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Knowledge Management, Innovations Systems, and Firm Performance

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This is to certify that the doctoral study by

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Walden University
2020

Abstract

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Henry D. Young

MBA, University of Phoenix, 1993

BSOM, California State Polytechnic University-Pomona, 1989

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Small and medium sized-enterprise managers are unable to effectively manage employees' knowledgeability and innovation systems successfully, which results in negative firm performance. Managers who do not consider employee knowledge management and the benefits related to innovation systems experience financial hardships within the organization. Grounded in the unified model of dynamic organizational knowledge creation theory, the purpose of this quantitative correlational study was to examine the relationship between knowledge management, innovation systems, and firm performance. Data were collected using SurveyMonkey to gather online survey responses from 80 small and medium-sized enterprise managers in California. The results of the standard multiple linear regression analysis showed the full model was statistically significant in distinguishing the relationship between knowledge management, innovation systems, and firm performance, F (2, 80) = 51.98, p = < .001, R^2 = .574. A key recommendation is for managers to understand how to create, develop, transfer, share, and deploy employee knowledge sources when using innovation systems within the organization. The implications for positive social change include the potential to provide managers with an understanding of how to increase innovation success, organizational performance, and the social wellbeing of workers and their families within communities.

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Dedication

I dedicate this study to my family, who were instrumental in me completing this doctoral study. To my wife, Sherri Young, your patience, support, and love positively influenced my scholarly development and belief in myself necessary to complete this study. To my parents, Beverly A. Young and Henry Young Jr., without your motivation, teaching, and guidance, this achievement would not have been possible. As well, my children, Brenden, Brittany, Briana, and Sydnie, thank you for believing in me and supporting me every day as I pursued my doctoral study completion. Also, I want to express my most profound appreciation of my Uncle, Philip Bailey, and brother Jevon Mcglory your mentoring, and directive that I finish my doctoral study despite failures and hardships were vital to my success.

Thank for supporting me during this doctoral study journey.

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I am eternally grateful to you all.

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Section 1: Foundation of the Study

The financial success of small and medium-sized enterprises (SMEs) in developed and non-developed countries can depend on management's ability to identify, manage, and exploit innovation systems (Donato & Nieddu, 2018; Ndesaulwa & Kikula, 2016; Sunday & Chinedu-Eze, 2018). SMEs' innovation success relies on their ability to manage internal and external knowledge sources, developing firm-specific knowledge management (KM) (Nonaka, 1994). Nonaka, Kodama, Hirose, and Kohlbacher (2014) found that SMEs' effective utilization of KM directly affected innovation success and performance. Understanding the relationship between KM, innovation systems, and performance could help SME managers allocate knowledge and information resources effectively to minimize cost and improve profitability (López-Nicolás & Meroño-Cerdán, 2011). The objective of this study was to explore how firm-specific KM practices affect business innovation systems and performance of SMEs.

Background of the Problem

SMEs influence economic growth and job creation in world markets (Ndesaulwa & Kikula, 2016; Sunday & Chinedu-Eze, 2018; Wang, 2016) and represent over 90% of existing firms worldwide (Norek, 2014; Xie, Zeng, Peng, & Tam, 2013). Despite these contributions, SMEs accumulated $24 billion in financial losses because managers fail to implement a firm's specific KM influencing innovation success (Brunswicker & Van de Vrande, 2014). The problem was that

some SME managers lack understanding of KM to achieve financial success, which potentially reduces SMEs job creation opportunities and limiting operational sustainability (Cerchione & Esposito, 2017; Costa, Soares, & de Sousa, 2016).

KM is an essential pillar of an organization's sustainability and growth. Barão, de Vasconcelos, Rocha, and Pereira (2017) wrote that organizations' effective KM processes require business managers to create new knowledge usable and exploitable in specific workplace environments influencing employees' innovation developments. Donate and Sánchez de Pablo (2015) stated KM could improve business processes, productivity, and efficiency. SME managers' financial success arguably links to their ability to arrange effective connections between KM, innovation systems, and performance (Inkinen, 2016; López-Nicolás & Meroño-Cerdán, 2011). Managers who increase understanding on how to renew and grow their employees' cognitive and applicable knowledge resources can mitigate innovation system inefficiencies, potentially enhancing organizational performance and financial success.

Problem Statement

Managers' inability to manage employee knowledge and innovation system implementation success negatively impacts the SMEs' profitability; thereby, impacting organizational sustainability and performance (Donato & Nieddu, 2018). SME managers who do not meet performance goals are 50% more likely to fail within 5 years of opening for business (U.S. Small Business Administration [USSBA], 2016). The general business problem was that some SME managers do not

know how to ascertain KM in relation to innovation system implementations within their enterprise influencing performance. The specific business problem was that some SME managers do not know the relationship between KM, innovation systems, and firm performance.

Purpose Statement

The purpose of this quantitative correlational study was to examine the relationship, if any, between SME managers' KM, innovation systems, and firm performance. The independent variables are KM and innovation systems. The dependent variable was firm performance. The targeted population consisted of SME managers located in the high desert region of San Bernardino, California. The implications for positive social change included the potential to understand and better utilize KM connected to innovation systems implementations mitigating the risk of business failures, potentially increasing the financial health, intellectual wealth, and the standard of living for SME business managers and their employees. A decrease in business failures due to increased financial success could make SMEs more sustainable; therefore, positively benefiting communities.

Nature of the Study

The quantitative methodology was used for this study. Researchers use a quantitative method to test theory objectively and deductively, comparing quantifiable changes of a target population against others in similar situations (Saunders, Lewis, & Thornhill, 2015). My study used a quantitative methodology

with the goal of unbiasedly testing theory explaining the relationship if any between numerical variables examined in this research study. Therefore, the quantitative method was appropriate for this study. In a qualitative study, a researcher explores how individuals make sense and meaning from their experiences to develop a theory (Yin, 2014). Researchers use a mixed method approach to examine qualitative and quantitative occurrences viewed simultaneously or in sequence to explore and explain data within the same study interpreting particular social conditioning (Venkatesh, Brown, & Sullivan, 2016). The qualitative and mixed methods approach are incompatible for this study because the qualitative researchers' exploration of how or why individual experiences make sense, as well as the mixed methods investigation of individual social conditioning, do not explain the numerical variable relationship required in this study.

For the design, I used a correlational design. A correlational researcher examines the relationship between two or more variables to determine the strength of direction between variables (Green & Salkind, 2017; Saunders et al., 2015). The correlational design, appropriate for this study, rooted in the study's objective examination of the relationship between independent variables (KM and innovation systems) and dependent variable firm performance. By contrast, researchers use experimental and quasi-experimental designs to determine the degree of variables' cause-and-effect relationships (Gupta, 2014). The objective of this study was not to identify variable cause-and-effect relationships but to identify the strength of a

connection between the independent and dependent variable. As a result, the experimental and quasi-experimental designs do not meet the needs for this study.

Research Question

What is the relationship if any between SME managers' KM, innovation systems, and firm performance?

Hypotheses

Null Hypothesis (H_0): There is no statistically significant relationship between SME managers' KM, innovation systems, and firm performance.

Alternate Hypothesis (H_1): There is a statistically significant relationship between SME managers' KM, innovation systems, and firm performance.

Theoretical Framework

Nonaka (1994) developed the dynamic organizational knowledge creation theory (DOKCT). Nonaka designed the theory to explain the organizational knowledge creation process on the premise that knowledge creation and conversion represent a continuum of interactions between individuals' implicit and explicit knowledgeability. Since Nonaka's (1994) pioneering work, Nonaka, Toyama, and Konno (2000) suggested an extension to the theory as the SECI, *ba*, and leadership: a unified model of dynamic organizational knowledge creation (UMODKC). Nonaka et al. posited that organizational knowledge creation is a continuous process, influenced positively through *ba*, (shared space or environment), and leadership. This arrangement energizes individuals' and group knowledge creation experiences

affected spherically through managers' articulation, transference, and exploitation of these intellectual resource possessions within business environments (Nonaka et al., 2000).

The theoretical constructs underlying the UMODKC include independent variables (a) socialization, externalization, combination, and internalization (SECI), (b) *ba,* and (c) leadership (Nonaka et al., 2000). As applied to this study, the independent variables KM and innovation systems, measured, using the Strategic Knowledge Management, Innovation, and Performance questionnaire to corroborate the underlying constructs of the theory.

Operational Definitions

Researchers' specify precise definitions related to research study foundations, potentially enhancing the understanding of information within a study. While exploring KM, the following definitions can help clarify terms associated with my research study. In this section, the focus was on KM terms including the definition of a small- and medium-sized enterprises.

Ba: Ba represents the physical and mental localization where individuals' work groups and organizational managers shared interactions occur (Nonaka et al., 2014).

Explicit knowledge: Explicit knowledge is the knowledge developed and shared through formal and systematic processes (Nonaka et al., 2000), or the

knowledge specifically related to an industry sector (Gilson, Lim, Luciano, & Choi, 2013).

Knowledge management (KM): An organized system designed to capture the (tacit and explicit) interactions of staff to improve organizational performance (Nonaka, 1994).

Knowledge management practices: This term refers to a management strategy to develop, store, and retrieve organizational knowledge translated into actionable decision-making and problem-solving (Lloyd, 1996).

Small and medium enterprises (SMEs): SMEs represent a business with 1 to 499 employees and annual gross sales of a maximum of $7.5 million in annual receipts, non-manufacturing businesses (U.S. Small Business Administration (USSBA), 2016).

Tacit knowledge: Tacit knowledge is cognitively developed through personal experience, mental involvement, and therefore, challenging to formalize (Nonaka, 1994).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions are common ideas or beliefs, not explicitly proven, yet are theoretical items that researchers consider accurate based on how the phenomenon perceived within reality (Punch, 2014). The first assumption in this study was participants will answer survey questions truthfully and accurately to the best of their

knowledge. The second assumption was participants possess similar management skills across the multidimensional businesses within the sample. The third assumption was participants within the study have adequate accounting management and operational experience to answer the survey questions effectively. The final assumption was participants represent SMEs in a management capacity and can answer independently about the questions presented in the survey.

Limitations

The limitations of a research study consist of weaknesses and deficiencies that a researcher cannot control or change that potentially could influence the outcome validity of the study (Saunders et al., 2015). In this study, several limitations existed. The first limitation was that the study population was limited to SMEs located in inland empire geographical boundary of San Bernardino, California. The second limitation, SME management participants might not be aware of their organizations' KM strategies, yet possess knowledge about operational, accounting, and information systems used within the organization.

Delimitations

Delimitations are self-imposed restrictions of a study made by the researcher to reduce the scope of the survey (Rovai, Baker, & Ponton, 2014). The first delimitation related to SME participants to include firms with 1 to 499 employees located in the high desert communities of San Bernardino County to establish workforce size and geographic generalization scope. The second delimitation was that

participants will include SME managers with more than 1-year experience in a managerial decision-making level position within the organization.

Significance of the Study

The significance of this study exists in providing SME managers with the understanding of KM tools to influence their operational business practices related to innovation systems implementations that can potentially increase the lifespan organization and their financial profitability performance. These internal business practice developments might influence managers and their employees' self-efficacy and confidence, potentially growing their knowledgeability-to-innovation systems success. SME managers' awareness of these transcendent workplace arrangements can provide them with the ability to increase their employees' productivity connected to innovation systems utilization, providing them with the ability to impact the performance of their business positively.

Contribution to Business Practice

The study findings could help improve SMEs managers' understanding of KM and innovation systems integrations in the field of accounting information and information technologies to improve performance. According to Cerchione and Esposito (2017), effective KM strategies are necessary for the successful implementation of innovation systems within SMEs. Expanding SME managers' understanding of KM in the context of innovative accounting information system and information technology (IT) system could potentially improve the relationship with

suppliers, quality of products or services, and financial profit, resulting in long-term sustainability of the company.

Implications for Social Change

SME managers' awareness of KM in accounting formation system and IT system could improve business performance resulting in business growth. Business growth results in employment opportunity for the people in the local community, elevating their quality of life, social gratitude, and happiness in their professional and personal lives (Martinez-Conesa, Soto-Acosta, & Palacios-Manzano, 2017). Moreover, financial success because of KM could enable company decision makers to participate in increased corporate social responsibility activities, which could benefit the community at large through corporate philanthropy.

A Review of the Professional and Academic Literature

The review of the professional and academic literature includes a critical analysis and synthesis of the theoretical framework relating to current organizational knowledge creation, additionally providing a summary of contrasting theories and empirical studies conducted by business scholars. First, explanations included the general theoretical framework for this study, as well as the dynamic organizational knowledge creation theory posited by Nonaka (1994). Next, descriptions included the central framework of Nonaka et al.'s (2000) unified model of dynamic organizational knowledge creation theory, including the justification of use for this study.

In addition, this study included an analysis of the underlying constructs of the primary and focal theories, as researched in the context of SME organizations. Next, I explained the importance of SMEs in national and international economies. Additionally, definitions include a synchronization of the independent variables of the study, which are KM and innovative systems follow. After reviewing existing literature related to SMEs in connection with the independent variables of this research study, I include a brief discussion related to the dependent variable, performance.

Literature Search Strategies

During the search for professional and academic literature, I searched the following databases available in the Walden University library: EBSCO, ABI / INFORM, Business Source Complete, Emerald Insight, ProQuest, Science Direct, Scholar Works, and Business Academic Search Complete, as well as Google Scholar. The peer-reviewed journal articles predominantly selected in relation to this study ranged between years 2015 through 2020. Additionally, Ulrich's Periodical Dictionary was used to validate the status of the sources ensuring that at least 85% of the total sources were peer-reviewed. Other sources included the SBA government website and seminal books. The keywords used in the search were *knowledge management, organizational knowledge creation theory, small- and medium-sized enterprises, dynamic theory, innovation system, accounting systems, information*

systems, leadership styles, SMEs' KM practices, and *SMEs' innovation* and *performance* (see Table 1).

Table 1

Professional and Academic Literature Source

	No. of sources outside of 5-year range (2014-and earlier)	No. of sources within 5-year range (2015-2020)	Total No. of sources
Peer-reviewed journal articles	71	103	174
Government websites	1	4	5
Books	4	4	8
Total sources by year	76	111	187

Literature Review Organization

The literature review includes five parts. First, discussions include the general and central theoretical framework chosen for this study. Also included in this discussion, an examination and synthesis of comparable and contrasting theories and other researchers inquires related to organizational knowledge creation. In the second part, discussions indicate the importance of SME organizations in various geographies. Third, additional discussions include KM, knowledge creation, and the knowledge conversion process as applied within SMEs. Fourth, I addressed innovation systems, which includes analysis of accounting and information systems

and SMEs culture and management leadership styles. Fifth, discussions include SMEs performance and the potential links to innovation systems and KM practices.

Theoretical Framework

In this literature review, examination included Nonaka's (1994) DOKCT as the general theoretical framework for this study. Also considered was Nonaka et al.'s (2000) UMDOKC as the central theory to examine the independent variable constructs of this study. Next, I explain Nonaka's theoretical propositions and the interrelated independent construct variables that relate SME businesses in connection with my research. Other theories considered included Brătianu's (2016) multi-field knowledge creation spectrum theory and Wiig's (1997) building and using KM theory.

Dynamic Organizational Knowledge Creation Theory

Knowledge creation (KC) can play an essential role in SMEs' organizational sustainability and economic growth. According to Nonaka's (1994) theory, SMEs' financial success depends on management's ability to arrange KC developments of the organizations' workers (a) personal understanding, (b) applied competence, (c) sound knowledge, and (d) communicated and exchanged between individuals within organizations. In this context, Nonaka's theoretical constructs of DOKCT include (a) continuous individual's intellectual development within an organization, (b) development of knowledge ideologies justified by leadership, and the (c) ongoing creation, maintenance, and exploitation of organizational knowledge. SME managers

KC arrangements are viewed as vital to expanding organizational knowledge and employees' intellectual capital (IC), which can impact the success of the firm.

Interpreting business specific KC requirements involves how efficiently operational decision-makers collect and disseminate information within changing competitive environments (Nonaka, 1994). Nonaka pointed out an organization that mechanizes information flow dynamically, including (a) workers, (b) customers, (c) suppliers' knowledge input, and (d) product, (e) services, and (f) supplier knowledge output promote KC developments, expanding the firm's knowledge system. Nonaka (1994) and Nonaka et al. (2000) agreed that SMEs' articulation and expansion of knowledge amplified through the ongoing dialogue between workers tacit (personal) and explicit (applied) knowledge elements promotes the dynamic creation of organizational specific KC and IC. How SMEs process KC developments can affect their ability to create sustainable uniqueness, improving innovation, and operational performance.

SMEs need to enhance their organization's internal KM capacity affecting KC innovatively. SMEs use of information communication technologies (ICT) can increase knowledge flow and information data gathering expanding operational performance (Santoro, Vrontis, Thrassou, & Dezi, 2018). SMEs' KC process requires managers to create, maintain, and distribute knowledge information efficiently, potentially influencing the creation of new knowledge within the business, impacting non-reproducible comparative advantages. By contrast, Cepeda-Carrion, Martelo-

Landroguez, Leal-Rodríguez, and Leal-Millán (2017) suggested SMEs' KC success depends on (a) environmental, (b) structural, and (c) human relational factors. Similarly, Bennett (2001) found similar relational elements, such as social and cultural considerations, providing a basis for businesses to interpret information to create meaningful knowledge, sharable among workers within the organization. KC and information exchange mechanisms potentially heighten managers' ability to grow workers' intimate understanding and the organizational knowledge environment.

Use of dynamic organizational knowledge creation theory in research studies. Nonaka's (1994) DOKCT model applies to many business environments. Bandera, Keshtkar, Bartolacci, Neerudu, and Passerini (2017) stated utilizing Nonaka's KC framework within the context of SMEs entrepreneurial domain, resulted in sustainability and growth of organizations. According to Tyagi, Cai, Yang, and Chambers (2015), both tacit and explicit knowledge interplay in *ba* during four SECI modes to update and create knowledge for competitive advantages that lead business growth and sustainability. Organizational factors could affect knowledge acquisition and management process.

Castrogiovanni, Ribeiro-Soriano, Mas-Tur, and Roig-Tierno (2016) explored the literature to identify the type of organizational factors that have the most significant impact in knowledge acquisition and management decision-making in financial institutions using Nonaka's (1994) framework. Castrogiovanni et al. viewed KC through the lens of human resources, technology adoption, business environment,

and management. As previously noted, human resources and technology adoptions can significantly affect the knowledge acquisition, creation and transfer, exploitation, and management within organizations (Alvarez, Zamanillo, & Cilleruelo, 2016). SMEs face challenges in harnessing their workers' tacit and explicit knowledge sources continuously. Various competitive factors internal and external to the organization can affect managers' ability to understand, arrange, and structure internal KC processes to build retainable IC capabilities promoting sustainable organizational growth. These management concerns represent essential issues researched within this study.

SMEs' KC developments can increase workers' development and use of knowledge and information affecting IC within the firm. Alvarez et al., (2016) found organizations need to utilize information systems as a method to enhance knowledge and information IC value. Alegre, Sengupta, and Lapiedra (2013) explained that to increase IC within SMEs managers need to enhance workers' knowledge stocks (intangible understanding) and flows (tangible application) knowledge practices and KM efficiencies. SMEs' IC value is linked to a manager's abilities to combine information from employees,' suppliers, and vendors creating new knowledge and IC competitive advantage. Furthermore, López-Nicolás and Meroño-Cerdán (2011) found in their study SMEs' IC development expanded through managers' ability to increase workers' personalization (personal understanding) and codification (routines expertly applied) through the knowledge transfer and knowledge information

interaction of managers and their workforce. SMEs' managers' articulation and understanding of the relationship between KC and IC growth can expand their organizational performance (Nonaka et al., 2000). Managers' improved performance can lead to an increase in financial growth and organizational sustainability.

Unified Model of Dynamic Organizational Knowledge Creation

The KC process includes the unification of individuals' personalized understanding, becoming formalized to form newly formed knowledge (Nonaka, 1994). Nonaka et al. (2000) posited KC transcends from a person's frontier (discovery) of tacit knowledge into an explicit knowledge asset resource, through the dynamic process wherein new knowledge to create nonreplicable value within the firm. Nonaka et al. expressed, in the UMODKC theory, the KC phase solidifies within a business environment or *ba* amplified through managers' purposeful KC procedures within the organization. Business managers of small and large firms need structured KC development paths to support KC advantages and intellectual capital growth continuously (Alegre, Sengupta, & Lapiedra, 2013). Similarly, Nonaka et al. and Mehralian, Nazari, Akhavan, and Reza Rasekh (2014) suggested KC occurs within organizations' shared space, enhanced through managements' understanding and arrangement of their workers' KC developments.

SMEs can face barriers that impact their ability to grow operationally and financially. These obstacles can impact their ability to build consistent employee reconfigured knowledge to create competitive advantages. According to Nonaka et al.

(2000), UMODKC theory when firms can dynamically create knowledge systematically through SECI, *ba* and management SMEs can succeed financially creating more jobs contributing to income growth opportunities within societies. This research study might provide SME managers with an increased understanding of necessary management considerations potentially improving their KC KM tools, affecting the development of KMP and innovation systems implementations.

According to Nonaka's (1994) DOKCT, organizational KC modes include: (a) socialization (tacit-to-tacit), (b) externalization (tacit-to-explicit), (c) combination (explicit-to-explicit), and (d) and internalization (explicit-to-tacit) or (SECI) process. Organizational KC expands through managers' development and leveraging of employees' knowledge through SECI within the firms' boundaries. SMEs' managers can build employees' KC spirally, developing new knowledge sharable within the firm, increasing the productivity of workers. In this context, Nonaka et al. (2000) developed *ba*, which represents a place or environment for sharing knowledge. In the ba concept, the shared space includes the physical, virtual, or combination of both in which individuals could advance collective knowledge for organizational wellbeing (Nonaka et al., 2000).

Within the *ba* (shared space or place), SME managers could improve workers' personal knowledge experiences, potentially resulting in new processes, products, and services. Moreover, the shared location aligns with Phillips (1960), a 19th-century philosopher, who advised an individual's affirmation of knowing occurs

automatically through their experiences and repetition in which knowledge commonality substantiates' KC. Furthermore, Nonaka et al.'s UMODKC theory concluded the SECI process can provide business leaders with a KC tool to exploit employees' tacit (know-why) knowledge building their explicit (know how) knowledgeability and organizational performance. SME managers, *ba* (place) arrangements can affect their ability to build employees' knowledge repositories, promoting beneficial operational returns to the company.

SMEs managers need to identify what type of employee, customer, and vendor knowledge requires continuous developments. According to Nonaka (1994), different types of knowledge exist in an organization. Tacit knowledge originates from an individual's cognitive understanding and experiences challenging to transfer in written and verbal ways. On the other hand, explicit knowledge is often expressed as (a) vocabulary, (b) numbers, (c) data forms, (d) precise formulations, and (e) specification manuals (Nonaka et al., 2000). Managers' ability to identify and combine implicit and explicit knowledge is vital to KM and the unification of employees' intellectual sources and actionable problem-solving capabilities within an organization. Nonaka's (1994) concept of KMP supports the notion that epistemological and ontological aspect of creative and competitive knowledge evolves from an interaction between existing tacit and explicit knowledge. Nonaka (1994) stated to create a competitive understanding, organizational managers need to amplify their employees' tacit and explicit knowledge expanding the operational

value link between (a) customers, (b) vendors, (c) suppliers, and (d) competitors. Though KC represents an essential factor for competitive advantage, managers have not prioritized continuous KMPs within business enterprises. Nonaka's (1994) DOKCT and modified UMODKC theory (Nonaka et al., 2000) represent suitable frameworks to understand SME's use of KMPs, innovation systems, and the influence on firm performance.

Contrasting Knowledge Creation Theorists

In this section, discussion includes theories not chosen against using as the theoretical framework for this study. The focus was on organizational KC developed within individuals versus KC influenced through operational and social process arrangements. The contrasting theorists provide useful researched information on the KC process through the SECI knowledge spiral model. There are numerous perspectives on how organizational decision-makers create new knowledge within their firms. Since Nonaka's (1994) and Nonaka et al.'s (2000) theories, Brătianu (2016) and Wiig (1997) viewed the KC process differently, as discussed in the upcoming section.

Multi-field knowledge spectrum theory. Brătianu (2016) conducted a systematic review of the literature and provided a new perspective on knowledge dynamics. According to Brătianu's multi-field knowledge spectrum theory, KC exists in an organizational learning environment as three knowledge factors: (a) spiritual (moral ideologies), (b) emotional (cultural well-being), and (c) rational (supplier,

customer). Brătianu examined these three KC factors and suggested each originated as thermodynamic energy interacting and transforming from one form to another. Managers' and employees' KC perpetuate metaphorical knowledge power (motion), enhanced adaptively within an organization. Brătianu (2016) suggested managers and their employees' unarticulated knowledge be viewed as an interwoven energy field, connecting knowledge factors promoting new articulated forms of knowledge exploitable within competitive market environments (Brătianu, 2016).

Brătianu (2016) posited three knowledge fields exist that enable organizational leaders to create knowledge which include, a) rational, mechanically (forged) energy, b) emotional learning commences as thermal (exploded) energy, and c) spiritual (electrical) energy powers organizational learning. In this context, Brătianu posited the organizational energy (force) influences KC and the development of new knowledge sources. Brătianu indicated employees' explicit knowledge resides in their rational understanding. Tacit knowledge lies underneath an individual's emotional learning, and spiritual knowledge represents the combined transformation of implicit and explicit intellectual KC (Brătianu, 2016). The interchange of tacit and explicit knowledge can increase business managers' and their workforce's problem solving and decision-making effectiveness. The interplay and transfer of the three knowledge elements require employee involvement to improve business performance. Brătianu's theory includes the identification of the importance of KC developed through employees as an energy field, intangibly developed, yet

does not explain KC as a continuum, explicitly connected related to SMEs connected to innovation implementations.

Wiig's building and using KM theory. Wiig (1997) stated an organizational KC is influenced by the development and transfer of individuals' (a) shared, (b) personal, and (c) communicated knowledge, which promotes the development and codification of tacit and explicit knowledge within the organization. In line with this, Wiig suggested an organization's KC development is influenced using business systems such as (a) information technologies, (b) content services, and (c) process management systemization. As a result, SME managers' abilities to enhance employees' codified knowledge transferred through innovation systems can provide their firms increase in operational flexibility, improving organizational and financial performance, and organizational sustainability (Wiig, 1997). Wiig's theoretical propositions represent valuable KC understanding concerning managers and workers' KC developments linking tacit and explicit through business systems. However, this study focused on the KC process incorporating the KC dynamic spiral effect that enables managers and workers to merge old and new knowledge promoted through SECI mitigating inefficiencies related to innovation performance.

Cleary and Quinn (2016) expressed similar views to Wiig's (1997) KC theory, stating KC as a creative process in which business managers use individuals' implicit and explicit knowledge in business operation and process management. Cleary and Quinn explained that organizational managers need to view tacit and explicit knowledge

as intellectual capital managed effectively for corporate longevity. SMEs' use of the KC process can impact innovation and performance within the enterprise (Cleary & Quinn, 2016; Wiig, 1997).

In 1997, Wiig included the KC process as employees' interpersonal communications in which tacit and explicit knowledge established. Wiig's KC theory separates KC and information systemization as a method SMEs' managers can use to increase operational performance. However, Wiig's theory does not include KM of KC knowledge factors connected spirally in which new knowledge arises. SMEs can lack adequate financial capital and operational expertise, hence Nonaka et al.'s (2000) UMODKCT embeds SME managers KC spirally enhanced through SECI, *ba*, and management leadership which promotes sustainable innovation affecting operational performance.

Other theoretical views of organizational knowledge creation. Different theoretical views exist to understand organizational KC and the effect on firm performance. Management theorist Barney (1991) identified resource-based-view as a theoretical framework to explain an organization's KC influenced by the firm's physical, operational design, and human dynamic capabilities. Similarly, Teece, Pisano, and Shuen (1997) posited the firms' internal wealth creation realized through technology, organizational culture, and management of unique knowledge assets amplify firm performance. Theorist conclusions varied about the management of KC and the potential impact on a firm's performance, financial growth, and sustainability. The previously

mentioned scholars' theoretical views do not consider KC uniquely linked to individuals' tacit and explicit knowledgeability, dynamically influenced through socialization, internalization, combination, and internalization (SECI) knowledge modes. These KC modes possibly spirally expanded through managers' ability to lead employees, within business structured environments, increasing the synergy between cognitive understanding and explicit worker applied routines (Nonaka, 1994; Nonaka et al., 2000). Based on these differences, Barney (1991) and Teece et al. (1997) are discussed in this study comparatively yet are incongruent with this study.

Akbar and Khan (2016) examined how the scope and level of employees' involvement affect the KC process. Akbar and Khan found the level of employee engagement and management commitment differ within varying types of organizations. This variability can affect individuals' tacit and explicit KC, impacting shared understanding, know-why, and knowledge applied behavior. Manager and employee's motivation, commitment, and interactions can increase KC providing knowledge sharing (KS) opportunities within the organization. Business managers' abilities to create KS within their organizations could result in business sustainability and longevity (Wang & Wang, 2012). Akbar and Khan's (2016) theoretical constructs include the KC relationship between (a) employees' commitment, (b) motivation, synergistically connecting employees' (c) tacit, and (d) explicit knowledge factors, without the inclusion of the KC SECI. Akbar and Khan's study includes critical motivational factors that influence the KC of employees yet does not incorporate KC

knowledge modes, *ba*, and leadership as vital to organizational KC developments (Nonaka et al., 2000).

Akbar and Khan (2016) agreed with Wang, Noe, and Wang (2014) that organizations, in many cases, do not possess the ability to distribute tacit and explicit knowledge evenly within the business. Therefore, managers' arrangement of KS activities can impact capturing, creating, and storing an employee's KC, affecting intellectual capabilities that can impact organizational sustainability (Wang & Wang, 2012). Managers' alignment of KC and KS within their firm can increase the operational performance and growth of the business enterprise.

Managers' abilities to restructure operational practices adaptable to environmental changes can impact the business success (Alegre et al., 2013). Managers create, develop, and utilize their employees' tacit and explicit knowledge developments to expand production efficiencies and increase organizational competitiveness (Grant, 1996). By contrast, Alavi and Leidner (2001) found an organization's management's innovative business culture, operational policies, production routines, and documentation systemization can influence the firm's KC developments. Pee and Kankanhalli (2017) found their study of 101 organizations that KM and KC played a significant role in a firm's organizational effectiveness, theorizing capital equipment (innovation system) investments enabled managers the ability to capture, build, share, and generate new KC improving enterprise performance. Management of KC can potentially expand intellectual resources,

economic growth, and competitive advantages (Pee & Kankanhalli, 2017). When SMEs can create KC and innovation arrangements within managers and workers, IC abilities increase efficiencies in operational functions and reductions in cost become possible.

Small and Medium-Sized Enterprises

Smaller business enterprises encounter a higher risk of organizational failure linked to the scarcity of financial capital, leadership, and employee intellectual capital developments (Mutandwa, Taremwa, & Tubanambazi, 2015). However, SMEs influence economic growth and job creation in world economies (Wang, 2016). Singh, Garg, and Deshmukh (2008) stated SMEs play a significant role in the economic sustainability and growth in developed countries. According to Bharati and Chaudhury (2015), SMEs employ one-half of the workforce in the private sector and contribute less than 5 out of 10 of the overall dispersed payroll amounts, generating between 7 out 10 new employment opportunities annually in the United States (SBA, 2015).

Decker, Haltiwanger, Jarmin, and Miranda (2014) indicated SMEs constitute one-fifth of the average workforce of 16.3 million employed persons and over the past 30 years generated over 1 million jobs per annum in the United States. Karadag (2015) indicated in Turkey, SMEs account for 99.9% percent of employment, resulting in economic growth within the country. Shrirame and Soni (2015) agreed on the vital role SMEs constitute within global and developing geographic economies establishing the importance of these organizational entities within global market environments. The

contributions of smaller firms reaffirm managers' need to succeed financially, potentially influencing economic growth while providing goods and services within domestic and international.

SMEs' managers face challenges in succeeding financially, yet smaller firms are vital to the economic growth of national and international economies. According to Mutandwa et al. (2015), various obstacles impede SMEs' ability to earn real income. Mutandwa et al. found SMEs' profitability in global economies hinges upon owners' abilities to navigate (organizational- paths), negotiate (customer, employee, and supplier relations) that foster operational and financial success. Moreover, Karadag (2015) found various factors impede SMEs ability to achieve commercial success, such as the implementing of communication technologies. Karadag suggested SMEs use of information systems can mitigate increasing cost affecting the organizational financial sustainability. In relation to this study, SME managers' effective coordination of resource elements along with KM of employees and supplier relationship can improve the possibility of financial success.

An operational element that influences SMEs' management potential to succeed and not fail involves the implementation of innovative technology (Sunday & Chinedu-Eze, 2018). Teng, Bhatia, and Anwar (2011) studied 178 SMEs in Singapore and found essential elements for success include, (a) workers training, (b) intellectual capital, (c) development of personnel, (d) leadership quality, and (e) access to financial capital

SMEs' decisions to innovate potentially influence workers productivity and organizational knowledge asset development (Bagheri, 2017). Similarly, Brunswicker and Vanhaverbeke (2015) found SMEs' ability to develop knowledge management practices (KMPs) combined with the implementation of technology can increase organizational capabilities improving the businesses' competitive advantage.

SMEs' utilization of KMPs, innovative technology (Apak & Atay, 2014), and managerial skills (Bo & Qiuyan, 2012) are equally crucial for SMEs' success. Brunswicker and Vanhaverbeke (2015) and Dutot, Bergeron, and Raymond (2014) agreed SMEs' ability to manage knowledge resources combined with technological innovations could increase competitive advantage. In contrast, Teng et al. (2011) found SMEs' active management of knowledge and information resources could enable the ability to experience higher productivity at a lower cost, thereby increasing financial profits and sustainable business performance. SMEs' awareness and understanding of KMPs could constitute better decision-making impacting the operational success of the business. The impact of this study exists in SME managers' awareness, understanding, and potential operational benefits related to KMPs and innovative technology used within the organization to increase the firm's Performance.

SMEs' and KM. One of many SMEs' roles requires the ability to create, maintain, share, and improve knowledge within the organization (Apak & Atay, 2014). Effective KM result from organizational managers exploiting, changing, and

evolving interrelated sources of information linked to organizational needs (Barão et al., 2017). SME managers can use KMPs to focus on increasing the firms' economic and performance through increased sales growth, profits, and cost reductions (Cerchione, Esposito, & Spadaro, 2016). By contrast, Zack, McKeen, and Singh (2009) stated the act of processing knowledge does not in all situations provide strategic advantages. On the other hand, López-Nicolás and Meroño-Cerdán (2011) Bagnoli and Vedovato (2014) and Cerchione et al. confirmed SMEs exhibit a positive relationship between the knowledge creation processing and comparative operational advantages.

Various researchers studied the connection between SMEs and their usable KMPs. Dalmarco, Maehler, Trevisan, and Schiavini (2017) examined KMPs used to help entrepreneurs in the Southern region of Brazil overcome failure factors. Dalmarco et al. found the relationship between the firms' internal KMPs procedures included (a) intellectual assets, (b) procedural manuals, and (c) human processes models. Dalmarco et al. specified the human process model involved knowledge recognition, owner dedication, knowledge legitimacy, potentially increasing organizational competitiveness within markets. Tsai and Li (2007) concluded startup enterprises need to utilize useful KMPs tools necessary for the preparation of specific KC goals. Management's use of KMPs can narrow the understanding and application gap within firms influencing organizational performance. When SME managers

understand how to build KMPs into organizational policies, employees' intellectual competitive advantages can potentially increase business operational performance.

SMEs KM measurement. SMEs KM measurement can involve managers identifying intangible elements of the organization preventing workers' capacity reductions in production that increase cost, eroding profits (Lee & Wong, 2017). Furthermore, SMEs have struggled in harnessing the understanding of how to develop KM measurement techniques due to the lack of expertise and the ability to innovate cost effective KM processes (Hutchinson & Quintas, 2008). Grossman (2007) suggested managers' effective use of KM measurement techniques can influence their ability to develop knowledge specific job-orientation articulation, knowledge development benchmarking, and knowledge sharing and transfer of workers knowledge resources. Improvement in KM analysis and evaluation potentially increase worker productivity and organizational knowledge use efficiencies. SMEs KM measurements can improve the flow of understanding of workers' KC, sharing, and transfer activities through an isolated analysis of independent job-related tasks and application requirements (Nonaka et al., 2000). A better understanding of how to measure SMEs' KM needs can strengthen a manager's KMP efforts towards improving employees' tacit to explicit knowledge conversions and overall worker productivity.

Knowledge Management

Managers of small organizations can leverage KM promoting a higher rate of innovation success (Aktürk & Kurt, 2016). Desouza and Awazu (2006) encouraged SMEs to use KMPs to combine customer data and internal workers' IC to increase their potential firm innovation performance. Hall and Goody (2007) stated many organizational managers' ineffective knowledge management strategies (KMS) resulted in undesirable outcomes. Teng et al. (2011) found SME managers' ineffective KMS could increase cost, decrease productivity, and lower financial profits. Consequently, KMS are essential to promote higher business growth and organizational success (Bagnoli & Vedovato, 2014). As related to this study, SME managers that increase innovation performance can enhance the quality and usage of customer information positively affecting managers' decision-making effectiveness to build market position, reduce cost, and improve the performance of the firm.

Brunswicker and Vanhaverbeke (2015) argued KM include how SMEs organize, maintain, and transfer tacit (implicit understanding) and explicit (know how-activities) to develop innovative solutions to achieve organizational goals. Thereafter, SME managers combine tacit knowledge with the explicit knowledge in developing systematic knowledge leading to the organization's exploration and implementation of work at a higher level (Wiig, 1997). Nonaka (1994), Wiig (1997), and Nonaka et al. (2000) indicated a combination of implicit and explicit knowledge leads to the development of systematic instruction, transferable within organizational

processes. In relation to this study, SME managers' codification (tacit) and personalization (explicit) of employees' knowledge sources can yield the creation of new and improve products and services, increase productivity, and higher sales (Brandas, Megan, & Didraga, 2015). SME managers meeting their financial goals are essential to organizational sustainability and financial success.

SMEs require organizational growth of their firms promoted through employees' non-replicable knowledge inventories coupled with innovation implementation success. Jordão and Novas (2017) posited KM concerns knowledge creation, sharing, and systemization of intellectual capital and information set up within the organization (Jordão & Novas, 2017). SME managers' performance and organizational sustainability impacted through their ability to incorporate KM strategies developing non-duplicable knowledge resource synergistic processes.

The firm's productive KM activities influence the sustainability and financial performance growth, essential, to the competitive position of the organization. Barão et al. (2017) found organizations' effective KM processes require business managers to evaluate the firm's KC and transfer pursuits concerning intelligence and competency developments. In this context, Jordão and Novas (2017) suggested KC, specifically, workplace knowledge requirements, require the innovation of value-added task within the firms KM arrangements. In rebuttal, Zack et al. (2009) offered a less definitive opinion suggesting the mere act of processing knowledge does not, in all situations, provide strategic advantages. However, business managers' ability to

apply new knowledge effectively and efficiently could result in competitive advantages (Bagnoli & Vedovato, 2014; López-Nicolás & Meroño-Cerdán, 2011). Consequently, KM strategies potentially remain essential to promote higher business growth and organizational success.

Wiig (1997) and Nonaka (1994) agreed organizational managers' ability to create, codify, and expand tacit and explicit knowledge an essential factor for any size organization to remain competitively relevant. Tamayo-Torres, Gutiérrez-Gutiérrez, Llorens-Montes, and Martínez-López (2016) revealed knowledge orientation coupled with innovative capabilities for SMEs, could facilitate the achievement of competitive advantage and improve performance. SMEs' KM efforts, effectively building (implicit and explicit) KM, and innovation can affect increase in operational success (Nonaka et al., 2000). Concerning this study, managers' utilization of KM can increase their ability to create an organizational learning environment in which employee KC, knowledge transfer, and exploitation can grow firm performance.

Organizational managers need to identify a path towards KM developments that increase organizational value-assets and combined process knowledge domains (Nonaka et al., 2000). Within business environments, managers' awareness and understanding of KM can provide them with a mechanism to identify, build, exploit, and transfer to their employees and vendors intellectual possessions promoting increased organizational performance. Massingham and Massingham (2014) emphasized KM as a tool to assess the implementation of value-added innovation

opportunities impacting an enterprise. Additionally, Young (2016) found an organizational manager's KM tools consist of computer hardware (systems) connected to employee training, which provides them increased information and procedure developments. Many organizations possess a training mechanism to build KM within firms yet lack the understanding to develop and cultivate KM continuously.

Scholars argued KM includes how SMEs organize, maintain, and transfer tacit and explicit knowledge to develop innovative solutions to achieve organizational goals (Brunswicker & Vanhaverbeke, 2015; Robertson, Casali, & Jacobson, 2012). Other management theorists posited organizational ambidexterity thrives through the exploration and exploitation of existing knowledge capabilities, thereby, promoting opportunities for innovation (Soto-Acosta, Popa, & Martinez-Conesa, 2018). KM enables SME managers tools to sustain competitive advantages through the exploration and exploitation of intellectual capital (Lee & Choi, 2003). SMEs' KMPs can increase the turnover of employees' old knowledge into explicitly amplified new knowledge supporting continuous knowledge of innovation success.

The advantages of KM spread beyond employees to vendors and customers. Nonaka et al. (2000) suggested organizational KMPs connect people through KC processes. Nonaka et al. stated knowledge creation consists of (a) conversion of implicit and explicit knowledge and (b) utilization of *ba,* a platform for sharing knowledge. These tenets of KM creation are more useful to SMEs managers than

leaders from large organizations (Bandera et al., 2017). For example, shared experiences or *ba* could enable SMEs managers to focus on familiarization of individuals tacit and explicit knowledge in the enterprise resulting in innovative products, process, and services (Nonaka et al., 2000).

Organizations that explore innovation successfully will compete in economies potentially earning organizational profits and success. Salim and Sulaiman (2011) investigated innovation approaches and performance of SMEs in Malaysia and found organizational learning contributed to innovation capability, which positively correlated to firms' performance. Similarly, Storey and Barnett (2000) found various factors such as undeveloped IT, misaligned KM strategies and practices, or lack of understanding of the value creation contributed to the organizational failure. Successful implementation of innovative systems can provide SMEs increased competitive insight necessary to plan resources effectively.

Regardless of the size of the business, organizational managers' attempts to remain competitive revolve around the ability to create and retain employees' internal knowledge (not easily documented) in the minds of individuals and expressed understanding (behavioral activity) to remain competitive. Durst and Runar Edvardsson (2012) found organizations that create ways to create and capture unique knowledge attributes reduce the amount of knowledge lost, which can result in decreased operational performance. When organizations ineffectively manage knowledge developments resources such as physical, financial, and intellectual

capital become increasingly scarce, costing the organization more eroding profits (Coyte, Ricceri, & Guthrie, 2012). Coyte et al. (2012), in their case study of 48 Australian SMEs, found resource scarcity of SMEs a vital issue indicating knowledge resources, harnessed (both tacit and explicit) reducing intricacies expanding operational innovation opportunities, product and service choice available to customers. The method in which SMEs mobilize and exploit knowledge depends on how the intellectual resource was used rather than developed (Coyte et al., 2012). Concerning this study, SMEs' competitive position can depend on managers' skills and capabilities to identify, structure, and deploy KMP to build non-duplicable employee expertise and documented processes, increasing operational uniqueness and performance.

Knowledge creation. An organization's KC occurs from multiple sources within and outside of the enterprise. Nonaka et al. (2000) in their UMODKC model posited employees' KC proceeds from (a) socialization (justified understanding-to-internal knowing), (b) externalization (internal-knowing-useable competencies), (c) combination (usable competencies-to-skilled routines), and (d) internalization (skilled-to-expert) knowledge, within the *ba* learning environment. Similarly, yet somewhat differently, Ahumada-Tello, Evans, and Puga (2017) expressed KC includes (a) integrating understanding, and (b) know-how knowledge to optimize innovation. SMEs organizations' KC developments occur in two knowledge forms. First, tacit knowledge or intimate understanding resides within individuals in an

organization. Second, explicit expert knowledgeability activities come from combining employees personal experience with information repositories such procedures, and routines joined through database and internet networks (Nonaka et al., 2000).

Workers' intelligence, skills, and abilities play a role in the innovative success of organizations (Barão, de Vasconcelos, Rocha, & Pereira, 2017). KC architecture (human resource and systemization arrangements), which include the Internet communities and information systems, can assist decision-makers' predictive data analysis related to employee transferrable intellectual capacities. Furthermore, processing of information, KC impact the firms' productivity (Wang & Wang, 2012). The businesses intellectual assets, technology systems, and operational performance promote increased capacity and organizational learning. Employees' tacit and explicit knowledge combinations enhance with SECI knowledge spiral can enable employees more considerable intellectual capital usable within the organization's technology systemization process (Nonaka et al., 2000). These KC and KM developments potentially increase workers IC and IT expertise and routine strengths impacting operational performance.

KC environments require conductivity workers and systems to promote sustainable growth. Andreeva and Kianto (2011) indicated ba (environment) represents the physical and mental space managers utilize for knowledge creation. Nonaka (1994) noted that shared ba represents a multilayered composition of formal

structures, which enable member-to-member interactions within conventional boundaries to create new knowledge. Nonaka et al. (2000) asserted the four types of *ba* concept include: (a) originating (person-to-person), (b) dialoguing (shared from one person to another), (c) systemizing (knowledge transmitted through information technology), and (d) exercising (knowledge communicated through cyberspace, computer networks, and manuals). Managers' recognition of ba can influence increased social interaction amongst workers heightening knowledge creation while increasing enterprise performance. Shared experiences could enable SME managers to focus on familiarization of individuals tacit and explicit knowledge in the enterprise (Nonaka, Takeuchi, & Umemoto, 1996) resulting in innovative products, process, and services.

Knowledge conversion. According to Nonaka et al. (2000), the knowledge conversion process considers the utilization of tacit and explicit knowledge disbursed within organizations. The knowledge conversion process involves tacit and explicit knowledge development, transformed through employees' experiences, and becomes widespread, influencing new expertise within the organization (Nonaka, 1994; Nonaka et al., 2000). Managers require skills necessary to build implicit and explicit knowledgeability of employees, thus vital for KC success within organizations to enhance firm performance (Nonaka et al., 1996). Organizational knowledge conversion expands through managers and their workers' information input and data output interactions within the enterprise (Nonaka, 1994; Nonaka et al., 1996; Nonaka

et al., 2000). Consequently, employees combined tacit and explicit knowledge travel outward in a spiral path spreading throughout the business, in which managers can create transferrable expertise within the enterprise (Nonaka & von Krogh, 2009). This new knowledge can solidify a managers' ability to solve problems and improve operational efficiencies (Nonaka et al., 2000).

Knowledge assets. SME managers need to build firm-specific resources to create a long-term comparative advantage. Knowledge assets (KA), also defined as intellectual capital (IC), represent unique understanding necessary to grow KC uniqueness within organizations (Nonaka et al., 2000). According to Nonaka et al., (a) KA acquisition, (b) development, and (c) maintenance originates as an output of KC in the form of employee, (d) trust, (e) experience, (f) developed customer relationships, (g) technology, and (h) procedurally developed task expertise. SMEs operating in globally competitive markets need to identify, capture, develop, and exploit IC within knowledge-concentrated firms (Khalique, Bontis, Shaari, Yaacob, & Ngah, 2018; Serenko, Bontis, & Grant, 2009). Khalique et al. (2018) conducted a study examining the relationship between IC and organizational performance of SMEs operating in the electronics manufacturing sector in Malaysia and found human, customer, structural, technological, spiritual, and intellectual capital necessary for an organization's success. In the context of KC, Nonaka et al. (2000) examined IC about tacit and explicit knowledge developments and suggested KA

existed as, experiential, conceptual, routine, and systematic, which enables the business-specific IC essential to create value within the firm.

Innovation Systems

SMEs managers need to understand innovation planning and implementations. These managers' ability to maintain financial sustainability affects their potential to succeed in competitive and turbulent business environments (Norek, 2014; Samuelsson, Andersén, Ljungkvist, & Jansson, 2016). Saunila (2014) agreed on the notion that managers could benefit from increased innovation capabilities. Organizational financial sustainability requires an innovative approach from managers to refine old processes or implement new processes that could improve productivity (Saunila, 2014). Teixeira, Oliveira, and Curado (2018) stated managers' ability to utilize employees, and suppliers' intellectual knowledge influences their capability to implement successful innovation systems. Chawinga and Chipeta (2017) asserted managers' ability to articulate, organize, and redistribute the knowledge among their employees and suppliers accelerates business managers innovative agenda (Lin, Che, & Ting, 2012; Nonaka, 1994). Brunswicker and Vanhaverbeke (2015) noted a positive relationship between organizational innovation capability and firm performance. The innovation capabilities in IT and accounting information system could help SME managers to improve Performance.

Accounting information systems. SMEs managers use accounting information systems (AIS) to record, compile, and disseminate customer and supplier

financial data essential for a firm's success. Omri, Frikha, and Bouraoui (2015) stated that SME managers' use of AIS could result in innovation capabilities, increasing financial profits. According to Omri et al. (2015), managers' use of AIS is a catalyst necessary to organize operational and financial data, influencing innovation success and long-term financial growth. SMEs managers' use of AIS potentially increase organizational KC, development, sharing, and transferability inter-organizationally. A manager's use of AIS short- and long-run financial planning of the firm increases planning profit-to-expense performance of the organization (Samuelsson et al., 2016).

Ismail and King (2014) found AIS enabled business managers to enhance the operational process and helped to improve decision-making efficiency for both profit and not-for-profit organizations. SME managers could customize AIS and ensure reliable financial data analysis and support work-related task and business objectives (Abduljalil & Zainuddin, 2015a). However, Abduljalil and Zainuddin (2015b) found SMEs managers encountered barriers in the successful implementation of AIS because of limited managerial knowledge in accounting information systems. SME managers' ability to meet operational and financial goals connected to their access to accurate financial data used to make critical supplier and vendor buying decisions potentially lowering cost and increasing profits for the organization. Concerning this study, SMEs AIS implementations provide managers a tool to improve internal and external operational data flows usable to increase planning, organizing, motivation, and control of employees, vendors, and customers' data efficiently. Data flow

efficiency, when embedded in operational technologies, can provide an increase in KC and subsequent KMP design to improve organizational ambidexterity (Soto-Acosta et al., 2018).

Information systems. The demand for information systems (IS) within SMEs continues to grow as a result of the competitive business landscape. SME managers' financial investment information technologies (IT) improves market intelligence for SMEs (Ghobakhloo & Tang, 2015). IS implementation helps business managers to create value, improve service to customers, enhance negotiated partnerships, and increase trade associations (Bharati & Chaudhury, 2015; Soto-Acosta et al., 2018). Zehir, Köle, and Yildiz (2015) discovered innovative technology could significantly increase product qualities and services to customers. Innovation capability requires business managers to harness existing technology while building new knowledge (Zehir et al., 2015).

Bharati and Chaudhury (2015) analyzed six peer-reviewed articles to explore how SMEs differ from large firms regarding IS adoptions. Researchers indicated SMEs provide over 45% of the total U.S. private payroll and generated between 60% to 80% of the net new jobs annually from 1990 to 2015 (Bharati & Chaudhury, 2015). SMEs' IS adoption impact their organizational growth and innovation success. However, SMEs' lack of financial resources will negatively impact the firm's performance, which limits the successful implementation of IS technologies within the organization (Soto-Acosta et al., 2018). SMEs' use of IT or IS systemization can

increase managers' abilities to mitigate employee knowledge losses. An employee who leaves a job can potentially impact the sustainability and financial profitability of an organization (McGee, 2017).

Soto-Acosta et al. (2018) confirmed a firm's IT capability could expand the organization's market opportunities to meet challenges related to employee restructuring. SMEs managers' use of IT is vital to operational and financial growth. SME managers' ability to collect and disseminate employees', customers', and suppliers' data, provides increased KM flexibility necessary during unexpected departures (Massingham & Massingham, 2014). In connection with this study, KMP and innovation systems planning can provide managers tools to meet financial goals. Managers' abilities to arrange KMP connected to IT implementation potentially enhance their employees' transferrable and sharable IC enhancing organizational productivity and performance (Massingham, 2014).

Leadership. Leaders' attributes could motivate followers to meet organizational goals by adopting innovative ideas. Farrell (2017) theorized leadership attributes are essential in creating and strengthening connections between individuals, teams, and entities to improve decision-making capabilities across the organization. Bagheri (2017) posited leaders within organizations assist in the development of human-to-human (relationship) and acquire skills to motivate and support employees towards a common goal. Yasin, Nawab, Bhatti, and Nazir (2014) contended SME managers are responsible for encouraging individuals to capture, create, and share

knowledge to exploit innovation within organizations. Farrell (2017) argued SME managers' skills and capabilities help implement KM best suited to organizational success. Yasin et al. (2014) found SME managers' leadership style can help mitigate intellectual stimulation inefficiencies that hinder innovation and performance**.**

A manager's leadership style can potentially inspire and motivate employees. As proposed by Bass (1985), transformational leaders have an insight of their organizational landscape, and they utilize interpersonal skills to encourage employees to become creative and innovative to devise creative solutions to organizational problems. Moreover, the transformational leadership style consists of charismatic, motivational, and intellectual attributes (Antonakis & House, 2014; Yasin et al., 2014), which promotes psychological inducement of followers influencing them to commit toward productivity.

Transactional leadership style represents a social engagement relationship in which followers receive contingent rewards and sanctions for their performance (Strom, Sears, & Kelly, 2014). Heifetz, Grashow, and Linsky (2009) defined adaptive leadership style as the leader's ability to adapt to organizational change by mobilizing individuals to take on challenges to thrive in a new business environment (as cited in Boylan & Turner, 2017). Noruzy, Dalfard, Azhdari, Nazari-Shirkouhi, and Rezazadeh (2013) found a significant and influential relationship between transformational leadership, organizational learning, knowledge management, innovation, and firm's performance. Transformational, transactional, and adaptive leadership style could

help SME managers promote KM practice for organizational success, but leaders must take caution on deciding the type of leadership style, as its effectiveness depends on organization type and operating environment (Young, 2016). SME managers' leadership and commitment can influence employees' motivational character during innovation systems implementations.

Organizational culture. SMEs organizational culture (OC) impacts a manager's abilities to motivate employees towards common goals influencing the operational performance of the business enterprise (Donate & Guadamillas, 2015). Schein (1984) explained OC as management's values and beliefs shared by the individual's or a group within a business. SMEs managers are required to establish OC and company vision to build an organizational value system impacting social and environmental ideologies (Fernández-Esquinas, van Oostrom, & Pinto, 2017). SME management developed OC can embed fundamental assumptions about operational patterns, skills, and functional routines within the organization (Fernández-Esquinas et al., 2017). SMEs OC represents a vital role in their operational guidance of employees' cultural values within the organization.

In 2017, Aksoy discovered OC connected to technology and documentation that exists within the firm. Moreover, Fernández-Esquinas et al. found OC underpinned through managers and their employees' values and beliefs that result from behavioral norms, motivations, perceptions, and cognitive knowledge possessions. Chang and Chuang (2011) also suggested OC influences managers

decision-making capabilities and choices. In this regard, Donate, and Guadamillas (2015) suggested OC supports knowledge creation leading to innovation success and firm performance. SME managers' development of OC can impact their employees' workplace perspectives connected to knowledge development potentially increasing firm performance.

SMEs' OC could affect a manager's absorptive capacity. Cohen and Olsen (2015) noted absorptive capacity consist of a manager's capability to disseminate, acquire, share, and utilize external knowledge within organizations to stimulate innovative ideas. Cegarra-Navarro, Wensley, Jimenez-Jimenez, and Sotos-Villarejo (2017) found a manager's ability to combine customers', vendors', and suppliers' knowledge sources can influence resource knowledge accumulation promoting faster innovation success. Researchers found a positive and significant relationship between an SME manager's absorptive capacity, and firm's innovation performance (Ferreras-Méndez, Newell, Fernández-Mesa, & Alegre, 2016; Tzokas, Kim, Akbar, & Al-Dajani, 2015).

Firm Performance

SMEs contribute to a nation's gross domestic product (GDP). Management research theorists stated SMEs' businesses significantly improved job opportunities from 1990 to 2015 (Mutandwa et al., 2015). SMEs include responsibility for financial value creation boosting national incomes, investments, and skills acquisitions necessary to maintain economic stability (Karadag, 2015). Therefore, SMEs'

financial success is essential for countries economic growth. Suriyankietkaew and Avery (2016) studied 439 SME managers in Thailand and found SMEs performance resulted in the country's socio-economic growth. When SMEs managers meet their performance goals, their accumulated profit can impact the organization's sustainability; therefore, potentially improve innovation possibilities. Thus, business success can increase employment and income generation opportunities of individuals within domestic and international market economies (Alegre et al., 2013).

SMEs managers' ability to increase income while lowering cost can give rise to increases in employment opportunities (Saunila, 2014). SMEs managers' performance and operational goals can substantiate the need for greater understanding of how to improve employees' tacit and explicit knowledge to fit innovation investments, increasing organizational intellectual value and financial success (Nonaka et al., 2000). SMEs' financial success can be seen as a manager's organizational leadership ability to, (a) improve services, (b) expand market position, (c) reduce cost of production, and (d) innovatively increase profits within turbulent competitive markets (Chang & Chuang, 2011; Saunila, 2014; Wang & Wang, 2012). Wang and Wang (2012) conducted a study in which KM of employees' tacit knowledge, innovation techniques, and financial and operational performance possessed a statistically significant relationship. In this context, organizational decision-makers implementation of KM and innovation implementations can increase the firm's performance (Young, 2016). In relation to this study, SME managers'

awareness and understanding of KM, in relation to innovation, can potentially increase the firm's income in national and global economies.

SME managers' KM and innovation capabilities affect economic performance and organizational sustainability (Donato & Nieddu, 2018; Sunday & Chinedu-Eze, 2018; Teng et al., 2011). In line with this study, Magnier-Watanabe and Benton (2017) and Wang, Wang, Cao, and Ye (2016) indicated manager KM arrangements could result in organizational innovation in operational process and quality of services leading to financial success. Furthermore, management theorists Brunswicker and Vanhaverbeke (2015) agreed SME managers need to combine employees' tacit and explicit knowledgeability and innovation implementations to gain positive financial returns (Eniola & Entebang, 2015; Nonaka et al., 2000; Popa, Soto-Acosta, & Perez-Gonzalez, 2018). SME managers' awareness and understanding KM could result in increased financial success. Moreover, effective management of organizational resources could influence a firm's life span and performance (Donato & Nieddu, 2018), and improve competitive advantage (Apak & Atay, 2014). In this study, I identified the importance of KM and innovation, potentially increasing SME managers' understanding of how developing employees tacit and explicit knowledgeability can possibly provide higher performance and economic growth for their firms.

Innovation and firm performance. SMEs' innovativeness can increase competitive advantages that allow firms higher sales and increased financial returns

that increase business growth (Bigliardi, 2013). Rosenbusch, Brinckmann, and Bausch (2011) found in their analysis of 42 empirical studies consisting of 21,270 SMEs, a positive relationship exists between SME managers' innovation orientation and performance. Furthermore, additional factors affect the innovation-performance relationship strength including the SMEs, (a) innovation orientation, (b) resource input commitment into innovation process, (c) management commitment, (d) newness of the firm, and (e) internal innovation system compared to external collaborations can affect the performance increases of the business (Rosenbusch et al., 2011). Van De Ven and Polley (1992) pointed out a firm's innovation success influenced through a manager's, (a) goals, (b) actions, and outcomes over time, render less uncertain predictions of the innovation-performance relationship. Van De Ven and Polley's ideas emphasized the connection between SME managers' leadership and innovation culture to mitigate innovation-performance losses and resource cost inefficiencies. Concerning this study, SMEs managers' innovation implementations arguably impact the firm's performance and market position of the business entity.

Transition and Summary

This section included information on the foundation of the study, the background of the problem, assumptions, limitations, delimitations, and the significance of this study. I identified independent variables KM, innovation systems (accounting and information technology), and the dependent variable performance in

connection with this study. I conducted a literature review that entailed an exploration of different aspects of KM within SMEs and theoretical framework the organizational knowledge creation theory.

In Section 2, the discussion included the role of the researcher, participants, research method and research design, and population and sampling approach. Furthermore, Section 2 covered the research considerations, instrumentation technique, data collection and analysis techniques, and measures to ensure study reliability and validity. In Section 3, discussion I included the application for professional practice and implications for social change. I presented and discussed the findings of my research, providing recommendations for action, and recommendations for future research. Last, this study concluded with a summary of the research conducted, the discussion of conclusions, and sharing of personal reflections on the research study process.

In Section 3, discussion included explanation of the application for professional practice and implications for social change. I presented and discussed the findings of my research, provide recommendations for action, and recommendations for future research. Last, this study concluded with a summary of the research conducted, discussion of conclusions, and share my reflections of the research study process.

Section 2: The Project

This section begins with a restatement of the purpose of this study. The focal areas of this section include the role of the researcher, research method, and research design for this quantitative study. Next, I included in this section: a) the identification of the specific population of SME managers used during data collection, b) methods usable for recruitment of participants, and c) ethical considerations taken during the gathering of participant data for this study. Then, this section also included the methods chosen to survey, collect, and measure the data gathered for the research study. Lastly, techniques used for data collection, organization, and data analysis are shared.

Purpose Statement

The purpose of this quantitative correlational study was to examine the relationship, if any, between SME managers' KM, innovation systems, and firm performance. The independent variables are KM and innovation systems. The dependent variable was firm performance. The targeted population will consist of SME managers located in the high desert region of San Bernardino, California. The implications for positive social change include the potential to understand and better utilize KM connected to innovation systems implementations mitigating the risk of business failures, potentially increasing the financial health, intellectual wealth, and the standard of living for SME business managers and their employees. A decrease in

business failures due to increased financial success could make SMEs more sustainable, therefore, positively benefiting communities.

Role of the Researcher

The role of a researcher is to collect unbiased data, analyzable, to present credible findings linked to a business research phenomenon under study (Kang et al., 2017; Saunders et al., 2015). According to Tabachnick and Fidell (2013), quantitative researchers use a Statistical Package for the Social Sciences software when conducting quantitative research that provides a mechanism for analyzing the statistical relationship of predictors and criterion variables considered in a research study. I selected participants from SMEs located in the high desert region of San Bernardino, California. I designed an internet survey using Survey Monkey® software and ensure participants' feedback remains confidential and securely stored for five years from the data collection start date.

Researchers that own an interest in their research provide competency and advocacy in the best interest of study participants (Famenka, 2016; Judkins-Cohn, Kielwasser-Withrow, Owen, & Ward, 2014). I surveyed SME managers with whom I have no previous affiliation or belonging and possess no vested interest in their companies. Researchers' experience and education about research topics offer a greater understanding compared to the examiners with minimal experience (Halpern & Leite, 2015). Researchers need to conduct studies complying with the *Belmont Report*, which entails respecting participants refusal to participate, specifying the

benefit of research, and ensuring the protection of data gathered (U.S. Department of Health & Human Services, 1974). Judkins-Cohn et al. (2014) suggested researchers need to demonstrate respect on behalf of participants through the disclosure of the nature of the research process, informing participants of the ability to withdraw from a study at any time. Beneficence in research entails the researcher optimizing potential benefits while minimizing the cost or risk of participants (U.S. Department of Health & Human Services, 1974). The researcher demonstrates justice in research through the equal treatment of participants irrespective of demographic background, gender, religious belief, and educational attainment (U.S. Department of Health & Human Services, 1974). I informed participants of the right to withdraw from the study, protecting their anonymity in connection with the investigation.

Participants

Researchers must gain informed consent from the participants to improve the validity and reliability (Berrang-Ford, Pearce, & Ford, 2015; Hernández et al., 2017; Saunders et al., 2015). To establish participants and consent for the study, a researcher must determine eligibility criteria and a protocol useable for participant selection (Berrang-Ford et al., 2015; James & Busher, 2015). The participants in this study will include SME managers located in the high desert communities of San Bernardino, California. According to Tseli et al. (2017) and Hernández et al. (2017), the participants' eligibility criteria improve the trustworthiness and replicability of the study. I used the following four eligibility criteria for this study: (a) SME participants

located in the high desert region of San Bernardino, California, (b) participant is the manager of the organization possessing decision-making capacity, (c) participant possesses experience within the business holding a management position for a minimum one year, and (d) possess organizational accounting and or information systems management experience.

A researcher's strategy to gain access to study participants is essential to conducting a quantitative of researchers, and additionally must obtain informed consent from the participants to improve the validity and reliability (Berrang-Ford et al., 2015; Hernández et al., 2017; Saunders et al., 2015). To establish participants and consent for the study, a researcher must determine eligibility criteria and a protocol useable for participant selection (Berrang-Ford et al., 2015; James & Busher, 2015). The participants in this study included SME managers located in the high desert communities of San Bernardino, California. According to Tseli et al. (2017) and Hernández et al. (2017), the participants' eligibility criteria improve the trustworthiness and replicability of the study. I used four eligibility criteria for this study: (a) SME participants located in the high desert region of San Bernardino, California, (b) participant is the manager of the organization possessing decision-making capacity, (c) participant possesses experience within the business holding a management position for a minimum one year, and (d) possess organizational accounting and or information systems management experience.

To conduct a quantitative research study, a researcher must gain access to participants (De Bruijne, & Wijnant, 2014; Litman, Robinson, & Abberbock, 2017). The procedure I used to gain access will include (a) contacting SMEs using the Internet LinkedIn social media platform and (b) on-line Internet email to SMEs affiliated with the chamber of commerce professional associations. To gain access to participants, I sent emails to SMEs that meet the eligibility criteria protocol, including a voluntary participant consent form, which consists of a letter identifying my credentials, research purpose, and confidentiality statement as affiliated with Walden University doctoral study procedures. Also, the researcher provided contact information of the appointed Walden IRB committee member, usable in case of questions that arise related to the study.

Research Method and Design

Quantitative, qualitative, and mixed methods are three research methodologies researchers can use to conduct research studies (Brown, Strickland-Munro, Kobryn, & Moore, 2017). When a researcher intends to determine a statistical relationship between variables, a quantitative research method, and correlational design represents a feasible approach to measure the relationship of one variable to another variable (Park & Park, 2016). Moreover, Brown et al. (2017) indicated a quantitative design method predominantly is used when a researcher's study involves population participants. Therefore, I selected a quantitative correlational method and design for this research study.

Research Method

A quantitative method includes the collection of population data, measurable to explore the relationship between multiple independent and dependent variables (Queiros, Faria, & Almeida, 2017). Researchers can use a quantitative research method to analyze numerical data to test a hypothesis using a systematic, quantifiable, and scientific approach (Sarma, 2015). Barnham (2015) suggested a researcher's population data, gathered through questionnaires or surveys, between groups of individuals, can provide generalizable research study conclusions about a population identified in the research question. In my study, understanding the relationship between KM and innovation systems may provide SME managers an increased understanding of this relationship to improve firm performance goals.

According to Saunders et al. (2015), researchers use a qualitative research method to establish theory or understanding connected to a phenomenon; however, this is not the goal of this study. In other words, the qualitative approach is ideally used when during exploratory research to understand better individual participants' motivations, opinions, and reasons regarding a phenomenon (Choy, 2014). Consequently, the qualitative method does not provide the ability to identify a correlation between numerical variables and thus not usable for this study. Moreover, a qualitative experimental research method requires a controlled experiment setting or manipulation of a variable to observe the effect on other variables (Thiese, 2014), not feasible for this study.

Mixed methods incorporate the quantitative methodology that measures and evaluates variables explored through qualitative explored participant reasons, and opinions related to a research phenomenon (McCusker & Gunaydin, 2015). My research intention includes measuring the relationship between variables to test a theory, compared to explore and identify variables to develop a theory. The qualitative and mixed methodology does not fit this research.

Research Design

I chose a correlational design for this study. The correlational design requires statistical analysis to evaluate the strength of the relationship between multiple independent variables and a dependent variable (Aggarwal & Ranganathan, 2016; Saunders et al., 2015). Specifically, the correlational design does not include participants selected at random, within a control group, or multiple measured (Thiese, 2014). Using the correlational design will enable the researcher the ability to statistically analyze the significance of the relationship between the independent variables KM, innovation systems, and the dependent variable firm performance.

I considered the experimental and quasi-experimental for this study. However, the experimental research design does not represent a feasible method for a quantitative researcher to ascertain the significance of a relationship between multiple independent variables and a dependent variable (Saunders et al., 2015). Researchers employ experimental design when one or more independent variables assigned to specific conditions or groups measuring the causal effect on the dependent variable

(Becker et al., 2017). Furthermore, the quasi-experiment design requires between-subject-design, in which participants belong to an experimental or control group assigned without randomization into groups to measure a causal effect between independent variables and a dependent variable (Becker et al., 2017; Saunders et al., 2015). How researchers conduct the study differentiates the experimental from correlational research design. Researchers use correlational design measures to gather variable data of participants of a specific population; without specificity and manipulation, to determine the correlation between independent and dependent variables considered related to a research question proposed within a study. Experimental or quasi-experimental do not meet the design requirements for this study.

Population and Sampling

The sample population of this study includes SME managers located in the high desert communities of San Bernardino, California. The target population composes SMEs with a workforce ranging from 1 to 20, 20 to 99, and 100 to 499 employees. SME managers develop both human resources and innovation strategy providing planning and direction for an organization (Andries & Czarnitzki, 2014). SME managers or human resource decision-makers within the organization are responsible for developing workers' knowledge and innovation within the organization (Choi & Lee, 2002; López-Nicolás & Meroño-Cerdán, 2011). Managers' can improve organizational performance by understanding how to use KM strategy to

increase workers' tacit and explicit knowledge connections (Choi & Lee, 2002; López-Nicolás & Meroño-Cerdán, 2011; Seow et al., 2005). The sample population associated with this study supports gaining SME managers' views on knowledge management, innovation, and firm performance. Researchers use the nonprobability convenience sampling (NPCS) method when researching large geographical populations (Etikan, Musa, & Alkassim, 2016; Jiang, Zhang, Han, & Qian, 2014). Researchers utilize the NPCS method to gather specific, numerical data, from a desired set of respondents, based on their knowledge or experience (Etikan, 2016). According to Coolican (2017), the NPCS technique is usable to gather participant data, increasing accessibility, reducing time, and cost, while meeting the geographical requirements of a study. For this reason, I chose the NPCS technique for this study.

Researchers conduct a G*Power 3.1 power calculation to determine the sample size when performing a multiple regression study (Green & Salkind, 2017; Tabachnick & Fidell, 2013). Determining the appropriate effect size f2 assists researchers in estimating the correct sample size to quantify the distance between variables (Faul, Erdfelder, Buchner, & Lang, 2009; Green & Salkind, 2017). Researchers need to determine the appropriate effect size f2 to reduce the probability of Type II error occurring connected to a multiple regression variable relationship analysis (Green & Salkind, 2017; Tabachnick & Fidell, 2013). A Type II error occurs when researchers accept the alternate hypothesis, not rejecting a false null hypothesis (Green & Salkind, 2017). I conducted the G*Power 3.1 power calculation to

determine the sample size setting the F test power (1-β) of .80 for two predictor variables and one criterion variable to verify a medium effect size of f2 = .15 (medium) at 5% level of significance, to quantify the distance between variables, resulting in a minimum sample size of 68 (see Figure 1).

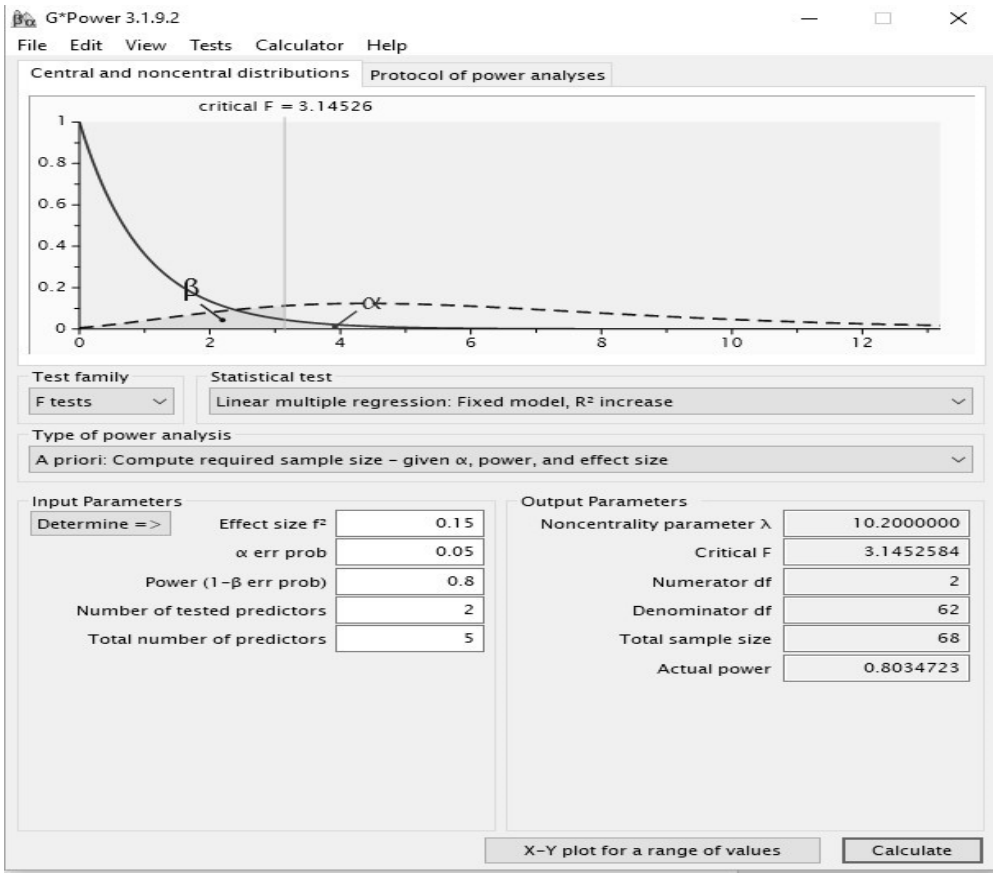

Figure 1. Graphical model of G* Power 3.1 analysis to determine sample size.

Ethical Research

Ethical considerations within a research study reflect participant safeguards to include protection of an individual's well-being, privacy, legal rights, and disclosures in connection with a study (Anderson, Newman, & Matthews, 2017). First, I ensured all

participants understand the ethical considerations in connection with this study. Then, using the informed consent process, communicate the purpose of the study, participant confidentiality, explaining how participation data collection and research use of participant data. Walden University requires scholar-students to obtain approval through the Institutional Review Board (IRB) that will provide the student with an IRB number to validate the study. Furthermore, it is the researcher's legal and ethical responsibility to gain the consent of participants specifying their rights through voluntary informed consent (Anderson et al., 2017).

Researchers' use of the SurveyMonkey® tool provides the gathering of participant responses data usable for conducting statistical analysis in connection with a research study (Herreid, Prud'homme-Genereux, Schiller, Herreid, & Wright, 2016). All potential SME participants received by email a SurveyMonkey® questionnaire survey and the attached informed consent form indicating answer options voluntarily "*consent*" or "*do not consent*" to participate in this study. If the participant chose to participate, the survey question link would appear, as an option, to take the SurveyMonkey® survey. Also, information about the personal safety of data collected and stored for no more than 5 years, as well as, the non-inclusion of company name or person involved with the study guaranteed by Walden University IRB process. There were no incentives used for this study. For this study, I conducted the study after receiving the Walden University IRB approval number 06-25-20-0701591591.

Instrumentation

Data collection for this study included the use of an online survey instrument to gather SMEs managers' participant responses. An attachment to the online survey will consist of the consent form for participants to sign indicating their voluntary consent to complete the SurveyMonkey® survey. I used the survey tool developed by López-Nicolás and Meroño-Cerdán (2011) concerning SMEs strategic knowledge management, innovation, and performance for this study. López-Nicolás and Meroño-Cerdán conducted a study using the survey to test 310 Spanish firms empirically, operating in various industries to determine the statistical relationship between KM, innovation, and firm performance.

López-Nicolás and Meroño-Cerdán's (2011) survey includes three sets of construct variable domains which include five ordinal subscale domains. Schaul, Horgan, Gregor, and Silver (2015) stated a construct variable domain represents a participant's knowledge (measured numerically) concerning a specific goal. In this context, the three construct domains are knowledge management, innovation, and firm performance. KM ordinal subscales are personalization and codification (López-Nicolás & Meroño-Cerdán, 2011). Innovation systems ordinal subscales exist as new processes developed domains. López-Nicolás and Meroño-Cerdán identified three ordinal subscales related to firm performance as financial, process, and internal performance domains each scaled as numerical values. López-Nicolás and Meroño-Cerdán (2011) developed a five domain subscales survey to measure independent

construct variables KM, innovation systems, and dependent variable firm performance. Domain subscales represent a research participant's knowledge achieved outside a specific goal, including human a) knowledge, b) behavior, c) cognition, and d) social behavior (Schaul et al., 2015).

López-Nicolás and Meroño-Cerdán (2011) completed a confirmatory factor analysis (CFA) to validate the strategic knowledge management, innovation, and firm performance survey instrument. According to López-Nicolás and Meroño-Cerdán, a researcher's research instrumentation subscale validation exists within two-factor domains as; (a) instrument reliability, and (b) instrument validity. López-Nicolás and Meroño-Cerdán found the subscales for KM strategies and firm performance subscales, as well as, innovation domains, the Cronbach's alpha coefficients as .67 and .819, indicating high reliability and CFA Validity.

Cronbach's alpha/composite scoring procedure requires construct variables scales, tested at a composite reliability index of higher than .70 (Bonett & Wright, 2015; Daoud, 2017), with a minimum variance of above .50 posited by Ab Hamid, Sami, and Mohmad Sidek (2017). The Cronbach alpha/composite scores of López-Nicolás and Meroño-Cerdán's study supports the use of survey instrument concerning SMEs in other geographic locations.

López-Nicolás and Meroño-Cerdán (2011) developed the survey instrument (see Appendix B) as an extension of Choi and Lee's (2002) research study about KM and knowledge creation. Also, López-Nicolas and Meroño-Cerdán adopted survey

questions from two studies completed by Choi and Lee (2002) and Hoque and James (2000). Specifically, López-Nicolás and Meroño-Cerdán selected: (a) independent variable questions connected to KM from Choi and Lee (2002) study, (b) independent variable related to innovation systems from Choi and Lee (2002) study, and (c) dependent variable on firm performance from Choi and Lee (2002) and Hoque and James' (2000) studies.

Quantitative researchers developed Cronbach's alpha/composite reliability score to increase CFA instrument reliability and internal validity of the construct (independent and dependent) variables measured within a survey instrument (George & Mallery, 2016). Cronbach's alpha represents a widely used measure used to test the interrelationship of observed construct variable items (Ab Hamid, Sami, & Mohmad Sidek, 2017). Researchers conduct the Cronbach's alpha/composite scoring to describe the reliability of a calculated sum (average) of questionnaire test items (Bonett & Wright, 2015; Daoud, 2017). Cronbach's alpha/composite scoring process incorporates the combining of multiple survey items, connected to a construct variables domain, weighting scores of participants gathered data associated with a survey instrument (Feldt, 2004). I calculated the Cronbach's alpha/composite scoring on participant data collected connected with this study.

López-Nicolás and Meroño-Cerdán's (2011) study identified three construct domains as strategic KM, innovation, and performance. López-Nicolás and Meroño-Cerdán found KM strategies aligned with independent KM (implicit and explicit)

variable as codification and personalization. Survey instrument items (KMS1, KMS2, KMS3, and KMS4) align with the codification domain (see Appendix B). These researchers, López-Nicolás and Meroño-Cerdán, found personalization domain items as (KMS5, KMS6, KMS7, and KM8) (see Appendix B). López-Nicolás and Meroño-Cerdán found a composite scoring exists in new methods developed aligning with domain items (INNOV1, and INNOV2) for the independent variable innovations systems (see Appendix B). In connection with my study, the previously mentioned independent variable composite scoring domains underpin KM and innovation systems independent variables providing a composite scoring instrumentation reliability process.

Choi and Lee's (2002), and Kaplan and Norton's (1996) studies determined composite scoring for organizational performance dependent variable as financial process and internal performance domains. López-Nicolás and Meroño-Cerdán (2011) corroborated composite scoring, and domains related to firm performance. Kaplan and Norton's and López-Nicolás and Meroño-Cerdán's financial firm performance aligned with survey instrument items (FP1, FP2, and FP3) (see Appendix B). Kaplan and Norton found and López-Nicolás and Meroño-Cerdán agreed on process domain related to firm performance aligned with instrument items (FP4, FP5, FP6, and FP7) which include balanced scorecard customer and internal perspectives (see Appendix B). Kaplan and Norton and López-Nicolás and Meroño-Cerdán found the dependent variable firm performance aligned with internal process

domain instrument items (FP8, FP9, and FP10). My research will include the identical composite scoring domain connected to the dependent variable (firm performance) measurable within this study.

Using the survey instrument will not require publisher permission. The limited license (see Appendix C) includes the publisher's consent to reproduce the survey instrument. The researcher will correct several grammatical errors to prepare the survey for the use, which consists of changing the original terms "advises" to "advice" and "quicklier" to "quicker." Based on these grammatical error corrections, the psychometric subscale properties remain embedded in the survey.

The data scores, calculations completed using Likert-type scales. The survey includes Likert-type scale responses. Responses to 20 items range from 1 (strongly disagree) and 7 (strongly agree) on a 7-point Likert-type scales. The scales include: 1 = strongly agree, 2 = Disagree, 3 = somewhat disagree, 4 = neither agree nor disagree, 5 = somewhat agree, 6 = agree, 7 = strongly agree. The larger the Likert-type scale value the higher degree of strength firm performance when SMEs managers utilize KM and innovations systems within the organization.

Data Collection Technique

According to Khazall et al. (2014), gathering research participants, online numerical data provide researchers a reliable tool when conducting quantitative versus qualitative research study. De Bruijne and Wijnant (2014) posited online survey data assemblage provides a dependable tool for quantitative researchers to

analyze study participant data using the Internet. Online survey methods enable participants the flexibility of time and place and reduce workplace disruptions, which ensure higher reliability of the survey data collected (Walsh & Brinker, 2015). SurveyMonkey® is an Internet data collection tool that exists as an authorized online survey mechanism to administer a survey (Herreid et al., 2016). Internet-based surveys enable researchers to reach large participation groups (Kays, Gathercoal, & Buhrow, 2012). Kays et al. (2012) suggested Internet survey methods are cheaper to conduct and provide participants faster response capabilities. However, the Internet survey technique potentially presents response problems for those participants unfamiliar with computer-based email systems (De Bruijne & Wijnant, 2014). I used Survey Monkey® Internet online survey tool to collect data from SME manager participants, obtaining SMEs' email addresses from the regional chamber of commerce agencies, located in the high desert communities of San Bernardino County, CA. SMEs in this geographic area aligns with the research population sample boundary for this study.

Data Analysis

The research question that directs this study is: What is the relationship between SME managers' KM, innovation systems, and firm performance?

The hypothesis of the study:

H_0: There is no statistically significant relationship between SME managers' KM, innovation systems, and firm performance.

H_a: There is a statistically significant relationship between SME managers' KM, innovation systems, and firm performance.

Researchers conduct a multiple linear regression statistical analysis to assess the relationship strength between two independent variables and a dependent variable when doing a research study conclusion (Green & Salkind, 2017; Plonsky & Oswald, 2017; Saunders et al., 2015). Quantitative researchers use multiple linear regression analyses to determine the correlation (relationship) between a set of independent variables against a dependent variable. In contrast, bivariate correlation enables the relationship strength determined between a single predictor and a criterion variable (Azadi & Karimi-Jashni, 2016; Green & Salkind, 2017). For this study, I used the multiple regression analysis to determine the relationship, if any, exists between SME managers KM, innovation systems, and firm performance. I analyzed the survey data collected, conducting a multiple linear regression analysis.

When researchers conduct a multiple regression analysis, the potential exists to analyze the statistical degree of effect independent variables have on the dependent variable (Faul et al., 2009; Green & Salkind, 2017; Plonsky & Oswald, 2017). My research includes multiple regression statistical predictions concerning predictor variables KM, innovation systems, and criterion variable firm performance. A Likert-type scale response survey instrument is appropriate to collect research participant response data (Boone & Boone, 2012). Following data collection, a researcher conducts the data cleaning process to isolate survey response errors to improve the

quality of gathered data (Cai & Zhu, 2015). Researchers perform data cleaning to remove survey data that possess missing or incomplete participant responses required before multiple regression analyses completed (Cai & Zhu, 2015). After collecting data using SurveyMonkey®, I performed the data cleaning process to detect participant survey response errors, verify missing data, and identify incomplete surveys for removal. Next, I transferred survey data from SurveyMonkey® file into SPSS version 24 to complete the research analysis for this study.

Testing Assumptions

Researchers' use of multiple regression analysis requires the consideration of parametric testing assumptions necessary to validate statistical data analysis (Hox, Moerbeek, & Van de Shoot, 2017). Testing assumptions includes (a) linearity, (b) normality of standardized residuals (c) multicollinearity, and (d) homoscedasticity (Green & Salkind, 2017; Plonsky & Oswald, 2017). Researchers examine both linearity and homoscedasticity to identify if a simultaneous relationship exists between multiple independent variables and a single dependent theory under study predicted (Plonsky & Oswald, 2017). I conducted this statistical assessment examining statistical plots related to participant data collected concerning standardized residuals and predicted values. According to Green and Salkind (2017), if a linearity assumption between the independent variables and the dependent variable is non-violated, the data plot will not exhibit a curvilinear pattern. Further, the homoscedasticity assumption verified using a data plot that will show a rectangle

arranged in a non-flared pattern on either side of the data distribution graph (Green & Salkind, 2017).

According to Hox et al. (2017), the parametric normality assumption evaluated using a standard probability plot and a histogram which depicts, if the premise is not violated, in a regular distribution pattern. The multicollinearity (non-linear dependence) assumption test (MAT), is necessary to determine the correlation between the predictor variables in a quantitative correlation study (Daoud, 2017). When the independent variables are closely related, a distortion of the linear regression analysis between independent variables and the dependent variable occurs, rendering the interpretation of a researcher's statistical conclusions inaccurate (Daoud, 2017; Hox et al., 2017). I conducted the MAT using KM as an independent variable and innovation as the dependent variable to determine if a violation of the previously mentioned test occurred.

The MAT entails the identification of variance inflation factors identified to assess if two independent variables possess a linear correlated relationship (upward sloping line) pattern, and if so unusable for multiple regression data analysis (Daoud, 2017; Green & Salkind, 2017). According to Hox et al. (2017), if the variance factor is less than 10, exhibiting a tolerance between .1 to 1.0, of independent variables, mitigating the condition in which two independent variables are highly correlated. According to Daoud (2017), the standard error of the coefficients increases with a violation of the MAT, causing the multiple regression model unusable to test

population parameters connected to a research question. A researcher can resolve the MAT violation through the omission of the independent variable, included in the research question, highly associated with another independent variable (Daoud, 2017). I completed a multiple regression analysis as no violation of the parametric testing assumptions occurred.

Study Validity

Research study validity entails the process in which a researcher determines if study construct variables, within quantitative studies, are adequately measured (Heale & Twycross, 2015). Quantitative research requires researchers to fulfill internal and external validity. Internal validity includes three elements: (a) content validity, (b) construct validity, and (c) criterion validity (Saunders et al., 2015). Content validity includes the determination if the test instrument appropriately covers all construct variable content domains (Heale & Twycross, 2015). Construct validity includes the extent to which a statistical inference analyzable, using a specific measurement tool, adequately measures an identified construct in research (Saunders et al., 2015). Criterion validity entails whether the instrument measures used, when viewed against other measures, possess correlational consistency to similar construct variables (Heale & Twycross, 2015). Research validity entails mitigating internal validity concerns, and statistical correlational properties fulfilled for this quantitative study.

Saunders et al. (2015) posited a researcher's study needs to maintain external validity, which renders research findings generalizable to other organizations within a

population. Steckler and McLeroy (2008) agreed that external validity concerns exist when research participants do not serve a specific research community. I mitigated external validity generalizability concerns through the development of research study proposition, hypothesis, and construct variables that constitute comparisons to similar organizations within a population. The construct variables regarding knowledge management, innovation, and performance represent the applicable research basis to multiple communities and business organizations (Nonaka et al., 2000). Moreover, according to Saunders et al. (2015), other external validity issues potentially exist concerning the researcher's intentions and the importance of the study connected to organizations in a specific geographical location. For this study, I addressed research purpose and relevance external validity issues, including a letter to potential participants explaining the intentions and research study significance to SME managers located in the High Desert communities of San Bernardino, CA.

Statistical conclusion validity (SCV) occurs researchers' data analysis confirms a logical conclusion connected to the study (Cheung, Burns, Sinclair, & Sliter, 2017; Garcia-Perez, 2012). Moreover, SCV threats include incorrectly processing statistical data and incorrectly determining the correct statistical conclusion from the data collected (Garcia-Perez, 2012). To address this SCV threat, the researcher calculated a minimum sample size requirement for the study of 69 using G*Power 3.1.9.2 analysis to mitigate this SCV threat. To ensure a Type I error

does not occur, wherein the researcher rejects the research question null hypothesis incorrectly (Green & Salkind, 2017).

Transition and Summary

In this section, the purpose statement, research question, and hypothesis of this study explained. I also told the role of the researcher, research design, research method, and participant population studied. Next, discussed was the survey instrument, data collection technique, and data analysis. Finally, threats to internal, external, and statistical conclusion validity in connection to quantitative study briefly discussed.

In Section 3, I presented the findings, application to professional practice, implications for social change. I provided a discussion of the recommendations for action and further research to include biases I was unaware of until conducting this research. I summarized the study and discuss the conclusions to include the statistical significance of the study.

Section 3: Application to Professional Practice and Implications for Social Change

Introduction

The purpose of this quantitative correlational study was to examine the relationship, if any, between SME managers' KM, innovation systems, and firm performance. The independent variables were KM and innovation systems. The dependent variable was firm performance. The null hypothesis (H_0) was there is no statistically significant relationship between SME managers' KM, innovation systems, and firm performance. The alternative hypothesis (H_1) was there is a statistically significant relationship between SME managers' KM, innovation systems, and firm performance. The population was comprised of SME managers located in San Bernardino, Ca.

In this section, I presented the findings, applications to professional practice, overarching social change possibilities, and recommendations for future research concerning KM, innovation technologies, and organizational performance. The results indicated that there was a statistically significantly relationship between KM, innovation systems, and firm performance. I rejected the null hypothesis.

Presentation of the Findings

I used standard multiple regression analysis to determine if a relationship existed between two independent variables KM and innovations systems and the dependent variable firm performance. My discussion included the presentation of descriptive and inferential statistic results. Also included, the testing of assumptions, and the theoretical conversation related to research findings.

Descriptive Statistics

I distributed 252 surveys through SurveyMonkey® to SME organizations in the high desert communities of San Bernardino, CA. Eighty survey responses were returned complete. The overall response rate was 31%, with a completion rate of 100%. Based on the data analysis connected to this study, I rejected the null hypothesis and found that KM and innovation had a significant positive relationship on firm performance. The statistical means of each survey response is depicted in Table 2.

Table 2

Means of Independent Variables and Dependent Variable (n=80)

Variable	*M*	*SD*
Knowledge Management		
KMS1 Codification	4.206	.3460
KMS2 Codification	4.279	.3434
KMS3 Codification	4.281	.3360
KMS4 Codification	4.270	.3273
KMS5 Personalization	4.279	.3146
KMS6 Personalization	4.279	.3146
KMS7 Personalization	4.254	.3394
KMS8 Personalization	4.254	.3353
KMS 9 Personalization	4.279	.3325
Innovation Systems		
INNOV1	4.252	.3258
INNOV2	4.254	.3447
Firm Performance		
FP1	4.416	.3023
FP2	4.254	.3290
FP3	4.275	.3082
FP4	4.266	.3155
FP5	4.289	.2877
FP6	4.266	.3177
FP7	4.270	.3186
FP8	4.252	.3343
FP9	4.279	.2985

Test of Assumptions

I used SPSS 24 to verify multiple regression test assumptions of multicollinearity, linearity, outliers, normality, and homoscedasticity for independent and dependent variables included in this study. To combat the influence of assumption violations, researchers use bootstrapping to ensure test assumptions avoided potentially affecting the validity of study results (Hox et al., 2017; Rungi,

2014). Bootstrapping of 2,000 samples enabled the mitigation of test assumption violations.

Multicollinearity. I conducted the multicollinearity test to examine the linear relationship of the independent variables. Hox et al. (2017) and Gómez, Pérez, Martín, and García (2016) suggested two independent variables that have a variance inflation factor (VIF) of less than 10 illustrates no collinearity exist between the two variables. According to Gómez et al., a tolerance level between .1 to 10 indicated a workable range of collinearity exists between variables included in a study. Table 3 shows the VIF and tolerance levels of the independent variables. A violation of the multicollinearity assumption does not exist between the independent variables for this study.

Table 3

Multicollinearity Statistics for Independent Variables

Variable	*Tolerance*	*VIF*
Knowledge Management	.542	1.846
Innovation	.542	1.846

Linearity and homoscedasticity. I examined the linearity and homoscedasticity to verify the normality assumptions for this study. Using a standard probability plot and a histogram, a researcher can examine both linearity and homoscedasticity to show if a simultaneous relationship exists between multiple independent variables and a single dependent variable (Plonsky & Oswald, 2017). Figure 2 depicts the histogram of standard residuals for the dependent variable.

Figure 3 shows the linear relationship between the independent variables and compared to the dependent variable. No normality assumption violation exists between the variables.

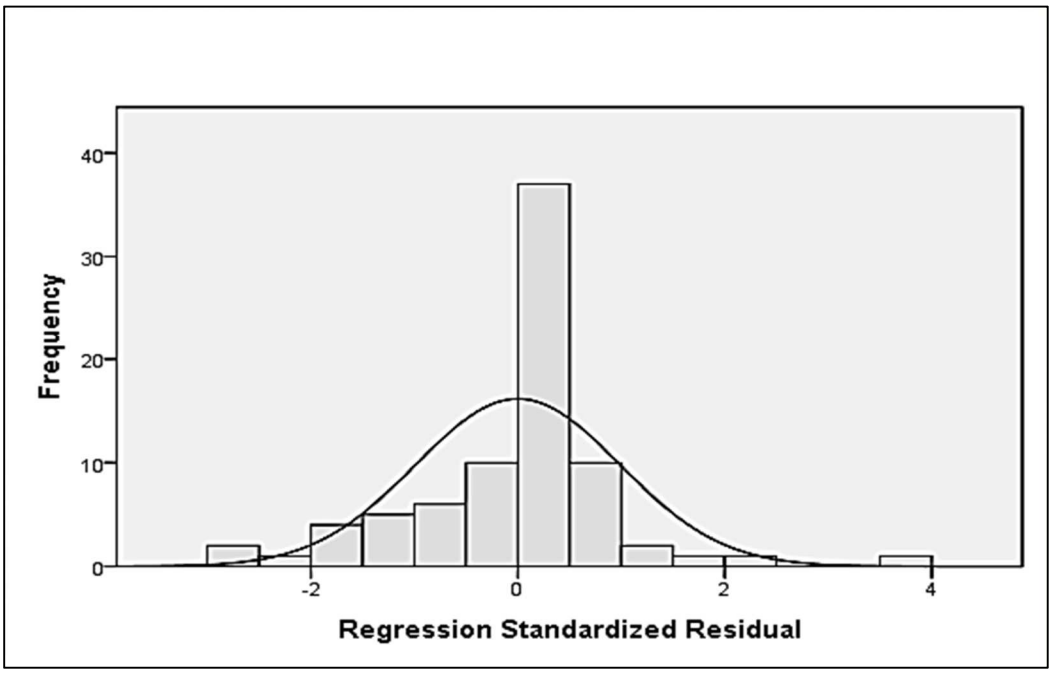

Figure 2. Histogram of regression standard residuals: Dependent variable: Firm performance

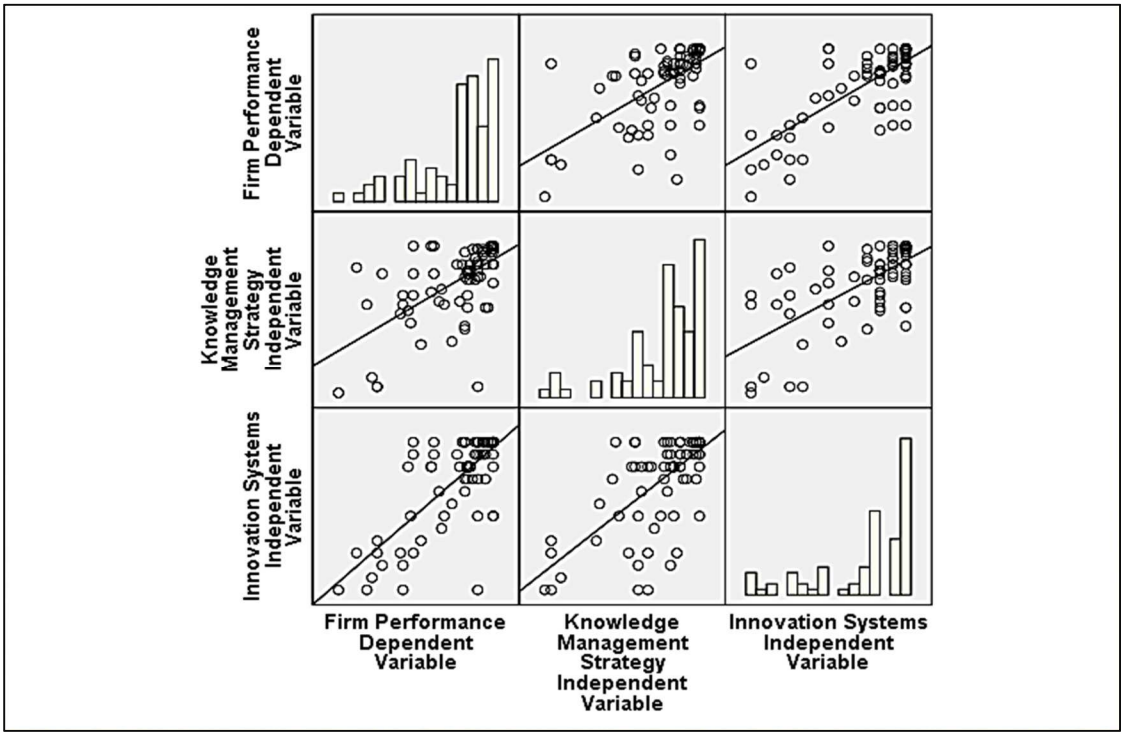

Figure 3. Test for linearity between the independent variables, and dependent variable

Inferential Statistics Results

Researchers use multiple linear regression analysis when assessing the statistical relationship between variables within a study (Green & Salkind, 2017; Plonsky & Oswald, 2017; Saunders et al., 2015). I performed a standard multiple linear regression, $\alpha = .5$ (two-tailed test), to answer my research question, what is the relationship between SME managers knowledge management, innovation systems, and firm performance using SPSS 24. The model showed a significant relationship between KM, innovation systems, and firm performance, $F\ (2, 80) = 51.98$, $p = .000$, $R^2 = .574$. The R^2 (.574) value showed that approximately 57% of the variation in

firm performance was accounted for by the linear combination of independent variables KM and innovation (see Table 4). The final model, firm performance, was significantly correlated with innovation systems (beta = .497, p = .000) but not with KM (beta = .196, p = .053) in this study (see Table 5).

The multiple regression test of assumptions was conducted. The test assumptions included the examination of multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals for independent variables within this study. My test concluded no violation of test assumptions occurred in this standard multiple regression analysis.

Table 4

Model Summary with Dependent Variable: Firm Performance

Model	R	R^2	Adjusted R^2	Std. Error of the Estimates
1	.758[a]	.574	.563	.16415

Table 5

Coefficient of KM and Innovation: Dependent Variable Firm Performance

Model	*B*	Unstandardized Coefficients Coefficients Std. Error	Standardized Coefficients Beta	*t*	*Sig.*
1 (Constant)	1.31	.320		4.110	.000[b]
Knowledge Management	.196	.100	.198	1.964	.053
Innovation	.497	.082	.609	6.033	.000[b]

Analysis summary. The purpose of this study was to determine the relationship, if any, between SME managers KM, innovation systems, and firm performance. I conducted a standard multiple regression to examine this potential relationship between the previously stated variables. The model showed a significant relationship between KM, innovation systems, and firm performance F (2, 80) = 51.98, p = .000, R^2 = .574. Both KM and innovation systems had a significant correlation relationship to firm performance.

Theoretical discussion or findings. This study confirmed the use of the UMDOKC theory as a theoretical framework to extend a manager's awareness of relationship KM-SECI, innovation, and firm performance in SME organizations. According to Nonaka (1994) and Nonaka et al. (2000), managers' use of employees' KM sources (tacit-and-explicit) involves continuous creation, transfer, sharing exploitation, and redistribution of knowledge in connection with innovation systems

to bring about increased organizational sustainability. Further, Nonaka et al. suggested employees KM develop continuously through the SECI nodes, enhancing organizational learning and performance. Nonaka et al. posited KM nodes: (a) socialization (tacit-to-tacit), (b) externalization (tacit-to-explicit), (c) combination (explicit-to-explicit), and (d) internalization (explicit-to-tacit) encompass an organizations ability to transform knowledge spirally increasing innovation success within the firm.

Many studies support the propositional theory of DOKCT concerning KM, innovations systems, and firm performance. Young's (2016) study, using the DOKCT and UMDOKC, confirmed that a significant relationship exists between firms KM SECI nodes, innovation, and firm performance in the shipbuilding industry. Byukusenge and Munene (2017) used the knowledge-based theory; similarly, found SMEs must manage employees' knowledge innovatively as well as effectively for success. Hence, Youngs's and Byukusenge and Munene's studies support the views that SME managers innovation systems combined with employee KM arrangements increase firm performance, yet, do not agree on the strength of KM SECI nodes within the SME organizations. These findings do not corroborate my study of SME organizations using the DOKCT and UMDOKC theoretical framework.

Since August 2018, various researchers have used Nonaka's (1994) DOKCT and Nonaka et al. (2000) UMDOKC theory as frameworks that support KM and innovation as predictors of firm performance. Canonico, De Nito, Vincenza, Iacono,

and Consiglio (2020) found the dynamics of KM SECI nodes connected with employee KC essential for lean product development in the auto industry. Moreover, KM and KC are crucial to organizations owning, managing, storing, transfer, and diffusion standing for serval streams of knowledge necessary for innovative success. Brix (2017) posited KC stands for a process where employees create new levels of understanding in cognizant moments resulting in the revamp of (tacit-to-tacit) increasing (tacit-to-explicit) knowledgeability within the organization. My research study findings interconnect with Canonico et al. and Brix's studies using the DOKCT and UMDOKC as a theoretical framework to examine KM, innovation systems, and an organization's performance.

Brix (2017) suggested that Nonaka, Takeuchi, and Umemoto's (1996) organizational knowledge creation theory applicable as a theoretical framework to understand employee KC phenomena within organizations. Also, Brix expressed employees' knowledge codified (tacitly) and applied (explicitly) through SECI nodes enhance innovative achievements within the organization. According to Brix, managers use *obeya* (set aside room for team problem solving) versus Nonaka's *ba* (platform environment for shared learning) to decrease product development cost and improve innovation efficiency in the automobile industry. However, organizational knowledge creation applies to large businesses compared to SMEs considered in this study. Brix (2017) and Nonaka et al. (1996) studies support

the finding of my research yet develop new theoretical tenets concerning KM, innovation, and firm performance within non-SME organizations.

Alternatively, studies exist that do not support KM created through SECI nodes and *ba,* increasing firm performance. Bolisani and Bratianu (2018) viewed KM as an abstract concept in which employee knowledge solidified through spoken words, transferred, and identified within employees' introspection KC sources. Business leaders can use KM to create and expand employees' tacit and explicit knowledge pillars usable to positively impact operational performance (Bolisani & Bratianu, 2018). Bolisani and Bratianu's study found KC and KM through sensory and audio interactions from employee-to-employee. Attar, Kang, and Sohaib's (2019) study employed the theory of intellectual capital (knowledge donating and collecting), suggesting KM promotes operational success within organizations. Bolisani and Bratanu's or Attar et al.'s study did not support Nonaka's (1994) DOKCT or Nonaka et al.'s (2000) UMODKC SECI nodes and *ba* as theoretical frameworks to determine how managers KM affects firm performance.

I found a statistical significance between SME managers' KM, innovation systems, and firm performance using Nonaka's (1994) DOKCT and Nonaka et al.'s (2000) UMODKC SECI nodes theoretical frameworks. However, other researchers with similarly structured study propositions had conflicting results and did not show a significant relationship between the KM, innovation, and firm performance. The juxtaposition of Bolisani and Bratianu's (2018) knowledge energy theory and Attar et

al.'s. (2019) intellectual capital theory compared to my study and the use of Nonaka's (1994) DOKCT and Nonaka et al.'s. (2000) UMODKC theories call for additional research regarding the KM and innovation constructs and firm performance.

Applications to Professional Practice

My research study findings potentially provide a positive contribution to SME managers' providing increased awareness of the relationship between knowledge management, innovation systems, and firm performance. According to Nonaka et al. (2000), when managers arrange, transfer, and exploit employees' tacit and explicit knowledge sources, innovation productivity increases. Further, Ahumada-Tello et al. (2017) and Soto-Acosta et al. (2018) found a correlated significance between KM and innovation systems affecting performance when managers facilitate KC, KM, and KMP in alignment with information technology uses.

My study findings validated the relationship between KM, innovation systems, and firm performance within SMEs in San Bernardino, CA. I identified several applicable management benefits using Nonaka et al.'s (2000) UDMOKC theory to assess SME managers' understanding of KM (implicit and explicit) related to employees' use of innovation systems. Management benefits include increased awareness and ability to arrange KM and innovation systems together within the organization affecting the continuity of supplier partnerships positively, increase the quality of products or services, and improve financial success resulting in long term growth and organizational performance.

Implications for Social Change

SME managers' understanding of KM and innovation systems in tandem could improve the social wellbeing of those within communities. Knowledgeable workers have a positive impact on an organization through increased productivity and reductions in cost increasing financial performance (Bagheri, 2017). Managers' understanding of the method to develop KM of workers before the implantation of innovation systems can increase knowledge-to-innovation success (Apak & Atay, 2014). SMEs' managers innovation success can improve financial and operational performance, leading to increased social responsibility enhancing business owners' sustainability and their employees' quality of life and work experiences.

The tangible benefits of my study findings include SME managers' ability to engage with employees through mutually beneficial KMP that affect the collaborative social engagement and intellectual growth of workers within a community. Improving KC, KM, and the resulting expansion of information systems can create customer and vendor partnering success, growing the equitable ownership of all constituents in San Bernardino, CA. Increasing citizens' workplace perspectives, abilities, and skills, potentially the formation of new business, education, and wellness of a given community (Ika & Donnelly, 2017). My research results did not ascertain how KM and innovations systems (accounting and information system) technologies increased firm performance. However, I found a relationship existed between SME managers' KM, innovativeness, and firm performance.

Recommendations for Action

The purpose of this quantitative correlational study was to examine whether a relationship existed between KM, innovation systems, and firm performance. I conducted a standard multiple regression using SME manager participants numerical data that showed a significant correlation between independent variables and the dependent variable. The findings of this study led to the rejection of the null hypothesis. Though the alternate hypothesis was accepted, determining the specific type of innovation system was not discovered in this study.

The instrument used in this quantitative correlational study (multiple regression analysis) did not sufficiently support conclusive findings concerning independent variable innovation (accounting and information) systems. Further research is required to explore and explain the business phenomenon as applied to specific SME organizational structures such as science and technology firms, smaller retail enterprises, and small scale manufacturing firms to measure the correlation between managers KM practices in connection with certain types of innovation.

SME managers' in San Bernardino, CA, including the high desert communities of Adelanto, Victorville, Apple Valley, Hesperia, and Lucerne Valley, California could benefit by the further evaluation of this study about KM arrangements, innovation systems, and the resulting impact on firm performance. SMEs' lack of financial sustainability decreases in employment opportunities, and lack of growth in competition curtailed through the understanding and use of KM

practices and innovative process connections in-front of innovation systems implementation, reducing cost, and increasing firm performance. SME managers located in other geographical locations could benefit from my study conclusions towards the development of workplace KM practices required to build employees (implicit and explicit) knowledgeability impacting increased operational performance and financial success.

Recommendations for Further Research

My recommendations for further research encompass the expansion of the independent variables KM and innovation systems using a different theoretical framework for analysis. Using the UMDOKC theory, I found limitations in applying the research propositions to SME managers' human resource training practices potentially necessary to increase innovation success and firm performance. Using a different theoretical framework could provide broader implications for managers' development of KM and training method that affect the improvement of employees' knowledge, skills, abilities, and innovation success.

I believe using a conceptual versus a theoretical framework and conducting a qualitative case study could provide an understanding of managers' and employees' shared experiences requiring fewer research participant responses. I encountered difficulty gaining participants, which was a limitation of this study; thus, a qualitative approach instead of a quantitative method could provide expanded insight on the relationship firm performance have with KM and innovation systems. Examining a

different target population could broaden the external validity of my research findings and conclusions, which were another limitation of my study. As the researcher, the target population's consideration could broaden my research recommendations connected to understanding the relationship between KM, innovation systems, and firm performance.

Reflections

My doctoral study journey began to complete a life-long dream of earning a terminal degree. As a professor of accounting, I was interested in understanding if SME managers KM of employees' (implicit and explicit) knowledge influences the effective utilization of accounting and information systems impacting firm performance. I found that my interest and professional expertise muddied my research lens of viewing, increasing the level of research bias built-in before research. Using a multiple linear regression analysis allowed me to compare numerical data of a target population of similar situations removing biases preconceived about the business practice. Research bias did not negatively affect the data collection, analysis, or findings of my research study.

In my doctoral journey, I have experienced feelings of frustration, reward, and humility, each experience necessary for me to achieve scholar ability and individual growth. I am blessed by God to have the ability to understand, develop, and refine my academic expertise needed to become a Doctor of Business Administration-Accounting. The doctoral study journey included uncertainties, challenges, and

opportunities required for me to grow personally and professionally to build relationships impacting the well-being and success of citizens within my community.

Conclusion

SMEs' influences the growth of economic trade and financial prosperity in national and international countries. SME's financial performance can significantly impact the well-being and financial sustainability of small and large communities (Mutandwa et al., 2015). In this study, I gathered quantitative numerical data to unbiasedly test a theory related to SMEs' managers KM, innovation systems, and firm performance. Participants in this study included SME managers located in San Bernardino County, CA. I used SPSS 24 to test my research hypothesis, conducting a standard multiple regression analysis. I found a statistically significant relationship between KM, innovation systems, and firm performance.

The results of this study supported Nonaka et al.'s (2000) UMDOKC theory. In this study, I provided a statistical analysis and information about KM, innovation systems, and firm performance. The overarching goal was to provide SME managers with additional research on the importance of the relationship between KM, innovation systems, and firm performance to increase organizational success.

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Appendix A**:** National Institutes of Health Certification of Completion

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Henry Young** successfully completed the NIH Web-based training course "Protecting Human Research Participants."

Date of Completion: 05/25/2018

Certification Number: 956761

NIH National Institutes of Health
Office of Extramural Research

Appendix B: Sample of Instrument

Measurement (7-point scales where 1 = *strongly disagree* and 7 = *strongly agree*)

Section 1: KM Strategy (KMS)

1. KMS1 - Knowledge (know-how, technical skill, or problem-solving methods) is well codified in your company.
2. KMS2 - Knowledge can be acquired easily through formal documents and manuals in your company.
3. KMS3 - Results of projects and meetings should be documented in your company.
4. KMS4 – Knowledge is shared through codified forms like manuals or documents in your company.
5. KMS5 - My knowledge can be easily acquired from experts and co-workers in your company.
6. KMS6 - It is easy to get face-to-face advice from experts in your company.
7. KMS7 - Informal dialogues and meetings are used for knowledge sharing in your company.
8. KMS8 - Knowledge is acquired by one-to-one mentoring in your company.

Section 2: Innovation (INN)

9. INN1 - The number of new or improved products and services launched to the market is superior to the average in your industry.

10. INN2 - The number of new or improved processes is superior to the average in your industry.

Section 3: Firm Performance (Compared with key competitors, your company . . .)

11. FP1 - is growing faster

12. FP2 - is more profitable

13. FP3 - achieves higher customer satisfaction.

14. FP4 - provides higher quality products.

15. FP5 - is more efficient in using resources.

16. FP6 - has internal processes oriented to quality.

17. FP7 - delivers orders quicker.

18. FP8 - has more satisfied employees.

19. FP9 - has more qualified employees.

20. FP10 - has more creative and innovative employees.

Appendix C: Publisher's Consent to Reproduce Survey Instrument

PsycTESTS

Strategic Knowledge Management, Innovation and Performance Questionnaire

Note: Test name created by PsycTESTS

PsycTESTS Citation:
López-Nicolás, C., & Meroño-Cerdán, Á. (2012). Strategic Knowledge Management, Innovation and Performance Questionnaire [Database record]. Retrieved from PsycTESTS. doi: 10.1037/t34065-000

Test Shown: Full

Test Format:
Responses for the 20 items ranged from 1 (strongly disagree) and 7 (strongly agree) on 7-point scales.

Source:
López-Nicolás, Carolina, & Meroño-Cerdán, Ángel L. (2011). Strategic knowledge management, innovation and performance. International Journal of Information Management, Vol 31(6), 502-509. doi: 10.1016/j.ijinfomgt.2011.02.003, © 2011 by Elsevier. Reproduced by Permission of Elsevier.