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The Moderating Role of
Training in the Relationship
between Knowledge Management and Innovation

By

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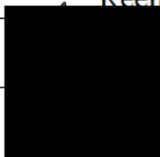
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To my hearts:

My husband, Ziad

and

My children, Moustafa and Mohammad

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The Moderating Role of
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between Knowledge Management and Innovation

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ABSTRACT

This study yields a deeper understanding of the relationship between knowledge management and innovation in organizations along with insights into the importance of training. Hence, the primary aim of this study is to examine the relationship between knowledge management and innovation as moderated by the construct of training. While the constructs of knowledge acquisition, application, and protection, and behavior and strategic innovation are the cornerstones of this study, the Resource-Based View Theory is the theoretical framework. An online questionnaire was leveraged to gather data from respondents, In Lebanon and the Middle East region, for data collection purposes. The present research uses SPSS statistical software to investigate the relationship between the different constructs. Results indicated that knowledge acquisition, knowledge application and knowledge protection are significantly and positively related to the two dimensions of innovation: behavior innovation and strategic innovation. Also, results indicated a moderating effect of training in the relationship between knowledge acquisition and behavior innovation, and in the relationship between knowledge application and behavior innovation. Specifically, as levels of training increase, the effect of knowledge acquisition and knowledge application on behavior innovation decreases. On the other hand, this study indicated that training had no significant moderating effect in the relationship between knowledge protection and behavior innovation. Moreover, training has

no significant moderating effect in the relationship between the three constructs of KM under study and strategic innovation. Overall, the study recommends that organizations who want to foster innovation should give considerable attention to their knowledge management processes of acquisition, application, and protection, even in the presence of training.

Keywords - Knowledge management, Knowledge acquisition, Knowledge application, Knowledge protection, Training, Innovation, Behavior innovation, Strategic innovation.

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List of Abbreviations

KM: knowledge management

HR: human resources

IP: intellectual property

RBV: Resource-Based View

R&D: research and development

LAU: Lebanese American University

IRB: Institutional Review Board

SPSS: Statistical Package for the Social Sciences

Chapter One

INTRODUCTION

1.1. Introduction

In an effort to contribute to previous literature related to knowledge management and further dwell on innovation theories, this thesis utilizes a survey to investigate the relationship between three constructs of knowledge management (knowledge acquisition, knowledge application, and knowledge protection), and two forms of innovation (behavior and strategic innovation), while simultaneously examining the role of training, through moderation.

1.2. General background

The global business environment of today is incessantly growing, driving organizations towards competitive pressure to maintain sustainability, profitability, and effectiveness. Competitiveness and adapting to constant change demand that organizations should keep rejuvenating their processes, products, services, and systems. Organizations should therefore resort to what is known as innovation to create such a competitive edge (Hussinki et al., 2017). Moreover, investing in an organization's workforce is mandatory for a firm to be competitive. Hence, employee training specifically, among other human resource functions, proves itself necessary to reach innovation. Today, however, organizations are diverting their focus from tangible to intangible resources, which include technologies, core competencies, innovational capabilities, and knowledge, among many others (Obeidat et al., 2016). Hence, the role of knowledge management (KM) is now regarded with great significance. This study will encompass the constructs of KM, innovation and training with further detail and examination.

Innovation capability is presently recognized as an indispensable tool for competition and survival in the global business environment (Wang & Chen, 2013). On the other hand, effective HR practices, such as training, can foster innovative behavior among work members of an organization. Hence, training, as an HR function, can help an organization achieve innovation (Harter et al. 2002). Furthermore, a considerable amount of research has demonstrated the strong influence of KM practices on innovation e.g. (Obeidat et al., 2016; Al-Hakim & Hassan, 2016; Darroch, 2005). Organizations can therefore nurture innovation in its strategies, processes, products, markets, and employee behaviors through effective KM practices. Overall, the study probes the moderating impact of training on the relationships between the aforementioned variables of knowledge management and innovation.

1.3. Need for the study

Existing literature connecting all three constructs of KM, training, and innovation is scarce. This study fills a significant gap in KM and innovation literature as it encompasses findings on the relationships between knowledge acquisition, knowledge application, and knowledge protection with behavior and strategic innovation. Moreover, it adds value to existing literature as it tackles the significance of training as a moderator in the relationship between the abovementioned variables. This contribution is crucial to provide additional insights to organizations to understand the impact of knowledge acquisition, application, and protection on behavior and strategic innovation, both in the presence and absence of training.

1.4. Purpose of the study

Using the Resource-Based View theory of the firm (Barney, 1991) as the theoretical framework, the first purpose of this study is to investigate the effect of knowledge acquisition, knowledge application, and knowledge protection on behavior and strategy innovation. The

second purpose of this study is to analyze the impact of the three constructs of KM discussed on behavior and strategic innovation with training as a moderator between these variables.

Through this study, the researcher aims to discuss the following questions to help devise organizational recommendations accordingly:

- What is the strength of the relationship between knowledge acquisition, knowledge application, and knowledge protection on the one hand and behavior and strategic innovation on the other?
- What is the role of training in the relationship between knowledge acquisition, knowledge application, and knowledge protection on the one hand and behavior and strategic innovation on the other?

1.5. Operational definitions of terms

1. Knowledge Management

Knowledge management is described as the process where knowledge is generated, acquired, and transferred, which is reflected in the organizational behavior (Bueno et al., 2010).

2. Knowledge Acquisition

Knowledge acquisition refers to the knowledge gained by organizations from both internally and externally (Gamble & Blackwell, 2001).

Another explanation of knowledge acquisition is that it is the outcome of workforce involvement and the collaboration of individuals, technology, and resources (Chiu & Chen, 2016).

3. Knowledge Application

Knowledge application is defined as the process to utilize, exploit, and apply knowledge to all organizational operations to achieve excellence in organizational performance (Lee et al. 2011). It includes social, technological, and operational aspects (Pasha & Pasha, 2008).

4. Knowledge Protection

Knowledge protection indicates “the set of possible approaches, methods, or tools employed to protect not only the tangible results of the exploitation of knowledge, but also knowledge itself. Accordingly, knowledge protection is a broader concept that includes IP rights protection and also "softer" protection methods that can be used to deal with the intangible nature of knowledge”, (Bolisani et al., 2013, pp.192-211).

5. Innovation

Innovation can be defined as an organization’s predisposition to employ new ideas, innovations, and discoveries that lead to the evolution of new products or services, managerial strategies, work methods, procedures, and technology (Chahal & Bakshi, 2015; Maria & del Mar, 2013).

6. Behavior Innovation

Behavior innovation comprises of generating new ideas and finding opportunities to implement change, use new knowledge and increase personal or business performance (Wang & Ahmed, 2004).

7. Strategic Innovation

Implementing novel approaches in business procedures, workplace organization, or external interactions constitute strategic innovation (Wang & Ahmed, 2004).

8. Training

A definition of training is “the systematic acquisition of skills, rules, concepts, or attitudes that result in improved performance”, (Goldstein, 1986, p.837). Another definition is that training is the appropriation of knowledge and skill for current tasks (McDowall & Saunders, 2010).

1.6. Overview

This thesis is set to understand the moderating effect of training on the relationships between three forms of knowledge management (knowledge acquisition, knowledge application, and knowledge protection) and two forms of innovation (behavior and strategic innovation).

The structure of the paper is as follows:

Chapter I – Introduction

Chapter II – Literature Review & Theoretical Framework

Chapter III – Methodology

Chapter IV – Data Analysis and Results

Chapter V – Discussion and Conclusion

Chapter Two

Literature Review & Theoretical Framework

2.1. Knowledge Management

2.1.1. Knowledge management definition

The concept of knowledge management (KM) emerged around twenty years ago, approximately in 1990 (Koenig, 2012). Davenport and Prusak (1998) defined KM as a combination of structured knowledge, values, standards, expert insight, and contextual information that renders a framework for assessing and integrating new experience and information. Beckman (1999) described KM as the definition and admission to experience, knowledge, and proficiency that generate novel capabilities, permit advanced performance, encourage innovation, and improve customer value. More recently, Parlbay and Taylor (2000), stated that KM is about sustaining innovation, producing new ideas, and utilizing the organization's thinking power. Similarly, Bueno et al. (2010) defined KM as the process where knowledge is created, acquired, and transferred, which is reflected in the organizational behavior. Lately, researchers consider employees to be the central element in the KM process and encourage organizations to raise the bar for human resources knowledge to build a more suitable context for the creation and implementation of KM (Delshab & Bouroujerdi, 2018).

2.1.2. Importance of knowledge management

This century is apprehended as the age of information and knowledge, where the latter is regarded as a critical organizational asset (Obeidat et al., 2016). Although knowledge can be explained in terms of data, concepts, know-how, proficiency and experience, the bare existence

of knowledge in an organization is not sufficient to achieve competitive advantage and organizational success, unless managed effectively (Shahzad et al., 2016). KM transforms experience into knowledge and proficiency creating new capabilities, hence inspiring superior performance and innovation (Beckman, 1999). KM adds and creates value by leveraging the skills and proficiency embedded in individual minds (Ruggles, 1998; Scarbrough, 2003).

2.1.3. Types of knowledge

According to Nonaka and Takeuchi (2011), three types of knowledge are to be considered. *Explicit knowledge* is the understanding of organizational goals, advanced techniques, and position in a task-oriented approach. *Tacit knowledge* comprises decision-making methods, power and politics, and cultural and context cognizance. *Experiential knowledge* or practical wisdom emerges as an overall apprehension of the effects of a decision on the organization and on society.

2.1.4. Factors of knowledge management

Scholastic studies signified that KM is composed of five factors: knowledge creation, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application (Hasani & Sheikhesmaeili, 2016; Sallis, 2002). Nonaka (1994) defined *knowledge creation* as the ongoing transfer, composition, and transformation of the different kinds of knowledge. Furthermore, Cook and Brown (1999) acknowledged the difference between knowing and knowledge, and state that the development of the action and reaction between the two is what creates knowledge. *Knowledge acquisition* refers to the knowledge gained by organizations from both internal and external sources. Both these sources are considered to be the origin of achieving intangible assets (Gamble and Blackwell, 2001). Chiu and Chen (2016) declared that knowledge acquisition is the outcome of employees' involvement and the collaboration of

individuals, assets, and technology. It is the most essential of the KM operations and has been discussed to be one of the most complicated and expensive processes. *Knowledge storage* occurs when organizational knowledge is structured, organized, recovered, and maintained, allowing firms to retain knowledge embodied in various types, such as expert knowledge, electronic data, and written documentation (Alavi & Tiwana, 2003). Kim and Nelson (2000) defined *knowledge sharing* as the learning process, which organizations engage their stakeholders with, to innovate or create. According to Van den Hooff and Ridder (2004), it is the process where individuals reciprocally diffuse and exchange their tacit, implicit, and explicit knowledge to generate new knowledge. It is also known as the facilitator of knowledge dissemination within a firm (Yang et al., 2005). *Knowledge application* is defined as the process to utilize, exploit, and apply knowledge to all organizational operations to achieve excellence in organizational performance (Lee et al., 2011). It includes social, technological, and operational aspects (Pasha & Pasha, 2008). Gold et al., 2001 similarly described KM processes, adding the factor of *knowledge protection* (Gold et al., 2001). *Knowledge protection* indicates “the set of possible approaches, methods, or tools employed to protect not only the tangible results of the exploitation of knowledge, but also knowledge itself. Accordingly, knowledge protection is a broader concept that includes IP rights protection and also "softer" protection methods that can be used to deal with the intangible nature of knowledge”, (Bolisani et al., 2013, pp.192-211).

2.1.5. Effective knowledge management

Lin H., (2014) considered effective knowledge management a challenge. KM literature suggests a number of elements contributing to the success or failure of organizational KM. These include management support and proactive leadership (Davenport T. , 1996; Beckman, 1999), a sound organizational culture and support infrastructure (Beckman, 1999; Zand, 1997),

understanding KM as a business strategy (Ruggles & Holtshouse, 1999) employee empowerment (Davenport & Prusak, 1998; Liebowitz & Beckman, 1998), developing and sustaining a climate for learning within the organization (Starbuck, W., 1997; Liebowitz & Beckman, 1998), and strong communication channels (Koulopoulos & Frappaolo, 1999). Moreover, for KM to become a competitive advantage, it must be connected to *transferability* (the ease at which organizations can transfer and share it), *transparency* (the speed with which other organizations can establish the same knowledge), *replicability* (the ease at which firms can reproduce and use it) and *durability* (the rate at which it becomes obsolete (Grant, 1991). Furthermore, McGurk and Baron (2012) stress the importance of refreshing knowledge in an organization, hence the need for proper knowledge networks for employees to be able to share knowledge.

2.2. Innovation

2.2.1. Innovation definition

Innovation is one of the essential firm constituents that affect strongly organizational outcomes and can be defined as an organization's predisposition to employ new ideas, innovations and discoveries that lead to the evolution of new products or services, managerial strategies, work methods, procedures, and technology (Chahal & Bakshi, 2015; Maria & del Mar, 2013). According to Sartori et al. (2013, pp.1-18), "innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations". Innovation is the complete group of activities resulting in introducing a novel entity, hence causing an organizations' impregnable competitive advantage to be stronger (Van der Meer, 2007). More specifically, innovation can be *new to the organization* (might have been applied by other businesses, but is novel to one specified business), *new to the market* (a firm

is a pioneer in introducing it to the market), and *new to the world* (a firm is the pioneer in introducing it to all firms and markets) (Sartori et al., 2013).

2.2.2. Importance of innovation

Today, the intangible assets of knowledge and innovation are considered to be primary factors contributing to organizational growth (Dickel & de Moura, 2016). Innovation, specifically, is a main differentiator for organizations and an essential element for competitive advantage, as well as organizational growth (Cunha & Cunha, 2004), and is considered to be a positive contributor to the performance of business firms (Jimenez-Jimenez & Sanz-Valle, 2011).

2.2.3. Dimensions of innovation

Vigoda-Gadot et al. (2005) defined five dimensions for organizational innovativeness: proactiveness, creativity, openness to change, risk-taking, and future orientation. Also, Wang and Ahmed (2004) have evaluated organizational innovation according to five dimensions. First, *behavior innovation* comprises of generating new ideas and finding opportunities to implement change, use new knowledge and increase personal or business performance. Second, *product innovation* is the launching of new or improved goods or services significantly for their potential uses or features. Third, *process innovation* involves introducing novel manufacturing, managerial and technological methods to improve manufacturing and management processes. Then, *market innovation* incorporates different business functions to gain marketing effectiveness and efficiency, hence increasing a firm's competitive advantage and gaining more value for shareholders. Finally, *strategic innovation* comprises of implementing original approaches in business procedures, workplace organization, or outside connections.

2.2.4. Knowledge management and innovation

Prior research literature deduces the positive relationship between KM and innovation e.g. (Lee et al., 2011; Andreeva & Kianto, 2011; Du Plessis, 2007). Obeidat et al. (2016), for instance, argued that organizational innovation is based on its knowledge and skills acquired from both internal and external resources and stakeholders. Business performance and innovation are the result of adopting KM methods such as knowledge acquisition and implementation (Inkinen, 2016; Shang et al., 2009). Similarly, Huang and Li (2009) declared that through the practice of sharing and utilizing knowledge, organizations can foster innovativeness in organizational processes, products, and services can be fostered. Lin Y. (2006) proposed that organization's ability to convert and utilize knowledge may decide its level of organizational innovation, such as enhanced rapid reaction to new information and faster problem-solving capability. Azadegan et al. (2008) argued that innovation is frequently the consequence of the capacity to utilize prevailing data and knowledge to create various reconfigurations and combinations, meaning that innovation is affected by knowledge management. Indeed, a considerable quantity of research findings have demonstrated the positive influence of KM processes on innovation e.g. (Obeidat et al., 2016; Al-Hakim & Hassan, 2016; Darroch, 2005). The first main role that KM plays in innovation is tacit knowledge sharing, and is indispensable for innovation capacities of organizations (Cavusgil et al., 2003). The second role that KM plays in the process of innovation is associated with explicit knowledge, where it is essential for organizations to create competences and resources that will permit the capturing and modification of knowledge and product development routines, to guarantee the adequate transfer of knowledge (Cardinal et al., 2001; Scarbrough, 2003). Moreover, the convergence of tacit and explicit knowledge creates new probable ideas, raising the frequency of new combinations to occur, hence leaving a positive impact on innovation (Rodan, 2002).

Collaboration of stakeholders to create knowledge sharing communities both inside and outside the organization is the third main role that KM plays in innovation. Collaboration plays a particularly important role in transferring tacit knowledge and constructing cumulative know-how (Cavusgil et al., 2003; Pyka, 2002; Rodan, 2002; Scarbrough, 2003). Moreover, Cavusgil et al. (2003) and Scarbrough (2003) established that tacit knowledge transfer has a greater magnitude when the relationship between collaboration partners is stronger. The fourth and final role of KM in the innovation process is controlling the different KM activities, knowledge acquisition, application, and protection. Without KM integration of its various processes, the possible merits of knowledge cannot be achieved (Baddi & Sharif, 2003).

The interaction of knowledge acquisition with existing knowledge can improve knowledge dimensions accessible to the organization, hence boosting the prospects for novel groundbreaking results (Galunic & Rodan, 1998; Li & Calantone, 1998; Yli-Renko et al., 2001). In addition, Grant (1996) argued that knowledge application is central in the KM process. By implementing knowledge effectively, individuals enhance their efficiency (Grant, 1996; Gold et al., 2001), ultimately speeding development of new products, and creating processing technologies and administrative systems that are more innovative (Sarin & McDermott, 2003). Furthermore, Bolisani et al. (2013) signified that systematic knowledge protection tactics tend to be used by extremely innovative services, and that there exists a relationship between knowledge protection and R&D.

Therefore, and according to the aforementioned literature, the various roles and facets of KM impact innovation significantly, leading us to deduce that knowledge management positively impacts innovation.

Taking a closer look to previous literature, the relationship between the three types of knowledge on one hand and behavior and strategic innovation, specifically, is discussed.

Success of idea realization can be determined by the degree of knowledge acquisition. With knowledge acquisition, people's abilities and skills increase, meaning that they are inclined to have various visions on a task at various levels of knowledge (Fan et al., 2017; Pearl, 2017). The basic mission of the process of innovation includes idea realization by implementing innovative models or prototypes that can be applied by a person, group, or organization (Janssen, 2000). Since idea realization is an element of innovative work behavior (Charbonnier-Voirin et al., 2010), the influence of knowledge acquisition on behavior innovation has, therefore, been endorsed in previous studies (Darroch, 2005).

According to Ahuja and Lampert (2001), knowledge acquisition provides organizations with various problem-solving tactics and distinctive types of reasoning. Firms are prompted to question existing cognitive structures, take a renovated look at causative understanding, and discover recent competence deficiencies when exposed to these different approaches (Subramaniam & Youndt, 2005). Consequently, organizations can revolutionize their strategic processes to implement novel ideas from knowledge acquired, hence, benefiting from knowledge acquisition to promote strategic innovation (Zheng Zhou & Li, 2012).

Furthermore, and according to Pitt and Clarke (1999), with the progression of learning and the implementation of knowledge, individuals must show the ability to make abstract theoretical links, to work in more flexible and innovative structures, hence accentuating the correlation between knowledge application and behavior innovation.

Also, Pitt and Clarke (1999) stated that the application of intellectual property allows the organization to design new outputs and generate revenue streams which it and others can embrace, utilize, and learn from. According to the authors, knowledge application expands the organization's experience, providing it with a strategic innovative route.

Finally, and as mentioned previously, Bolisani et al. (2013) signified that highly innovative services tend to use efficient knowledge protection strategies, and that a relationship between knowledge protection and R&D amount was found. However, literature is scarce on the specific relationship between knowledge protection on one hand and strategic and behavior innovation on the other.

Against this backdrop, our study is adopting three KM processes (knowledge acquisition, knowledge application, and knowledge protection) described by Gold et al. (2001), and two facets of innovation described by Wang and Ahmed (2004) (behavior innovation and strategic innovation) to hypothesize the following:

H1a: Knowledge acquisition relates positively to behavior innovation.

H1b: Knowledge application relates positively to behavior innovation.

H1c: Knowledge protection relates positively to behavior innovation.

H1d: Knowledge acquisition relates positively to strategic innovation.

H1e: Knowledge application relates positively to strategic innovation.

H1f: Knowledge protection relates positively to strategic innovation.

2.3. Training

2.3.1. Training definition

Training literature has experienced immense change over the past 100 years (Bell et al., 2017). Goldstein (1986, p.837) defined training as “the systematic acquisition of skills, rules, concepts, or attitudes that result in improved performance.” McDowall and Saunders (2010) described training as the appropriation of knowledge and skill for current tasks.

2.3.2. Importance of training

In a highly volatile and speedily changing environment, training proves itself to be imperative for an organization to sustain employees' competence and skills to face challenges and attain a high quality of performance. According to Ward et al. (1994) and Agnew et al. (1997), workforce training is a crucial supplement for improving industry competitiveness and organizational performance. Knoke and Kalleberg (1994) suggested that investment in training is positively related to enhanced organizational outcomes. Billions of dollars are spent worldwide annually on work force training (Jodlbauer et al, 2011). Training supplies employees with distinctive skills, which allow the successful execution of competitive strategies and create competitive advantages for the organization (Ostroff et al., 2000; Ubeda-Garcia, 2005).

Mathieu et al. (1992) stated that training is essential at the individual level since it develops individuals' present skills and enables them to gain new ones. Moreover, job applicants announced that training was a very important criterion when evaluating a prospective employer (Leonard, 2001). At the organizational level, Hornsby and Williams (1990) and Tobias (1991) declared that training is significant since it boosts organizations' overall performance and productivity of their employees (Hornsby & Williams, 1990; Tobias, 1991). In one study, it was found that 218 percent higher income generation per employee, 24 percent higher-gross profit margins, and a 26 percent higher price-to-book value of company stock price were experienced by firms that were in the highest quartile of their peers, relative to the average training expenditure per employee, than those firms in the lowest quartile (Wells, 2001).

2.3.3. Training, knowledge management, and innovation

Organizations can strengthen special competencies and discover innovation opportunities through the knowledge residing in human capital (Hansen, 1999; Grant, 1996; Wright et al,

2001). The capacity and motivation of human capital are required by organizations to generate creative concepts, produce new opportunities, and develop innovative activities (Scarbrough, 2003). Employee capabilities, behavior, and attitudes to realize organizational goals can be affected by human resource management (Collins & Clark, 2003; Martinsons, 1995). Moreover, human resource management is essential to support the required settings for channeling and catalyzing employees towards developing innovation initiatives (Scarbrough, 2003; Laursen & Foss, 2003; Michie & Sheehan, 1999). Organizations can use strategic human resource functions such as training, staffing, compensation, and performance appraisal to engage employees in innovation and creative thinking, and to enhance their commitment (Damanpour, 1991; Laursen & Foss, 2003). In particular, Ling and Nasurdin (2010) established that of all the human resource management practices they researched, only training was found to have a positive and important effect on all three types of organizational innovation (administrative innovation, product innovation and process innovation). Organizations encounter vast variability and uncertainty in the innovation process when they develop innovation approaches (Atuahene-Gima, 1996). Thus, creative employees who are flexible, risk taking, and have high tolerance for ambiguity and uncertainty are needed (Madsen & Ulhoi, 2005). Training, as a strategic human resource function, would expose employees to innovative ideas and various forms of knowledge (Brockbank, 1999; Beatty & Schneier, 1997; Jaw & Liu, 2003). Employees may be equipped with immense and varied training programs by their organizations in order to develop novel skills, knowledge, and innovative capacity essential for executing their roles and tasks (Brockbank, 1999; Mumford, 2000). Through training, organizational proficiency in terms of demand and content for innovation can be developed (Weisberg, 2006). Employee expertise at the entire organizational level can be enhanced by training. Consequently, this likely results in a possibly boundless source of innovation ideas (Torraco & Swanson, 1995). Furthermore, academics have often declared that

innovation is enhanced by training methods that nurture the learning environment (Gomez et al., 2004; Shipton et al., 2005; Cortini et al., 2016) and investigative learning (Shipton et al., 2006; Beugelsdijk, 2008). Research also signifies that a crucial element in the success of strategic combinations for innovative services and products is how partners cooperate, communicate, and deal with mutual learning processes (Larsson et al., 1998; Ceschi et al., 2018; Manuti et al., 2017; Scalco et al., 2018). Moreover, it is important to train employees on these matters since it is presumable that employees don't know how to on their own accord (Sartori & Scalco, 2014). Employees could be equipped with innovative minds and skills, gain new expertise and knowledge, and expand their insights when exposed to diverse training programs (Nonaka & Toyama, 2003; Von Krogh, 1998). Literature, therefore, strongly highlights that human resource training is essential to develop the competencies needed for innovation and creativity processes (Sartori & Scalco, 2014).

According to the Resource-Based View (RBV) strategy, one of the resources of the organization is human capital, and training is an investment in human capital that provides workforce with distinctive skills, abilities, and knowledge, which in turn help the firm in reaching positive results (Jodlbauer et al., 2011). Saks and Ashforth (1997) argue that for the individual to establish proactive behaviors and strategies, it is important to foster individual socialization tactics, such as training and mentorship programs. Group-based training, for instance, is vital for transferring explicit knowledge and for initiating some cultural aspects (Ashforth et al., 1998). Informal individualized trainings were found essential in transferring role behavior (Warhurst & Black, 2015). Mentoring training programs are important for leveraging personal sources of knowledge (Abrams et al., 2003). Effective transfer of knowledge, prompted by knowledge management during training, was found to be essential to reap the full benefits of training (Dirani, 2012). Organizations extend training initiatives to expand and foster workforce knowledge and expertise (Jaw & Liu, 2003; Brockbank, 1999;

Nonaka & Takeuchi, 1995), making training important for employees in the knowledge management process (Argote et al., 2003; Von Krogh, 1998).

Consequently, since previous literature supports that training affects both KM and innovation positively, we propose that the presence or absence of training moderates the relationship between the three processes of KM and the two dimensions of innovation adopted in this study.

Thus, the following hypotheses can be formulated:

H2a: The relationship between knowledge acquisition and behavior innovation is moderated by training.

H2b: The relationship between knowledge application and behavior innovation is moderated by training.

H2c: The relationship between knowledge protection and behavior innovation is moderated by training.

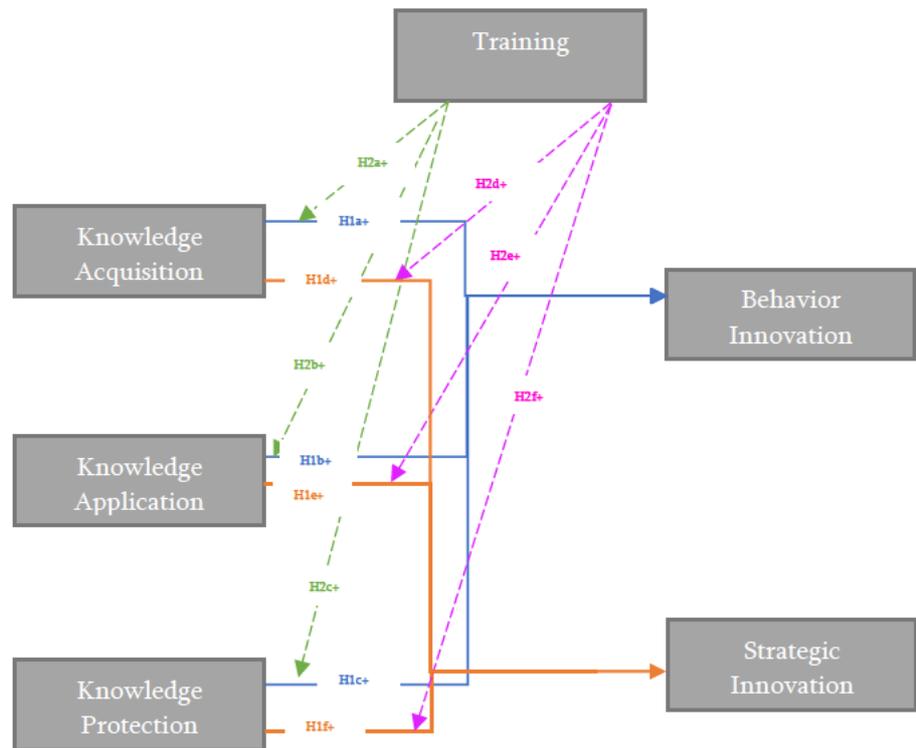
H2d: The relationship between knowledge acquisition and strategic innovation is moderated by training.

H2e: The relationship between knowledge application and strategic innovation is moderated by training.

H2f: The relationship between knowledge protection and strategic innovation is moderated by training.

The figure below shows the research framework of this study:

Figure 1.5.
Hypothesized
relationships between
the variables



2.4. Resource-Based View Theory of the Firm

For this study, the researcher adopts the Resource-Based View Theory of the firm (Barney, 1991), which accentuates the importance of identifying and exploiting strategic capabilities and resources as essential foundations of organizational success and sustainable competitive advantage (Barney, 1986; Conner & Prahalad, 1996; Grafton et al., 2010; Kristandl & Bontis, 2007; Liu, 2017; Takeuchi et al., 2007; Wernerfelt, 1984). A major subcategory of strategic resources is intellectual capital (both human and structural) (Kristandl & Bontis, 2007; Wernerfelt, 1984). Moreover, knowledge is the most crucial strategic resource, tackling an extensive array of essential characteristics related to the theory of firm, including role of management, organizational structure, and the theory of innovation (Grant, 1996).

So, on solid base, a knowledge-based standpoint of intellectual capital is an important matter with respect to the RVB theory of the firm (Conner & Prahalad, 1996), and an essential ingredient for innovation (Amabile, 1996; Sternberg & Lubart, 1999; Madrid-Guijarro et al., 2013).

Moreover, and according to RBV theory, an important organizational resource is human capital, in which training is invested. Training provides the human element with the unique knowledge, skills, and abilities, which in turn help the firm achieve positive results.

(Jodlbauer et al., 2011). Also, Saks and Ashforth (1997) argue that for individuals to display proactive behaviors and strategies, it is important to promote training programs.

This theory provides a dynamic lens through which we assume that employees can reach factors, such as innovation, to achieve organizational competitive advantage and success, when provided with effective knowledge management features. Moreover, RBV theory can explain how training, an important investment in organizational resources, when introduced, may affect the relationship between knowledge management and innovation, and consequently, success of the organization.

Chapter Three

Methodology

In this chapter, the researcher discourses the methodology of the present study with detail and sheds a light on the process through which analysis was executed. The topics discussed are the design of the questionnaire, the instruments used to measure each construct, and the data collection method and process. The concluding section tackles the analysis methods used to study the data.

3.1. Survey Method

The researcher of this study employed quantitative approach using a well-structured electronic survey with the purpose of achieving reliability and consistency. The survey was created using Google Forms and utilized close-ended questions. It was distributed electronically among participants using e-mails and electronic business networks such as LinkedIn.

3.2. Questionnaire Design

Data collection took place between December 2021 and January 2022. It was conducted using an e-questionnaire, Google survey, which was tailored specifically for this study: to test the moderating effect of training on the relationship between the three forms of knowledge management (acquisition, application, and protection), and the two forms of innovation (behavior and strategic).

The questionnaire consists of six sections. The first section comprised of the consent form. Section two included a “yes” or “no” button indicating if the respondent agrees to partake in the survey study or not. Section three examines the respondents’ demographics including age, gender, level of education, occupation, and years of employment with current organization.

Each of the remaining three sections adopts a different variable. Section four adopts an 18-item scale proposed by Gold et al. (2001) and adopted by Abd Rahman et al. (2013) to measure the independent variables being *knowledge acquisition*, *knowledge application*, and *knowledge protection*. Section five adopts five items from the questionnaire initially developed by Ahmad and Schroeder (2003) and adopted by Manzour et al. (2019) to measure moderating variable being *training*. Section six adopts 8 items from a questionnaire developed by Wang and Ahmed (2004) to measure the dependent variables being *behavior innovation* and *strategic innovation*. For each of the items in sections four, five, and six, the responses of the survey were measured using a 5-point Likert scale, 1 being “Strongly Disagree” to 5 being “Strongly Agree”. Kindly refer to Appendix 1 for a copy of the questionnaire.

The questionnaire was reviewed and approved by the Lebanese American University’s (LAU) Institutional Review Board (IRB) before it was electronically sent out to respondents. This was a measure to ensure integrity and approval from an international standard of research and ethical principles. The LAU IRB granted approval and the questionnaire was distributed to respondents. Kindly refer to Appendix 2 for a copy of the IRB approval letter.

Ethical considerations

The researcher considered the below ethical issues during the creation and administration of the survey:

- The right of respondents to be informed and have voluntary consent.
- The right of respondents to have the data reported in the thesis anonymously.
- The right of respondents to not fill out any detailed personal information.
- The right of respondents to anonymity and confidentiality.

3.3. Measurement Instruments

3.3.1 Independent Variables

To measure the independent variables, knowledge acquisition, knowledge application, and knowledge protection, the researcher used an 18-item scale from a questionnaire proposed by Gold et al. (2001) and adopted by Abd Rahman et al. (2013). The responses were measured using a five-point Likert scale ranging from 1= “Strongly Disagree”, being the lowest, to 5= “Strongly Agree”, being the highest. Items “My organization has processes for generating new knowledge from existing knowledge”, “My organization has processes to apply knowledge learned from mistakes”, and “My organization has processes to protect knowledge from inappropriate use inside the organization” (Gold et al., 2001). This scale shows a high reliability coefficient alpha of $\alpha = 0.88$ for *knowledge acquisition*, $\alpha = 0.94$ for *knowledge application*, and $\alpha = 0.85$ for *knowledge protection*, which indicates a high level of internal consistency for our scale with this specific sample.

Table 3.1. Reliability Statistics of Knowledge Acquisition, Knowledge Application, and Knowledge Protection

Reliability Statistics			
Variable	Cronbach's Alpha	Cronbach's Based on Standardized Items	Alpha N of Items
Knowledge Acquisition	.88	.873	6
Knowledge Application	.94	.886	5
Knowledge Protection	.85	.884	7

3.3.2 Moderating Variable

To measure the moderating variable, *training*, the researcher used a five-item scale initially developed by Ahmad and Schroeder (2003) and adopted by Manzour et al. (2019). Items are measured using a five-point Likert scale ranging from 1= “Strongly Disagree”, being the lowest

to, 5= “Strongly Agree” being the highest. Sample items include “Employees at my organization receive training in workplace to improve their skills on a regular basis” and “Management at my organization believes that continual training and promoting of employees' skills are important”. This scale shows a high reliability coefficient alpha of $\alpha = 0.85$, which indicates a high level of internal consistency for our scale with this specific sample.

Table 3.2. Reliability Statistics of Training

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.85	.900	5

3.3.3. Dependent Variables

To measure the dependent variables, behavior innovation and strategic innovation, the researcher used an 8-item scale developed by Wang and Ahmed (2004). Sample items include “Employees at my organization get a lot of support from managers if we want to try new ways of doing things” and “Key executives of my firm are willing to take risks to seize and explore "chancy" growth opportunities”. This scale shows a high reliability coefficient alpha of $\alpha = 0.87$ for behavior innovativeness, and a satisfactory coefficient alpha of $\alpha = 0.63$ for strategic innovativeness, the acceptance level being 0.60 as suggested by Price and Mueller (1986). This indicates a high level of internal consistency for our scale with this specific sample.

Table 3.3. Reliability Statistics of Behavior Innovation and Strategic Innovation

Reliability Statistics			
Variable	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Behavior Innovation	.87	.888	4
Strategic Innovation	.63	.849	4

3.4 Sample & Data Collection

The survey was created using Google Forms and utilized close-ended questions. It was distributed electronically among participants using e-mails and electronic business networks such as LinkedIn.

This study relied on snowball sampling, filled by respondents employed and working in Lebanon and the Middle East region. When “members of the population of interest are hard to identify”, snowball sampling is applied (Marpsat & Razafindratsima, 2010, pp.3-16). Hence, employees were asked to pass the survey to their associates to acquire a fair sample of respondents.

Data collection took place between December 2021 and January 2022, with a total of 250 usable completed surveys.

Participation in the survey was voluntary. Respondents were requested to examine the consent form and click on the “Yes” button, if they agreed to the terms of the questionnaire. If a respondent clicks the “No” button after reading the consent form, the survey automatically ends. This was done in alignment with the LAU IRB office guidelines.

3.5 Analysis Methods

The researcher adopted four methods to analyze the accumulated data. The methods are descriptive statistics, reliability and validity of constructs, confirmatory factor analysis, and regression analysis.

3.5.1. Descriptive Statistics

The researcher will use descriptive statistics to feature the characteristics of the existing sample. “Descriptive statistics can apply to the measurement of various characteristics of a population.” (Bickel & Lehmann, 1975, pp. 1045-1069).

3.5.2. Confirmatory Factor Analysis

Besides testing reliability, the researcher used a confirmatory factor analysis to test the factor loadings of the variables. According to Hair et al. (2010), factor loading estimates should be higher than 0.5, and ideally, 0.7 or higher.

3.5.3. Equations of Simple Regression Analysis

In order to verify the relationship between the independent and the dependent variables and in order to examine whether the moderating variable, *training*, has an impact on the relationship between the independent variables (knowledge acquisition, knowledge application, and knowledge protection) and the dependent variables (behavior and strategic innovation), a series of simple -regression- analysis equations was performed.

3.6 Survey Administration

The sample includes employees who work in Lebanon and the Middle East region. The questionnaire was distributed electronically as a google survey through e-mails and professional social media platforms such as LinkedIn. The overall number of collected replies was 256. Out of the 256, 1 respondent was dropped as he/she clicked on “No” after the consent form, so the questionnaire closed immediately. Another 5 respondents were also dropped as their responses were incomplete. Consequently, the data of **250** respondents were entered into SPSS.

Chapter Four

Data Analysis & Results

4.1. Descriptive Statistics

Starting with the age of respondents, the majority of respondents fall into the age group of 30-39 (36.8%), followed by the age groups 40-49 (31.2%), 20-29 (15.2%), and 50-59 (11.6%) respectively, and finally the age group of 60 and above (5.2%).

The number of females and males participating in this study is almost equal, with 49.6% females and 50.4% males.

Regarding the educational level of respondents, the majority of respondents have reported to be graduates (86.4%), followed by equal results for undergraduates (6.8%) and the group holding an educational level not like the ones mentioned and labeled as “other” (6.8%).

As for the occupational level of respondents, the majority reported to hold middle-management positions (33.6%), followed by the group holding top-management positions (30.8%), then the groups holding employee (23.2%) and supervisory (10.8%) positions respectively, and finally, those reporting a custodian position (1.6%).

Finally, in terms of years of experience with the current employer, the majority of respondents mentioned that they have 10 years of experience or less (53.6%), followed by those who have between 10 and 20 years of experience (26.4%), followed by those who have between 20 and 30 years of experience (11.2%), and finally those with 30 years of experience or more (8.8%).

Table 4.1. summarizes the demographics of the study’s respondents.

Table 4.1. Descriptive Statistics

Demographic Variable	Frequency	Percentage
Age		
20-29	38	15.2
30-39	92	36.8
40-49	78	31.2
50-59	29	11.6
60+	13	5.2
Gender		
Female	124	49.6
Male	126	50.4
Level of Education		
Undergraduate	17	6.8
Graduate	216	86.4
Other	17	6.8
Occupation		
Top Management	77	30.8
Middle Management	84	33.6
Supervisory	27	10.8
Employee	58	23.2
Custodian	4	1.6
Years of Employment with Current Organization		
0-10	134	53.6
10-20	66	26.4
20-30	28	11.2
30+	22	8.8

4.2 Reliability of Constructs

To evaluate the internal consistency of the scales adopted, the researcher used the renowned coefficient of reliability, Cronbach's alpha, whose acceptable lower limit is usually 0.70 (Cronbach, 1951). Table 4.2 summarizes the coefficient alpha for all six variables: *knowledge acquisition*, *knowledge application*, *knowledge protection*, *training*, *behavior innovation*, and *strategic innovation*.

		Item-to-scale correlations					
Variable		Number of scale items	Cronbach's α	Mean	SD	Lowest	Highest
Table 4.2. Summary of reliability measures for each variable	Knowledge acquisition	6	.873	3.7544	.77600	.732**	.854**
	Knowledge application	5	.886	3.8922	.84434	.784**	.893**
	Knowledge protection	7	.884	3.6562	.82160	.657**	.832**
	Training	5	.900	3.6822	.94818	.785**	.909**
	Behavior innovation	4	.888	3.6412	.93869	.834**	.898**
	Strategic innovation	4	.849	3.448	.81797	.792**	.852**
Note: n= 250							

4.3. Confirmatory Factor Analysis

Besides testing reliability, the researcher conducted a confirmatory factor to test factor loadings of the constructs under study. Factor loading estimations should be greater than 0.5, and ideally, 0.7 or higher, according to Hair et al. (2010). As shown in Table 4.3., the factor loadings of the variables *knowledge acquisition* and *knowledge application* are all above the minimum value of 0.7, supporting the uni-dimensionality of their subscales. Also, the two variables' average variances extracted of 61.72 percent and 69.16 percent, respectively, are well above the minimum required percentage of 50 percent (Hair et al., 2010). The factor loadings of the variable *knowledge protection* are all above the ideal value of 0.7, with the exception of the sixth item on the scale reporting 0.62, which is an acceptable value according to Hair et al. (2010)). The variable's average variance extracted of 59.93 percent is above the minimum required percentage of 50 percent. The variable *training* has all its factor loadings well above the minimum value of 0.7, and its average variance extracted of 71.73 percent is also well above the minimum required percentage of 50 percent. The variables *behavior innovation* and *strategic innovation* captured factor loadings well above the minimum value,

and their average variances extracted of 75.01 percent and 68.88 percent are also well above the acceptable minimum percentage.

Items	Factor loadings
<i>Knowledge acquisition</i>	
My organization has processes for generating new knowledge from existing knowledge.	.833
My organization has processes for distributing knowledge throughout the organization.	.867
My organization has processes exchanging knowledge with our trading partners.	.743
My organization has processes for exchanging knowledge between employees.	.786
My organization has processes acquiring knowledge about new products/services within our industry.	.766
My organization has processes for acquiring knowledge about competitors within our industry.	.708
<i>Knowledge application</i>	
My organization has processes to apply knowledge learned from mistakes.	.793
My organization has processes for using knowledge to solve new problems.	.898
My organization makes knowledge accessible to those who need it.	.811
My organization takes advantage of new knowledge.	.864
My organization has processes for using knowledge in development of new products/services.	.786
<i>Knowledge protection</i>	
My organization has processes to protect knowledge from inappropriate use inside the organization.	.826
My organization has processes to protect knowledge from inappropriate use outside the organization.	.797
My organization has processes to protect knowledge from theft from within the organization.	.810
My organization has processes to protect knowledge from theft from outside the organization.	.851
My organization has incentives that encourage the protection of knowledge.	.748
My organization has technologies that restrict access to some sources of knowledge.	.615
My organization has extensive policies and procedures for protecting trade secrets.	.748
<i>Training</i>	
Employees at my organization receive training in workplace to improve their skills on a regular basis.	.883
Management at my organization believes that continual training and promoting of employees' skills are important.	.875
Employees at my organization receive training to execute multiple tasks.	.913

Table 4.3.
Factor loadings for knowledge acquisition, knowledge application, knowledge protection, training, behavior innovation and strategic innovation

Employees at my organization are cross trained so that they can perform other tasks if necessary.	.776
Employees at my organization are encouraged to learn specific skills, rather than develop a broad skill base.	.779

Behavior innovation

Employees at my organization get a lot of support from managers if we want to try new ways of doing things.	.828
My organization tolerates individuals who do things in a different way.	.835
My organization is willing to try new ways of doing things and seek unusual, novel solutions.	.902
My organization encourages people to think and behave in original and novel ways.	.896

Strategic innovation

My firm's R & D or product development resources are not adequate to handle the development need of new products and services. (R)	.801
Key executives of my firm are willing to take risks to seize and explore "chancy" growth opportunities.	.847
Senior executives at my organization constantly seek unusual, novel solutions to problems via the use of "idea men".	.834
When my organization sees new ways of doing things, we are last at adopting them. (R)	.837

4.4. Regression Analysis

4.4.1. Testing Hypotheses H1a to H1f

Table 4.4.1. a. presents the results of the construct correlations, supporting hypotheses H1a to H1f. Therefore, as hypothesized, *knowledge acquisition*, *knowledge application* and *knowledge protection* are in positive relationships with the two dimensions of innovation: *behavior innovation* and *strategic innovation*. The relationship between knowledge application with the two constructs of innovation is the most positive of the three types of knowledge management.

		Knowledge acquisition	Knowledge application	Knowledge protection	Behavior innovation
	Knowledge acquisition	1			
	Knowledge application	0.807**	1		
	Knowledge protection	0.571**	0.588**	1	
	Behavior innovation	0.597**	0.637**	0.411**	1
Table 4.4.1. a.	Strategic innovation	0.594**	0.616**	0.457**	0.744**
Correlation results	Note: ** Correlation is significant at 0.01 level (2-tailed).				

A series of simple-regression-analysis equations is conducted using the factor scores generated by SPSS to test the significance of influence of the three independent constructs of knowledge management on the two dependent constructs of innovation. The results are reported in Table 4.4.1. b.

Table 4.4.1. b. Summary of simple-regression-analysis equations between knowledge management constructs and innovation constructs

	Behavior innovation					Strategic innovation				
	R	t	p-Value	F	R-square	R	t	p-Value	F	R-square
Knowledge acquisition	0.597	11.730	0.000	137.587	0.357	0.594	11.622	0.000	135.078	0.353
Knowledge application	0.637	13.003	0.000	169.085	0.405	0.616	12.299	0.000	151.264	0.379
Knowledge protection	0.411	7.104	0.000	50.466	0.169	0.457	8.082	0.000	65.314	0.208

Dependent variables: behavior innovation, strategic innovation. Independent variables: knowledge acquisition, knowledge application, knowledge protection.

The model confirmed the significance of the relationships between the independent variables (*knowledge acquisition, knowledge application, knowledge protection*) and the dependent variable (*behavior innovation*), with regression coefficients of 0.60, 0.64 and 0.41 respectively,

and p -values of 0.000. Moreover, it confirmed the significance of the relationships between the independent variables (knowledge acquisition, knowledge application, knowledge protection) and the dependent variable (strategic innovation), with regression coefficients of 0.59, 0.62 and 0.46 respectively, and p -values of 0.000. Therefore, the results fully support hypotheses H1a to H1f.

4.4.2. Testing Hypotheses H2a to H2f

To test the moderation hypotheses H2a to H2f, the researcher conducted a multiple regression analysis using Hayes Process, version 4.0 (Hayes, 2018). Table 4.4.2.a. illustrates significant amounts of variance in behavior innovation and strategic innovation when the moderating variable training, and the focal predictors of knowledge acquisition, knowledge application, and knowledge protection were introduced, with p -values < .001.

In addition, as presented in Table 4.4.2.a., the interaction terms: [knowledge acquisition*training], [knowledge application*training], and [knowledge protection*training] were added in the regression model.

Table 4.4.2. a. Hayes Process moderation model summary

	Behavior innovation			Strategic innovation		
	R-square	<i>p</i> -Value	F	R-square	<i>p</i> -Value	F
Knowledge acquisition	0.4909	0.000	79.0733	0.4499	0.000	67.0730
Knowledge application	0.5195	0.000	88.6708	0.4668	0.000	71.7905
Knowledge protection	0.4649	0.000	71.2304	0.4365	0.000	63.5167
Knowledge acquisition* Training	0.0093	0.0354	4.4743	0.0007	0.5709	0.3220
Knowledge application* Training	0.0111	0.0181	5.6592	0.0000	0.8893	0.0194
Knowledge protection* Training	0.0038	0.1886	1.7384	0.0004	0.6953	0.1537

A small but significant amount of the variance in behavior innovation was noticed when the interaction terms [knowledge acquisition*training] and [knowledge application*training] were added, with *p*-values of 0.0354 and 0.0181 respectively, which indicates moderate evidence against the null hypothesis. Specifically, as levels of *training* increase, the effect of *knowledge acquisition* and *knowledge application* on *behavior innovation* decreases. *Behavior innovation* shows significant variation as shown in Table 4.4.2. b. and Table 4.4.2. c. Hence, hypotheses H2a and H2b are supported.

Table 4.4.2. b.
Conditional effects of the focal predictor at values of the moderator

Training level	Effect	SE	t	<i>p</i> -value	LLCI	ULCI
Low	0.3026	.0711	4.2576	.0000	0.1626	.4425
Medium	0.2266	.0650	3.4853	.0006	0.0985	.3546
High	.1506	.0773	1.9465	.0527	-	.3029
					0.0018	

Note: Focal predictor=Knowledge acquisition. Moderator=Training. Dependent variable=Strategic behavior

Table 4.4.2. c.
Conditional effects of the focal predictor at values of the moderator

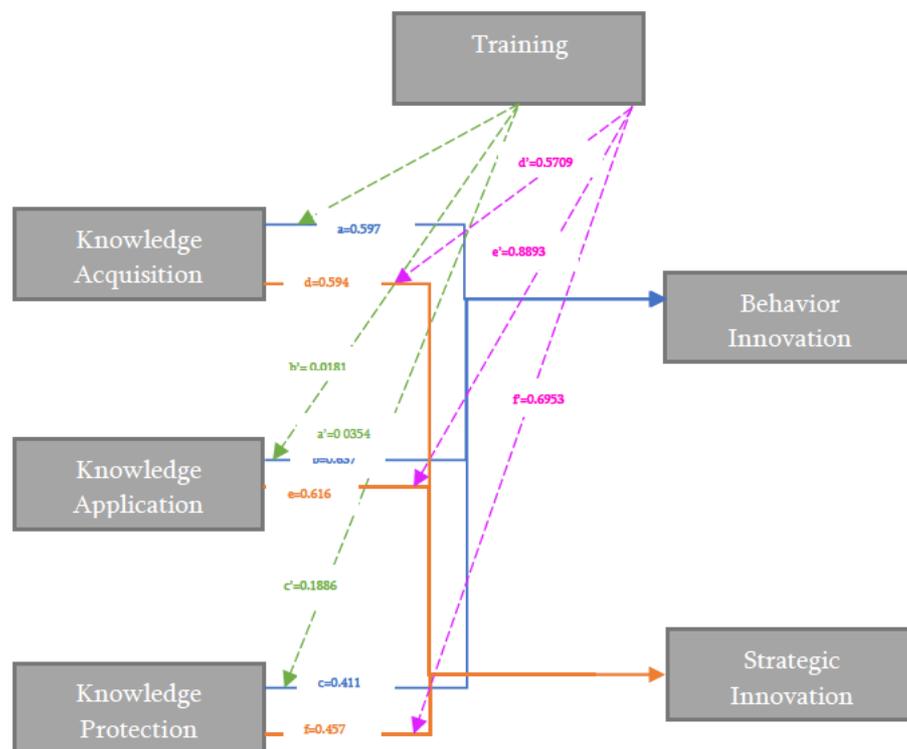
Training level	Effect	SE	t	<i>p</i> -value	LLCI	ULCI
Low	0.3850	.0661	5.8278	.0000	0.2549	.5152
Medium	0.2992	.0625	4.7870	.0000	0.1761	.4223
High	0.2134	.0778	2.7429	.0065	.0602	.3666

Note: Focal predictor=Knowledge application. Moderator=Training. Dependent variable=Strategic behavior.

On the other hand, and as shown in Table 4.4.2. a., no significant variation in *behavior innovation* was reported when the interaction term [knowledge protection*training] was introduced (p -value= 0.1886). Moreover, no significant variation in strategic innovation was reported when all three interaction terms were introduced (p -values: 0.5709, 0.8893, and 0.6953 respectively). Hence, hypotheses H2c, H2d, H2e, and H2f are rejected.

The results of the proposed model are illustrated in Figure 4.4.

Figure 4.4.
Proposed
model
results



Note: **a,b,c,d,e** and **f** represent regression coefficients.

a',b',c',d',e' and **f** represent p -values significant at <0.05 .

Chapter Five

Discussion and Conclusions

This article does not focus on the role of training as a mediator between knowledge management and innovation since there is sufficient literature to predict that a mediating analysis would be positive and significant. For instance, Dibella and Nevis (1998) stated that an organization with KM processes have a clearer depiction of what the organization is lacking, giving more relevance and benefit to training, consequently, accentuating the positive relationship between KM and training (Abd Rahman et al., 2013). Furthermore, Neirotti and Paolucci (2013) and Sung and Choi (2014) stress that training incite novel ideas and is positively impacts innovation in an organization.

The prime concern of the current study was to examine the influence of knowledge acquisition, knowledge application, and knowledge protection on both behavior and strategic innovation, and to verify whether training can have a moderating role on these relationships, hence exploring the effects of the presence or absence of training on these correlations.

5.1. Discussion

Argote et al. (2003) and Von Krogh (1998) found that training is important for employees in the knowledge management process. Moreover, Ling and Nasurdin (2010), noted that training was the only human resource practice to have an important positive impact on the three types of organizational innovation (innovation of process, product, and administration). Building on the works of the aforementioned researchers, the author tested the moderating role of training in the relationship between three constructs of knowledge management (acquisition, application, and protection) and two forms of innovation (behavior and strategic).

The hypotheses relating knowledge acquisition, knowledge application, and knowledge protection to behavior and strategic innovation were supported by the results of this research. Knowledge acquisition, knowledge application and knowledge protection were found to be positively related to behavior innovation. Also, the three forms of knowledge management in this analysis were found to be positively related to strategic innovation. These findings add to the literature previously proposed by Inkinen (2016) and Shang et al. (2009) pertaining to the variables under study. The results also show that training moderates only two of these relationships: the relationship between knowledge acquisition and behavior innovation, and the relationship between knowledge application and strategic innovation. Specifically, the presence of training is tied to increased levels of knowledge management as attested by Argote et al. (2003) and Von Krogh (1998), who affirmed that training is important for employees in the knowledge management process. When correlating training with behavior innovation and strategic innovation, results show a significant positive relationship between the constructs, which supports the analysis set forth by Sartori and Scalco (2014), Nonaka et al. (2003), and Von Krogh (1998). Moreover, this research reveals that when training is applied, the positive relationship between knowledge acquisition and behavior innovation is weakened. Also, when training is applied, the positive relationship between knowledge application and behavior innovation is reduced. Finally, this study indicates that training, when introduced, neither strengthens nor weakens the relationship between knowledge protection and behavior innovation; similarly, training does not moderate the correlations between knowledge acquisition, application, and protection with strategic innovation.

These findings are attributed to possible factors discussed in the next section.

5.2. Recommendations and Managerial Implications

For organizations eager to realize sustainable competitive advantages and superior innovation, knowledge management is a prized resource. The moderating role of training when examining the relationship between knowledge management and innovation is highlighted by the standpoints of this study.

Based on this research, managers who want to foster innovation in their organizations should give considerable attention to their knowledge management processes of acquisition, application, and protection. From the analysis of this research, it appears that behavior and strategic innovation are mostly influenced by knowledge application. This is likely due to the fact that utilizing knowledge actually allows employees to improvise and mold knowledge into new and creative structures. In contrast, behavior and strategic innovation are least influenced by knowledge protection, probably because it is the least of the three proposed constructs of knowledge management that allows manipulability of knowledge.

In all cases, it is important to note that for KM to become a competitive advantage, it must be connected to *transferability* (the ease at which organizations can transfer and share it), *transparency* (the pace with which other organizations can establish identical knowledge), *replicability* (the ease at which firms can reproduce and use it) and *durability* (the pace at which it becomes outdated) (Grant, 1991).

Our analysis shows that it is important for managers to note that training weakens the effect of knowledge acquisition and knowledge application on behavior innovation. This is expected because as employees acquire more training, their procurement of knowledge from KM systems decreases, since they will depend more on their training to engage in innovative and creative behaviors. In other words, the knowledge and skills acquired by employees from

training becomes the organization's knowledge asset that can be shared and stored (Abd Rahman et al., 2013). With firms expending approximately \$200 billion per annum on staff training (McKenna, 1990), it is critical that organizations scheme and execute training programs effectively (Facteau et al., 1995). Over the years, workforce training has progressively transformed from a less-individualized context to a more formal one. It was stated that workforce training steadily relied on formal training in a study of 340 organizations, with 70% of this training weighted to instructor-led initiatives, while 30% was technology-enabled (ATD, 2014). While formal group-based training is important in the transfer of explicit knowledge and in initiating some cultural aspects (Ashforth et al., 1998), informal individualized training is crucial for transferring role behavior (Warhurst & Black, 2015). In other words, it is recommended that managers resort to informal training, specifically, to realize the full benefits of behavior innovation.

Next, our study shows that it is useful for managers to realize that training has an insignificant effect on the relationship between the three facets of knowledge and strategic innovation. This is probably due to what Cavusgil et al. (2003) stated in their study, that establishing and preserving an innovation program has become progressively complicated due to increasing competitive pressure, fast technological change, and changing customer needs (Du Plessis, 2007). Also, Vigoda-Gadot et al. (2005) stated that organizational innovation rests on five pillars: proactiveness, risk-taking, creativity, future orientation, and openness to change. Hence, organizations find it increasingly difficult to rely on standard training to foster strategic innovation, with all its elements, and must preserve strong knowledge management processes. Consequently, knowledge acquisition, application and protection must not be neglected even in the presence of training.

5.3. Limitations and Future Research

The first limitation encountered by this work is that the respondents chosen for this research were sampled employees in Lebanon and the Middle East region. Consequently, the analysis could only examine the moderating role of training in the relationship of the three knowledge management constructs and the two innovation variables in companies without including a control variable for a particular industry or enterprise. Moreover, future studies should be carried out by testing the model in other countries and regions. Finally, this research included only three forms of knowledge management (knowledge acquisition, knowledge application and knowledge protection) and two constructs of innovation (behavior and strategic innovation). Researchers are recommended to embrace the inclusion of other knowledge management and innovation variables in their study.

5.4. Conclusion

The prime aim of the current study was to explore the impact that knowledge acquisition, knowledge application, and knowledge protection have on behavior innovation and strategic innovation, to test whether training has a moderating role in these relationships. The researcher draws main conclusions from this thesis. First, although both behavior and strategic innovation are affected positively by knowledge acquisition, application and protection, the innovation variables under study are mostly influenced by knowledge application. Second, training moderates only two of these relationships: the relationship between knowledge acquisition and behavior innovation, and the relationship between knowledge application and strategic innovation. Third, when training is applied, the positive relationship between knowledge acquisition and behavior innovation is weakened. Fourth, Also, when training is applied, the positive relationship between knowledge application and behavior innovation is reduced. Finally, when training is introduced, it neither strengthens nor weakens the relationship

between knowledge protection and behavior innovation; similarly, training does not moderate the correlations between knowledge acquisition, application, and protection with strategic innovation.

Although the introduction of training to a company may decrease the influence of knowledge acquisition and knowledge application on behavior innovation, the researcher concludes that efficient knowledge management processes are necessary to organizational innovation even in the presence of training.

References

- Abd Rahman, A., Ng, S. I., Sambasivan, M., & Wong, F. (2013). Training and organizational effectiveness: moderating role of knowledge management process. *European Journal of Training and Development*, 37(5), 472-488.
- Abrams, L., Cross, R., Lesser, E., & Levin, D. (2003). Nurturing interpersonal trust in knowledge-sharing networks. *Academy of Management Executive*, 17(4), 64-77.
- Agnew, A., Forrester, P., Hassard, J., & Procter, S. (1997). Deskillling and reskillling within the labour process: the case of computer integrated manufacturing. *International Journal of Production Economics*, 52(3), 317-324.
- Ahmad, S., & Schroeder, R. (2003). The impact of human resource management practices on operational performance: recognizing country and industry differences. *Journal of Operations Management*, 21(1), 19-43.
- Ahuja, G., & Lampert, C. (2001, June-July). Entrepreneurship in the large corporation: a longitudinal study of how established firms create breakthrough inventions. *Strategic Management Journal*(Special Issue 22), 521-543.
- Al-Hakim, L., & Hassan, S. (2016). Core requirements of knowledge management implementation, innovation and organizational performance. *Journal of Business Economics and Management*, 17(1), 109-124.
- Alavi, M., & Tiwana, A. (2003). Knowledge management: the information technology dimension. In M. Easterby-Smith, & M. Lyles (Eds.), *Organizational Learning and Knowledge Management* (pp. 104-121). London: Blackwell Publishing.
- Amabile, T. (1996). *Creativity in Context*. Boulder, CO: Westview Press.
- Andreeva, T., & Kianto, A. (2011). Knowledge processes, knowledge-intensity and innovation: a moderated mediation analysis. *Journal of Knowledge Management*, 15(6), 1016-1034.
- Argote, L., McEvily, B., & Reagans, R. (2003). Managing knowledge in organizations: an integrative framework and review of emerging themes. *Management Science*, 49(4), 571-582.
- Ashforth, B., Saks, A., & Lee, R. (1998). Socialization and newcomer adjustment: the role of organizational context. *Human Relations*, 51(7), 897-926.
- ATD, A. (2014). *2014 State of the Industry*. Alexandria, VA.

- Atuahene-Gima, K. (1996). Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia. *Journal of Product Innovation Management*, 13(1), 35-52.
- Azadegan, A., Dooley, K., Carter, P., & Carter, J. (2008). Supplier innovativeness and the role of interorganizational learning in enhancing manufacturer capabilities. *Journal of Supply Chain Management*, 44(4), 14-35.
- Baddi, A., & Sharif, A. (2003). Information management and knowledge integration for enterprise innovation. *Logistics Information Management*, 16(2), 145-155.
- Barney, J. (1991, March). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99.
- Barney, J.B. (1986). Strategic factor markets: expectations, luck, and business strategy. *Management Science*, 32(10), 1231-1241.
- Beatty, R., & Schneier, C. (1997). New HR roles to impact organizational performance: from "partners" to "players". *Human Resource Management*, 36(1), 29-37.
- Beckman, T. (1999). The current state of knowledge management. In J. Liebowitz (Ed.), *Knowledge Management Handbook*. Boca Raton, FL: CRC Press.
- Bell, B., Tannenbaum, S., Ford, J., Noe, R., & Kraiger, K. (2017). 100 years of training and development research: what we know and where we should go. *Journal of Applied Psychology*, 102(3), 305-323.
- Beugelsdijk, S. (2008). Strategic human resource practices and product innovation. *Organization Studies*, 29, 821-847.
- Bickel, P., & Lehmann, E. (1975). Descriptive statistics for nonparametric models II. *Annals of Statistics*, 3(5), 1045-1069.
- Bolisani, E., Paiola, M., & Scarso, E. (2013). Knowledge protection in knowledge-intensive business services. *Journal of Intellectual Capital*, 14(2), 192-211.
- Brockbank, W. (1999). If HR were really strategically proactive: present and future directions in HR's contribution to competitive advantage. *Human Resource Management*, 38(4), 337-352.
- Bueno, E., Aragon, J., Salmador, M., & Garcia, V. (2010). Tangible slack versus intangible resources: the influence of technology slack and tacit knowledge on the capability of organizational learning to generate innovation and performance. *International Journal of Technology Management*, 49(4), 314-337.
- Cardinal, L., Alessandri, T., & Tumer, S. (2001). Knowledge codifiability, resources, and science based innovation. *Journal of Knowledge Management*, 5(2), 195-204.
- Cavusgil, S., Calantone, R., & Zhao, Y. (2003). Tacit knowledge transfer and firm innovation capability. *Journal of Business & Industrial Marketing*, 18(1), 6-21.

- Ceschi, A., Sartori, R., Constantini, A., & Tommasi, F. (2018). How do you manage change in organizations? Training, development, innovation, and their relationships. *Frontiers in Psychology, 9*, 313.
- Chahal, H., & Bakshi, P. (2015). Examining intellectual capital and competitive advantage relationship: role of innovation and organizational learning. *International Journal of Bank Marketing, 33*(3), 376-399.
- Chahal, H.; Bakshi, P. (2015). Examining intellectual capital and competitive advantage relationship: role of innovation and organizational learning. *International Journal of Bank Marketing, 33*(3), 376-399.
- Charbonnier-Voirin, A., El Akremi, A., & Vandenberghe, C. (2010). A multilevel model of transformational leadership and adaptive performance and the moderating role of climate for innovation. *Group & Organization Management, 35*(6), 699-726.
- Chiu, C. N., & Chen, H. H. (2016). The study of knowledge management capability and organizational effectiveness in Taiwanese public utility: the mediator role of organizational commitment. *SpringerPlus, 5*(1), 1-34.
- Collins, C., & Clark, K. (2003). Strategic human resource practices, top management team social networks, and firm performance: the role of human resource in creating organizational competitive advantage. *Acad Manage J, 46*(6), 740-751.
- Conner, K., & Prahalad, C. (1996). A resource-based theory of the firm: knowledge versus opportunism. *Organization Science, 7*(5), 477-501.
- Cook, S., & Brown, J. (1999). Bridging epistemologies: the generative dance between organizational knowledge and organizational knowing. *Organization Science, 10*(4), 381-400.
- Cortini, M., Pivetti, M., & Cervai, S. (2016). Learning climate and job performance among health workers. A pilot study. *Frontiers in Psychology, 7*(1644).
- Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-334.
- Cunha, R., & Cunha, M. (2004). Impact of strategy, HRM strength and HRM bundles on innovation performance and organizational performance. FEUNL Working Paper No. 464. SSRN.
- Damanpour, F. (1991). Organizational innovation: a meta-analysis of effects of determinants and moderators. *The Academy of Management Journal, 34*(3), 555-590.
- Darroch, J. (2005). Knowledge management, innovation and firm performance. *Journal of Knowledge Management, 9*(3), 101-115.
- Davenport, T. (1996). Some principles of knowledge management, strategy, management. *Competition, p. Winter*.

- Davenport, T., & Prusak, L. (1998). *Working Knowledge-How Organizations Manage What they Know*. Boston, MA: Harvard Business School Press.
- Delshab, V., & Bouroujerdi, S. (2018). Investigating the influence of unlearning on knowledge management in sport organizations. *Kybernetes*, 47(10), 2025-2040.
- Dibella, A., & Nevis, E. (1998). *How Organizations Learn: An Integrated Strategy for Building Learning Capacity*. San Fransisco, CA: Jossey-Bass.
- Dickel, D., & de Moura, G. (2016). Organizational performance evaluation in intangible criteria: a model based on knowledge management and innovation management. *RAI Revista de Administracao e Inovacao*, 13(3), 211-220.
- Dirani, K. (2012). Professional training as strategy for staff development: a study in training transfer in the Lebanese context. *European Journal of Training and Development*, 36(2), 158-178.
- Du Plessis, M. (2007). The role of knowledge management in innovation. *Journal of Knowledge Management*, 11(4), 20-29.
- Facteau, J., Dobbins, G., Russell, J., Ladd, R., & Kudish, J. (1995). The influence of general perceptions of the training environment on pertaining motivation and perceived training transfer. *Journal of Management*, 21(1), 1-25.
- Fan, S., Cregan, C., Harzing, A., & Kohler, T. (2017). The benefits of being understood: the role of ethnic identity confirmation in knowledge acquisition by expatriates. *Human Resource Management*, 57(1), 327-339.
- Galunic, D., & Rodan, S. (1998). Resource recombinations in the firms: knowledge structures and the potential for Schumpeterian innovation. *Strategic Management Journal*, 19(12), 1193-1201.
- Gamble, P.R.; Blackwell, J. (2001). *Knowledge Management: A State of the Art Guide*. London: Kogan Page.
- Gold, A., Malhorta, A., & Segars, A. (2001). Knowledge management: an organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185-214.
- Goldstein, L. (1986). *Training in Organizations: Needs Assessment, Development, and Evaluation*. Monterey, CA: Brooks/Cole Publishing Company.
- Gomez, P., Lorente, J., & Cabrera, R. (2004). Training practices and organizational learning capability. *Journal of European Industrial Training*, 28(2-3-4), 234-256.
- Grafton, J., Lillis, A., & Widener, S. (2010). The role of performance measurement and evaluation in building organizational capabilities and performance. *Accounting, Organizations, and Society*, 35(7), 689-706.

- Grant, R. (1991). The resource-based theory of competitive advantage: implications for strategy formulation. *California Management Review*(Spring), 114-135.
- Grant, R.M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17, 109-122.
- Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate Data Analysis* (7th Edition ed.). New York: Pearson.
- Hansen, M. (1999). The search-transfer problem: the role of weak ties in sharing knowledge across organizational subunits. *Administrative Science Quarterly*, 44(1), 83-111.
- Harter, J., Schmidt, F., & Hayes, T. (2002). Business-Unit-Level relationship between employee satisfaction, employee engagement, and business outcomes: a meta-analysis. *Journal of Applied Psychology*, 87(2), 268-279.
- Hasani, K., & Sheikhesmaeili, S. (2016). Knowledge management and employee empowerment: a study of higher education institutions. *Kybernetes*, 45(2), 337-355.
- Hayes, A. (2018). *Introduction to Mediation, Moderation, and Conditional Process Analysis: a Regression-Based Approach*. New York, NY: The Guilford Press.
- Hornsby, H., & Williams, C. (1990). CAM still needs people. *Business and Economic Review*, 37(1), 26-30.
- Huang, J., & Li, Y. (2009). The mediating effect of knowledge management on social interaction and innovation performance. *International Journal of Manpower*, 30(3), 285-301.
- Hussinki, H., Kianto, A., Ritala, P., & Vanhala, M. (2017). Intellectual capital, knowledge management practices and firm performance. *Journal of Intellectual Capital*, 18(4), 904-922.
- Inkinen, H. (2016). Review of empirical research on knowledge management practices and firm performance. *Journal of Knowledge Management*, 20(2), 230-257.
- Janssen, O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behaviour. *Journal of Occupational and Organizational Psychology*, 73(3), 287-302.
- Jaw, B., & Liu, W. (2003). Promoting organizational learning and self-renewal in Taiwanese companies: the role of HRM. *Human Resource Management*, 42(3), 223-241.
- Jimenez-Jimenez, D., & Sanz-Valle, R. (2011). Innovation, organizational learning, and performance. *Journal of Business Research*, 64(4), 408-417.
- Jodlbauer, S., Selenko, E., Batinic, B., & Stiglbaue, B. (2011). The relationship between job dissatisfaction and training transfer. *International Journal of Training and Development*, 16(1), 39-53.

- Kim, L., & Nelson, R. (2000). *Technology, Learning and Innovation: Experiences of Newly Industrializing Economies*. Cambridge: Cambridge University Press.
- Knoke, D., & Kalleberg, A. (1994). Job training in U.S. organizations. *American Sociological Review*, *59*, 537-546.
- Koenig, M. (2012). What is KM? Knowledge management explained. *KM World*.
- Koulopoulos, T., & Frappaolo, C. (1999). *Smart Things to Know About Knowledge Management*. Dover, NH.: Capstone.
- Kristandl, G., & Bontis, N. (2007). Constructing a definition for intangibles using the resource-based view of the firm. *Management Decision*, *45*(9), 1510-1524.
- Larsson, R., Bengtsson, L., Henriksson, K., & Sparks, J. (1998). The interorganizational learning dilemma: collective knowledge development in strategic alliances. *Organ. Sci.*, *9*, 285-305.
- Laursen, K., & Foss, N. (2003). New human resource management practices, complementarities, and the impact of innovation performance. *Cambridge Journal of Economics*, *27*(2), 243-263.
- Lee, P., Cheng, T., Yeung, A., & Lai, K. (2011). An empirical study of transformational leadership, team performance and service quality in retail banks. *Omega*, *39*(6), 690-701.
- Leonard, D. (2001). Using mentoring and storytelling to transfer knowledge in the workplace. *Journal of Management Information Systems*, *18*(1), 95-114.
- Li, T., & Calantone, R. (1998). The impact of market knowledge competence on new product advantage: conceptualization and empirical examination. *Journal of Marketing*, *62*(4), 13-29.
- Liebowitz, J., & Beckman, T. (1998). *Knowledge Organizations: What Every Manager Should Know*. Boca Raton, FL.: St. Lucie Press.
- Lin, H. (2014). A multi-stage analysis of antecedents and consequences of knowledge management evolution. *Journal of Knowledge Management*, *18*(1), 52-74.
- Lin, Y. (2006). An examination of the relationships between organizational learning culture, structure, organizational innovativeness and effectiveness: evidence from Taiwanese organizations. University of Minnesota.
- Ling, T., & Nasurdin, A. (2010). Human resource management practices and organizational innovation: An empirical study in Malaysia. *Journal of Applied Business Research*, *26*(4), 105-115.
- Liu, C. H. (2017). Creating competitive advantage: linking perspectives of organization learning, innovation behavior and intellectual capital. *International Journal of Hospitality Management*, *66*, 13-23.

- Madrid-Guijarro, A., Garcia-Perez-De-Lema, D., & Van Auken, H. (2013). An investigation of Spanish SME innovation during different economic conditions. *Journal of Small Business Management*, 51(4), 578-601.
- Madsen, A., & Ulhøi, J. (2005). Technology innovation, human resources and dysfunctional integration. *International Journal of Manpower*, 26(6), 488-501.
- Manuti, A., Impedovo, M., & De Palma, P. (2017). Managing social and human capital in organizations: communities of practices as strategic tools for individual and organizational development. *J. Workplace Learn.*, 29, 217-234.
- Manzour, F., Wei, L., Banyai, T., Nurunnabi, M., & Abdul Subhan, Q. (2019). An examination of sustainable HRM practices on job performance: An application of training as a moderator. *Sustainability*, 11(8), 2263.
- Maria, R., & del Mar, F. (2013). Knowledge combination, innovation, organizational performance in technology firms. *Industrial Management & Data Systems*, 113(4), 523-540.
- Marpsat, M., & Razafindratsima, N. (2010). Survey methods for hard-to-reach populations: introduction to the special issue. *Methodological Innovations Online*, 5(2), 3-16.
- Martinsons, M. (1995). Knowledge-based systems leverage human resource management expertise. *Int J Manpow*, 16(2), 17-34.
- Mathieu, J., Tannenbaum, S., & Salas, E. (1992). Influences of individual and situational characteristics on measures of training effectiveness. *Academy of Management Journal*, 35(4), 828-847.
- McDowall, A., & Saunders, M. (2010). UK managers' conceptions of employee training and development. *Journal of European Industrial Training*, 34(7), 609-630.
- McGurk, J., & Baron, A. (2012). Knowledge management-time to focus on purpose and motivation. *Strategic HR Review*, 11(6), 316-321.
- McKenna, J. (1990). Take the 'A' training. *Industry Week*, 239, 22-29.
- Michie, J., & Sheehan, M. (1999). HRM practices, R&D expenditure and innovative investment: evidence from the UK's 1990 workplace industrial relations survey (WIRS). *Industrial and Corporate Change*, 8(2), 211-234.
- Mumford, M. (2000). Managing creative people: strategies and tactics for innovation. *Human Resource Management Review*, 10(3), 313-351.
- Neirotti, P., & Paolucci, E. (2013). Why do firms train? Empirical evidence on the relationship between training and technological and organizational change. *International Journal of Training and Development*, 17(2), 93-115.
- Nonaka, I. (1994). A dynamic theory of organization knowledge creation. *Organization Science*, 5(1), 14-37.

- Nonaka, I., & Takeuchi, H. (2011). The wise leader. *Harvard Business Review*, 89(5), 58-67.
- Nonaka, I.; Takeuchi, H. (1995). *The Knowledge-Creating Company*. New York: Oxford University Press.
- Nonaka, I.; Toyama, R. (2003). The knowledge-creating theory revisited: knowledge creation as a synthesizing process. *Knowledge Management Research & Practice*, 1, 2-10.
- Obeidat, B., Al-Suradi, M., Tarhini, A., & Masa'deh, R. (2016). The impact of knowledge management on innovation: an empirical study on Jordanian consultancy firms. *Management Research Review*, 39(10), 23-39.
- Ostroff, C., & Bowen, D. (2000). Moving HR to a higher level: HR practices and organizational effectiveness. In K. J. Klein, & S. W. Kozlowski (Eds.), *Multilevel Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions* (pp. 211-266). San Fransisco, CA: Jossey-Bass, CA: Jossey-Bass.
- Parlby, D., & Taylor, R. (2000). *The power of knowledge: a business guide to knowledge management*.
- Pasha, S., & Pasha, M. (2008). Innovators knowledge services.
- Pearl, L. (2017). Evaluation, use, and refinement of knowledge representations through acquisition modeling. *Language Acquisition*, 24(2), 126-147.
- Pitt, M., & Clarke, K. (1999, September). Competing on competence: A knowledge persepective on the management of strategic innovation. *Technology Analysis & Strategic Management*, 11(3), 301.
- Price, J., & Mueller, C. (1986). *Handbook of Organizational Measurement*. Marshfield, MA: Pitman.
- Pyka, A. (2002). Innovation networks in economics: from the incentive-based to the knowledge-based approaches. *European Journal of Innovation Management*, 5(3), 152-163.
- Rodan, S. (2002). Innovation and heterogeneous knowledge in managerial contact networks. *Journal of Knowledge Management*, 6(2), 152-163.
- Ruggles, R. (1998). The state of the notion: knowledge management in practice. *California Management Review*, 40(3), 80-89.
- Ruggles, R.; Holtshouse, D. (1999). *The Knowledge Advantage*. Dover, NH.: Capstone.
- Saks, A., & Ashforth, B. (1997). Organizational socialization: making sense of the past and present as a prologue for the future. *Journal of Vocational Behavior*, 51(2), 234-279.
- Sallis, E. (2002). *Knowledge Management in Education* (3rd Edition ed.). London: Kogan.

- Sarin, S., & McDermott, C. (2003). The effect of team leader characteristics on learning, knowledge application, and performance of cross-functional new product development teams. *Decision Sciences*, 34(4), 707-739.
- Sartori, R. & Scalco, A.(2014). Managing organizational innovation through human resources, human capital and psychological capital. *European Journal of Management*, 14(2), 63-70.
- Sartori, R., Favretto, G., & Ceschi, A. (2013). The relationships between innovation and human and psychological capital in organizations: a review. *Innovation Journal*, 18(3), 1-18.
- Scalco, A.; Ceschi, A.; Sartori, R. (2018). Application of psychological theories in agent-based modeling: the case of the theory of planned behavior. *Nonlinear Dyn. Psychol. Life Sci.*, 22, 15-33.
- Scarborough, H. (2003). Knowledge management, HRM and the innovation process. *International Journal of Manpower*, 24(5), 501-516.
- Shahzad, K., Bajwa, S., Siddiqi, A., Ahmid, F., & Raza Sultani, A. (2016). Integrating Knowledge Management (KM) strategies and processes to enhance organizational creativity and performance: an empirical investigation. *Journal of Modelling in Management*, 11(1), 154-179.
- Shang, S., Lin, S., & Wu, Y. (2009). Service innovation through dynamic knowledge management. *Industrial Management & Data Systems*, 109(3), 322-337.
- Shipton, H., Fay, D., West, M., Patterson, M., & Birdi, K. (2005). Managing people to promote innovation. *Creativity and Innovation Management*, 14(2), 118-128.
- Shipton, H., West, M., Dawson, J., Birdi, K., & Patterson, M. (2006). HRM as a predictor of innovation. *Human Resource Management Journal*, 16, 3-27.
- Starbuck, W. (1997). Learning by knowledge-intensive firms. In L. Prusak (Ed.), *Knowledge in Organizations*. Boston, MA.: Butterworth-Heinemann.
- Sternberg, R., & Lubart, T. (1999). The concept of creativity: prospects and paradigms. *Handbook of Creativity*, 1, 3-15.
- Subramaniam, M., & Youndt, M. (2005). The influence of intellectual capital on the types of innovative capabilities. *Academy of Management Journal*, 48(3), 450-463.
- Sung, S., & Choi, J. (2014). Do organizations spend wisely on employees? Effects of training and development investments on learning and innovation in organizations. *Journal of Organizational Behavior*, 25(2), 393-412.
- Takeuchi, R., Lepak, D., Wang, H., & Takeuchi, K. (2007). An empirical examination of the mechanisms mediating between high-performance work systems and the performance of Japanese organizations. *Journal of Applied Psychology*, 92(4), 1069-1083.

- Tobias, A. (1991). Managing the redesign of manufacturing systems. *International Journal of Technology Management*, 6(3-4), 375-384.
- Torraco, R., & Swanson, R. (1995). The strategic roles of human resource development. *Human Resource Planning*, 18(4), 10-21.
- Ubeda-Garcia, M. (2005). Training and business performance: the Spanish case. *The International Journal of Human Resource Management*, 16, 1691-1710.
- Van den Hooff, B., & Ridder, J. (2004). Knowledge sharing in context: the influence of organizational commitment, communication climate and CMC use on knowledge sharing. *Journal of Knowledge Management*, 8(6), 117-130.
- Van der Meer, H. (2007). Open innovation: the Dutch treat: challenges in thinking in business models. *Creat. Innov. Management*, 16, 192-202.
- Vigoda-Gadot, E., Shoham, A., Ruvio, A., & Schwabsky, N. (2005). Innovation in the Public Sector.
- Von Krogh, G. (1998). Care in knowledge creation. *California Management Review*, 40(3), 133-153.
- Wang, C., & Ahmed, P. (2004). The development and validation of the organizational innovativeness construct using confirmatory factor analysis. *European Journal of Innovation Management*, 7(4), 303-313.
- Wang, D., & Chen, S. (2013). Does intellectual capital matter? High-performance work systems and bilateral innovative capabilities. *International Journal of Manpower*, 34(8), 861-879.
- Ward, P., Leong, G., & Boyer, K. (1994). Manufacturing proactiveness and performance. *Decision Sciences*, 25(3), 337-358.
- Warhurst, R., & Black, K. (2015). It's never too late to learn. *Journal of Workplace Learning*, 27(6), 457-472.
- Weisberg, R. (2006). Expertise and reason in creative thinking: evidence from case studies and the laboratory. In J. C. Kaufman, & J. Baer (Eds.), *Creativity and Reason in Cognitive Development*. Cambridge: Cambridge University Press.
- Wells, S. (2001, January). Stepping Carefully. *HR Magazine*, 46(1), 44-49.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180.
- Wright, P., Dunford, B., & Snell, S. (2001). Human resources and the resource-based view of the firm. *Journal of Management*, 27(6), 701-721.

- Yang, J., Lai, F., & Yu, L. (2005). Harnessing value in knowledge acquisition and dissemination: strategic sourcing in product development. *International Journal of Technology Management*, 33(2-3), 299-317.
- Yli-Renko, H., Autio, E., & Sapienza, H. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22(6-7), 587-613.
- Zand, D. (1997). *The Leadership Triad: Knowledge, Trust and Power*. London: Oxford University Press.
- Zheng Zhou, K., & Li, C. (2012). How knowledge affects radical innovation: knowledge base, market knowledge acquisition, and internal knowledge sharing. *Strategic Management Journal*, 33(9), 1090-1102.

Appendix 1 Survey Study

The Moderating Role of Training in the Relationship between Knowledge Management and Innovation

I am a graduate student in Master of Science in Human Resources at the Lebanese American University, and I would like to invite you to participate in a research project by completing the following questionnaire/ survey. I am a student at the Lebanese American University and I am completing this thesis as part of my Masters in Human Resource Management requirements. The purpose of this questionnaire / survey aims to examine the moderating role of training in the relationship between knowledge management and innovation.

There are no known risks, harms or discomforts associated with this study beyond those encountered in normal daily life. The information you provide will be used to examine the moderating role of training in the relationship between knowledge management and innovation. I will not directly benefit from participation in this study and the participant's data will only be used for the research project purpose. The study will involve 250-300 participants. Completing the survey will take 5-7 minutes of your time.

By continuing with the questionnaire / survey, I agree with the following statements:

1. I have been given sufficient information about this research project.
2. I understand that my answers will not be released to anyone and my identity will remain anonymous.
3. My name will not be written on the questionnaire nor be kept in any other records.
4. When the results of the study are reported, I will not be identified by name or any other information that could be used to infer my identity.
5. Only researchers will have access to view any data collected during this research however data cannot be linked to me.
6. I understand that I may withdraw from this research any time I wish and that I have the right to skip any question I don't want to answer.
7. I understand that my refusal to participate will not result in any penalty or loss of benefits to which I otherwise am entitled to.
8. I have been informed that the research abides by all commonly acknowledged ethical codes and that the research project has been reviewed and approved by the Institutional Review Board at the Lebanese American University.

9. I understand that if I have any additional questions, I can ask the research team listed below.
10. I have read and understood all statements on this form.
11. I voluntarily agree to take part in this research project by completing the following survey/Questionnaire.

If you have any questions, you may contact:

Name (PI) Phone number Email address

Reem Fadel

+90 552 398 51 80 reem.fadel@lau.edu

If you have any questions about your rights as a participant in this study, or you want to talk to someone outside the research, please contact the:

Institutional Review Board Office,

Lebanese American University

3rd Floor, Dorm A, Byblos Campus

Tel: 00 961 1 786456 ext. (2546)

irb@lau.edu.lb

This study has been reviewed and approved by the LAU IRB: LAU.SOB.SK1.6/Dec/2021

Would you like to participate in my survey?

Yes

No

Demographics

Age

20-29

30-39

40-49

50-59

60+

Gender

Female

Male

Level of Education

Under Graduate

Graduate

Other

Occupation

Top Management

Middle Management

Supervisory

Employee

Custodian

Years of Employment with Current Employer

0-10

10-20

20-30

30+

The following questions are answered using a 5-point Likert scale (1=strongly disagree, 5=strongly agree).

KNOWLEDGE MANAGEMENT

Knowledge acquisition

My organization has processes for generating new knowledge from existing knowledge.

My organization has processes for distributing knowledge throughout the organization.

My organization has processes exchanging knowledge with our trading partners.

My organization has processes for exchanging knowledge between employees.

My organization has processes acquiring knowledge about new products/services within our industry.

My organization has processes for acquiring knowledge about competitors within our industry.

Knowledge application

My organization has processes to apply knowledge learned from mistakes.

My organization has processes for using knowledge to solve new problems.

My organization makes knowledge accessible to those who need it.

My organization takes advantage of new knowledge.

My organization has processes for using knowledge in development of new products/services.

Knowledge protection

My organization has processes to protect knowledge from inappropriate use inside the organization.

My organization has processes to protect knowledge from inappropriate use outside the organization.

My organization has processes to protect knowledge from theft from within the organization.

My organization has processes to protect knowledge from theft from outside the organization.

My organization has incentives that encourage the protection of knowledge.

My organization has technologies that restrict access to some sources of knowledge.

My organization has extensive policies and procedures for protecting trade secrets.

TRAINING

Employees at my organization receive training in workplace to improve their skills on a regular basis.

Management at my organization believes that continual training and prompting of employees' skills are important.

Employees at my organization receive training to execute multiple tasks.

Employees at my organization are cross trained so that they can perform other tasks if necessary.

Employees at my organization are encouraged to learn specific skills, rather than develop a broad skill base.

INNOVATION

Behavior Innovativeness

Employees at my organization get a lot of support from managers if we want to try new ways of doing things.

My organization tolerates individuals who do things in a different way.

My organization is willing to try new ways of doing things and seek unusual, novel solutions.

My organization encourages people to think and behave in original and novel ways.

Strategic Innovativeness

My firm's R & D or product development resources are not adequate to handle the development need of new products and services. (R)

Key executives of my firm are willing to take risks to seize and explore "chancy" growth opportunities.

Senior executives at my organization constantly seek unusual, novel solutions to problems via the use of "idea men".

When my organization sees new ways of doing things, we are last at adopting them. (R)

Appendix 2 IRB Approval of Research



لجنة الأبحاث

NOTICE OF IRB EXEMPTION DETERMINATION

To: Ms. Reem Fadel
Dr. Silva Karkoulian
Assistant Professor
School of Business

APPROVAL ISSUED: 6 December 2021
EXPIRATION DATE: 6 December 2023
REVIEW TYPE: EXEMPT CATEGORY B

Date: December 6, 2021
RE: IRB #: LAU.SOB.SK1.6/Dec/2021
Protocol Title: *The Moderating Role of Training in the Relationship between Knowledge Management and Innovation*

Your application for the above referenced research project has been reviewed by the Lebanese American University, Institutional Review Board (LAU IRB). This research project qualifies as exempt under the category noted in the Review Type

This notice is limited to the activities described in the Protocol Exempt Application and all submitted documents listed on page 2 of this letter. Final reviewed consent documents or recruitment materials and data collection tools released with this notice are part of this determination and must be used in this research project.

CONDITIONS FOR ALL LAU NOTICE OF IRB EXEMPTION DETERMINATION

LAU RESEARCH POLICIES: All individuals engaged in the research project must adhere to the approved protocol and all applicable LAU IRB Research Policies. PARTICIPANTS must NOT be involved in any research related activity prior to IRB notice date or after the expiration date.

EXEMPT CATEGORIES: Activities that are exempt from IRB review are not exempt from IRB ethical review and the necessity for ethical conduct.

PROTOCOL EXPIRATION: PROTOCOL EXPIRATION: The LAU IRB notice expiry date for studies that fall under Exemption is 2 years after this notice, as noted above. If the study will continue beyond this date, a request for an extension must be submitted at least 2 weeks prior to the Expiry date.

MODIFICATIONS AND AMENDMENTS: Certain changes may change the review criteria and disqualify the research from exemption status; therefore, any proposed changes to the previously IRB reviewed exempt study must be reviewed and cleared by the IRB before implementation.

RETENTION: Study files must be retained for a period of 3 years from the date of project completion.

IN THE EVENT OF NON-COMPLIANCE WITH ABOVE CONDITIONS, THE PRINCIPAL INVESTIGATOR SHOULD MEET WITH THE REPRESENTATIVES OF THE IRB OFFICE IN ORDER TO RESOLVE SUCH CONDITIONS. IRB CLEARANCE CANNOT BE GRANTED UNTIL NON-COMPLIANT ISSUES HAVE BEEN RESOLVED.

If you have any questions concerning this information, please contact the IRB office by email at irb@lau.edu.lb

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The IRB operates in compliance with the national regulations pertaining to research under the Lebanese Minister of Public Health's Decision No.141 dated 27/1/2016 under LAU IRB Authorization reference 2016/3708, the international guidelines for Good Clinical Practice, the US Office of Human Research Protection (45CFR46) and the Food and Drug Administration (21CFR56). LAU IRB U.S. Identifier as an international institution: FWA00014723 and IRB Registration # IRB00006954 LAUIRB#1

Dr. Joseph Stephan
Chair, Institutional Review Board

DOCUMENTS SUBMITTED:

LAU IRB Exempt Protocol Application	Received 16 November 2021
Research Proposal	Received 16 November 2021
Informed Consent Form	Received 16 November 2021
Questionnaire	Received 16 November 2021
Link to Online Survey	Received 16 November 2021
IRB Comments sent: 17 November 2021 3 December 2021	PI response dated: 3 December 2021 3 December 2021
NIH Training – Silva Karkoulian	Cert. # 2059914 (Dated 20 April 2016)
CITI Training – Reem Fadel	Cert.# 46253879 Dated (3 December 2021)

