuously renew and transform the organization in ways that support shared aims” (p. 8).

The organization forms for purposes that cannot be obtained by an individual. Learning is enhanced in a group format with people working together toward a common goal (Collinson & Cook, 2007). Part of the reason for groups coming together involves knowledge diffusion between different members as opposed to a one-way direction of information. The main idea is that knowledge is not the exclusive right of upper- or senior-level management. The groups may ensure useful information is spread to other members. In other words, individuals learn from mistakes or errors detected, as indicted by Argyris and Schon (as cited in Collinson & Cook, 2007, p.17). According to Daft and Weick (as cited in Collinson & Cook, 2007, p.17), knowledge acquisition is the process of questioning, data collection, reflection, and action. Inquiry or questioning is used within groups to reduce confusion that may result from information from multiple sources. There are problems to consider within group learning, however.

Openness to external ideas or “absorptive capacity” (Jantunen, 2005, p. 337) represents a method for benchmarking best practices. How the company acquires and utilizes knowledge to create value depends on internal knowledge processing (Jantunen, 2005). The internal version of “absorptive capacity” has been termed “internal stickiness” (Szulanski, 1996, p. 2). Internal stickiness is the measure of the firm’s internal transfer capabilities (Szulanski, 1996). Barriers to internal transfer capabilities include procedure ambiguity and negative or arduous employee relationships (Szulanski, 1996). Other barriers include peoples’ unwillingness to use external knowledge as it is not their own, little to any involvement of senior management, and utilization of mislabeled knowledge (Liebowitz, 2012).

It is important to understand the concept of the “competency trap” (Levitt & March, 1988, p. 332). This trap is operationalized when favorable performance is obtained with a system

or practice that is not optimized. This situation can prevent a company from learning best practices. Employees can become complacent in their current practices and see little need or incentive to make productivity improvements. Best practices can also be difficult to retain in the event of high employee turnover. High turnover with employees may result in the loss of organizational memory. Levitt and March (as cited in Collinson & Cook, 2007, p.47) stated organizational memory better ensures useful information about experiences is retained. Experiences and best practices are normally stored within knowledge management systems or common practices. Organizations jettison or reject information that is not compatible with current logic.

### **Middle Managers and Knowledge Management**

Knowledge sharing or diffusion from increased communication tends to increase company innovation (Saenz et al., 2009; Sankowska, 2013). To increase organizational knowledge, individuals make connections utilizing their new knowledge with established organizational knowledge. The knowledge sharing activity within an organization supports a foundation of innovation (Casimir et al., 2012). Knowledge sharing is the main enabler of MM to provide support for innovation (Casimir et al., 2012; Viljoen, 2015). Research suggests managers who support and participate in social interactions promote knowledge management (Saenz et al., 2009). Personal networks are used to share, integrate, and synthesize information to create knowledge. Middle managers who support social interactions can broker new connections for people to experiment, evaluate, and reflect on information and new knowledge.

Knowledge is managed within a three-tiered structure of managers, often referred to as the “knowledge crew” (Al-Hakim & Hassan, 2011; Nonaka & Takeuchi, 1995). This group of people is responsible for creation and general management of knowledge. The crew is composed

of upper-level, middle-level and lower-level managers (Al-Hakim & Hassan, 2011). Each level utilizes knowledge differently. For example, lower-level management tend to execute management policy more often than generate management policy. Middle managers, as discussed in a separate section of this literature review, are the focus of knowledge generation activity. Middle managers are the “knowledge engineers” (Nonaka & Takeushi, 1995, p. 128). One important role of the knowledge engineer is to extract tacit knowledge for inclusion in the company’s knowledge repository (Liebowitz, 1999). Middle managers transfer expert knowledge to the organization (Liebowitz, 1999). Upper managers normally process information from lower-level management. The knowledge upper management creates is normally composed of basic concepts to be applied to various operational conditions (Nonaka & Takeushi, 1995). For example, if a trend in the data (information) indicates technicians are not following procedures, upper management will determine that a piece of equipment is difficult to use (knowledge). Upper management will instruct lower management to process a new training system. The knowledge created in the upper management ranks is developed to be implemented by the lower ranks (Nonaka & Takeushi, 1995). This is particularly true if the company follows a top-down management style (Nonaka & Takeushi, 1995).

Knowledge is primarily created in the upper management ranks in the top-down management model (Nonaka & Takeushi, 1995). However, as the company is flattened or made less hierarchal, knowledge tends to be created and controlled by line management (Nonaka & Takeushi, 1995). This management structure, often referred to as bottom-up, does not rely on instructions or information handed down to lower-level managers. Instead, the autonomy granted at the lower level serves as the operational system (Nonaka & Takeushi, 1995). Knowledge is primarily created by individuals and not necessarily by group interaction. Lower-level managers

tend to be more independent and exhibit entrepreneurial traits in this bottom-up model. This model may allow for the creation of disruptive policies or ideas since the manager operates with fewer rules or restrictions from the top-line management (Nonaka & Takeushi, 1995). For example, with greater autonomy, the line manager may feel it is appropriate to challenge a procedure. This disruption may result in knowledge creation.

While the aforementioned models may serve as a platform for creating knowledge, they do have limitations. For example, knowledge is limited to the personal training and experience of the individual. Interaction with group members further refines information and knowledge (Lin, 2007; Nonaka & Takeushi, 1995). Middle managers play a larger role in knowledge creation in the model “middle-up-down management” (Nonaka & Takeushi, 1995, p. 127). Middle managers, in this model, enjoy being at the center of information exchange. Middle managers receive information from line management up to upper management while, at the same time, they are privy to information that flows across departmental boundaries. As managers with access to front-line and top-line management information, MM are positioned well for knowledge creation. Middle managers weigh opportunities against existing criteria (or rules/policies) within the department and also across departmental boundaries to create and spread knowledge (Janczak, 2004). Middle managers tend to form teams of individuals to refine possibly flawed information further and to amplify potentially good information (Nonaka & Takeushi, 1995). These teams are also important in cultivating and processing implicit knowledge from employees who work on the frontlines when value is created (Herschel et al., 2001; Macneil, 2003; Nonaka & Takeushi, 1995). As trust is built between coworkers through personal networks, tacit knowledge becomes explicit knowledge and is eventually factored into future procedures or policies (Davenport, 2005; Nonaka & Takeushi, 1995). Additionally,

institutional knowledge may be exploited by sharing information and engaging in creative problem solving (Janczak, 2004; Leonard-Barton, 1995). This information is eventually imported and integrated into organizational capabilities. The research suggests MM are highly involved in the management of knowledge. Middle managers should be involved in the transfer of knowledge. Organizational knowledge diffusion can positively influence innovation. This literature led to *Hypothesis 1: OKD has a positive impact/influence on the extent of II among MM.*

The difficulty in understanding knowledge diffusion is rooted in the limited understanding of knowledge management frameworks (Al-Hakim & Hassan, 2011). Current research indicates there are three fundamental elements of the knowledge management structure: (a) critical success factors like IT, (b) knowledge processes such as procedures and management systems, and (c) knowledge strategies such as codification of information (Al-Hakim & Hassan, 2011). All three elements make up a firm's knowledge-based assets. Assets are involved in the acquisition and retention of knowledge (Jantunen, 2005). How knowledge is processed within the organization and between organizations is an important question in understanding the firm's innovation activities and abilities (Jantunen, 2005). For example, firms obtain information from clients and suppliers. Benchmarking ideas and best practices from outside the company results in innovation as long as the information is utilized effectively. Information technology are used as a tool to acquire information. A moderating role of a middle managers' propensity to use IT may strengthen the organization's potential for knowledge diffusion. This moderating role may increase the organization's potential for II.

Information technology tools help employees receive knowledge but not necessarily donate knowledge (Lin, 2007). The usage or application of knowledge involves social interaction

(Lin, 2007). Organizations may exhibit a tendency to encourage employees to use knowledge as their source of control or influence for personal advantage (Syed-Ikhsan & Rowland, 2004). The organization's online database, intranet, or communication tools cannot distribute knowledge by themselves. As such, investing in IT alone may not be sufficient to facilitate knowledge exchange. *Hypothesis 2: IPIT moderates the relationship between OKD and II among MM.*

Prior to Al-Hakim and Hassan's (2011) research, Janczak (2004) examined how MM utilize or integrate knowledge. The roles of MM were placed into contexts of various projects. Janczak, through a coding mechanism, identified knowledge integration modes MM tended to use: analytic, intuitive and pragmatic. This research demonstrates how MM process information and develop knowledge within an organization. This research also provides insight on the role MM play in the processing of knowledge and implementation of new or improved procedures. For example, the analytic managerial process is characterized by MM who seek out problems to solve. These managers are efficient at locating a problem and establishing solutions. This managerial mode is also utilized when resources are available or known (Janczak, 2004). The intuitive process is characterized by managers who regard challenges as more personal. Middle managers proactively undertake challenges that appeal to their personal interest. These challenges may be more in line with managers' moral judgement (Janczak, 2004). The motivation for intuitive ideas may be more instinctive than logical. Finally, the pragmatic style is associated with a more opportunistic manager who operates within established limitations (Janczak, 2004). The manager who uses this mode of knowledge integration is primarily interested in establishing relations or dialogues to develop workable solutions (Janczak, 2004). According to the research, each mode was evaluated based on specific stages of knowledge assessment and incorporation. The awareness stage is recognized as the time when MM are faced

with the problem and begin to consider opportunities. The exploring versus exploiting knowledge stage is characterized by interaction with coworkers and problem scope determination. Finally, the codifying and assessment stage takes place with the managers placing new knowledge into practice (Janczak, 2004). Each management mode processes information differently according to the phase of knowledge integration. This research demonstrates how MM help their companies develop and refine competencies and organizational knowledge.

A healthy corporate culture is essential for the success of knowledge management (Beckman, 1999; Zand, 1997). Cooperation and collaboration should be rewarded and part of the company's goals (Beckman, 1999). Additionally, a workforce that is trusting and highly motivated continues to take calculated risks and innovate accordingly (Beckman, 1999). Reinforced behavior will most likely be repeated (Quinn, Baruch, & Zien, 1997). For example, employees may be rewarded for taking calculated risks based on available data. The actual risk taken may or may not result in innovation. However, lessons are learned from the action taken. Additionally, there are no sanctions or punishments levied against employees who wish to take calculated risks. Sanctions may negatively impact the corporate culture and jeopardize knowledge management.

### **Incremental Innovation**

Innovation is generally defined in the literature as “the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures and to create market driven products and services” (Jantunen, 2005, p. 339).

Innovation is also important for the creation of new knowledge. As innovation occurs, new knowledge is created and transferred or shared, and eventually impacts products and services (Al-Hakim & Hassan, 2011). The potential for innovation is supported by the knowledge

management structure of the company (Kamasak & Bulutlar, 2010). The creation of knowledge and knowledge transfer support innovation (Sankowska, 2013). Innovation is also promoted by knowledge sharing (Kamasak & Bulutlar, 2010; Saenz et al., 2009). The firm's ability to utilize knowledge, such as information stored in an IT knowledge base, impacts innovative performance (Jantunen, 2005). Employees can store and organize information and knowledge into IT management systems to facilitate knowledge retrieval.

Several types of innovation have been discussed in the literature. For example, radical innovation and II are innovations that routinely occur in businesses that describe contrasting types of technical process changes and levels of company benefit and risk. "Radical innovations are fundamental changes that represent revolutionary change in technology" (Dewar & Dutton, 1986, p. 1422). Radical innovations have been referred to as discrete innovations as well. Radical and discrete innovations generally describe new technology. Minor improvements in existing technology are associated with II (Dewar & Dutton, 1986). Furthermore, II is associated with the refinement of existing products and services as well as product reinforcement (Ettlie, Bridges, & O'Keefe, 1984). An example would include a drug product that can be administered one time per month as opposed to three times per week. Incremental innovation can be used to increase gas mileage from a car. Radical innovation is normally associated with major changes in inputs and processes (Germain, 1996). Radical innovation can be described as the marketing of an electric car or introducing a novel drug directed at a new indication. Incremental innovation is believed to be a continuous improvement process of a specific product or service (Ettlie et al., 1984; Lindberg & Berger, 1997). The current paradigm of innovation is not limited to incremental and radical forms. Other researchers have examined innovation occurring in practice represented by shifts in architectural connections between product and service components or where modular

changes occur in fundamental components that comprise the product or service architecture (Henderson & Clark, 1990).

The definition of II has expanded to include the maintenance of competitiveness through commitment and knowledge of people (Audretsch et al., 2011). Incremental innovation has also incorporated the concept of continuous improvement, which better ensures the participation of all employees for increased business competitiveness (Audretsch et al., 2011). Continuous improvement is a continuous change process that includes incremental enhancements to business processes and involves less financial commitment and less risk or uncertainty (Audretsch et al., 2011; Ghosh, Kato, & Morita, 2017). Researchers have offered creative descriptions such as “incremental innovation tries to reach the highest point on the current hill” (Norman & Verganti, 2014, p. 79). Radical innovation attempts to find the hill (Norman & Verganti, 2014). Incremental innovation does not attempt to modify the technology; rather, it attempts to improve upon existing technology.

There have been other labels besides continuous improvement attached to enhancing productivity gradually or continuous improvement. For example, total quality management (TQM) has been used to ensure corporate advancement through continuous change (Lindberg & Berger, 1997). The TQM tool has helped to ensure continuous improvement is in operation after mistakes have been made or problems encountered. There are numerous ways to ensure TQM in an organization. It can be used to ensure there is a corrective and preventive action system for the production of a product or service. For example, a *kaizen* is a Japanese-inspired experience where companies focus on one aspect of the service to address procedural gaps (Lindberg & Berger, 1997). A *kaizen* is composed of a small group of people who retain various talents and backgrounds working together for a common improvement task. A *kaizen* event may result in the

implementation of improved processes that can be measured for effectiveness. This continuous improvement method is normally applied to cycle time improvements. The technology of manufacturing a product could be improved to decrease the time to customer.

Incremental innovation has been used many ways in the services industry besides supporting the development of continuous improvement processes. For example, pharmaceutical companies engage in supplemental approvals for drugs (Berndt, Cockburn, & Grepin, 2006). Instead of spending the required research and development cost for a new drug, pharmaceutical companies can explore new indicators for current drugs (Berndt et al., 2006). This expansion of drug capability benefits the corporation with relatively fewer financial constraints. The Food and Drug Administration (FDA) can approve multiple indications for existing dosage forms which expand the original drugs capabilities. Multiple indications can be realized from the same technology and manufacturing efforts.

Incremental innovation increases competitiveness by helping to meet customer demands. By making small changes as a result of customer and internal investigations, incremental innovation helps a company's ability to stay in the market (Gloet & Terziovski, 2004). Incremental innovation helps companies maintain higher performance, reduce risk associated with application of resources toward innovation, and create and maintain competitive orientation (Manimala et al., 2005). However, some researchers have explored the value of II when faced with the option of more radical innovation. More specifically, researchers have explored when it is beneficial to the corporation to employ one type of innovation verses the other. For example, Ghosh et al. (2017) examined how competitive pressures influence the dynamic between radical or discrete and incremental innovations. They described discrete innovation as new innovation or new technology while II is made to existing technology. Discrete innovation is favored over II as

the competition within the industry increases (Ghosh et al., 2017). Furthermore, upon successful implementation of discrete innovation, II becomes less relevant (Ghosh et al., 2017). A successful innovation to technology (discrete or radical innovation) tends to decrease incentive to focus on II.

A number of mediators influence innovation, such as knowledge among employees. Knowledge breadth and depth among employees in an organization directly and indirectly influence the generation of II (Xu, 2014). “Knowledge depth positively contributes to the development of incremental innovation” (Xu, 2014, p. 610). This research suggests training and education programs and systems play a major role in the ability of a company to innovate.

*Hypothesis 3: CIT moderates the relationship between OKD and II among MM.*

Leadership style also plays a major role in a company’s ability to innovate. “Transformational style of leadership is positively related to innovation” (Sethibe & Steyn, 2015). Furthermore, organizational performance, achieved through strong transformational leadership, positively influences innovation (Sethibe & Steyn, 2015). Transformational leadership tends to increase organizational performance (Howell & Avolio, 1993). Transformational leadership, normally associated with organizational change or growth, can drive and motivate performance. Evidence also suggests different leadership styles are needed for establishing an innovative culture. For example, transactional leadership styles may be more important for bolstering innovative culture (Sethibe & Steyn, 2015). Transactional leadership is best suited for monitoring the implemented system and general compliance, sometimes utilizing rewards and punishments as incentives and sanctions (Howell & Avolio, 1993). Adherence to established organizational knowledge better ensures innovations are implemented appropriately. Transactional leadership may contribute to innovative culture, which may complement the

contributions of transformational leadership. Leaders need to be positioned optimally for best innovative performance in the company. Transactional leadership is based on contingent reward system (Bass & Avolio, 1993). Rewards for the employee are contingent on meeting expectations. Transactional leadership is also based on management by exception (Bass & Avolio, 1993; Howell & Avolio, 1993). Management by exception is a system where the manager intervenes when there is a problem. Unlike transformational leadership, change is not considered a fundamental component of transactional leadership. Instead, transactional leadership depends on clear communications and expectations (Kesting, Ulhoi, Song, & Niu, 2015). Followers develop expectations for rewards for meeting expectations and/or goals. Transactional leadership is important for the implementation process and II (Keller, 1992; Kesting et al., 2015). For example, when utilizing clear expectations and a rewards and punishment process, a corrective action or specific plan can be more easily implemented.

Subramaniam and Youndt (2005) found II is positively influenced by organizational capital. This capital may include robust management systems, documentation systems, and physical IT systems (Subramaniam & Youndt, 2005). Social capital also plays a “significant role in incremental innovation” (Subramaniam & Youndt, 2005, p. 450). Social capital, along with organizational capital, is used by the company to enhance or increase knowledge. Social capital is defined as knowledge utilization by social groups and individuals (Nahapiet & Ghoshal, 1998). The utilization of knowledge, in the context of social capital, depends on the social dynamics, trust, or shared norms of the group or organization. Social capital facilitates group dynamics and increases productivity. For example, social capital can be increased within a group if the trust level is likewise increased.

Group dynamics or shared norms can be leveraged to increase knowledge and facilitate innovation. This type of capital is similar to that of organizational capital. However, organizational capital involves codification of knowledge into formalized documentation systems (or patents) which help organizations retain knowledge (Nahapiet & Ghoshal, 1998). Retrieving this organizational knowledge requires processes and rules. Incremental innovation is closely tied to how a company utilizes knowledge management and resources such as intellectual capital. Gatignon, Tushman, Smith, and Anderson (2004) indicated II involves “improving and exploiting an existing technological trajectory” (p. 1107). Basically, II enhances prevailing knowledge. Social capital plays a role in II by improving the way a company processes data. Increased social capital is associated with the quality of interaction among groups (Subramaniam & Youndt, 2005). As research suggests, it is common to use knowledge management characteristics as an antecedent to innovation (Subramaniam & Youndt, 2005). These characteristics can include patents, databases, systems, and other processes.

Organizational structure further impacts II. A company’s degree of specialization positively impacts II (Germain, 1996). This finding regarding specialization further supports the aforementioned research by Xu (2014) on knowledge depth. Incremental innovation is positively influenced when an organization commits to resources that are highly specialized (Germain, 1996). Specialized organizations and technology likely contain highly knowledgeable employees who share knowledge with other functions (Damanpour, 1991). A decentralized organization also positively II innovation because the organizational structure facilitates involvement and awareness (Germain, 1996). An organization characterized as decentralized verses centralized tends to have impactful decisions made by lower ranking members of the organization (Germain, 1996). This decision-making structure suggests opportunity for involvement in the decision-

making process is higher for lower ranked employees. A centralized decision-making structure suggests decision-making authority rests with senior leadership exclusively. Characteristics of a decentralized structure include the encouragement of involvement and increased awareness of company trajectory (Germain, 1996). The decentralized company also cultivates employee commitment (Germain, 1996). Cardinal (2001) further suggested project control is positively related to II. Specifically, when decisions are controlled, faster decisions are made on product attributes and implemented according to routine and centralized procedures (Cardinal, 2001). As it relates to the generation of ideas and employee involvement, the research suggests decentralized organizations are preferable. However, the corporation that implements control of routine tasks may enhance II (Cardinal, 2001). A routine task control could be the process of implementing or putting into procedure a newly discovered enhancement.

Koen et al. (2014) also emphasized the importance of the structure of the organization. Company characteristics are influenced by effective teams, team leadership, and communities of practice. The degree of these attributes, in turn, has a positive influence on innovation (Koen et al., 2014). These characteristics provide the necessary organizational structure to support various aspects of innovation. For example, the degree to which the company identifies external opportunity may help the company to find solutions that would not otherwise be available internally (Koen et al., 2014). A company that does not seek outside help may have a low degree of opportunity identification and analysis. A second example involves “idea enrichment,” or the capability of the firm’s IT systems to make available information that leads to innovation (Koen et al., 2014). Finally, “concept definition” represents the degree to which a company attempts to understand project feasibility (Koen et al., 2014). Feasibility can be determined by working with

different functions to understand various characteristics of the product and potential impact to current operations. Each of these three activities has a positive impact on II (Koen et al., 2014).

Corporate entrepreneurial activity, which is not limited to managers, is an integral part of innovation and creating an environment for competitive advantage (Jones, 2005). Corporate entrepreneurialism is a method to achieve value through innovation (Mehta & Gupta, 2014). It is a group process that encourages the development of new ideas from employees to achieve success (Block & MacMillian, 1993). It also infuses strategy that empowers MM and other employees to generate innovative ideas (Block & MacMillian, 1993). Businesses that are structured and organized to have corporate entrepreneurial characteristics are positively related to innovative behavior (Amo & Kolvereid, 2005). Furthermore, intrapreneural traits are also positively related to innovation (Amo & Kolvereid, 2005). Intrapreneurs are individuals who possess independent ambition and drive (Pinchot & Pellman, 1999). They tend to initiate innovative actions and take advantage of business opportunities (Pinchot & Pellman, 1999). Unlike entrepreneurs, intrapreneurs operate within an established organization. Corporate entrepreneurs are involved in reenergizing the corporation to enhance innovative behaviors (Kuratko, 1990). Corporate entrepreneurialism has emerged from the literature as a corporate system, while intrapreneur is a term to describe an employee. The concept of corporate entrepreneurialism surfaced in the literature in the 1970s (Mehta & Gupta, 2014). The primary concern was that organizations would become complacent and fail to retain market share. Corporate entrepreneurs are people with high internal motivation or achievement motivation (Mehta & Gupta, 2014). Internal motivation or intrinsic motivation is found in employees who are motivated by internal factors as opposed to external rewards (Lasson et al., 2009; Mehta & Gupta, 2014). Entrepreneurial activity is associated with expanding markets and risk taking

(Lasson et al., 2009). This literature provides background on how managers provide competitive advantage to a company. Informal networks are leveraged to provide resources to entrepreneurs. This work also provides background into how MM instigate change to improve processes.

Corporate entrepreneurialism is facilitated by social capital (Jones, 2005). Social capital can help to exploit social relationships and further encourage risk taking (Jones, 2005). Entrepreneurialism requires social capital because it helps to encourage risk taking and subsequently supports innovation (Jones, 2005). An organization's success depends in part on the maintenance of social relationships and the interaction between and within companies (Eberly, Holtom, Lee, & Mitchell, 2011). The success is generated in large part to the individual who maintains social capital. Social capital is directly impacted by the employees' ability to communicate and network within and outside of a company and less dependent on their job skillsets (Eberly et al., 2011). As turnover occurs within the workforce, the loss of social capital eventually generates communication gaps (Eberly et al., 2011). Recent research suggests intra-organizational social capital is positively related to employee performance (Hador, 2016). Additionally, social capital reinforces and supports employee interaction and serves as a mechanism for sharing knowledge (Hador, 2016).

Middle managers may adopt and benefit from entrepreneurialism as they are potentially involved within and between social networks (Jones, 2005). Middle managers are in a unique position to broker ties between social groups and potentially leverage resources to create change (Jones, 2005). Middle managers can leverage their social networks to gain knowledge or to connect resources for faster implementation. In the classic corporate model, MM simply take instruction from upper managers and implement policy. By taking advantage of different function groups, MM may become more productive and efficient. Middle managers who enable

entrepreneurial characteristics create responsive and learning-oriented companies (Lasson et al., 2009). This environment then serves as the basis for innovation-oriented companies.

Senior leadership is involved in creating the environment conducive for entrepreneurial activity (Kuratko & Hornsby, 1999). Middle managers are involved in perceiving the culture as conducive for entrepreneurial activity and implementing suitable support systems (Kuratko & Hornsby, 1999). There are a few distinguishing characteristics of an organization's culture that influence middle management corporate entrepreneurial activity (Kuratko & Hornsby, 1999). A positive risk-taking attitude helps to drive new ideas without fear of sanctions. The company's culture should encourage risk to help implement new ideas. Management support and the availability of resources also encourage entrepreneurial activity (Kuratko & Hornsby, 1999).

Incremental innovation is a component of the overall innovation framework and must operate in concert with the overall innovation strategy. Innovation strategy is developed by external analysis and internal perspective. This development is oftentimes initiated by upper management. Strategy is composed of several other factors influenced by economic conditions and internal capabilities (Katz, Preez, & Schutte, 2010). For example, a company may choose II and low risk tolerance as part of the innovation strategy because of perceived market stability. The strategy is determined based on the available resources. A management system is a resource worth exploiting for the benefit of the company and incorporated into strategic thinking. Evidence suggests the relationship between innovation capabilities, innovation efforts, and firm performance are significant (Rajapathirana & Hui, 2018). Innovation strategy and technological capabilities contribute to continuous improvement. Incremental innovation, which is used as part of the innovation strategy, operates within the limitation of resources available (Rajapathirana & Hui, 2018).

Internal resources greatly impact the ability to innovate. To ensure the company is leveraging the best ideas, many companies are investing in a structured approach to innovation management. This approach relies on not only great resources such as people and facilities, but also on well-established processes. Processes drive the components of the innovation framework to innovate consistently. Training and ideation procedures and knowledge management processes each influence innovation (Girniene, 2013). The innovation framework, which includes procedures, is part of the system that drives selection, management, and implementation of improvement projects. The framework of an innovation value chain (IVC) supports the processing of ideas for continuous improvement. The IVC helps to distinguish complementary processes and functional groups from sourcing to completion of work (Ganotakis, 2012). For example, the IVC highlights process linkages between research and development and manufacturing. The IVC also helps to demonstrate strengths and weaknesses in innovation performance. Management must ensure continuous support and training to ensure the IVC remains in operation. Personality, of the internal human resource, can also help establish a robust innovative infrastructure.

### **Personality– Locus of Control**

Locus of control is a personality variable that has been extensively researched in the field of psychology to explain patterns of behavior. It is generally defined as the degree to which a person attributes outcomes to personal behavior or environmental factors (Rotter, 1990). Internal LOC, as a personality trait, is characterized as attributing outcomes to personal behavior, while external LOC personality is characterized by associating outcomes to luck or environmental factors (Rotter, 1990; Yukl, 2013). Locus of control significantly moderates the adversity

oftentimes faced by managers, particularly entrepreneurs (Bulmash, 2016). People with internal LOC tend to be more persistent, resilient, and face challenges as they arise (Bulmash, 2016).

Early research indicated people with internal LOC tend to use persuasion rather than manipulation while communicating with group members (Goodstadt & Hjelle, 1973). Persuasion techniques are normally accompanied with objective evidence to support outcomes.

Manipulation is often accompanied with coercive techniques that may not necessarily be objective. Later, Miller, Kets de Vries, and Toulouse (1982) uncovered evidence that people with internal LOC are more flexible, adaptive, and innovative when confronted with a problem. Risk taking was also associated with internal LOC (Miller et al., 1982). People with internal LOC are more future oriented as they perceive being in control of actions and that they can influence their personal destiny (Yukl, 2013). Internals tend to take initiative solving current problems since they believe they can influence situational outcomes (Yukl, 2013). Additionally, as Chandiramani (2014) reported, internals tend to be better at independent tasks, are less affected by the opinions of other people, tend to have strong self-efficacy and confidence, work hard to achieve goals, and are happier and more independent than people who score higher in external LOC. However, if internals lack the competence and efficacy required to obtain goals, they may be more prone to depression and anxiety (Chandiramani, 2014).

Recent research has shown internal LOC is positively associated with job satisfaction (Bhardwaj & Gupta, 2017; Spector, Cooper, Sanchez, O'Driscoll, & Sparks, 2002; Vigayashree & Jagdishchandra, 2011). Job satisfaction and organizational commitment have a strong relationship, where internal LOC and culture are measured strong as well (Abdulsalam, 2015; Chhabra, 2013). Furthermore, people who score high in internal LOC have stronger well-being or life balance as well as personal growth (Sharma & Juyal, 2017). With regards to well-being

and life balance, gender does not have a significant impact (Sharma & Juyal, 2017). In fact, there has been variation in the results with respect to gender. Limitations of this data relate to sample representations in a limited number of countries in Europe, India, and the United States (Smith, Dugan, & Trompenaars, 1997). Studies in India demonstrate females exhibit stronger internality while males are more influenced by externality—chance (Arakeri & Sunagar, 2017). Externality—chance indicates a tendency to believe personal circumstances are the direct result of environmental factors, such as events or random circumstances. This is similar to externality—others, which indicates personal circumstances are dictated by other people (Arakeri & Sunagar, 2017). In a study by Smith et al. (1997), LOC scores varied with respect to status and gender. Females with lower status tended to be externals (Smith et al., 1997). Also, lower status males and females tended to be more communal or external, while higher status employees tended to be internal and less communal (Smith et al., 1997).

Researchers have continued to examine the influence of culture on LOC in the business environment. Early literature indicated internal LOC is related to job involvement. People with internal LOC tend to have higher job involvement (Reitz & Jewell, 1979). The finding internals (people who score high for internal locus of control) are more involved in their jobs is strongest among males over females (Reitz & Jewell, 1979). The finding male internals are more involved in their jobs was evident in five of six countries in one study: Japan, Yugoslavia, United States, Mexico, Turkey, and Thailand (Reitz & Jewell, 1979). This early data offered evidence that age, gender, and skill level have little, if any, moderating impact on job involvement (Reitz & Jewell, 1979). McGinnies, Nordholm, Ward, and Bhanthumnavin (1974) found evidence that Japan tends to score higher in external locus of control probably due in large part to the cultural preoccupation with obedience and conformity. Locus of control scores also differ with respect to

job status (Smith et al., 1997). Females and lower level/status employees tend to score higher as externals (McGinnies et al., 1974; Smith et al., 1997). Higher status employees and men tend to score higher as internals and less communal (Smith et al., 1997).

Data suggests people who score higher on internal LOC are less community oriented and more individually oriented (Smith et al., 1997; Smith, Trompenaars, & Dugan, 1995). Western cultures such as the United States and most European countries tend to score higher as individualistic and, thus, higher as internals (LOC) than countries that identify as more community oriented, such as Japan (Mueller & Thomas, 2001; Smith et al., 1995). The propensity for internal LOC decreases with increased cultural distance from the United States (Thomas & Mueller, 2000). In other words, as individuals distance themselves from U.S. culture, the degree to which they feel in control of their own destiny decreases. As per Hofstede (as cited in Smith et al., 1995), people who tend to exhibit individualistic traits seek identity by way of life choices. Collectivists identify as dependent on membership to groups. Personal relationships appear to be more important in collectivist cultures as they are “crucial and long lasting” (Smith et al., 1995, p. 378). However, as this data were collected using a Western model (Rotter’s method), there may be limitations with regards to bias embedded in the questionnaire (Smith et al., 1995). For example, countries that score high as collectivist may not offer responses in terms of personnel opinion, which is the idea behind Rotter’s survey, but by how they wish to be regarded by their group. It may be referred to as “modesty” (Smith et al., 1995, p. 379).

Women appear to score highly consistently on external LOC in relation to men (Arakeri & Sunagar, 2017; Chandiramani, 2014; McGinnies et al., 1974; Reitz & Jewell, 1979; Smith et al., 1997). Arakeri and Sunagar (2017) found evidence females are more highly influenced by external– others LOC. External– others indicate there is a substantial impact by the people who

are involved in an individual's life (family or workplace people). Despite cultural differences, belief in control of an individual's work contributes to psychological well-being as well as job satisfaction (Sharma & Juyal, 2017; Spector et al., 2002). Well-being is linked to allowances in personal growth and purpose in life (Sharma & Juyal, 2017; Spector et al., 2002). Job satisfaction is directly linked to job commitment (Bhardwaj & Gupta, 2017). Bhardwaj and Gupta (2017) clarified those people with high internal LOC experience higher job satisfaction because internals have a more adaptive perspective. Those with external LOC are less likely to meet their potential because they have more motivational challenges (Bhardwaj & Gupta, 2017). Chandiramani (2014) studied how employees manage critical situations and how it impacts LOC measures. An internal is associated with "problem-focused coping strategies" (Chandiramani, 2014, p. 328). However, if the source of stress or critical situation is found outside of the subject's control, then stress management techniques are more emotion focused. Externals (LOC) are associated with more emotion-focused coping strategies (Chandiramani, 2014). This information regarding internals and externals may reveal important clues with regards to differences in male and female LOC scores.

Internal LOC and innovativeness are traits associated with entrepreneurial potential (Mueller & Thomas, 2001). There are two other traits associated with entrepreneurial propensity: risk propensity and energy level (Thomas & Mueller, 2000). However, only propensity for innovation is considered a "core component" of entrepreneurialism outside of the United States (Thomas & Mueller, 2000, p. 291). The other three traits associated with entrepreneurialism vary depending on the culture. Internal LOC is associated with achievement orientated motivation (Mehta & Gupta, 2014). The personality types that score high on internal LOC tend to be entrepreneurial in nature (Mehta & Gupta, 2014). The main cultural aspect could be risk

avoidance and individualism (Thomas & Mueller, 2000). However, further research has shown innovative orientation is more prevalent in low uncertainty avoidance cultures than in high uncertainty avoidance cultures (Mueller & Thomas, 2001). The aforementioned research indicates some cultures are more inclined to support entrepreneurialism than others. As the research suggests internal LOC is linked to propensity for innovation, I proposed the following hypothesis regarding MM and their influence on II: *Hypothesis 4: LOC has a positive effect/influence on the extent of II among MM.*

### **Emotional Intelligence**

The role of emotions has been extensively studied to understand their impact on social functioning (Brackett & Rivers, 2006). Salovey and Mayer (1990) referred to EI as the ability to deal with emotions. It is a subset of social intelligence that invokes the ability to monitor feelings from within oneself or with other people (Salovey & Mayer, 1990). Furthermore, EI is the ability to distinguish feelings and to use those feelings to inform one's thinking (Salovey & Mayer, 1990). It is important to understand EI is distinct from personality (Brackett & Rivers, 2006; Salovey & Mayer, 1990). Emotional intelligence involves the processing of information relevant to emotions. Personality, such as neuroticism, deals mainly with differences in levels of emotional reaction. In other words, personality is involved in the ease or onset of emotional activation (Eisenberg et al., 1995). For example, neuroticism, one of the Big Five personality traits, is associated with temperament or mood swings. Emotional intelligence involves the way in which someone learns to control emotions in order to function socially.

Emotions help people to solve problems with group living and social relationships (Keltner & Haidt, 2001). For example, emotions help to inform decisions that involve group interaction. Insight from emotional cues from others can be used to shape behavior and avoid

potentially conflicting emotions. However, emotional cues stemming from different cultures can vary and make it more challenging for group living among heterogeneous cultures. Each culture may influence emotional regulation differently (Gross, 1998). Emotions are constructed among social relationships and culture (Keltner & Haidt, 2001). Society can help condition or regulate emotions through suppression or encouragement (Gross, 1998). This suggests a social setting or cultural relationship can influence emotional behavior. The culture in which someone is raised shapes how emotions are expressed. For example, vocalized cues such as laughing or crying can be influenced by the social environment in which one is raised. However, cues for expressing emotion in some cultures can be difficult to distinguish in others (Yoshie & Sauter, 2019). The latest research suggests emotions are easier to distinguish when all involved parties are from the same culture (Yoshie & Sauter, 2019). Knowledge of nonverbalized cues helps to inform all parties in the situation of group living.

Emotions play a role in individual success; managers cannot rely on intelligence alone (Suliman & Al-Shaikh, 2007). Emotions may play a greater role than individual intelligence (Diggins, 2004). Emotional intelligence assists employees in being aware of interpersonal style (Suliman & Al-Shaikh, 2007). Being self-aware can assist in meeting the emotional climate of a particular situation. A good manager recognizes the impact of emotions on behavior (Diggins, 2004). For example, showing restraint in difficult times helps to diffuse a potentially disastrous business outcome. Furthermore, having high EI enhances the ability to evaluate the social situation or characteristics in the workplace (Diggins, 2004). Ensuring a mix or diversity of personality within a group may help to moderate unproductive emotional swings. Finally, EI helps to manage and improve employee relations (Diggins, 2004). Enhanced employee relations have a role in team interactions and effectiveness (Rezvani et al., 2016).

Emotions can be used in problem solving if properly understood (Brackett & Rivers, 2006). Emotional abilities can be broken down to perception, use, understanding, and management of emotions (Salovey & Mayer, 1990). Each function has a specific role in social functioning. Emotional intelligence is a concept that takes each function into consideration to determine appropriate responses to social situations (Mayer, Roberts, & Barsade, 2008). For example, EI can be used productively for the protection of one's own interests. As inappropriate behaviors are detected (perceived or understood), limits can be set to minimize damage (Mayor & Salovey, 1997). Use of emotions is also instrumental in providing accurate feedback for other people. If feelings are avoided, observers may become detached from their feelings or misunderstand completely (Mayor & Salovey, 1997). This condition can promote emotional detachment and negatively impact the work environment.

Emotional intelligence can improve management performance (Langhorn, 2004). Specifically, it can assist in motivation and direction of thought (Mayor & Salovey, 1997). In a team environment, a manager can perceive the onset of emotion and effectively regulate the emotion to ensure misguided or misappropriated behaviors are minimized. For example, if a manager perceives an employee to be angry with a particular decision, he or she may promote better decision-making and likely diffuse a potentially unproductive situation (Brackett & Rivers, 2006; Mayor & Salovey, 1997). This adaptive behavior is important in social situations where conflict emerges. Specifically, it is essential for managing conflict and organizational change (Digging, 2004; Suliman & Al-Shaikh, 2007; Zhang et al., 2015). This skillset, adaptive behavior or EI, is especially important for the management of teams. Emotional intelligence enhances team performance by improving team interaction and the way knowledge is managed (Tsakalerou, 2016).

Conflict in organizations is inevitable and occurs during organizational operations (Rahim, Buntzman, & White, 1999). Understanding how conflict plays a role in employee behavior is important especially as diversity and work–life balance become more dynamic and complex (Suliman & Al-Shaikh, 2007). Dealing with conflict is difficult since emotions are generated and must be managed effectively to continue to promote a positive work environment (Suliman & Al-Shaikh, 2007).

Positive emotions, either perceived by the manager or employee, support organizational growth and job performance (Langhorn, 2004; Law, Wong, & Song, 2004). Specific conflict management styles are positively associated with EI and innovation. Conflict management helps to explain the association between EI and innovation (Zhang et al., 2015). For example, the integrating style (of conflict management) appears to mediate the relationship between EI and innovation performance (Zhang et al., 2015). Emotional intelligence is also positively associated with compromising styles of conflict management (Zhang et al., 2015). This is especially important in cultures, such as Chinese, that characteristically avoid conflict and embrace harmony. The implications of this research suggest companies should invest in conflict management strategies, especially integrating and compromising styles.

Emotional intelligence impacts the success of innovation processes by impacting organizational productivity (Brooks & Nafukho, 2006; Tsakalerou, 2016). More specifically, EI enhances the management of intellectual capital (Brooks & Nafukho, 2006; Tsakalerou, 2016; Verma & Sinha, 2016). By managing intellectual capital, the organization increases the ability to share knowledge (Verma & Sinha, 2016). A lack of EI challenges the transfer of intellectual capital. Emotional intelligence improves team member interaction and facilitates information exchange (Tsakalerou, 2016). As the team increases their performance and improves the

management of intellectual capital, innovation is positively impacted (Tsakalerou, 2016). Additional information on knowledge sharing is located in Chapter 2.

Emotional intelligence positively impacts the performance of employees (Altindag & Kosedagi, 2015). Managers with increased EI are well positioned to create an innovative corporate culture (Altindag & Kosedagi, 2015). An innovative corporate culture helps to address employee performance and turnover (Altindag & Kosedagi, 2015). Employee performance can enhance productivity, though turnover can limit productivity. People who score higher on EI show higher levels of job performance (Abraham, 1999). The literature suggests there is insufficient information regarding the impact of middle managers' EI and level of work experience on II.

Several factors influence knowledge sharing activity, according to the literature (Lin, 2007; Taylor & Wright, 2004). As previously discussed, there are individual, organizational, and technological influences or enablers of knowledge sharing activity. With regards to the individual factor, knowledge sharing depends on several points, not least of which is the belief that the knowledge imparted will help others (Lin, 2007). People with EI not only promote knowledge exchange, but also understand other peoples' feelings. This suggests EI may aide in the transfer of knowledge and organizational innovation. Therefore, the following hypothesis was tested to evaluate the impact of middle managers' EI on II: *Hypothesis 5: EI has a positive influence/impact on the extent of II among MM.*

### **Literature Synthesis**

Research was well established for several of the variables within this study. Most notably, LOC has been evaluated in various models within the context of organizational learning. The influence of gender and culture on LOC has been extensively researched since the 1970s.

Organizational knowledge diffusion has been well researched within the context of organizational learning. Researchers have discovered various ways knowledge can be uncovered and diffused within the organization. Research activity on the influence of EI on OKD has been extensive since the 1990s, but has fallen short of establishing a link to II. The literature covering aspects of MM appears to be limited as well, and focuses primarily on knowledge sharing culture within an organization to promote strategy and innovation. The literature appears to fall short in examining MM and how they contribute in an organizational setting within the context of knowledge management. Few researchers have investigated key contributions of MM that benefit organizations. This gap in the literature suggests MM contribution to innovation, and subsequent increase in market share, has been insufficiently researched.

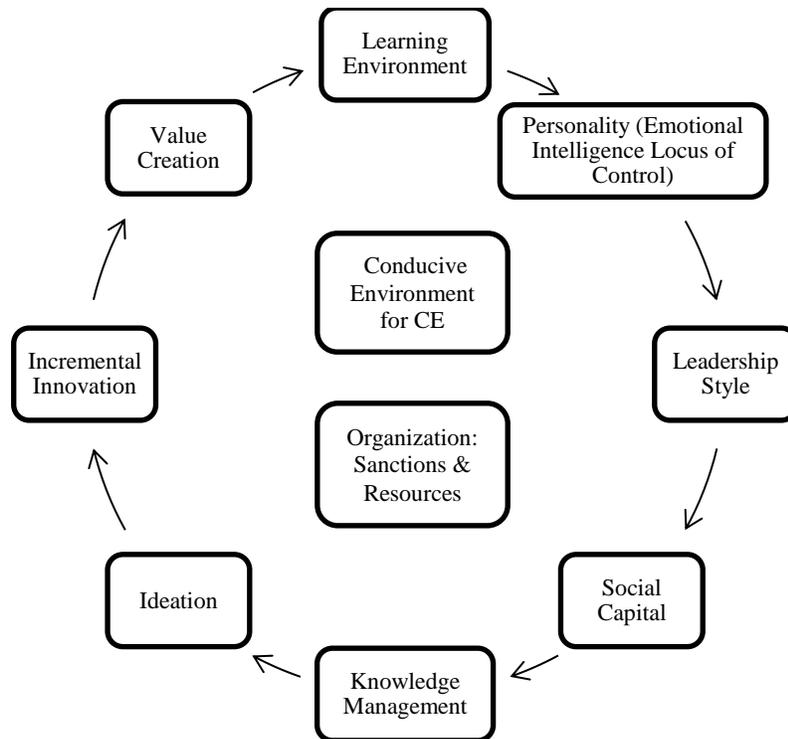


Figure 3. Theoretical model on personal and organizational variables influencing incremental innovation.

Theory regarding MM and the generation of new ideas leading to II centers around two major fields of study. This information expands on the general model in Figure 1 and is depicted in Figure 3. Research conducted on corporate entrepreneurship suggests employees enact entrepreneurial activity when the environment is perceived to be corporate entrepreneurship friendly (Jones, 2005; Kuratko & Hornsby, 1999). Also, innovative behavior increases when employees perceive management is supportive of entrepreneurial activity through a strategy (Amo & Kolvereid, 2005), for example, resources are committed to organizational procedures and policy that support risky behavior designed to enhance current systems. The resulting corporate entrepreneurial behavior energizes and enhances the ability to innovate. It is also documented that personality traits contributes to corporate entrepreneurial activity (Amo & Kolvereid, 2005). Finally, as a result of trial and error and conflict with coworkers and management, new ideas are generated that give rise to increased potential of innovation (Lasson et al., 2009; Mehta & Gupta, 2014).

The second field of study does not specifically mention corporate entrepreneurship activity. Middle managers' personality traits, such as LOC or other traits, may contribute to increased socialization or the potential to establish informal social relations that enhance networking ability. It is well documented that social relationships, specifically informal relations, contribute to the promotion of information exchange to increase the level of knowledge in the company (Darroch & McNaughton, 2003; Janczak, 2004; Saenz et al., 2009). For example, informal relations positively influence implicit knowledge, which is condensed to form explicit knowledge such as policy or procedures (Nonaka & Takeushi, 1995). Middle managers' behaviors contribute directly to knowledge management (Janczak, 2004). There is also an element of trust and motivation that helps to support information or knowledge transfer (Darroch

& McNaughton, 2003). An employee who supports social interaction supports knowledge diffusion (Saenz et al., 2009). The increase in trust in a social group or department influences information exchange, which can lead to increased knowledge. Finally, there is research to support increased innovation as knowledge management is enhanced (Al-Hakim & Hassan, 2011; Manimala et al., 2005). The connection between personality (LOC and EI) and knowledge sharing is documented in the literature. However, MM contributions are not clear and constitute a gap in the literature. As discussed in the literature review, there is a strong relationship between MM and their contribution to knowledge management. *Hypothesis 6: OKD has the strongest impact on II.*

The model depicted in Figure 2 displays the relationships between variables as supported in the literature. The overall gap in the literature involves middle managers' contribution to value creation. Value is created by supporting II, which helps a corporation to maintain (or gain) market share. There are many relationships suggested in this general model. This model suggests that MM must have personality traits, knowledge management skills, and optimal social or environmental factors in place to influence II consistently. Experience, training, and leadership styles may moderate II. For the purposes of this study, IPIT and CIT were included within the scope of the research. A table is provided below summarizing major research contributions that influenced the direction of this study.

Table 2

*Major Works That Influenced the Study*

Author	Date	Research Field	Research Contributions
Nonaka & Takeushi	1995	Middle Management	MM plays role of “knowledge engineers”
Al-Hakim & Hassan	2011	Middle Management	MM is important for knowledge management implementation
Janczak	2004	Middle Management	MM plays a role in not only ensuring stability, but also create ideas and innovate
Nonaka & Takeushi	1995	Knowledge Management	Transforming tacit to explicit knowledge
Jantunen	2005	Knowledge Management	Absorptive capacity concept depending on internal knowledge
Saenz et al.	2009	Knowledge Management	Knowledge sharing is key to influencing innovation
Al-Hakim & Hassan	2011	Knowledge Management	MM processing of implicit information
Ettlie et al.	1984	Incremental Innovation	Defining incremental innovation as refinement of products
Germain	1996	Incremental Innovation	Decentralized organization (and highly specialized resources) positively influences incremental innovation.
Lindberg & Berger	1997	Incremental Innovation	Incremental Innovation is a continuous improvement process that addresses procedural gaps
Ghosh et al.	2015	Incremental Innovation	Competitive pressures influence dynamic between incremental and radical innovation
Goodstadt & Hjelle	1973	Locus of Control	Those with internal locus of control tend to use persuasion rather than manipulation
Rotter	1990	Locus of Control	Attributing outcomes to personal behavior from people with internal locus of control
Bulmash	2016	Locus of Control	Internal locus of control is associated with persistence and resilience
Chandiramani	2014	Locus of Control	How employees manage critical situations and how that impacts locus of control measures
Salovey et.al.	1995	Emotional Intelligence	Emotional intelligence as the ability to deal with emotions and social functioning
Keltner & Haidt	2001	Emotional Intelligence	Emotions can help people solve problems with group living and social relationships
Diggins	2004	Emotional Intelligence	Distinguishing between emotions role versus individual intelligence



## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **Introduction**

This chapter is divided into seven major sections: research design and perspective, sampling plan, data collection procedures, operational definitions, overall reliability and validity, data analytical techniques, and summary. This cross-sectional study was conducted using inferential statistics based on the sample of survey respondents. There has been limited research on middle managers' roles in facilitating II. However, MM play an important role in an organization. They help to establish communication between lower levels and upper levels of management. They are also involved in knowledge diffusion. As a category, middle management is difficult to define. This problem may be due, in part, to middle managers' vacillating roles and contributions. Organizations may continue to neglect middle managers' potential unless they are better informed on how to leverage their unique and flexible position. It is to everyone's benefit to distinguish further middle managers' role from that of senior leadership or line management. By measuring middle managers' EI, LOC, and IPIT, their contributions to the organization's ability to compete are clarified. Additionally, evaluating an organization's propensity for knowledge diffusion sheds light on how the organization utilizes resources to maximize MM influence.

#### **Research Design and Perspective**

Innovation is a general term used in many different industries. The service industry innovates by discovering new ways to please clients and meet their needs. The manufacturing industry may find cheaper alternatives or enhanced methods to developing the same product. The degree to which a company innovates depends on its internal capabilities and knowledge

management infrastructure in concert with stated business objectives. Organizations may focus resources on increasing market share or improving performance of a product. A large organization may focus on the “next big thing” or “game changer” that may help establish its presence in a market. Innovation may be defined as radical or incremental. Incremental innovation, to a large extent, is utilized to keep the organization competitive within a specific market. Radical innovation involves more drastic change, whereas II happens routinely on the product or service in response to internal or external feedback. Radical innovation can take place to change a market or offer a new product or service. It is more disruptive to the organization, so radical innovation should not happen regularly. Incremental innovation takes place more often and does not involve as much risk to execute. It involves more people and drives powerful product or service improvement while taking less time and resources.

Incremental innovation involves the skillsets and knowledge of nearly every level of employee at an organization. It happens constantly and in many different capacities. Middle managers are highly involved in activities that support or augment market share or process/product efficiency. They occupy a position that helps to create and maintain knowledge within close communication channels. Knowledge management and diffusion require middle managers’ constant vigilance to remain valid and updated. Knowledge and communication management are antecedents to II. However, more research is needed to understand middle managers’ involvement more fully.

### **Sampling Plan**

This cross-sectional study did not include an experimental component. I used a survey questionnaire to evaluate managers’ responses to several statements describing aspects of the variables included. In this study, I investigated the roles of OKD, EI, and LOC on II. I utilized a

convenience sample mostly from my professional network. Given the difficulty I faced obtaining information from organizations directly, the benefits of the convenience sample outweighed the negative aspects of not obtaining information from a specific group.

Most organizations have a policy to prevent investigators from accessing employees. I researched three Washington DC/Maryland area companies, including my own employer, and could not secure an agreement with their administration officials for a study on II. Such companies could help a researcher to gain adequate survey circulation within one large company. However, this action was against most corporate policies and was subsequently abandoned.

As such, I chose to survey other managers within my professional network. This network was primarily made up of managers in the service sector of pharmaceuticals and other science industry professionals. There were also professionals, albeit limited, from finance industries and manufacturing. After the survey was administered, I was not aware of the ultimate consistency of industry types that participated. In order to ensure an adequate amount of responses, I selected industry professionals from my LinkedIn account who were most likely to be MM based on their profile information. I also utilized a network of professionals from various industries obtained from sources at Hood College. Together, my personal network and Hood College provided an adequate number of respondents.

The survey was pilot tested with Hood College MBA students to evaluate the applicability, feasibility, administration time, and any unforeseen issues resulting from the way in which the questions were perceived. Feedback from the pilot survey was used to make clarifications and adjustments prior to the large-scale administration of the survey. There were no reported problems with regards to the question design or clarity.

## Variables and Operational Definitions

I used inferential statistics to evaluate middle managers' capacity to influence II. I evaluated several control variables (i.e., age, gender, and manager experience) to determine whether demographics imposed a measurable amount of influence on the dependent variable (DV), II. The main independent variable (IV) was OKD. I also examined EI and LOC as other independent variables to describe personality. I evaluated the variable data based on answers to a questionnaire, which used a 5-point Likert scale with answers ranging from "strongly disagree" to "strongly agree." I used two other IV to evaluate moderation on OKD: IPIT and CIT.

Moderators may change the degree of influence or relationship between an IV and DV. Moderation introduces an interaction that can enhance, weaken, or reverse the IV effects on a DV (Aiken & West, 1991). Figure 4 illustrates an example of the moderation effects. For example, family support can moderate the relationship between third-party encouragement and success. The nature or strength of the relationship between two variables can change as a function of a third. To complete the evaluation, I calculated an interaction variable in SPSS and labeled it separately from the other variables by multiplying the values of OKD with each of the moderator variables. Multiple moderators in multiple regression create power issues unless the sample size is sufficiently large (Dawson, 2014). As such, this calculation method was considered to center the variables to avoid multicollinearity. However, it was determined as unnecessary as per the research (Echambadi & Hess, 2007; Shieh, 2011).

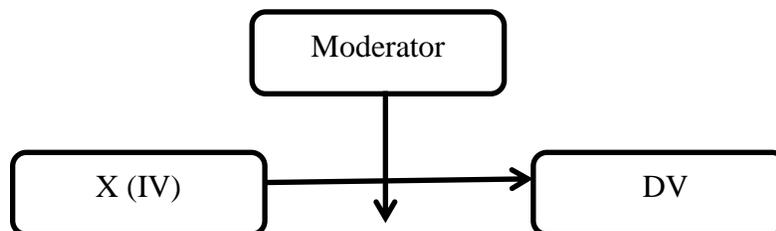


Figure 4. *Moderation.*

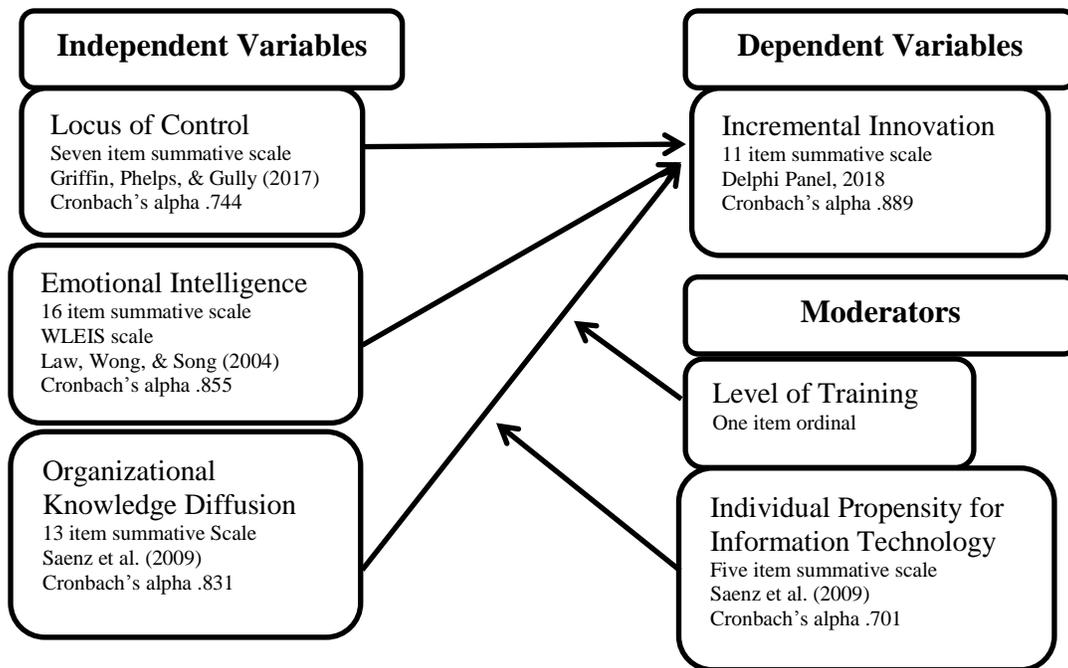


Figure 5. Measurement model.

### Data Collection Procedures

To collect data, I utilized the SurveyMonkey online application. I sent the link to the survey via LinkedIn or email address to the selected management professionals. A list of management professionals was generated from networks such as my personal network within LinkedIn as well as other networks from Hood College. Instructions for the use of the survey were provided. SurveyMonkey collected the completed survey data. I then downloaded the data to an Excel spreadsheet and directly transferred it to SPSS to run the tests.

To evaluate the impact of MM to II, I evaluated the survey results from SurveyMonkey. The Wong Law Emotional Intelligence Scale (WLEIS) scale has been found to distinguish emotions from the Big Five personality model (Law, Wong, & Song, 2004). Therefore, I utilized the WLEIS measurement tool to evaluate EI among the respondents. I also measured OK to provide an understanding of the knowledge management environment and how it influences II. Organizational knowledge diffusion is a construct taken in large measure from Saenz et al.

(2009). The questions were designed to measure the organization's potential for knowledge sharing and diffusion. Both are essential for knowledge creation and innovation (Nonaka & Takeuchi, 1995). I also used an identified moderator, IPIT, also adapted from Saenz et al. (2009). I utilized the LOC questions from Griffin, Phelps, and Gully (2017). Finally, I measured potential for II using data obtained from a Delphi study, which included five established experts in a service industry (see Table 3). Information from the Delphi study was used to develop the indicator for II. In addition to the Delphi panel, I measured II using questions that reveal propensity for the use of continuous improvement tools (Lindberg & Berger, 1997). Demographic questions originated from a survey administered by the Society for Human Resource Management (SHRM, 2017).

### **The Questionnaire: Perceptions of Middle Managers about Incremental Innovation and its Antecedents 2018**

The questionnaire measured individual reflections or self-evaluations of OKD, EI, LOC, IPIT, TIC, and II. Supporting demographic data were collected including education level, gender, and experience. All data were collected using a 5-point Likert scale. Possible answers ranged from "very inaccurate" to "very accurate." Regarding EI, there were a total of 16 self-evaluating questions based on a previously validated questionnaire. The seven questions for LOC came from a previously established survey designed for people in a working environment. Thirteen questions collected information on OKD. These questions divided into three main contributors to OKD: day-to-day management processes, IT knowledge sharing, and people-focused knowledge sharing. Eleven questions examined potential for II. These questions were self-evaluative. The literature contains several examples of how II is measured. Most of these examples involve reporting the results of innovation. For example, measures of II involve

number of patents, revenue growth, productivity, and/or client satisfaction. It was not possible to obtain this information within the timeframe and scope of this study. Instead, I included questions to evaluate the potential for II originating from the Delphi panel and research. Finally, six additional questions gathered demographic information using multiple choice responses. Appendix A provides the questionnaire (survey) results for demographics and CIT. The survey contains both original questions and questions from existing questionnaires. Original items came from the results of the Delphi study. Appendix C provides the results of the Delphi study. The focus of this survey was to measure individuals' perceptions regarding each of the variables. See Figure 5, the Measurement model, for details on variable relationship and how the variables were measured.

### **Questionnaire Testing (SurveyMonkey)**

The survey was administered to a graduate Hood College class: MGMT 590 Strategy and Competitive Advantage. The students who reviewed and tested the survey were completing their MBA degree and worked in various local industries. The revisions determined to be important were grammatical in nature. No modification to the survey questions originated from validated surveys. This included the questions regarding EI. The survey did not require major modifications and retained the original 60 questions. (See Table 5 for a complete listing of measured constructs and corresponding question numbers.)

### **Incremental Innovation**

The measure of II for the survey came from industry experts and various research journals. Several points regarding II from the literature were reinforced by the Delphi panel. For example, workgroups can be used in an effort to create ideas. Survey items were addressed as statements and respondents gauged their level of agreement with the statements. The measure for

II was determined from 11 Likert questions. Six of the questions originated from a Delphi panel of five experts. The remaining five questions originated from a review of the literature. The data from the 11 questions were combined to present one composite score for analysis. There are multiple definitions of II depending on the type of industry. This study measured II broadly with respondents from different industries. As such, there was a need to supplement the study with an expert panel (see Table 3).

Table 3

*Incremental innovation panel members*

Name	Title	Industry
Crispian Bailey	Senior Director of Global Operations	Commercial Pharmaceutical Service
Bruce Simpson	Director, Advanced Therapy Operations and Strategic Projects	Commercial Pharmaceutical Service
Steve Giardina, Ph.D.	Senior Scientific Administrator & Advisor	Government and Commercial Research & Development
Ron Hinkle	Director, Business Analyst & Advisor	Commercial Biotechnology and Research & Development
Jason Yovandich, Ph.D.	Program Director	Government Research & Development

The Delphi panel of experts expressed a need for established goals and metrics. These tools help to establish whether modifications or perceived enhancements have achieved the desired results to improve delivery of product, process, or service. Two survey statements reflected this expectation: (a) demonstrating of success by meeting or exceeding goals and (b) demonstrating improvement through established metrics. The panel also expressed a need for client satisfaction. Satisfaction may be achieved by working closely with the client or customer to drive improvement or modification. Two questions reflected this expectation: (a) the company is able to win new contracts or business through customer driven modifications and (b) whether the company had experienced decreased customer complaints and increased client satisfaction. The panel also indicated employee morale would improve in part because of increased

involvement in projects designed to improve the company and working conditions. An additional question reflected the inclusion of enhanced employee morale. Finally, the panel identified service expansion or product improvement as an important indicator of II. A sixth and final question was added to address service or product expansion.

Incremental innovation has also been measured in research including the concept of continuous improvement. Continuous improvement involves various business tools to improve service, process, product and/or working conditions. The tools not only investigate and address the deficiency, they also establish preventive measures. There is no limit to employee involvement. For example, Plan, Do, Check, Act (PDCA) is a business process system designed to allow any employee to implement improvement measures (Lindberg & Berger, 1997). These tools are oftentimes performed in team environments (Lindberg & Berger, 1997). Five questions were included in the survey that reflect individual or team-based employee actions designed to improve business systems (survey items were addressed as statements and respondents were asked to gauge their level of agreement):

1. Policies and procedures are updated regularly. To implement an improvement addressed by the aforementioned PDCA tool, procedures must be updated to reflect best practices (Lindberg & Berger, 1997; Manimala et al., 2005).
2. All employees contribute to continuous improvement. The PDCA tool is designed to be inclusive of employees (Lindberg & Berger, 1997). Furthermore, II involves lower risk (in relation to more radical innovation) and therefore sustains increased employee involvement (Manimala et al., 2005).

3. The company constantly eliminates wasteful operations. The PDCA tool and other tools outside the scope of this study identify and eliminate process and product waste (Lindberg & Berger, 1997).
4. We employ proactive autonomous workgroups. Workgroups or teams administrate the process improvement activities (Lindberg & Berger, 1997). Additionally, workgroup usage was also supported by the Delphi panel.
5. The improvements we make to operations have prevented reoccurrence of problems. The reoccurrence of the problem indicates improvement or II was not established in the business processes. Prevention of reoccurrence is fundamental to the PDCA tool implementation (Lindberg & Berger, 1997).

The combination of the Delphi panel of experts from the biotechnology industry and several research articles on innovation produced a robust set of statements from which to administer. A Cronbach's alpha measure of .889 completed the triangulation of II as a measurable construct.

### **Organizational Knowledge Diffusion**

The questions came directly from a study that measured knowledge sharing and the degree of influence on innovation performance among high tech and low tech companies (Saenz et al., 2009). The OKD construct was developed utilizing three main knowledge sharing factors within an organization: (a) day-to-day management processes, (b) IT-based knowledge sharing, and (c) people-focused knowledge sharing.

1. Day-to day-management processes. Knowledge sharing is measured utilizing responded information regarding the degree to which the organization encourages knowledge sharing through ordinary business practices such as balance scorecards,

- incorporation of external agents' ideas, and business strategy processes (Saenz et al., 2009; see Table 20, Questions 1–3).
2. IT-based knowledge sharing. Factors that measure the degree to which the organization utilizes IT tools in an effort to enhance the sharing of knowledge (Saenz et al., 2009), for example, e-mail and intranet promotion and utilization (Davenport & Prusak, 1998; see Table 20, Questions 4–8).
  3. People-focused knowledge sharing. Factors included the degree to which the organization promoted social interaction (Wigg, 2004). For example, I used questions requiring the respondent to indicate whether coaching, employee rotations, or external mobility were present. Duplicate or redundant knowledge sharing questions were removed from the original questions to help with a logical stream of survey questions. For example, the original questions from the article included whether or not the respondent was encouraged to use communities of practice or forums for knowledge exchange. This survey consolidated these questions into one that included “meeting events and/or workshops.” Communities of practice and/or “forums” may not have been familiar to most managers (see Table 20, Questions 9–13).

### **Individual Propensity to Use Information Technology**

Propensity to use IT came from the aforementioned study used for the OKD construct (Saenz et al., 2009). The IT questions were constructed to reflect personal IT usage. This moderator measured managers' use of IT tools which, as research suggests, are critical to knowledge management and innovation.

## **Emotional Intelligence**

Emotional intelligence represented the principle IV under consideration. Respondents self-evaluated their level of EI. Initially, the research that inspired the use of a self-administered EI scale originated in a study by Brackett and Rivers (2006). This work investigated the relationship between EI and social functioning. The EI theory basically asserts that information embedded in personal emotions can enhance reasoning or thinking.

To measure the EI of MM, a validated, self-rated EI questionnaire was used. The questions measured four EI abilities: (a) appraisal and expression of emotion in oneself, (b) appraisal and recognition of emotion in others, (c) regulation of emotions in oneself, and (d) use of emotions to facilitate performance. These abilities underscored the respondents' social functioning, which may determine socially acceptable behavior (Brackett & Rivers, 2006; Gross, 1998; Law et al., 2004). Such skillsets may impact on managers' ability to support and leverage social networks (Brackett & Rivers, 2006).

To be accurate, the survey needed to distinguish personality traits from emotional traits. The WLEIS scale distinguishes emotions from the Big Five personality model (Law et al., 2004). The questions on the WLEIS were also based on the aforementioned definition of EI by Mayor and Salovey (1997). The survey has been administered to different cultures (Law, Wong, Huang, & Li, 2008) as well as a mix of ethnicities and genders (Whitman, Vanrooy, Viswesuaran, & Kraus, 2011). The WLEIS scale is suitable in diverse organizations (Law et al., 2004). The 16 validated items of the WLEIS consisted of the following factors: (a) self-emotion appraisal, (b) others– emotion appraisal, (c) use of emotion, and (d) regulation of emotion.

## **Demographics**

Demographic questions were obtained from a questionnaire by the SHRM (2017). Responses from demographics were used as study controls and represented the characteristics of the respondents. Demographic characteristics of interest included size of the respondent's organization, job tenure, generation/age, gender, job level (middle manager, executive, etc.), education, and race. Demographic information provided context to understand the environment in which II operates. Furthermore, job level was used to distinguish MM. Only data from MM or higher-level professionals (SME) were evaluated.

## **Data Analytical Techniques**

The data were collected as per the sampling methods and uploaded into SPSS. Multiple regression analysis was used to predict an unknown value of a variable from five other variables (predictors). A one-tailed test was used as I assumed a positive relationship between the variables. This tool helped to identify the strength of the effect that the IV had on the DV. Hierarchical multiple regression helped to reveal which IV would be the best predictor of II when taking into account the other independent variables. Hierarchical multiple regression is used when an order is determined for variables to be entered into the regression equation to test whether a variable contributes significant predictive power over and above other predictors (Petrocelli, 2003). For example, in this study, I examined whether OKD adds a significant amount of variance over and above that which was accounted for by the personality variables entered in previous models. Hierarchical multiple regression may not be the most appropriate tool unless the theoretical basis for use is clearly illustrated and not neglected. If causal relationship is known, as per Petrocelli (2003), this should be used to determine the entry into the HMR model. In the current study, the causal relationships between the predictor variables was

not fully understood. However, the variable order entered into the HMR model was determined based on predictive power as opposed to an exploratory study.

The variance of the personality variable, internal LOC, was accounted for during the first regression model. Internal LOC has long been established as a predictor of innovative behavior. Internal LOC was used in the framework as the basis from which other predictors would build. A new model was added over the original model to examine the contribution of EI above and beyond the original variable, LOC. With the two personality variables controlled, OKD was added to examine the unique contributory factor to II. The research suggests OKD is one of the most important factors for innovation. Finally, a fourth and final model was added with the two moderators [IPIT & CIT] to evaluate any contribution above and beyond the first three models. The moderators were included in the fourth model to examine any effect on the DV as IV. This last model was added for information only and was not intended to be included as a valid scientific evaluation.

The null hypotheses assumed that each of the predictor variables would not influence the DV, II. The alternate hypotheses indicated there would be a statistically significant influence on the DV. (See Figure 6 for the equation used for multiple regression and Table 4 for the alternate hypotheses presented in this study.) This equation expresses the linear relationship between multiple IV and one DV. The “y” represents the predicted value of the DV (II). The “b” represents the constants or the regression coefficients. The “x” values denote the IVs (e.g., LOC). The equation in Figure 6 represents five IVs as well as the DV.

$$y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5$$

*Figure 6.* Algebraic equation for multiple regression for five predictors.

A strength value between -1 and 1 was evaluated for each IV as it compared to the DV. Statistical significance was measured by the R<sup>2</sup> value, the coefficient of multiple

determinations. This indicated how much of the DV variation was explained by the IV or complete model. The lower the percentage represented by the variation in the DV, the lower the amount of variation could be explained. The R<sup>2</sup> value was between 0 and 1. The closer the model measured to “1,” the better its predictability.

Table 4

*Summary of Hypotheses*

No.	Hypothesis	Inferential Statistical Testing	Variables	Survey Source
1	Organizational knowledge diffusion (OKD) has a positive influence on II among MM.	HMR	OKD and II	See Table 5
2	Individual propensity to use Information Technology (IPIT) moderates the relationship between OKD and II among MM.	Moderated Multiple Regression	IPIT, OKD and II	See Table 5
3	Training moderates the relationship between OKD and II among MM.	Moderated Multiple Regression	OKD and II	See Table 5
4	Locus of control (LOC) positively influences II among MM.	HMR	LOC and II	See Table 5
5	Emotional intelligence (EI) has a positive influence on II among MM.	HMR	EI and II	See Table 5
6	Organizational knowledge diffusion (OKD) has the strongest impact on incremental innovation.	HMR	OKD and II	See Table 5

Multiple regression techniques do not test whether data are linear. Scatterplots were examined to ensure linearity. Scatter plot analysis was run with each of IV to evaluate whether there was evidence of a positive or negative relationship. A box plot and histogram were used to evaluate the outliers, which indicated sampling error. A pilot run of this survey was designed to address potential error of this kind prior to full implementation. A histogram was also run to determine whether the data followed a normal distribution.

Evaluation of the strength of each IV outcome was evaluated as well as the interaction of multiple IV. Covariates or controls were included to test their impact on the relationship between two variables. For example, CIT level or respondent generation may have helped to explain the relationship between the variables. Spuriousness may be addressed by other variables in operation, such as level of education and tenure. The strength of the interaction between two

variables may be explained by a third. Significance was evaluated by the measured p-value. A critical value of  $p < 0.05$  was established before data collection.

### **Data Qualification Testing**

*Linearity.* Multiple regression analysis can accurately estimate the relationship between an IV and DV if the relationship is determined to be linear. If the relationship is not linear, the results of the regression analysis can underestimate the relationship between the two variables (Osborne & Waters, 2002). This may result in a Type II error, or the chance of not rejecting the null hypothesis, or assuming there is no influencing effect of the variables. A normal probability plot of standardized residuals was used to evaluate linearity.

*Homoscedasticity.* The variance of residual errors should be constant over the values of the IV. Funneling or otherwise abnormally distributed value may suggest signs of heteroscedasticity (Osborne & Waters, 2002; Tabachnick & Fidell, 2019). Heteroscedasticity may negatively impact the analysis and cause Type I error, which occurs there is evidence to reject the null hypothesis, but it is not rejected due to problematic data.

*Normality.* Through SPSS, a probability plot was constructed to determine whether variables were normally distributed. Results of each variable are reported in Chapter 4.

*Multicollinearity.* Multicollinearity was evaluated between IV to ensure there was minimal overestimation of the Pearson  $r$  coefficient. If the multicollinearity between two independent variables exceeds .7, it indicates two or more variables contain similar variation (Mason & Perreault, 1991; Tabachnick & Fidell, 2019). This scenario would not add value to the multivariate linear regression. For example, it was anticipated that LOC and EI would be correlated. This result would have further supported the use of EI alone without examining LOC impact on innovation.

*Residuals are independent.* A residual plot was analyzed to make the determination of whether residuals were sufficiently independent. There should be no systematic variation occurring within the model.

*No influential outliers biasing the model.* This was examined using Cooks distance as reported in Chapter 4. Outliers were examined and subsequently removed as needed to ensure they did not distort the outcome of the regression analysis. However, as reported in Chapter 4, outliers were only removed if there was evidence of a disengaged respondent.

*Autocorrelation.* A test to ensure randomness or the absence of repeated patterns was employed. Autocorrelation can lead to false positives and should be evaluated to ensure a Type II error is not made.

*Cronbach's alpha (co-efficient of reliability).* Cronbach's alpha is an internal consistency reliability test that measures the strength of the consistency of the factors. Factors are the individual variables being measured within the survey. This tool is typically used when there are multiple Likert questions. Cronbach's alpha can measure a latent variable like "feelings of safety" for internal consistency. For the current research, Cronbach's alpha measured the latent variables of OKD, II, and EI. A result of 0.7 or higher was a satisfactory score and indicated the factor was an adequate measure of the respective variable (Nunnally, 1978). Other statistical tools were run as required to help explain relationships of variables to certain demographic data. (See Table 5 for a summary of the variables included in this study.)

Table 5

*Summary of Variables*

Variable Name	Variable Type	Level of Measure	Description	Survey Question
Emotional Intelligence	independent	Ordinal	Likert scale	No. 30–45
Locus of Control	Independent	Ordinal	Likert scale	No. 46–52
Organizational Knowledge Diffusion	Independent	Ordinal	Likert scale	No. 1–13
Individual Propensity for Information Technology	Moderator	Ordinal	Likert scale	No. 25–29
Training on Continuous Improvement	Moderator	Ordinal	Likert scale	No. 59*
Incremental Innovation	Dependent	Ordinal	Likert scale	No. 14–24
Gender	Demographic	Nominal	Male/female	No. 55*
Education	Demographic	Ordinal	Formal education scale	No. 60*
Manager Experience	Demographic	Ordinal	Years scale	No. 58*
Job Category	Demographic	Ordinal	Organization level	No. 57*
Generation	Demographic	Ordinal	Generation scale	No. 56*
Race	Demographic	Ordinal	Race category	No. 54*
Organization size	Demographic	Ordinal	Size scale	No. 53*

*Note.* \*Appendix A Survey Results.

### Overall Reliability and Validity

The survey used easily understandable wording to allow for managers who may consider English as a second language or nonnative speakers. The Likert scale used a simple 5-point answer field for all questions ranging from “very accurate” to “very inaccurate.” As previously discussed, most survey questions came from vetted sources such as the survey questions developed for one of the two personality variables, EI.

## **Construct Validity**

Each IV was vetted by other researchers. For example, the survey questions designed to determine the level of EI were tested within multiple cultures. The survey was also found to be valid between genders. The OKD measure was adopted from another researcher. Locus of control was also adopted from a survey designed for the workplace. The DV construct, II, was developed utilizing extensive literature as well as feedback from a panel of experts. This panel reviewed other panelist's responses to formulate consensus regarding construct definition. This collaboration across different companies and industries strengthened the definition of II.

## **Internal Validity**

There are limitations in the available literature with regards to available variables and how they can be quantified. A confounding variable, hitherto unknown, may have influenced the responses collected in the questionnaire. Self-reported measures are subject to social desirability response biases (Paulhus, 1991). For example, respondents may answer questions based on their aspirations or social goals as opposed to honest personal feedback. Furthermore, the level of EI itself may have influenced the subject's ability to report EI (Brackett & Rivers, 2006). This study did not have provisions for narrative responses. It was estimated that the survey would take between 10–15 minutes to complete. This timeframe could have been too long and time consuming, which may have contributed to several incomplete responses that were subsequently disqualified and dropped from the study. Finally, the previously discussed *r* value, although suggesting strength between variables, did not account for timing of the variables or non-spuriousness. The data could not determine causality between the variables examined.

Individual responses regarding the variables in question varied due to the managers' specific history or experience. It is difficult to ensure objectivity. Control variables such as

tenure and education may explain part of the subjectivity. However, all possible variables could not be taken into consideration especially within the available timeframe for this study.

### **External Validity**

The data were not limited to one industry or one large company within the industry. Generalizability of the sampled network obtained from this study was a challenge. As a result, information inferred from the data may be impacted. The data were solicited from various managers primarily in the mid-Atlantic region. The data may have originated primarily from managers in a service industry such as biotechnology. Managers from various other service sectors may have contributed to this survey and subsequently been selected for overall analysis. Although this may account for generalizability of the data, subtle differences in manager function in various industries may have impacted the data. For example, as previously discussed, MM make up a large proportion of an organization's operations. A middle manager's job responsibilities may fluctuate widely depending on the participating industry. This may have impacted the managers' responses to the survey.

The data were collected from a convenience sample of familiar managers within my professional network as well as a network affiliated with Hood College. A convenience sample represents the best alternative from a more controlled sample set. For example, access to several companies within the biotech industry would have provided an opportunity to sample managers within one industry. Had this occurred, the data obtained may have allowed for additional inferences regarding MM. Many companies will not allow an outside (or inside) researcher to solicit information for a study that can be published. In fact, I approached three companies in the mid-Atlantic region who eventually turned down the research opportunity.

## **Sampling Bias**

As discussed, a convenience sample was necessary to complete this study. This potential bias limited the respondents to managers within a network. There is no practical method to determine whether the network is representative of the population of MM. The network may contain an overwhelmingly strong response from the biotechnology industry. This industry may contain representatives from service and manufacturing. However, the industry represents a fraction of the type of industries within the mid-Atlantic region. This bias may be partially offset by utilizing managers who attended Hood College. Sampling bias may also have been impacted by potential researcher bias.

## **Researcher Bias**

I have worked in the pharmaceutical industry since 1996. This industry is primarily service oriented; the drugs developed (or tested) are procured on behalf of other researchers (the customers). This perspective may have skewed my understanding of innovation in favor of a scientific or research point of view. My predisposition or experience with organizational learning and II may be different from people in other industries. Incremental innovation may be measured by the number of patents, organic growth, or other determinants such as revenue growth, as apparent in the automobile or retail industry. However, there are other ways to measure II as pointed out in this study and the Delphi panel. As there is a limit to how much financial or patent information I could obtain for this study, I measured factors that represented potential for II.

## **Chapter Summary**

The methodology was designed to examine the relationships between independent and dependent variables. There was also opportunity to examine potential moderating factors. The aforementioned cross-sectional survey was designed to gather data for inferential statistics

utilizing SPSS (Version 25) software. This software enabled me to utilize multiple regression analysis as well as other statistical tools as needed. The methodology chapter contained six major sections: research perspective and design, sampling plan, operational definitions, data collection procedures, data analytical techniques, and overall reliability and validity. As characteristic of a convenience sample, there are limitations to the sampling and its overall representation of the population in question (MM). In Chapter 4, I present the results from the administration of the survey.

## **CHAPTER 4**

### **RESULTS**

#### **Introduction**

The purpose of this study was to examine middle managers' contribution to innovation. The literature suggests OKD, EI, and LOC influence innovation. However, insufficient research has focused specifically on middle managers' influence on innovation. This study represents an effort to obtain specific MM data regarding their contribution to II. A survey was administered to a convenience sample primarily derived from my LinkedIn account. The results of the study are arranged by demographics, descriptive statistics, internal validity, assumptions of multiple regression, and finally, the results.

#### **Summary of the Methods**

The research represents a non-experimental cross-sectional study. The questionnaire was designed to evaluate responses to statements that describe characteristics of the selected variables. As discussed, the purpose was to investigate the impact of OKD, EI, and LOC on II among MM. The convenience sample gave valuable access to practitioners without violating specific company protocols that dictate access to employee information. Most organizations have a policy that prevents investigators from accessing employee information. I was unable to gain agreement with human resources departments within the Washington DC/Maryland area, including my own employer, to present the questionnaire formally.

As discussed in the previous chapter, I utilized a panel of industry experts to obtain a working definition of II. The consensus of a panel of five suggested the following definition was appropriate: *Incremental innovation*: Expand and/or enhance service/product offering to meet

client needs and/or improve operational efficiency utilizing any employee at little to no perceived business risk.

Two research scientists and three senior-level managers made up the Delphi panel (see Table 3). During the course of the study, the panel members were unaware of the identities of the other members who contributed ideas based on their experience. This method of identity masking facilitated unbiased and honest discussion. In addition to generating a definition of II, the information learned from the panel members was used to develop six questions to measure II. The other five questions originated from research summarized in Chapter 2. (See Appendix B for protocol procedures and Appendix C for results of the Delphi study.) The definition supported by the Delphi panel helped to generate a valid and operationally feasible measure of incremental innovation.

My professional network, which was ultimately used for the questionnaire, was primarily made up of managers in the service sector of pharmaceuticals and other science industry professionals. There were also professionals from finance industries and other component manufacturing companies. I do not know the ultimate consistency of industry types represented in the data. I selected industry professionals from my LinkedIn account who were most likely MM based on their profile information. I also utilized a network of professionals from various industries obtained from sources at Hood College.

The survey was piloted by Hood College MBA capstone students to evaluate the applicability, feasibility, administration time, and unforeseen issues resulting from the way in which the questions are perceived. Feedback from the pilot survey was used to make clarifications and adjustments prior to large-scale administration of the survey. There were no major problems with the survey questions, aside from the modification of sentence structure

designed to measure the applicable variables more precisely, as reported by the pilot testers. No questions were dropped or completely modified.

The data obtained from the respondents was downloaded from SurveyMonkey to SPSS where survey results were evaluated. Out of the total 113 respondents, 4 respondents were excluded for incomplete survey responses. These respondents skipped over major demographic questions as illustrated in Tables 7 and 8. Only one of the four incomplete respondents was reportedly from middle management. Five of the remaining respondents skipped a question regarding OKD.

Five questions were not answered or skipped from the remaining respondents. To complete these gaps in the survey responses, the median was calculated within the available responses (limited to the OKD variable). For example, out of two answered questions that made up a three question variable, a score of four was determined if the respondent answered three and five for the other questions. There were no obvious unengaged responses upon reviewing the data for repeated numbers within a respondent. However, as discussed later within this chapter, an outlier response was subsequently removed after further examination.

Only three survey questions required reversal of responses to ensure the construct was evaluated correctly. Locus of control survey response numbers 2, 3, and 5 were reversed to ensure internal LOC was consistently measured. The new variables were labeled RevLOC2, RevLOC3, and RevLOC5. The other questionnaire responses were determined to measure the respective constructs correctly. Additionally, utilizing SPSS functionality, a new variable was created representing the total score of each component that devised a variable. This new variable represents the total score originally from each of the Likert questions. For example, to measure EI, a validated set of 16 questions were used. A new total EI score was generated from the 16

questions resulting in one scale variable. The 16 question scores were added to make a new score for each respondent. A new total variable was created to represent LOC, EI, OKD, II, and IPIT (see Table 6).

It was necessary to remove one survey respondent from the analysis after further review. The repeated selection of “1” within one variable (OKD) clearly indicated a disengaged respondent. This discovery was determined during the analysis for outliers as discussed later in this chapter. The final count of respondents for the analysis reached 90 after the removal of the disengaged respondent ( $N = 90$ ). (See Table 6 for a summary of new variables developed to run HRA.)

Table 6

*Summary of Variables Used for Hierarchical Regression Analysis*

Variable Name	Variable Type	Level of Measure	SPSS Description	Survey Question
Emotional Intelligence	independent	Scale	TotEM	No. 30–45
Locus of Control	Independent	Scale	TotLOC	No. 46–52
Organizational Knowledge Diffusion	Independent	Scale	TotOKD	No. 1–13
Individual Propensity for Information Technology	Moderator	Scale	TotIPIT	No. 25–29
Level of Training	Moderator	Ordinal	CITTrain59	No. 59
Incremental Innovation	Dependent	Scale	TotalIncInn	No. 14–24

**Participant Characteristics**

Two hundred and seventy professionals within the LinkedIn account as well as sources within the Hood College community received the questionnaire utilizing a provided email account. A total of 113 people responded, demonstrating a 42% response rate (see Tables 7–10). Seventy-five respondents indicated they were MM while 17 indicated they were professional

non-management. The balance of the respondents were self-employed, non-manager contributor (specialist), or executive level (See Table 7). Only middle managers and professional non-managers were included in the results. Professional non-managers, such as project managers or other SME, were eventually added to the list of MM respondents. Professional non-managers, although not having employee reports, possess similar job functions as MM. For example, SME work closely with teams and manage information from multiple sources within the company.

Table 7

*Job Category*

Job Category	Percentage %	<i>N</i>
Own my own business, self-employed, or consultant	.92	1
Nonmanagement contributor (e.g., assistant, coordinator, specialist)	10.09	11
Professional nonmanagement (e.g., writer, artist, SME)	15.6	17
Middle management (e.g., manager, supervisor, director)	68.81	75
Executive level (e.g., CEO, CFO)	4.59	5
Answered		109
Skipped		4

The respondents' age was also captured (see Table 8). A mix of Millennials, Generation X, and Baby Boomers made up the majority of the respondents. Most of the respondents were born between 1965 and 1979. However, Baby Boomers and Millennials each made up about 30% of the respondents. Regarding gender, 58% of the respondents reported to be male while 40% reported to be female. Finally, 70% of the respondents reported to be White Non-Hispanic.

Table 8

*Respondent Generation/Age*

Respondent Generation/Age	Percentage %	<i>N</i>
Generation Z (born 1995–2009)	0.92	1
Millennials (born 1980–1994)	26.61	29
Generation X (born 1965–1979)	44.95	49
Baby boomers (born 1945–1964)	27.52	30
Veterans (born before 1945)	0.00	0
Answered		109
Skipped		4

Most respondents reported their companies were either greater than 25,000 employees or somewhere between 101 or 500 (see Table 9). The years a person can serve as a middle manager can vary. For the purposes of this study, the criteria for years served remained unspecified; however, as per the survey responses, experience ranged from 1–3 years to greater than 15. As presented in Table 10, there was little to no distinction in years served among the survey respondents; there was a mix of experience represented in the study.

Table 9

*Company Size (Employee Count)*

Employees	Percentage %	<i>N</i>
1–10	2.75	3
11– 100	16.51	18
101–500	27.52	30
501–2500	9.17	10
2501–10,000	8.26	9
10, 001–25,000	8.26	9
Greater than 25,000	27.52	30
Answered		109
Skipped		4

Table 10

*Years Serviced As Manager*

Years	Percentage %	<i>N</i>
1–3	24.53	26
4–6	13.21	14
7–10	11.32	12
11–15	16.04	17
Greater than 15	34.91	37
Answered		106
Skipped		7

A total of 90 respondents were used for the analysis, making the effective participation rate 33%. Thirty-eight percent of the 90 survey takers included for the survey analysis were women. Only survey takers who reported to be professional non-management or MM were included in the data. Respondents reporting to be executive-level employees, contributors, or people who were self-employed were excluded from the final analysis (see Tables 11–14).

Table 11

*Job Category (N = 90)*

Job Category	Percentage %	<i>N</i>
Professional non-management (e.g., writer, artist, SME)	18.88	17
Middle management (e.g., manager, supervisor, director)	81.11	73

Table 12

*Respondent Generation/Age (N = 90)*

Respondent Generation/Age	Percentage %	<i>N</i>
Generation Z (born 1995–2009)	1.11	1
Millennials (born 1980–1994)	21.11	19
Generation X (born 1965–1979)	47.77	43
Baby boomers (born 1945–1964)	30.00	27

Table 13

*Company Size (Employee Count; N = 90)*

Employees	Percentage %	N
1–10	1.11	1
11–100	18.88	17
101–500	26.66	24
501–2500	8.88	8
2501–10,000	7.77	7
10,001–25,000	7.77	7
Greater than 25,000	28.88	26

Table 14

*Years Serviced As Managed (N = 90)*

Years	Percentage %	N
1–3	20.00	18
4–6	14.44	13
7–10	12.22	11
11–15	15.55	14
Greater than 15	34.44	31
Skipped	3.33	3

### Results of the Study

Results are organized in the following manner: descriptive statistics, internal reliability, data eligibility of multiple regression, preliminary statistical analysis, and hierarchical multiple regression. Each result is explained separately by alternative hypothesis.

#### Descriptive Statistics

Descriptive statistics were run for each variable to report the distribution mean, median, and standard deviations (Table 15). All variables report symmetry of negative skewness or left-skewed distributions. Negative skewness generally means the mean of the distribution is located to the left of the peak. Negative skewness occurs when there are fewer low answers given. For example, in this study, negative skewness meant fewer people answered “1” or “2” in favor of

“4” or “5” in the Likert scale, signifying greater tendency for agreement with the statements. Despite this skewness, the mean and median of each variable were similar; no more than 0.5 difference. The data were considered to be normal as the skewness was between -2 to +2 and kurtosis was between -7 to +7 (Hair, et al, 2017; Byrne, 2012). (See Table 15 for a summary of the descriptive statistics for scale variables and Table 16 for skewness and kurtosis figures.)

Table 15

*Summary of Descriptive Statistics for Scale Variables*

Variable Name	N	Range	Min	Max	Mean	SD	Variance	Median
TotLOC	90	17.0	18.0	35.0	26.6	4.2	17.5	27.0
TotEM	90	32.0	48.0	80.0	68.8	6.5	42.7	69.5
TotPIT	90	17.0	8.0	25.0	18.7	3.8	14.7	19.0
TotOKD	90	40.0	25.0	65.0	46.5	8.7	75.0	47.0
TotalIncInn	90	37.0	17.0	54.0	39.2	8.2	67.9	39.0
CITrain59	90	4	1	5	3.88	.89	.792	4

**Internal Reliability**

**Cronbach’s alpha.** Cronbach’s alpha statistic was run to assess the internal reliability of the individual factors within the variables. The variables assessed were measured to be at least 0.701. The highest Cronbach’s alpha value was .889 for measures of II. This data suggested there was strong evidence of intercorrelation within each question that measured the same construct. Results of at least 0.7 suggest a satisfactory score and indicate the factor is an adequate measure of the respective variable (Nunnally, 1978). Cronbach’s alpha is widely utilized for determination of internal reliability (Gall, Gall, & Borg, 2007). (See Table 16 for individual measurements of SPSS output.)

Table 16

*Internal Reliability, Skewness, and Kurtosis*

Variable Name	<i>N</i>	Cronbach's Alpha	Skewness Statistic	Skewness Std. Error	Kurtosis Statistic	Kurtosis Std. Error
Emotional Intelligence	16	.855	-.753	.254	.590	.503
Locus of Control	7	.744	-.338	.254	-.297	.503
Organizational Knowledge Diffusion	13	.831	-.391	.254	-.136	.503
Individual Propensity for Information Technology	5	.701	-.633	.254	.363	.503
Incremental Innovation	11	.889	-.451	.254	.095	.503

**Autocorrelation.** Autocorrelation of the predictor residuals was evaluated using the Durbin-Watson statistic available on SPSS (see Table 30). The value of 2.147 in Model 4 signified there was little to no evidence of positive serial correlation or autocorrelation in operation within the model of predictors. This model contained the three main predictors (OKD, LOC, and EM) as well as the moderating variables (IPIT and CITrain59). Model 3 contained only the three main predictors and obtained a value of 2.204. Model 2 contained EM and LOC and obtained a value of 2.261. Finally, Model 1 with LOC obtained a value of 2.298. Although this study was not longitudinal, autocorrelation was tested because it is an assumption of multiple regression. (See Table 30 for the model summary.). Other eligibility tests for multiple regression are given in the next section.

**Data Eligibility of Multiple Regression**

**Response validity.** The study contained a total of 90 responses for the analysis. This response rate was adequate according to Tabachnick and Fidell (2019) and Green (1991).

According to the rule, the study required at least 90 responses. The formula used is depicted below:

$$50 + 8 K = 90; \text{ where } K \text{ is the number of predictors}$$

**Residuals are independent.** The Durbin-Watson statistic (See Table 30) indicated this assumption was met. The values were well within the range between 1 and 3 indicating the residuals were sufficiently independent and uncorrelated.

**Multicollinearity.** Multicollinearity was measured by variance inflation factor (VIF) and tolerance. Variance inflation factor should not exceed 4.0 and tolerance should not be less than 0.2, otherwise multicollinearity problems between the variables are in operation (Hair et al., 2017; Ringle, Wende, & Becker, 2015). There was no evidence of multicollinearity within the four tested models. (See Table 17 for specific SPSS results.) Model 1 was used to illustrate the personality independent variable LOC. Model 2 illustrated the predictive capacity of EI over Model 1 predictor. Model 3 predictors included OKD over the two personality factors. Model 4 evaluated the predictive abilities of both the moderators over personality and OKD. Table 19 illustrates the Pearson correlations to suggest further the absence of multicollinearity, indicating that the IV have sufficient independent variation. The correlation table illustrates measured correlations between IV less than 0.7 suggest weak multicollinearity (Mason & Perreault, 1991; Tabachnick & Fidell, 2019).

**Homoscedasticity.** Homoscedasticity is an assumption of linear regression and describes a situation in which the residual error distribution is the same across all values of the IV. In the case of this model, there did not appear to be a condition of differing residual error distribution across the values of the predictor variables. The residuals, which appeared randomly distributed, were rectangular in shape with most scores concentrated in the center. Randomly scattered residuals

around the 0 of the scatterplot of residuals suggested homoscedasticity (Osborne & Waters, 2002).  
 (See Figure 7 for illustration.)

Table 17

*Coefficients– Dependent Variable Incremental Innovation (TotInn)*

Coefficients		Collinearity Statistics	
Model (and variable)		Tolerance	VIF
1	TotLOC	1.000	1.000
2	TotLOC	0.851	1.175
	TotEM	0.851	1.175
3	TotLOC	0.847	1.180
	TotEM	0.762	1.312
	TotOKD	0.861	1.162
4	TotLOC	0.761	1.314
	TotEM	0.738	1.354
	TotOKD	0.486	2.059
	TotPIT	0.574	1.741
	CITrain59	0.744	1.343

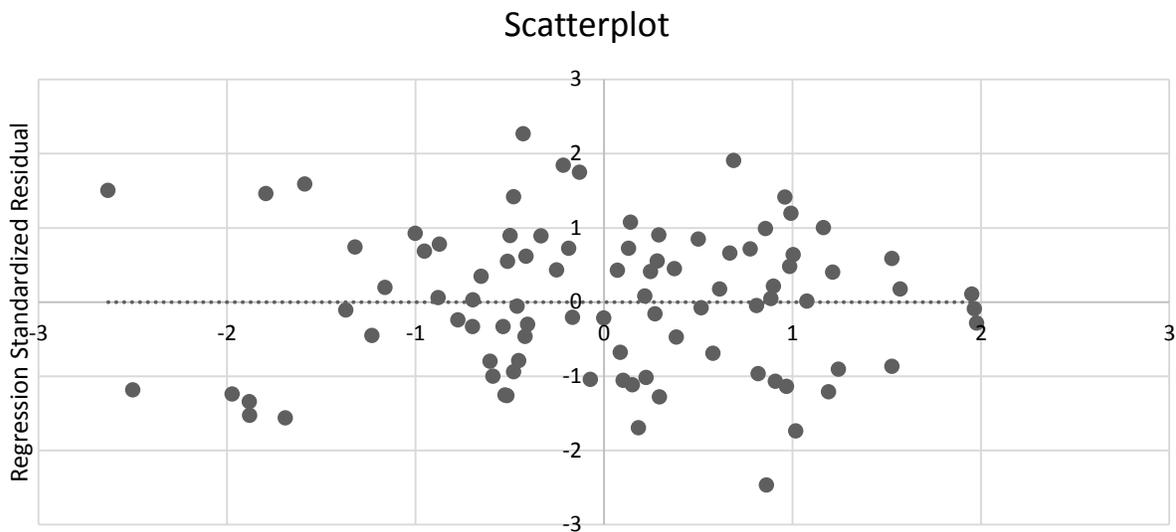


Figure 7. Scatterplot of Regression Standardized Residual and Predicted Value

**Linearity.** Linearity was assessed using the scatterplot of regression standardized residual and predicted value plot in Figure 7. The examination of residual plots revealed evidence of a linear relationship as suggested by the appearance of randomly distributed points (Osborne & Waters, 2002). Evaluation of each IV with the DV revealed evidence of a linear relationship.



Figure 8. Plot of Regression Standardized Residual.

**Normality.** The dependent variable (TotalIncInn) distribution was significant according to the Kolmogorov-Smirnov test,  $D(90) = .06, p = .2$ . Additionally, TotOKD,  $D(90) = .07, p = .2$ , and TotEM,  $D(90) = .09, p > .05$ , followed normal distribution. Since  $p$  was greater than .05, it is believed that the variable followed a normal distribution. However, LOC,  $D(90) = .1, p = .045$ , was just below the accepted threshold of .05. The Kolmogorov-Smirnov test indicated that the reaction times on LOC and TotIPIT,  $D(90) = .11, p < .05$ , did not follow a normal distribution as indicated in Table 18. The normal probability plot result suggests evidence that the residuals were normally distributed. The residuals and predicted dependent value scores should be a straight-line relationship (Tabachnick & Fidell, 2019) (See Figure 8).

Table 18

*Tests of Normality*

Variable	Kolmogorov-Smirnov <sup>a</sup>		
	Statistic	df	Sig.
TotalIncInn	0.064	90	.200*
TotOKD	0.074	90	.200*
TotIPIT	0.111	90	0.008
TotEM	0.087	90	0.087
TotLOC	0.095	90	0.045

Note. \* This is a lower bound of the true significance. a. Lilliefors Significance Correction.

**Outlier bias.** Outlier analysis was conducted and determined to not adversely impact the regression model. One respondent was removed after determining the answers appeared to be disengaged. Cook's distance analysis within SPSS was reviewed and determined to confirm that there were no outliers adversely impacting the model. All values determined by Cook's distance were well below 1. Additionally, there were no standard residuals more than 3.3 or less than -3.3, which suggested there were no outliers (Tabachnick & Fidell, 2019).

### **Preliminary Statistical Analysis**

The preliminary statistical analysis included a review of the correlations. As Table 19 illustrates, each IV and moderator demonstrates a valid positive correlation with II. The correlations ranged from as low as .313 for LOC (internal) ( $r = 0.313$ ,  $N = 90$ ,  $p < .05$ ). Organizational knowledge diffusion possessed the strongest correlation with II ( $r = 0.712$ ,  $N = 90$ ,  $p < 0.001$ ). (See results for individual hypothesis details.)

Table 19

*Correlations (N = 90)*

		TotalIncInn	CITrain59	TotIPIT	TotOKD	TotEM	TotLOC
Pearson Correlation	TotalIncInn	1.000	0.423***	0.509***	0.712***	0.459***	0.313**
	CITrain59	0.423***	1.000	0.262**	0.456***	0.169	0.293**
	TotIPIT	0.509***	0.262**	1.000	0.628***	0.293***	-0.005
	TotOKD	0.712***	0.456***	0.628***	1.000	0.368***	0.198*
	TotEM	0.459***	0.169	0.293**	0.368***	1.000	0.386***
	TotLOC	0.313**	0.293**	-0.005	0.198*	0.386***	1.000

Note. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

### Measuring the variables.

**Organizational knowledge diffusion.** Organizational knowledge diffusion was measured utilizing 13 questions that stemmed from a previous study measuring knowledge sharing (Saenz et al., 2009). The OKD construct was developed utilizing three main knowledge sharing factors within an organization: (a) day-to-day management processes, (b) IT-based knowledge sharing, and (c) people-focused knowledge sharing. Most of the respondents (approximately 60–80%) either agreed (“moderately accurate”) or strongly agreed (“very accurate”) with the statements regarding knowledge sharing factors. Under a Likert scale, this was represented by either a “4” or “5” score, respectively (see Table 20).

**Individual propensity to use information technology.** Similar to OKD, the statements that measured IPIT stemmed from previous research on knowledge sharing (Saenz et al., 2009). The IT questions were reframed to reflect personal usage of IT tools that may be available for middle manager use. Most of the responses from the five statements that made up the construct were either scored as a “4” or “5” category signifying agreement (“moderately accurate”) or strong agreement (“very accurate”), respectively, with the statement (see Table 21).

Table 20

*Survey Questions Measuring OKD*

Survey Question	Mean	SD
1. My organization's strategy formulation process allows employees to offer a wide variety of contributions and/or viewpoints.	3.7	1.0
2. My organization promotes meetings for reflection, viewpoint exchange, and/or subsequent adoption of policy/strategy actions.	3.4	1.2
3. My organization promotes the incorporation of external agents' (e.g., customers and suppliers) thoughts and/or viewpoints in management processes.	3.5	1.2
4. My organization promotes the use of e-mail to communicate information and/or knowledge.	4.4	.91
5. My organization promotes the use of online discussion forums and/or blogs.	3.0	1.4
6. My organization promotes the use of intranet/extranet.	4.1	1.1
7. My organization promotes the use of groupware tools (e.g., electronic meetings and collective writing tools).	3.8	1.2
8. My organization promotes the use of online knowledge repositories (i.e., store knowledge-based information).	3.8	1.2
9. My organization promotes the use of storytelling and/or lessons learned to diffuse or share best practices.	3.2	1.4
10. My organization promotes the use of coaching and/or mentoring.	3.6	1.3
11. My organization promotes the use of employee functional rotation to different areas or departments.	3.0	1.6
12. My organization promotes external professional development opportunities (i.e., travel to sites or training events).	3.6	1.4
13. My organization promotes the use of meetings on lessons learned and/or workshops in order to promote reflection as well as knowledge and experience sharing with external agents (e.g., customers and suppliers).	3.3	1.5

Table 21

*Survey Questions Measuring IPIT*

Survey Question	Mean	SD
25. I use e-mail to communicate information and/or knowledge often.	4.7	.69
26. I use online discussion forums and/or blogs often.	2.6	1.3
27. I use intranet/extranet to promote knowledge exchange.	3.8	1.2
28. I use groupware tools (e.g., electronic meetings and collective writing tools) extensively.	3.7	1.2
29. I use online knowledge repositories (i.e., store knowledge-based information, document management systems, and cloud-based data management systems) often.	3.8	1.2

***Locus of control.*** Locus of control survey questions were taken from Griffin et al. (2017). The seven questions were designed to measure, through a Likert scale, an individual's LOC. The Likert scores "4" and "5" represented agreement ("moderately accurate") and strong

agreement (“very accurate”), respectively, with statements regarding LOC. The higher number represented responses that were consistent with internal LOC. (See Table 22 for results.)

Table 22

*Survey Questions Measuring LOC*

Survey Question	Mean	SD
46. On most jobs, people can pretty much accomplish whatever they set out to accomplish.	3.8	.89
47. Getting the job you want is mostly a matter of luck (reverse coded).*	2.2	.99
48. Making money is primarily a matter of good fortune (reverse coded).*	2.4	1.1
49. Most people are capable of doing their jobs well if they make the effort.	4.2	.68
50. Promotions are usually a matter of good fortune (reverse coded).*	2.4	1.1
51. People who perform their jobs well generally get rewarded for it.	3.7	.97
52. Most employees have more influence on their supervisors than they think they do.	3.8	.86

*Note.* \*Responses were reversed in SPSS to ensure internal locus of control was consistently measured.

**Emotional intelligence.** Emotional intelligence was measured utilizing a previously validated survey. The WLEIS scale distinguishes emotions from the Big Five personality model (Law et al., 2004). The questions measured four EI abilities: (a) appraisal and expression of emotions within oneself, (b) appraisal and recognition of emotion in others, (c) regulation of emotions in oneself, and (d) use of emotions to facilitate performance. As with the previous predictors, a score of “1” represented “very inaccurate,” while “5” represented “very accurate” (see Table 23).

**Incremental innovation.** As previously mentioned, the measure for II was determined from 11 Likert style questions. Six of the questions originated from a Delphi panel of five experts (see Figure 6). The remaining five questions originated from a review of the literature. The data from the 11 questions were combined to present one composite score for analysis. A score of “1” represented “very inaccurate,” while “5” represented “very accurate.” (See Table 24 for results.)

Table 23

*Survey Questions Measuring EI*

Survey Question	Mean	SD
30. I always know my friends' emotions based on their behavior.	4.0	.74
31. I am a good observer of others' emotions.	4.3	.62
32. I am sensitive to the feelings and emotions of others.	4.2	.79
33. I have a good understanding of the emotions of people around me.	4.2	.59
34. I always set goals for myself and then try my best to achieve them.	4.5	.69
35. I always tell myself that I am a competent person.	4.2	.88
36. I am a self-motivating person.	4.5	.62
37. I always encourage myself to try my best.	4.6	.57
38. I am able to control my temper so that I can handle difficult situations rationally.	4.3	.77
39. I am quite capable of controlling my own emotions.	4.2	.70
40. I can always calm down quickly when I am very angry.	4.0	.97
41. I have good control of my own emotions.	4.3	.68
42. I always know whether or not I am happy.	4.5	.71
43. I really understand what I feel.	4.3	.76
44. I have a good understanding of my own emotions.	4.4	.73
45. I have a good sense of why I have certain feelings most of the time.	4.4	.68

Table 24

*Survey Questions Measuring II*

Survey Question	Mean	SD
14. Our product or service constantly expands and/or improves.	3.8	1.0
15. The improvements we make to operations have prevented the reoccurrence of problems.	3.5	1.1
16. We demonstrate success by meeting and/or exceeding established goals.	4.0	.98
17. We employ proactive autonomous workgroups to solve problems.	3.5	1.1
18. We demonstrate improvement through established metrics	3.8	1.2
19. We continuously eliminate wasteful or superfluous operations.	3.1	1.3
20. All employees contribute to continuous improvements.	3.4	1.1
21. We are able to win new contracts or business through customer driven modifications.	3.5	.90
22. Our policies and/or procedures are updated regularly.	3.6	1.2
23. We have experienced decreased client complaints and/or increased client satisfaction.	3.5	.95
24. Employee morale/satisfaction improves as involvement in continuous improvement activities increases.	3.5	1.1

## Results of Hierarchical Multiple Regression

### Restatement of the research questions.

RQ1. What are the roles of OKD, EI, and LOC in facilitating II among MM?

RQ2. Do CIT and IPIT moderate the relationship between OKD and II?

**Hypotheses.** Six hypotheses were tested using the data obtained. Hypotheses 1, 4, 5, and 6 were supported by the data and determined to be statistically significant (see Table 33).

Hypotheses 1, 5, and 6 were statistically significant within the HRM. Several controls or confounding variables were run in the multiple regression analysis initially. These controls included demographic data such as respondent generation, years within the company, and gender. Company size was also included. The results of running the controls with the DV revealed non-significant data. There does not appear to be statistically significant correlations between the controls and the DV ( $F(4,82) = 2.01, p = .101$ ). (See Table 26.)

Table 25

### Summary of Hypotheses

No.	Hypothesis	Inferential Statistical Testing	Variables	Survey Source
1	Organizational knowledge diffusion (OKD) has a positive influence on II among MM	HMR	OKD and II	See Table 5
2	Individual propensity to use IT moderates the relationship between OKD and II among MM	HMR	IPIT, OKD, and II	See Table 5
3	Training moderates the relationship between OKD and II among MM	HMR	OKD and II	See Table 5
4	Locus of Control (LOC) positively influences II among MM	HMR	LOC and II	See Table 5
5	Emotional intelligence (EI) has a positive influence on II among MM	HMR	EI and II	See Table 5
6	Organizational knowledge diffusion (OKD) has the strongest impact on II	HMR	OKD and II	See Table 5

Table 26

*Summary of Controls*

<i>R</i>	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	Std Error	<i>R</i> <sup>2</sup> Change	<i>F</i> Change	<i>Df</i> 1	<i>Df</i> 1	Sig <i>F</i> Change
.298	.089	.045	8.11	.089	2.005	4	82	.101

Four models were used to evaluate the research questions. The first model contained only the LOC variable. The second model contained LOC and EI variables. The third model added only OKD or the organizational variable. Individual propensity to use IT and level of continuous improvement raining (CITrain59) were used in the fourth model for information only. The two moderator variables were added to represent a conservative approach across the model.

Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, extreme outliers, and homoscedasticity. Correlations were evaluated within the predictor variables (LOC, EM, OKD, IPIT, and CITrain59; see Table 19).

Correlations were weak to moderate, ranging between  $r = .198, p < .05$  and  $r = .628, p < .001$ , indicating multicollinearity was unlikely to be a problem (Tabachnick & Fidell, 2019). All predictor variables were statistically correlated with II, suggesting the IV were sufficiently correlated with the DV. This information proved to be sufficient for hierarchical regression calculation. The correlations between the predictors and DV were moderately weak to moderately strong, ranging from  $r = .313, p = .001$  to  $r = .712, p < .001$ . (See Table 19 for details.)

The first step of the hierarchical regression (Model 1) included LOC as the predictor. This model was statistically significant  $F(1, 88) = 9.569; p < .05$  and explained 10% of the variance of II. In the second step (Model 2), EI made a significant unique contribution with an additional 13.4% ( $R^2$  Change = .134;  $F(1, 87) = 15.202; p < .001$ ) of variance explained in the

dependent variable. The entire model was also significant as reported in the ANOVA results ( $F(2,87) = 13.16; p < .001$ ). Organizational knowledge diffusion was added in the third model for a total of 33% explained ( $R^2 \text{ Change} = .331; F(1, 86) = 65.134; p < .001$ ). Organizational knowledge diffusion also represented the highest individual contribution according to the parameter estimates ( $\beta = .620, N = 90, p < .001$ ). In the third model, emotional intelligence remained valid as well and returned the second highest individual contribution ( $\beta = .184, N = 90, p < .05$ ). The fourth model, containing IPIT use and CIT, did not add any measurable valid predictive power while holding the other variables constant ( $F(2, 84) = 1.490; p = .231$ ). It must be noted, however that the T statistic for OKD was reduced at the presence of these two moderators. This fourth model was run for information only and not intended to obtain scientifically valid data. See Table 27 for details on the HMR.

The ANOVA model (Table 28) indicated each of the four models was a statistically significant predictor of II. Model 1,  $F(1,88) = 9.57, p < .05$ , indicated that the model containing only LOC was valid. Model 2,  $F(2,87) = 13.16, p < .001$ , indicated that the model was still significant after adding the other personality measure, EI. Model 3,  $F(3,86) = 36.95, p < .001$ , was significant after OKD was added. Finally, Model 4,  $F(5,84) = 23.02, p < .001$ , was significant even after adding the two modifiers (CITrain59 and TotIPIT).

**Hypothesis 1.** The first hypothesis sought to understand the relationship between OKD and II among MM. This hypothesis was based on research suggesting knowledge management and knowledge sharing is associated with innovation. As communication increases, the level of knowledge regarding the utilization of capital also increases. Research suggests knowledge sharing activity within an organization supports a foundation of innovation. According to the

results from the survey in this study, OKD positively influences behaviors that support II ( $r = .712, N = 90, p < .001$ ). (See Table 19 for details on correlations.)

Table 27

*Hierarchical Regression Model of Incremental Innovation*

	<i>R</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> Change	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>
Model 1	.313	.098**					
LOC				.616	.199	.313***	3.093
Model 2	.482	.232***	.134				
LOC				.315	.200	.160	1.570
EM				.501	.128	.397***	2.260
Model 3	.750	.563***	.331				
LOC				.234	.152	.119	1.537
EM				.233	.103	.184*	2.260
OKD				.590	.073	.620***	8.071
Model 4	.760	.553	.015				
LOC				.228	.160	.116	1.429
EM				.223	.104	.177*	2.148
OKD				.482	.097	.507***	4.938
CITrain59				.909	.760	.098	1.196
TotIPIT				.246	.201	.114	1.222

Note. \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

Table 28

*ANOVA Model*

ANOVA <sup>a</sup>					
Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>
1	Regression	592.399	1	592.399	9.569 <sup>b**</sup>
	Residual	5448.001	88	61.909	
	Total	6040.400	89		
2	Regression	1402.741	2	701.370	13.157 <sup>c***</sup>
	Residual	4637.659	87	53.306	
	Total	6040.400	89		
3	Regression	3401.430	3	1133.810	36.949 <sup>d***</sup>
	Residual	2638.970	86	30.686	
	Total	6040.400	89		
4	Regression	3491.841	5	698.368	23.018 <sup>e***</sup>
	Residual	2548.559	84	30.340	

Note. <sup>a</sup>Dependent Variable: TotalIncInn; <sup>b</sup>Predictors: (Constant), TotLOC; <sup>c</sup>Predictors: (Constant), TotLOC, TotEM; <sup>d</sup>Predictors: (Constant), TotLOC, TotEM, TotOKD; <sup>e</sup>Predictors: (Constant), TotLOC, TotEM, TotOKD, CITrain59, TotIPIT.

\*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

Table 29

*Coefficients Represented for Each Model*

Model		Unstandardized Coefficients		Standardized Coefficients	<i>t</i>
		<i>B</i>	Std. Error	Beta	
1	(Constant)	22.806	5.364		4.252***
	TotLOC	0.616	0.199	0.313	3.093**
2	(Constant)	-3.652	8.416		-0.434
	TotLOC	0.315	0.200	0.160	1.570
	TotEM	0.501	0.128	0.397	3.899***
3	(Constant)	-10.472	6.441		-1.626
	TotLOC	0.234	0.152	0.119	1.537
	TotEM	0.233	0.103	0.184	2.260*
	TotOKD	0.590	0.073	0.620	8.071***
4	(Constant)	-12.763	6.541		-1.951*
	TotLOC	0.228	0.160	0.116	1.429
	TotEM	0.223	0.104	0.177	2.148*
	TotOKD	0.482	0.097	0.507	4.983***
	TotIPIT	0.246	0.201	0.114	1.222
	CITrain59	0.909	0.760	0.098	1.196

Note. Dependent variable is incremental innovation.

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

Table 30

*Model Summary of Individual Predictor Contribution*

Model Summary <sup>e</sup>										
Model	<i>R</i>	<i>R</i> Square	Adjusted <i>R</i> Square	Std. Error of the Estimate	Change Statistics					
					<i>R</i> Square Change	<i>F</i> Change	<i>df</i> 1	<i>df</i> 2	Sig. <i>F</i> Change	Durbin-Watson
1	.313 <sup>a</sup>	0.098	0.088	7.86823	0.098	9.569	1	88	0.003	2.298
2	.482 <sup>b</sup>	0.232	0.215	7.30113	0.134	15.20	1	87	0.000	2.261
3	.750 <sup>c</sup>	0.563	0.548	5.53947	0.331	65.13	1	86	0.000	2.204
4	.760 <sup>d</sup>	0.578	0.553	5.50818	0.015	1.490	2	84	0.231	2.147

Note. <sup>a</sup>Predictors: (Constant), TotLOC; <sup>b</sup>Predictors: (Constant), TotLOC, TotEM; <sup>c</sup>Predictors: (Constant), TotLOC, TotEM, TotOKD; <sup>d</sup>Predictors: (Constant), TotLOC, TotEM, TotOKD, CITrain59, TotIPIT; <sup>e</sup>Dependent Variable: TotalIncInn.

**Hypothesis 2.** The second hypothesis sought to understand the controlling relationship of IPIT use on OKD and II. To complete the evaluation, an interaction variable was calculated in SPSS and labeled OKD\_IPIT. This variable was calculated by multiplying the values of OKD (TotOKD variable) with that of IPIT (hypothesized moderating variable). A multiple regression analysis was run utilizing the new interaction variable, original TotIPIT, and TotOKD indirect variables with the DV TotalIncInn or II. According to the parameter estimates, there was no measurable impact of the moderator (IPIT) on the relationship between OKD and II (TotalIncInn) ( $\beta = -.016, N = 90, p = .977$ ). (See Table 31.) As previously discussed, a four model hierarchical multiple regression analysis was run for information only. Individual propensity for IT use was run in the fourth model with CIT (CITrain59). The data suggested there was no predictive power of IPIT over OKD, EI, and LOC ( $\beta = .114, N = 90, p = .225$ ).

Table 31

*Coefficients for Individual Propensity for Information Technology*

Model	Coefficients <sup>a</sup>				
	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	6.090	12.699		.480	.633
TotOKD	.623	.298	.655	2.090	.040*
OKD_IPIT	.000	.015	-.016	-.028	.977 <sup>b</sup>
TotIPIT	.242	.700	.113	.346	.730

Note. <sup>a</sup> Dependent Variable: TotalIncInn.

<sup>b</sup>It was determined that centering the values was unnecessary.

\*  $\leq .05$  significance.

**Hypothesis 3.** The third hypothesis sought to understand the relationship of CIT on OKD and II. To complete the evaluation, an interaction variable was calculated in SPSS and labeled

OKD\_CIT. This variable was calculated by multiplying the values of OKD (TotOKD variable) with that of CIT (CITrain59, the hypothesized moderating variable). A multiple regression analysis was run utilizing the new interaction variable, original CITrain59, and TotOKD indirect variables with the DV TotIncInn or II. According to the coefficients chart, there was no measurable impact of the moderator (CIT) on the relationship between OKD and II (TotIncInn) ( $\beta = -.256, N = 90, p = .622$ ). (See Table 32) As with Hypothesis 2, a four-way model hierarchical multiple regression analysis was run. According to the survey results, there was no statistically significant predictive power of CIT over OKD, EI, and LOC ( $\beta = .098, N = 90, p = .235$ ).

Table 32

*Coefficients for Continuous Improvement Training*

		Coefficients <sup>a</sup>				
		Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	Sig.
Model		<i>B</i>	Std. Error	Beta		
1	(Constant)	.316	11.694		.027	.979
	TotOKD	.752	.273	.790	2.756	.007**
	CITrain59	2.642	3.107	.285	.850	.398
	OKD_CITrain59	-.034	.069	-.256	-.494	.622

Note. <sup>a</sup>Dependent Variable: TotalIncInn.

\*\* $\leq .01$  significance.

**Hypothesis 4.** The fourth hypothesis of the study sought to understand the relationship between LOC and II among MM. This hypothesis was based on the premise that LOC is associated with innovativeness, job satisfaction, and high work involvement. Those respondents determined to have a tendency toward internal LOC (Likert answers of 5) may influence behaviors supporting II at their firm. Internal LOC was measured using seven responses to questions from the survey. Likert questions answered either “4” or “5” were determined to be representative of internal LOC. According to the survey results, LOC (internal) influences

behavior that supports II ( $r = .313, N = 90, p < .05$ ). (See Table 19 for correlation details.) Locus of control explains 9% of the variance in II when entered in the first model ( $\beta = .313, N = 90, p < .05$ ) of hierarchical multiple regression. (See Table 27 for details.)

**Hypothesis 5.** The fifth hypothesis sought to understand the relationship between EI and II among MM. This hypothesis was based on research indicating EI can improve social functioning within a company and improve management and employee performance. Emotional intelligence was measured using 16 questions from the questionnaire that had been previously validated. The 16 measures of EI were combined into a single composite score for analysis. According to the survey results, EI influences behavior that supports II ( $r = .459, N = 90, p < .001$ ). Within Model 2 of the HRM, EI positively influenced II within MM ( $\beta = .397, N = 90, p < .001$ ). According to the parameter estimates, for every increase by one unit of EI, II increases by 0.501. Additionally, EI adds 13.4% explanatory power over internal LOC to the variance of II (see Table 27).

**Hypothesis 6.** The third model of the HRM, which included both personality indicators as well as OKD, accounted for over half of the variance in II ( $R^2 = .56$ ), which was highly significant contribution ( $F(1,86) = 65.134, p < .001$ ). Both OKD ( $\beta = .620, N = 90, p < .001$ ) and EI ( $\beta = .184, N = 90, p < .05$ ) demonstrated significant effects on II. However, the data suggested OKD contributes the most toward II as reported by the change in  $R^2$  for Model 3, which indicated OKD contributed an additional 33% of predictive power to the model. According to the coefficients model, as OKD increases by one unit, there will be a 0.590 increase in II, the DV.

## Summary

This study examined the role of OKD, EI, and LOC in facilitating II among MM. A survey was administered to MM and other SME, within a convenience sample, to evaluate individual variables on II. The information obtained from this study was evaluated against research questions, as stated in Chapter 3. Data eligibility testing was run and deemed satisfactory. Impact of middle manager personality or EI on II was modest, albeit statistically significant. The impact of EI on II was also modest, albeit valid, when holding the other IV constant. The study revealed a strong and significant relationship between OKD and II. This strong relationship was also evident within the model which contained the other variables held constant. A modest relationship was detected between LOC and II. However, this modest relationship was not statistically valid when controlling for the other variables within the model. Finally, the modest impact of the moderators IPIT and CIT were not statistically significant when controlling for the IV. However, the testing of the moderators in the fourth model of the hierarchical multiple regression was for information only. Table 33 summarizes the results of the study.

Table 33

### *Summary of Results*

No.	Hypothesis	Results	Reference
1	Organizational knowledge diffusion (OKD) has a positive influence on incremental innovation (II) among middle managers (MM).	Supported	Table 19
2	Individual propensity to use information technology (IPIT) moderates the relationship between OKD and II among MM.	Not supported	Table 31
3	Training moderates the relationship between OKD and II among MM.	Not supported	Table 32
4	Locus of Control (LOC) positively influences II among MM.	Supported	Table 19
5	Emotional intelligence (EI) has a positive influence on II among MM.	Supported	Table 19

6 Organizational knowledge diffusion has the strongest impact on II.

Supported

Table 27

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## **CHAPTER 5**

### **CONCLUSIONS AND IMPLICATIONS**

#### **Introduction**

This section includes a discussion of the findings as well as the theoretical and practical implications. Six hypotheses, along with the study results, are summarized within the context of middle management. Prior research findings articulated in the literature review section are used to underpin study result findings and articulate additional knowledge depth and perspective to the dynamic role of middle management. The results are compared to findings of other researchers where appropriate. Limitations of the generalizations of the study are pointed out to ensure appropriate comparability to prior studies. Finally, implications of the study are discussed along with recommendations for further research direction. The limitations of the study are followed by unanswered research questions as well as any other points raised during the course of this research.

#### **Summary of the Study**

The study suggests MM play a fundamental role in II. Despite the limitations presented by a convenience sample, the data provide interesting insights on the roles of knowledge management and personality on innovation within a corporation. The data lend support to four of the stated hypotheses within this study. Organizational knowledge diffusion, EI, and LOC support the enabling of II. Organizational knowledge diffusion influences II even from the perspective of middle management. Middle managers' perceptions of OKD influenced II. Emotional intelligence is a better predictor than LOC for II activity. The data also suggest the two proposed moderators, IPIT and CIT, have no predictive powers over and above OKD, EI, and LOC. The data do not provide evidence of moderation by either moderator.

## Discussion

There are several assumptions to fostering the operating environment from which II exists. As previously discussed, upper management must provide a measure of support to lower and mid-level management to encourage innovation (Sethibe & Steyn, 2015). Additionally, provisions for risk should be an essential component of the organization's continuous improvement system (Jones, 2005). Fear of sanctions may limit employee innovation activity and decrease the propensity for risk. Research on corporate entrepreneurialism suggests middle management supports entrepreneurial activity when a supportive and innovative culture is perceived. This support provides the foundation for other factors essential to II.

Incremental innovation is a continuous improvement process that does not exclude members of the organization. Middle management provides the catalyst to activate knowledge sharing tools and practices with other members of the organization. The data suggest MM ascertain the knowledge management components and practices that support innovation. Emotional intelligence can further influence II in conjunction with OKD. Referring to Figure 3 of Chapter 2, personality characteristics such as EI can impact leadership qualities. A leader with EI can have greater insight regarding employee challenges or feelings. Emotional intelligence can support more robust communication. The leader can potentially exercise greater social capital or influence over teams and individual employees with greater EI. As previously discussed, social capital refers to the subjects' connectedness with their organizational environment. Emotional intelligence essentially powers leaders to increase knowledge sharing capacity by enhancing the working environment (Kuratko, 1990). Knowledge sharing activity, in turn, powers II.

## **Organizational Knowledge Diffusion Impacts Incremental Innovation**

Knowledge diffusion resides within the larger context of the knowledge management framework. The knowledge framework consists, in part, of elements such as standard procedures, standard work, learning strategy, IT, and investigation and training systems. Successful knowledge management is a vital component of innovation (Al-Hakim & Hassan, 2011). The middle manager plays a role in successful knowledge management (Al-Hakim & Hassan, 2011). However, there is a lack of insight within the research community regarding the implementation of knowledge management. The study results indicate successful middle management involvement in OKD can support II, which is required for continuous improvement. The support for Hypothesis 1 and lessons from Hypothesis 2 address the lack of insight into knowledge management implementation. Middle managers play a substantive role in knowledge transfer and storage, which is required for knowledge systems implementation.

Knowledge-based assets, together with learning capabilities, contribute to innovativeness (Jantunen, 2005). Knowledge-based assets include activities such as acquiring useful data, information utilization, and promoting knowledge flows (Jantunen, 2005). The study suggests that MM, when supporting knowledge management, influence innovative performance by the company. Middle managers represent the management backbone of the corporation. It is important that they are exposed to and accurately perceive knowledge diffusion activities. The results of the data demonstrate that knowledge diffusion, as perceived by the MM, influences II. The data also suggest middle managers' use of IT influences II.

The study also highlighted middle management's role in utilizing external knowledge. The corporation's ability to recognize and exploit the value of external information can determine innovative capabilities (Cohen & Levinthal, 1990). The level of innovative capability

increases as absorptive capacity increases (Cohen & Levinthal, 1990). The study findings suggest exploiting knowledge by MM increases innovative capabilities. The study results offer additional insight into knowledge management. Middle managers, through the utilization of knowledge diffusion, are highly involved in the selection and exploiting of the external knowledge, as suggested by the support for Hypothesis 1.

As MM diffuse knowledge within the company, they actively manage intellectual capital, which influences innovative capacity. This insight is based on Subramaniam and Youndt's (2005) conclusion that intellectual capital influences II capabilities. Specifically, the interrelationships between human, organizational, and social capital have a positive influence on II (Subramaniam & Youndt, 2005). Organizational capital is a function of the organization's ability to store knowledge. Knowledge can be managed in a myriad of systems within a mature organization. Social capital is a function of the organization's ability to share knowledge between networks, customers, and employees. The data suggest MM play a substantive role in innovation performance as they diffuse knowledge or intellectual capital. Furthermore, awareness of knowledge sharing tools and practices can help MM to influence II. Middle managers can also impact II by exploiting and enhancing networks designed for knowledge exchange. For example, the manager may be aware of several investigative or communication tools that can assist a group with a problem. As the group utilizes the tool, continuous improvement occurs.

Internal knowledge transfer or OKD is impacted by causal ambiguity and arduous relationships between the knowledge source and recipient (Szulanski, 1996). Causal ambiguity is used to describe poorly understood features of the new context from which the new knowledge is applied. Replicating a capability in a new setting or environment may be problematic as the

capability is poorly understood in its original settings. The results from the study suggest MM influence the overall success of transferring knowledge and successful implementation. Additionally, successful transfer of knowledge is at least partly dependent on employee familiarity with the context in which knowledge is applied. As suggested by the survey results, MM are aware of the context in which knowledge resides. For example, the survey contained questions regarding understanding knowledge repositories and groupware tools. Groupware is a term used to describe software systems designed to help people collaborate. Frequent contact with functional groups can help managers understand the capability in the original setting and ensure that it is applied appropriately in a future setting. When knowledge is successfully transferred, II is realized. Emotional intelligence, or Hypothesis 5, may provide additional insight into addressing the impact of arduous relationships.

Middle managers who enable the transfer of knowledge contribute to the corporation's profitability or success within the market. Diffusion of knowledge facilitated by MM increases the propensity of innovative capabilities within the firm. Specifically, the study demonstrates a substantive role of the MM in a firm's continuous improvement cycle by ensuring knowledge is appropriately applied to II activity and strengthening competitive advantage. Organizational knowledge diffusion, as perceived by MM, adds considerable predictive power over EI and provides the most influence on II.

### **Individual Propensity for Information Technology Does Not Moderate the Relationship between OKD and II**

The survey results demonstrated middle managers' IPIT is positively related to II. Middle managers' propensity to use IT contributes to knowledge sharing which, in turn, contributes to potential for II. As middle managers use IT, propensity for II increases. As a moderator, IPIT

was based on research that people's propensity to use IT varies within organizations. Given the education level and experience of the survey respondents, no additional influence on II was detected. Most MM appear to be comfortable with technology usage. In addition, data indicate an overwhelming majority of the MM surveyed were in either Generation X or the Millennial generation, suggesting a robust level of experience with technology.

### **Continuous Improvement Training Does Not Moderate the Relationship Between OKD and II**

The survey results demonstrated middle managers' CIT is positively related to II. The data suggest that more CIT can influence II. However, half of the MM surveyed had been working as a manager for over 10 years. The training they received over their careers more than likely offset any additional CIT that may impact propensity for II. Continuous improvement training, as a moderator for OKD among MM, may not impact the level of II as measured in this study.

### **Locus of Control Positively Influences Incremental Innovation**

The data suggest a positive relationship between internal LOC and II. The research indicates people with internal LOC tend to be more persistent, resilient, and face challenges as presented (Bulmash, 2016). Innovation is a discipline that requires adherence to strategy and team focus. Innovation results from continuous process changes or enhancements to remain competitive (Lindberg & Berger, 1997). The hypothesis was proposed to evaluate the apparent relationship between internal LOC and II. The results of the survey did not produce evidence of a strong correlation between LOC and II. According to the Pearson correlation reported in Chapter 4, there was a moderate positive correlation between LOC and II. However, when tested in the

hierarchical multiple regression analysis, LOC did not offer valid predictive power when combined with EI and OKD.

### **Emotional Intelligence Positively Influences Incremental Innovation**

As previously discussed, OKD is impacted by causal ambiguity and arduous relationships between the knowledge source and recipient (Szulanski, 1996). Emotional intelligence can prevent such relationships (Salovey & Mayer, 1990). The literature suggests that a person with high EI is associated with influencing relationships within a firm (Altindag & Kosedagi, 2015; Suliman & Al-Shaikh, 2007). High EI positively impacts employee performance, improves team interactions, and enhances innovative culture (Altindag & Kosedagi, 2015; Tsakalerou, 2016). Tsakalerou (2016) also indicated EI facilitates management of intellectual capital. The data in this study suggest MM with high EI can improve team interactions and enhance the ability to innovate. Middle managers with high EI may effectively manage intellectual capital, previously discussed within the context of knowledge diffusion, to enhance the ability to innovate.

According to the research, integrating and compromising styles of conflict management positively moderate the relationship between EI and innovation (Zhang et al., 2015). Middle managers, who often are involved in brokering relationships between employees or between upper and lower management, are exposed to conflicts on a regular basis. The results of this study suggest that MM EI, when placed into operation to address conflict, can positively influence OKD and II. Emotional intelligence, as suggested by the data of this empirical study, may be a more robust measure than internal LOC in predicting II within an organization.

### **Limitations**

As discussed, this study was limited to a convenience sample of colleagues within my professional network. This limitation suggests there was little, if any, control over participating

industry. A sampling from one large company or established industry may provide insight into participant characteristics. For example, a sampling from a pharmaceutical company may provide managers with similar backgrounds in the science fields. This information may lend insight into II within one company culture. The knowledge gained utilizing one company may be limited to a single culture. The convenience sample scenario may suggest that the results herein can be applied to multiple cultures or industries. However, as the data were encrypted, it is uncertain the degree to which industries apply or are represented in the data.

The data represent information from employees who self-assessed. There is a possibility social desirability bias impacted the data. For example, it was not possible to determine whether people underreported undesirable information. Additionally, employees may have over-reported training and experience.

Cross-sectional data, such as the information reported in this study, is taken at the same point in time. This data should not be interpreted as causal or taken from different points in time. These data provide a snapshot of information from self-reported survey questions.

The II variable was largely developed utilizing industry experts in the science field. The Delphi technique was adopted as an anonymous group communication process to provide a clearer focus of II and how it operates within the context of an organization. The panel represented several years of experience ranging from government contracts to commercial enterprises. The advantages of the Delphi technique extend beyond access to seasoned professionals. The panel yielded meaningful and diverse points of view that contributed to a robust definition of II. Panel member anonymity was designed to address group-think or conformity. In addition, the Delphi panel was limited to only three rounds of discussions. Too many rounds of analysis can result in respondent fatigue (Saha et al., 2014). The extent to which

panel members offered unique insight remains uncertain. Retaining panel members for this study was problematic. The limited number of panel members may have impacted the robustness of the definition of II. Furthermore, a separate Delphi panel that contained experts from other industries may develop a separate definition which would have modified the II survey questions.

Locus of control was measured utilizing selected questions from a tool designed to measure employee internal LOC. The measure was limited to a few key questions from the original survey to ensure the survey would not take too much time to administer. Reducing the number of survey questions may have impacted the evaluation and measure of the intended construct.

The survey produced 90 valid responses after eliminating responses deemed incomplete or invalid. Ninety respondents represent the minimum number needed to meet an assumption of multiple regression analysis when five variables are used (Tabachnick & Fidell, 2019). Although the requirement for sample size was met, a higher response rate could have positively impacted several assumptions for multiple regression.

### **Practical Implications**

Middle managers should apply their skill sets to enhance knowledge management and build communication channels between functional groups. Since middle managers are highly involved in policy and procedure construction, companies have the potential to strengthen their competitive position substantially. Manager personality plays a substantive role in the continuous improvement process as well. The findings of this study may impact several aspects of an organization and improve the competitive positioning.

## **Upper Management Support**

There is evidence of MM involvement in knowledge sharing activity which contributes to II. This activity can strengthen a company's competitive advantage. The organization should further encourage MM involvement in knowledge sharing by utilizing company resources. Company policy should contain provisions for IT use and subsequent training. However, there should be upper management encouragement and support for extensive use of IT tools. Information technology can be leveraged to increase the flow of knowledge. Knowledge sharing practices should also be promoted. For example, resources can be diverted toward continuous improvement activity, which is done within a supportive team environment. Upper management can also encourage increased communications between company sites. Furthermore, trade shows or industry symposiums can provide useful knowledge that is leveraged within the organization. Middle managers should continue to take advantage of the resources and technology afforded by the organization's IT department.

## **Enhance Knowledge Infrastructure**

Company resources can enable managers (and others) to move information across functional or organizational boundaries. It may not be enough to hire and train experts to impact innovative activity. The collective skills of experts tend not to form naturally or establish a knowledge sharing infrastructure (Senge, 1999). The employees should share and develop knowledge collectively. Otherwise, intellectual silos form and knowledge will be channeled to one function of the company. This condition can influence unproductive activities that may result in duplication of effort. Supplying resources to employees only makes up part of the infrastructure required to build and transfer knowledge (Senge, 1999). Middle managers, as suggested by this study, have access to these systems or resources designed to handle knowledge

and therefore play a role in the knowledge infrastructure. For example, employees document lessons learned or maintain a repository that can help establish relevant policy to support the knowledge infrastructure. To further develop an organization's knowledge management infrastructure, effort should be made to support system-wide inquiry into the gaps or opportunities that oftentimes hamper continuous improvement activity. Middle managers are positioned well to play a key role in addressing organizational disparity as they work directly with line and upper management and may be privy to frequent conflicts. Knowledge can increase or emerge from the organization by sensemaking of competing points of view (Senge, et al., 1999). As Hope (2004) highlighted, MM sensemaking or interpretation can influence knowledge sharing. As the infrastructure develops, critical discussions can expand and transfer knowledge to other functions. It is important that knowledge extends beyond the confines of a database. Knowledge must be integrated within the organization. This can be done through the continued use of project teams or networking with other organizations. Middle managers are encouraged to organize project teams to promote knowledge exchange on a regular basis and not just for special cases.

### **Information Technology Investment**

The data suggest managers who utilize IT tools extensively can influence II. This supports IT tool involvement in the knowledge sharing infrastructure. Continued investment into IT can enhance the knowledge management capabilities of an organization. Information technology does not solely provide access to capable databases for knowledge storage. Investment in IT systems should involve integration solutions that can support knowledge diffusion and further leverage the support generated by middle management.

There are management systems in place that serve one or a few organizational functions. These systems are routinely updated and maintained to increase usability and speed. However, there may be several systems operated by one organization that are not compatible. Data entered into one system does not impact the data in other systems. This can create unnecessary administrative time by requiring duplicative data entry. Increased administrative action can create confusion and divert valuable resources. For example, a manager may have to utilize two or more systems to find data regarding a shipping order. One database may contain the cost of the order while the other database contains specific time taken to complete the shipping order. Information from one database can be combined with another to generate useful knowledge for future operations. As these systems are not integrated, time resources are spent extracting and recoding the data to interpret information. The condition of IT resources impacts the company's knowledge management particularly in the pharmaceutical industry.

Lack of adequate IT can hinder the FDA's ability to compare quality and risk within the industry (Yu et al., 2019). The integration of IT and knowledge management systems is complex and has negatively impacted compliance to regulations specifically within the pharmaceutical industry (Wilcock, 2006). There is currently a challenge within IT to manage knowledge and drug manufacturing efforts (Yu et al., 2019). The FDA is currently making efforts to enhance knowledge management by implementing new pharmaceutical quality IT applications. Enhanced IT solutions will help pharmaceutical companies manage knowledge through the lifecycle of the new drug (Yu et al., 2019). Information technology usability and efficiency remains unsatisfactory and has caused errors that impact patient health (Ratwani, Reider, & Singh, 2019). Information technology's ability to handle information represents a deficit of adequate knowledge management. As MM use IT tools to influence innovation, time resources may not be

utilized effectively. The aforementioned example illustrates the complexity of managing two or more systems to acquire knowledge. As the data from this research suggest, MM utilize IT tools that result in continuous improvement. Investment in IT solutions can further leverage middle managers' proclivity to technology and supplement sustainable II.

### **The Importance of Emotional Intelligence**

The study demonstrated the potential impact of EI on II. Middle manager EI influences II. Emotional intelligence can provide additional resilience to challenges and help managers handle customers and employees more effectively (Humphrey, 2013). Emotional intelligence, as suggested by the literature, matters with respect to teamwork performance and other face-to-face interactions. The data suggest II is influenced by middle manager EI and can enhance the knowledge sharing capacity accordingly. The existing literature, combined with the data in this study, may provide incentive for EI training and/or increased awareness. It may also impact the hiring practices of an organization. Several indicators of EI can be incorporated into the interviewing process to take compatible personality into consideration. This enhancement can help to ensure future MM with adequate EI are positioned well for company success.

### **Robust Continuous Improvement Policy**

Organizations should review their continuous improvement policy. Management should clearly outline goals and identify activity that can stimulate innovation. Quality improvement teams can be activated on a regular basis to solve emergent problems or procedural gaps. Teams are assembled regularly to ensure any latent or implicit knowledge is activated and used toward innovative goals. Encouraging employee communication can help knowledge sharing activity which can influence II. Rigor in the pursuit of continuous improvement can be enforced or

incentivized by establishing a quota for innovative idea implementation. Middle managers can provide oversight to continuous improvement activities and policy enforcement.

Employee communication is also important for ensuring management has accurate and updated information from which to make important decisions. Communication and relationship building skills are vital for sustaining innovation (Kanter, 2013). If employees find communication problematic, upper management may not receive pertinent information that can impact operations. Inaccurate or misleading information can be devastating and hamper the continuous improvement efforts. Executive-level managers are less likely to receive accurate company information as pertinent facts may be ignored or removed from reporting mechanisms (Charan & Useem, 2002). Organizational knowledge diffusion, supported by middle management, can enhance communication channels and help upper management receive accurate information.

### **Theoretical Implications and Future Research Opportunities**

Emotional intelligence has not been as extensively researched as LOC. This study adds knowledge to the literature regarding middle manager EI. The data suggest EI can predict II. Emotional intelligence can also add predictive powers in conjunction with OKD. Locus of control, when used in conjunction with EI, may not possess predictive value. As previously mentioned, internal LOC is associated with higher job satisfaction, organizational commitment, and personal life balance. According to the literature, internal LOC is also connected with strong self-efficacy. The study results suggest personal commitment to the organization and well-being, as measured by the LOC survey questions, only modestly impact II. The literature indicates internal LOC can represent several personality factors. It is not clear from the results of this study which combination of factors defining internal LOC influence II. Further research should

analyze one or several personality factors or characteristics of internal LOC and II within the context of middle management.

Demographics play little if any role in II. The respondents demonstrated considerable diversification. There is no sufficient evidence that demographics such as gender or race played a role in influencing II. Furthermore, the measure for EI was demonstrated to be valid under multiple demographics. This information, combined with the results of this study, suggest EI was measured robustly without extensive influence from demographics.

Training and experience can prepare MM for supporting knowledge management activities designed to influence II. However, pointing out specific training as having predictive power for II may not be feasible given the advanced level of the respondents' experience. The findings suggest the MM had abundant experience that adequately substituted for specific CIT.

As OKD and EI each influence II, a procedure or value chain should be identified to clearly articulate employee and resource involvement and to convey connections with continuous improvement activity. According to the data, knowledge sharing influences II. This evidence suggests there is an operational link between both variables (OKD and II). A value chain, which is a management tool connecting knowledge resources with innovation, can illustrate how employees contribute (inputs) to the continuous improvement process and ensure appropriate procedures are implemented. Innovation efforts should be linked between employees from various parts of the business (Kanter, 2013). Innovation needs connections and people who can help to establish connections. Connections can help cut across current boundaries and combine technologies to form new ideas (Kanter, 2013). The operational aspects of sharing knowledge and innovation are not fully understood. However, establishing a value chain can clarify ownership and help management enforcement activity. Continued study should include practical

consideration of the operation between knowledge sharing and II. The data in this study suggest MM can influence this relationship between OKD and II. More research should be undertaken to explore other possible moderators such as social capital or propensity for teamwork.

Recent theories on work style, such as addressing work issues alone, have emerged to challenge the productivity experienced from traditional teams (Newport, 2016). Additionally, office configuration or architectural space may influence organizational learning (Sailer, 2014). Both work style and office layout may be areas that researchers might evaluate as moderators to incremental innovation.

The literature states MM are an important component to knowledge creation (Al-Hakim & Hassan, 2011; Janczak, 2004; Nonaka & Takeuchi, 1995). This knowledge can be organized, stored, or shared within the organization's knowledge management systems. The influence on II demonstrated in this study suggests MM also utilize and implement knowledge to make improvement to the organization's systems. The results also suggest MM play an active role in translating policy and strategy from upper management to line management. Nonaka and Takeuchi (1995) highlighted MM operate like knowledge engineers, while line management are knowledge practitioners. Each type of manager utilizes knowledge tools, such as IT resources, to connect with other employees. Managers must also have great communication skills to foster innovation (Kanter, 2013). The potential for employees to leverage new knowledge increases as management increases the level of communication. The potential for II increases as knowledge sharing increases (Saenz et al., 2009). As knowledge is transferred, it can be exploited to assume greater organizational capabilities.

Middle management assumes an important and meaningful part of the continuous improvement process in an organization. An opportunity for future study may include exploring

challenges to exploit implicit knowledge. As knowledge engineers, uncovering additional strategies to help employees contribute to the success of the organization would be beneficial for middle management. Goleman et al. (2001) stated leaders' EI drives performance. Specifically, leaders with a positive disposition and mood help to elicit creativity, honesty, and helpfulness (Goleman et al., 2001). Encouragement to contribute latent or unspoken ideas can be triggered by the manager's EI. This study supports the role of EI in influencing II. As discussed, implicit knowledge is gained primarily through experience and practice (Nonaka & Takeuchi, 1995). This type of knowledge is not readily accessible and must be carefully leveraged. There may be barriers or trust issues in operation that limit the flow of implicit knowledge. The organization may have cultural issues that impact internal knowledge transfer capacity. Further study may reveal other opportunities for middle management to unlock implicit knowledge and enhance internal stickiness.

### **Conclusions**

The data suggest MM add value to an organization by engaging in knowledge sharing activity. Additional value is conveyed by activating EI in conjunction with knowledge sharing activity. This study confirms previous research regarding the positive relationship between II and knowledge sharing. The data from this study adds to the body of knowledge regarding the role and impact of middle management within the context of II. Middle managers serve an important role in establishing and maintaining the organizational infrastructure that supports II. The middle manager operates within a pivotal role between senior leadership and line management. Senior leadership's strategy and policy must be supported and translated for operational use. Line management requires directives to execute standard procedures and allotted resources. Middle managers use previous knowledge to discern the strategy within the context of the working

environment. As action plans are framed and procedures are implemented, MM are engaged in several efforts to engineer knowledge. One such effort involves knowledge management and sharing. The manager must have access to knowledge before it can be shared. The study results suggest MM have access to knowledge by utilizing organizational knowledge management tools (e.g., IT tools). The data also suggest MM are transferring and implementing knowledge-based activities as evidenced by the increase in II. Middle manager EI was further shown to impact II. The study results suggest MM with high EI and knowledge regarding OKD will influence II more than when implemented or applied separately.

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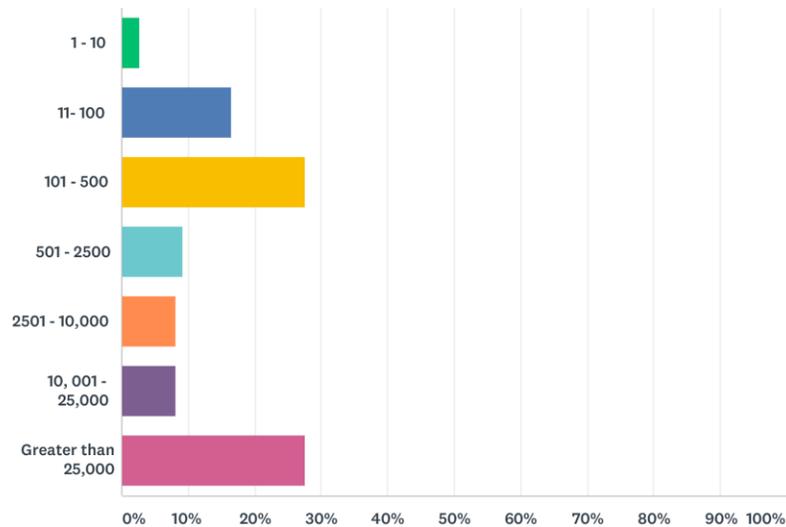
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## APPENDIX A

### SURVEYMONKEY QUESTIONS AND RESULTS– DEMOGRAPHIC AND CONTINUOUS IMPROVEMENT TRAINING

Q53 How large is your organizational size in terms of the number of employees?

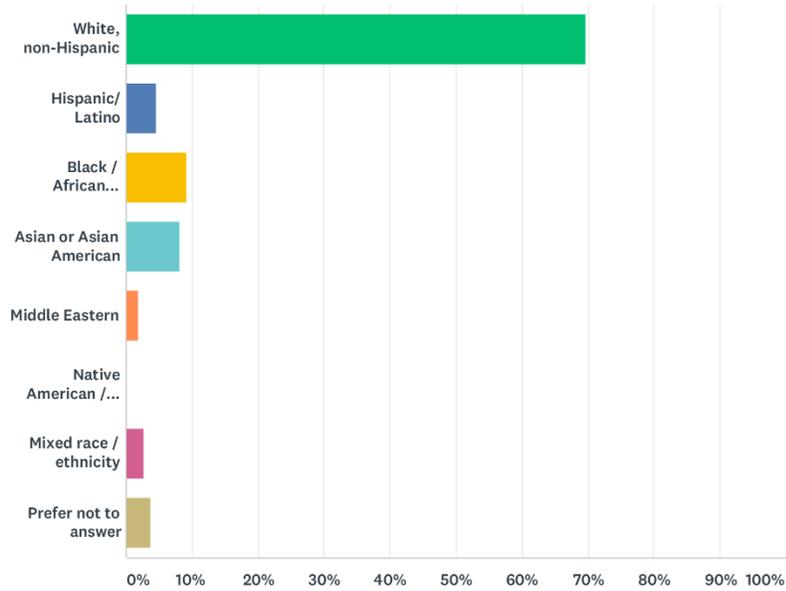
Answered: 109 Skipped: 4



ANSWER CHOICES	RESPONSES	
1 - 10	2.75%	3
11 - 100	16.51%	18
101 - 500	27.52%	30
501 - 2500	9.17%	10
2501 - 10,000	8.26%	9
10,001 - 25,000	8.26%	9
Greater than 25,000	27.52%	30
<b>TOTAL</b>		<b>109</b>

## Q54 Please describe your race or ethnicity for research purposes.

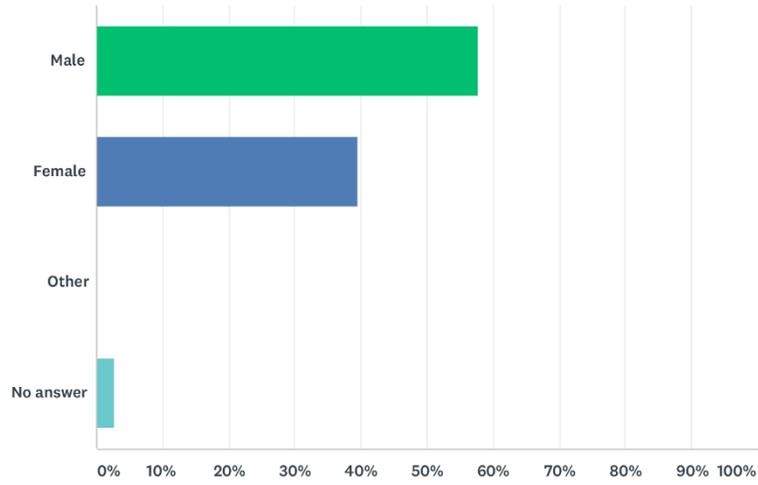
Answered: 109 Skipped: 4



ANSWER CHOICES	RESPONSES	
White, non-Hispanic	69.72%	76
Hispanic/ Latino	4.59%	5
Black / African American	9.17%	10
Asian or Asian American	8.26%	9
Middle Eastern	1.83%	2
Native American / Alaska Native	0.00%	0
Mixed race / ethnicity	2.75%	3
Prefer not to answer	3.67%	4
<b>TOTAL</b>		<b>109</b>

## Q55 What is your sex/gender?

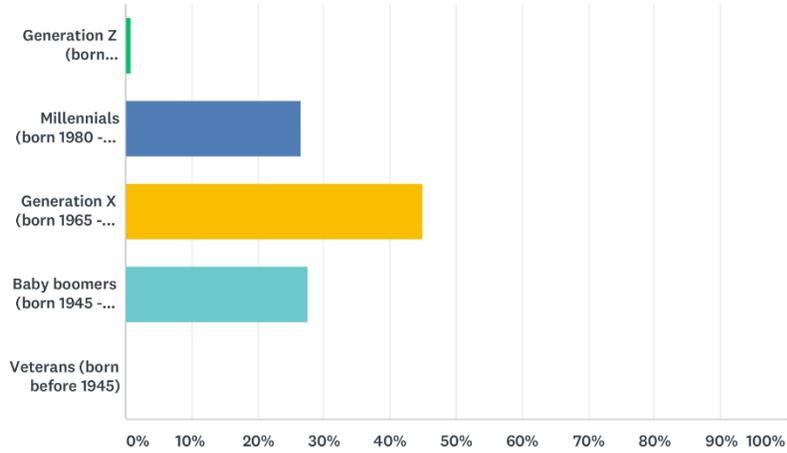
Answered: 109 Skipped: 4



ANSWER CHOICES	RESPONSES	
Male	57.80%	63
Female	39.45%	43
Other	0.00%	0
No answer	2.75%	3
TOTAL		109

### Q56 Please describe your generation/age.

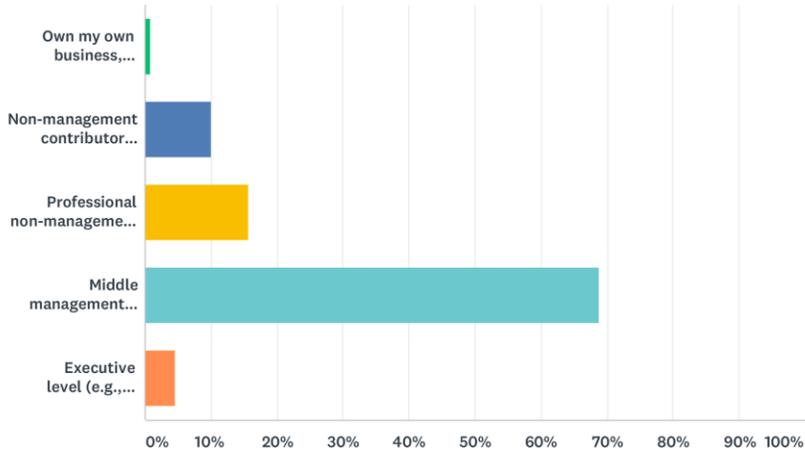
Answered: 109 Skipped: 4



ANSWER CHOICES	RESPONSES
Generation Z (born 1995-2009)	0.92% 1
Millennials (born 1980 - 1994)	26.61% 29
Generation X (born 1965 - 1979)	44.95% 49
Baby boomers (born 1945 - 1964)	27.52% 30
Veterans (born before 1945)	0.00% 0
<b>TOTAL</b>	<b>109</b>

### Q57 Please indicate your job category.

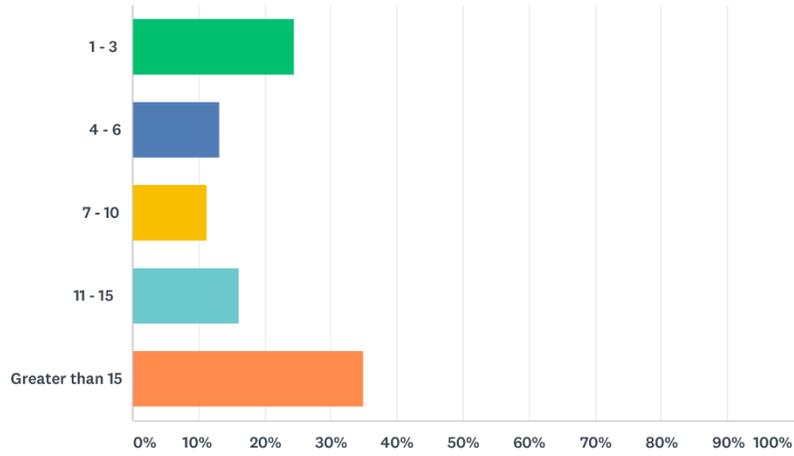
Answered: 109 Skipped: 4



ANSWER CHOICES	RESPONSES	
Own my own business, self-employed, or consultant	0.92%	1
Non-management contributor (e.g., assistant, coordinator, specialist)	10.09%	11
Professional non-management (e.g., writer, artist, SME)	15.60%	17
Middle management (e.g., manager, supervisor, director)	68.81%	75
Executive level (e.g., CEO, CFO)	4.59%	5
<b>TOTAL</b>		<b>109</b>

## Q58 How many years have you served as a manager?

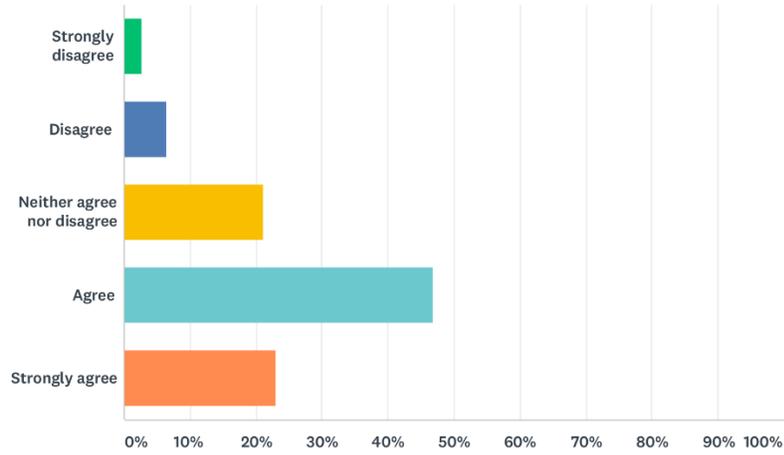
Answered: 106 Skipped: 7



ANSWER CHOICES	RESPONSES	
1 - 3	24.53%	26
4 - 6	13.21%	14
7 - 10	11.32%	12
11 - 15	16.04%	17
Greater than 15	34.91%	37
<b>TOTAL</b>		<b>106</b>

### Q59 My level of training for continuous improvement activities is extensive.

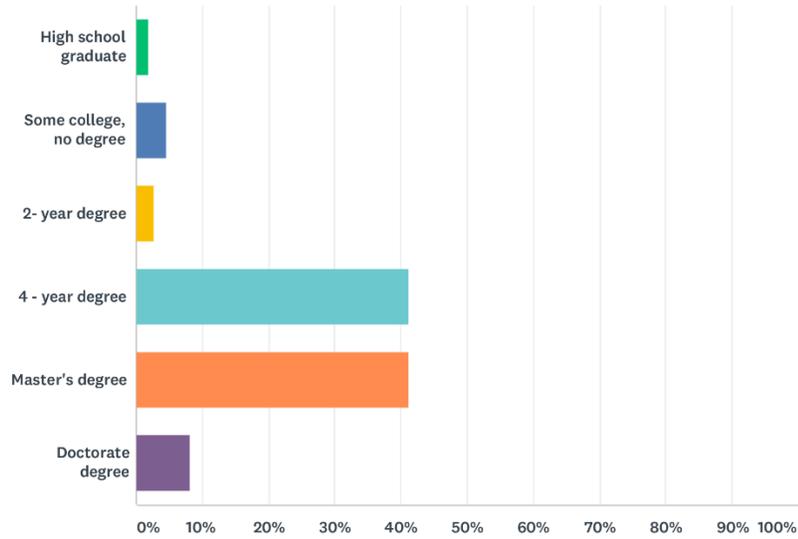
Answered: 109 Skipped: 4



ANSWER CHOICES	RESPONSES	
Strongly disagree	2.75%	3
Disagree	6.42%	7
Neither agree nor disagree	21.10%	23
Agree	46.79%	51
Strongly agree	22.94%	25
<b>TOTAL</b>		<b>109</b>

## Q60 Please indicate your formal educational level.

Answered: 109 Skipped: 4



ANSWER CHOICES	RESPONSES	
High school graduate	1.83%	2
Some college, no degree	4.59%	5
2- year degree	2.75%	3
4 - year degree	41.28%	45
Master's degree	41.28%	45
Doctorate degree	8.26%	9
<b>TOTAL</b>		<b>109</b>

## **APPENDIX B**

### **DELPHI PANEL PROTOCOL**

#### **Introduction**

The Delphi method was used to help generate a workable definition of incremental innovation (II) as it applies to the biotech and service industries. Incremental innovation is a concept not widely used in the biotech industry. Although some authors have cited II in the context of biotechnology (Berndt et al., 2006), a widely held concept has not been uncovered in the literature. General research and evolution of the concept of II has been uncovered in the literature. The research focuses on improvements that are commonly made and less radical. The definition of II can be found as early as 1979 as the “minor improvement or simple adjustments in current technology” (Munson & Pelz, 1979, as cited in Dewar & Dutton, 1986, p. 1422). Incremental innovation is commonly associated with product improvement. However, in the service industry, improvement is not easily uncovered or measured. Resolving customer complaints and the concept of continuous improvement may be central to how II is understood (Audretsch et al., 2011). The concept is widely considered to include incremental improvements that include most employees (Audretsch et al., 2011; Lindberg & Berger, 1997).

#### **Method**

The general research and concept evolution, combined with contributions from an assembled panel of industry experts, were used to generate a workable definition of II. Delphi was used to reach agreement for a workable definition of II. This definition was designed to apply to biotechnology and the service industries in general. As the definition is not widely understood, the involvement of the panel was leveraged to strengthen the understanding of II within the industry (Hsu & Sandford, 2007).

The panel was selected based on the individuals' background in management. Participants also had healthy experience in process improvement and directing departmental growth. Managers had experience in scientific aspects of drug development, process improvement, operational improvement, and quality oversight. A panel of five experts within the industry was adequate to collect sufficient judgements and knowledge regarding the target definition.

Anonymity helped respondents assess other panel members' responses. This method helped to moderate the influences of potentially dominant individuals. The anonymous feedback was designed to reduce the effects of bias and dominant personality. This also helped to reduce the effects introduced from self-interest and focus instead on the definition (Hsu & Sandford, 2007). Each round pulled out additional insight from panel members. The previous information from other members helped to draw new knowledge held by the diverse panel of experts.

### **Procedure or Workflow**

**Round 1:** I first asked general questions regarding the panel's understanding of II. Each person within the panel was asked separately. I collected the information and asked for clarification as needed. This information was considered the raw data. Each panel member's raw data was presented to other panel members as a code or letter (A, B, etc.) to conceal their identity. The information or raw data was added to a spreadsheet in a manner that was easy for other panelists to read.

**Round 2:** The collected and coded raw data was presented to each member for additional comment. Based on the original raw data, I generated a working definition of II. The panel was asked to consider the raw data (coded to conceal identity) when determining whether or not the

working definition was suitable. I asked the panel to rate (based on scale of 1 to 5) certain aspects of the definition in an effort to include widely agreed upon wording.

**Round 3:** I took the new (Round 2) comments into consideration to rework the working definition. Additional panel comments were added to the spreadsheet. With the new definition, I presented the updated raw data to the panel to retrieve any further comments. This ensured all panelists saw updates to the raw data. In addition to the new definition, I asked the panel to offer methods to measure (nonfinancial) II based on the working definition.

**Round 4:** The working definition, raw data, and proposed measures were presented to the panel for final comments. Each measure was rated (1 to 5) by each panelist.

## APPENDIX C

### DELPHI PANEL RESULTS

Title: Delphi Panel Study on Incremental Innovation

Dates: April 15 to June 18, 2018

Researcher: Jonathan N. Spaans, DBA Candidate

#### Introduction

The Delphi method was used to help generate a workable definition of incremental innovation (II) as it applied to the biotech and service industries. The Delphi panel was asked to opine on how II can be measured (nonfinancially). Five industry experts were approached for inclusion in the panel to help define II. Each of the five experts agreed via email response to be included in the panel and have their names included in any report associated with the study.

#### Results

The general research and concept evolution, combined with contributions from an assembled panel of industry experts, was used to generate a workable definition of II: *Expand and/or enhance service/product offering to meet client needs and/or improve operational efficiency utilizing any employee at little to no perceived business risk*. The panel was also instrumental in uncovering methods in which to measure II. These methods were used to formulate six questions that appeared in the survey. The information was limited to email conversation and the limitation of the panel's time. As I was not able to interview via phone or in person, some important details may have been omitted. However, details from the mail conversations have been cut and pasted into a separate table.

## Procedure or Workflow

**Round 1:** I asked a general, open-ended questions regarding the panel’s understanding of II. Each person was asked separately to ensure anonymity. I collected the information and asked for clarification as needed. Raw data were copied directly from the email and pasted to a word file. Each panel member’s raw data were presented to other panel members as a code or letter (A, B, etc.) to conceal their identity.

1. Contributor A: *Evolution – is a more typical term e.g., product evolution. Then it links to lifecycle...*
2. Contributor B: *In both of these cases, our clients or the industry has pushed us to incremental change.*
3. Contributor D: *Time spent on “improvements” driven by client demand.*
4. Contributor E: *It’s also important to incorporate key performance indicators so you can measure.*
5. Contributor F: *It is innovative (ELISA test) because it is a new idea intended to reduce human error and speed up a process, but it is incremental because there is no change in the overall intention of the process—it’s still an ELISA.*

**Round 2:** The collected and coded raw data (from Round 1) were presented to each member for additional comment. Based on the original raw data, the panel members attempted to draft a working definition of II. The panel was asked to consider the raw data (coded to conceal identity) when determining whether or not the working definition was suitable. The panel also was asked to opine on the measurement of II (nonfinancial). Notable details regarding the second round include:

1. Contributor A: *Innovation, or the desire to innovate, is a constantly present human characteristic. It is stimulated by success and repressed through failure. Ultimately, a monetary value can be used to judge incremental innovation—provided it can be closely attributable... although it is still a lagging metric of success. Visibility of activity such as proactive (autonomous) workgroups targeting innovation is a good indicator that innovation is present and likely to succeed. Success is self-perpetuating and would not be prevalent in a culture if failure was a likely outcome.*
2. Contributor B: *I am assuming that effort is made to have demonstrated and engineering cost standards in place. If so, we should be able to measure productivity or efficiency increase through increased throughput in less time. Demonstrated standard should improve over time. Employee satisfaction.*
3. Contributor D: *Project managers need to measure progress as judged by major and minor milestones and measure what was committed to against actual progress. Too many of the same complaints would be a big canary in the mine, and mean that there was only an illusion of efficiencies.*
4. Contributor E: *Measure the reduction or number of defects, increased throughput and reduction of regulatory findings.*
5. Contributor F: *So from both business AND research perspectives, you could look at measuring incremental innovation(s) by determining the increase in productivity/performance (choose any metric here) of an ESTABLISHED activity.*

**Round 3:** The researcher took the new (Round 2) comments into consideration to rework the working definition. These definitions were formulated by considering each of the panel contributions. Panel members were asked to vote on two definitions of incremental innovation:

- A. Expand and/or enhance service/product offering to meet client needs or overcome competitive threats and/or improve operational efficiency utilizing any employee at little to no perceived business risk.
- B. Expand and/or enhance service/product offering to meet client needs and/or improve operational efficiency utilizing any employee at little to no perceived business risk.

The voting resulted in favor of definition A.

Contributor	Definition Voted
A	A
B	B
D	A
E	B
F	A

**Round 4:** This round was not necessary as we had already achieved the objectives of the Delphi study to get consensus on a definition of II and find nonfinancial measuring tools for II. There were no objections to any of the measuring methods after Rounds 1 and 2 of the Delphi panel review.