How Innovation Is Created: A Conceptual Framework From a Knowledge-based View

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Abstract: Based on the knowledge-based view (KBV), knowledge is the most significant strategic resource of an organization. From a strategic management standpoint, connecting knowledge and performance is one of the most vital undertakings of any knowledge-based theory of an organization. However, most existing studies in this field left many questions unanswered. Although many researchers have recognized the importance of knowledge production in generating an organization's competitive advantage, they have failed to establish a solid causality between organizational behaviors in knowledge creation and firm performance, and hence the mechanisms remain unclear. This study argues that the innovation process is characterized by the generation of new knowledge, where creative problem solving and new product development can occur and yield innovation results. Idea management and intellectual property, innovation process, and innovation portfolio and project management represent broad innovation processes. Thus, this study proposes a new conceptual framework to investigate the link between broad innovation processes and Small and Medium Enterprise (SME) performance. This novel perspective sheds light on how new knowledge generation, i.e., innovation, in the innovation process directly impacts SME performance, thereby connecting knowledge and firm performance via innovation processes.

Keywords: innovation, innovation process, framework, knowledge-based view, SME performance

1. Introduction

Today, the importance of knowledge for the success of organizations is widely recognized (Lubit, 2001). Knowledge is becoming the key resource of organizations (Gao et al., 2008) and a deciding factor for business performance (Schiuma et al., 2012), and it is being considered the most valuable asset of an organization (Gituma, 2017). Dlamini (2017) highlighted that knowledge has become a highly complex asset, which has been receiving special treatment from management, unlike other resources. Given that knowledge-based view (KBV) is a management concept that helps organizations achieve competitive advantage, it must be carefully managed (Huges et al., 2017). Although the importance of knowledge creation is widely recognized by the academic community, evidence on how knowledge is created in organizations (Yang et al., 2010) and how to effectively manage (Yang et al., 2010) or evaluate (Chen & Edgington, 2005) the knowledge creation process remains limited. Despite the recognition of the importance of knowledge creation in developing a firm's competitive advantage, researchers have not been able to establish a strong causality between organizational knowledge creation behaviors and firm performance, so the mechanisms remain obscure (Brockman & Morgan, 2003). Extant literature failed to capture the importance of knowledge creation as a hidden driver of innovation in the knowledge economy, which is reflected in the recent increasing wave of calls to investigate the relationship between knowledge creation and innovation and, thus, linking knowledge and firm performance through innovation processes (Brockman & Morgan, 2003). This study attempts to address the above issues in the ensuing sections.

2. Knowledge-based view of a firm

Knowledge-based view (KBV) is an extension of a firm's resource-based view, which assumes that knowledge is a firm's most important productive resource, resulting in varying levels of firm performance (Kogut & Zander, 1992; Grant, 1996).

Major technological developments, particularly information and communication technologies (ICT), are leading to profound changes in society and the economy. For example, the OECD (1996) described today's economy as "a knowledge economy" or a knowledge-based economy. According to the World Bank (2016), the knowledge economy is characterized by a well-educated population, an economic and institutional system that provides incentives for the creation and transfer of knowledge for growth and prosperity, a dynamic information and communication infrastructure, and an effective innovation system.

Kogut and Zander (1992) developed the initial KBV by proposing that "the central competitive dimension of what organizations know how to do is to create and transfer knowledge efficiently within an organizational context" (p. 384). Hence, an organization is viewed as an institution for integrating knowledge or learning. Therefore, the

firm's ability to produce unique or low-cost products/services is owed to its superior knowledge (Grant, 1996). The KBV assumes that knowledge is the most important strategic resource of an organization. Through the transfer or creation of knowledge, organizations become more efficient and effective in utilizing scarce resources. Successful organizations are able to constantly create new knowledge, disseminate it throughout the organization, and quickly translate it into new technologies, services, and products (Nonaka, 1994). As a result, knowledge is increasingly viewed as an important source of competitive advantage (Grant, 1996; von Krogh & Roos, 1996).

The literature review revealed some salient features of the KBV. First, successful firms are able to draw on explicit and tacit knowledge to create and disseminate new knowledge throughout the firm (Polanyi, 1966). Nonaka (1991) compared the two by emphasizing that explicit knowledge is viewed as formal, systematic, codified procedures and universal principles, whereas tacit knowledge comprises insights, intuitions, and hunches of individual employees based on practice and experience. Both can be transformed into commercially useful products and services. Second, Kogut and Zander (1992) distinguished internal from external knowledge.

They further explained that internal knowledge is created by the organization through knowledge reorganization and experimentation, whereas external knowledge comes from external sources through acquisitions, networks, and joint ventures. However, with the proliferation of open innovation, this line is becoming increasingly blurred (Chesbrough, 2006). Third, knowledge is held by individuals and the social context within an organization (Simon, 1997). In the knowledge economy, human capital is crucial because employees are no longer merely an element of the production system, but rather owners, creators, and controllers of knowledge (Kogut & Zander, 1996).

Grant and Baden-Fuller (1995) stated that knowledge is acquired by individuals and, in the case of tacit knowledge, is also stored by individuals. In addition, knowledge is expressed and made explicit when members work together in a social setting, i.e., a team, group, organization, or network (Simon, 1997). Organizations should therefore be understood or viewed as a social community that specializes in the creation and transfer of knowledge (Kogut & Zander, 1996; Nonaka, 1994). This subject is also discussed in the literature as "organizational learning" (Huber, 1991; Powell et al., 1996). Such learning is embedded and mediated by various elements in an organization, including hierarchical culture and personality, schedules, archives, approaches, frameworks, and the organization's workforce (Kitchlew, 2015). Some researchers argued that learning is considered the most critical asset of an organization because learning-based assets are usually difficult to imitate, socially complex, and heterogeneous, and therefore are the real determinants of sustainable competitive performance of the organization (Kitchlew, 2015). Fourth, knowledge should be understood in the organizational context for value creation. KBV is based on a constructionist perspective, which assumes that knowledge can only be managed by creating enabling conditions rather than being completely controlled (von Krogh, 1998). As knowledge is the most important source of revenue, it can be portrayed with the concept of "intellectual capital" (Roos et al., 1998). Firms can align their strategy to what an organization knows or develop knowledge to support a strategy to ensure that they fully benefit from knowledge and capabilities in value creation (Zack, 1999). The above section synthesizes KBV research work and lays the foundation on which the theorization of broad innovation process is unfolded in the next section.

3. Theorization of broad innovation process

In terms of the KBV, recent studies of the innovation process have shifted their focus from the control of firm-specific knowledge as a static resource to the acquisition, conversion, and use of firm-specific knowledge (McEvily & Chakravarthy, 2002). Some researchers have also explored how the innovation process can be accelerated through knowledge creation (Bettis & Hitt, 1995).

Innovation process is commonly understood as the process that leads to the creation of innovations at firm level, which is well documented in the literature in various ways, such as the "innovation decision process" (Rogers, 2003), the "organizational innovation process" (Amabile, 1988), the "innovation process model" (Schroeder et al., 1989), and the "intraorganizational innovation process" (Saren, 1984). This is how innovation creation has been traditionally managed, which is a common concept accepted in the academic community. However, some scholars observed that the current understanding of innovation process in the literature is relatively generic, whereas innovation is quite complex and includes diverse influencing factors (Dodgson & Hinze, 2000). Hence, this research posits that such generic concepts will give rise to opportunities to examine the innovation process from specific/or different perspectives. If we consider a broad-based innovation process as the creation of new

knowledge, the co-creation of knowledge from specialized and tacit individual knowledge assets requires a new way of management with different rules (Amabile, 1998). As knowledge work is increasingly organized in projects, short-term task forces, and temporary cross-functional teams (Blomqvist, 2008), how innovation is organized and managed should be examined beyond the traditional general innovation process.

Idea management and intellectual property (IMIP) involves generating, collecting, and evaluating ideas to be used in the innovation process and protecting those ideas (Flint, 2002; Khurana & Rosenthal, 2002). Based on the KBV, knowledge always begins with the use of the individual's mind and all innovations start with the creation of ideas (Nokana, 1994), which is conceptualized as a change in the existing knowledge structure (Niamh, 2013). Thus, "idea management" plays an important role in this process (Fu, 2018). How can such ideas be managed by deploying the right techniques and appropriate platform so that some of these ideas can be successfully applied, resulting in the generation and application of new knowledge and the creation of value, must be determined. Such knowledge creation is closely linked to an organization's competitive advantage (Gupta et al., 2016). Hence, the protection of intellectual property of the new knowledge will help sustain the competitive advantage, thereby becoming a part of this process (Fu, 2018). Such perspective was reaffirmed by Peeters and van Pottelsberghe (2003) who further emphasized that intellectual property protection is an important dimension of the innovation process. Based on the KBV, this also reflects the transformation and/or creation of tacit knowledge (lying dormant in people's minds) into explicit knowledge (documented and protected as part of knowledge management and organizational learning) (Fu, 2018).

Innovation project and portfolio management (IPPM) are important tools or methods for managing innovation projects and processes (Cooper & Edgett, 2008). Project management methods address how to "do the projects right," whereas project portfolio management was developed to address how to "do the right projects," i.e., how to select and prioritize multiple projects or balance the number of incremental and radical innovation projects. Usually, the specific innovation strategy followed by a company is clearly reflected in its innovation project portfolio in which project portfolio management plays an important role in this process (Dervitsiotis, 2011). Mudrak et al. (2005) examined the dynamic interaction of organizational activities and suggested that the success of innovation projects depends on the ability to align innovation project activities with the supporting environment. This is consistent with the observation of other researchers from the KBV that when organizations innovate, they do not simply process information, but create new knowledge and information from within to redefine problems and solutions while adapting to and reshaping the environment (Nonaka & Takeuchi, 1995). Similarly, Perez-Freije and Enkel (2007) highlighted that IPPM are parts of the innovation process from innovation control and management perspective. Therefore, IPPM are considered part of the broad innovation process, reflecting the organization's ability to directly manage innovation activities.

Such perspective is also shared in the KBV literature, in which knowledge is recognized as a critical organizational attribute for promoting innovation (Dougherty, 1992) and knowledge creation as the ability to develop new and useful ideas and solutions relating to new products, services, and procedures (Nonaka, 1991). From the knowledge perspective, an innovation process (the generation of innovation) is characterized by the creation of knowledge required to understand how the innovation came about or is managed (Quintane et al., 2011). The knowledge that is created during the innovation process makes it possible to understand innovation as new knowledge creation and innovation process as methods or approach to manage innovation.

Collectively, IMIP has played an important part in the innovation process as it involves generating, collecting, and evaluating ideas to be used in the innovation process and protecting those ideas. IPPM are important tools or methods in not only managing innovation projects, but also the entire innovation process. Therefore, this study argues that the a broad innovation process shall include not only the innovation process, but also IMIP and IPPM, as this broad innovation process creates new knowledge and such new knowledge would not have been conceived, created, and captured before it has gone through this innovation process. The broad innovation process, from the knowledge management perspective, captures new knowledge creation not only in the form of innovation creation, but also through innovation management in the innovation process, i.e., how new knowledge is created and how new knowledge is applied to create value.

4. Innovation - as a process and an outcome

Kogut and Zander (1992) indicated that the central competitive dimension of organizations is the efficient creation and transfer of knowledge in an organizational context. A growing number of researchers explicitly

argue that knowledge creation is at the heart of organizational innovation (Quintane et al., 2011). Other researchers have also uncovered that an organization's ability to transform and exploit knowledge may determine its level of innovativeness, e.g., introducing new problem-solving methods or new products in response to market demand (Tidd et al., 2005). Thus, the processes by which knowledge is created and used within organizations are at the core of firm performance and value creation.

The knowledge literature states that innovation and knowledge creation are fundamentally intertwined (Niamah, 2013). Gold et al. (2001) regarded innovation as "the creation of new knowledge from the application of existing knowledge" (p.190). Heffner and Sharif (2008) stated that innovation is a kind of combination of knowledge and entrepreneurship. Other researchers specifically noted that innovation amounts to the use of new knowledge to provide a new product or service that is desired by customers (Albers & Brewer, 2003). Dvir and Pashar (2004) argued that innovation is a process of turning knowledge and ideas into value. Therefore, the innovation process as a process and as an outcome must be further understood from a knowledge creation perspective.

4.1 Innovation as a process

Defining innovation as a process allows researchers to examine the constituent activities of innovation, or what activities constitute innovation (Greve & Taylor, 2000). This process is generally referred to as the "innovation process," as previously discussed. Wolfe (1994) stated that studies on the innovation process are categorized into two, namely, the stage model and process research. Stage model research views innovation as a series of stages that unfold over time and as a process from initiation to the implementation of specific changes (Cooper, 1999, Tidd & Bessant, 2005). The stage-gate process introduced by Cooper (1990) has the most distinct and orderly phases. Many other scholars contend that innovation is best understood from the interactive process perspective, that is, a dynamic ongoing process in which institutional structures and actions are inextricably linked (Edwards, 2000). Moreover, researchers have acknowledged that many feedback loops and cycles occur before the process progresses, suggesting that organizational learning also occurs in the process (McDermott & Handfield, 2000). Interestingly, some scholars support the process view when examining disruptive innovation, viewing it as dynamic changes and the interconnection of events and actions rather than static outcomes (Langley, 2007; Petzold et al., 2019). That is the process-oriented view of innovation.

4.2 Innovation as an outcome

Defining innovation as an outcome helps identify what constitutes an innovation. In addition, innovations are classified into different categories used for further research and analysis (Eric et al., 2011). The most commonly observed outcome-based innovations are the number of patents and their derivatives (Whittington et al., 2009). Some researchers have also proposed the adoption of innovations as an indicator, which is widely used in innovation practice and its related academic research (Bell, 2005; Leiblein & Madsen, 2009).

However, patents or adoption measures are not featured in the traditional process-oriented innovation literature, as these measures are limited and therefore applicable to the innovation outcome (Eric et al., 2011). In the process-oriented literature, innovation is generally defined as activities (Armor & Teece, 1980; Terziovski, 2010) or events (Van de Ven & Polley, 1992), and most researchers measure the innovation process as a function of its outcome (Eric et al., 2011). For example, Armor and Teece attempted to overcome the difficulty of measuring innovation activity by using R&D expenditures as a proxy, whereas Terzovski (2010) measured outcomes of the technical, design, production, administrative, and commercial activities that constitute innovation. Most recently, in a published paper, entitled, Innovation management research method: Embracing rigor and diversity, the authors observe that, from a research methodology perspective, in treating innovation as an outcome, innovation management research has typically overlooked many potentially important topics and methodological approaches (Ritala et al., 2020). As such, there exist methodological opportunities for researchers to focus on innovation as an ongoing process, e.g., process studies that emphasize the activities of individuals, teams, and organisations, and so on, rather than as an outcome (Bresman, 2013). Consequently, reconciling the two research streams, i.e., innovation as a process and innovation, as an outcome seems to be challenging, but it is an issue that must be addressed.

Given that innovation is essentially new knowledge creation (Abou-zeid & Cheng, 2004), conceptualizing innovation from a knowledge creation standpoint is possible. Knowledge creation is a process in itself, regardless of the form in which the knowledge is created (Eric et al., 2011). Some research highlighted that the knowledge creation process is crucial for innovation given that it involves selecting and implementing new ideas, products,

or organisational developments, and solving unexpected problems (Soo et al., 2004). Thus, the process of knowledge creation is defined by its outcome: it is a process that generates new knowledge which could not have been conceived and created prior to the innovation process (Eric et al., 2011). Therefore, the close connection between the knowledge creation process and its outcome sheds light on how we can manage innovation (as new knowledge). Hence, this study postulates that innovation can be viewed and researched as a process and an outcome concurrently. Such fresh perspective can pave the way for studying innovation as new knowledge creation in an organization through new lens. This application will be an important assumption to the future development of the conceptual framework.

5. Development of conceptual framework

This section discusses the conceptual framework of innovation—as a process and an outcome—and its impact on SME performance.

5.1 Innovation and SME performance

Organizations with high innovativeness will be more successful in responding to customers' needs and in developing new capabilities that allow them to achieve better company performance and superior revenue (Calantone et al., 2002). Generally, innovation (through innovation process) is linked to positive company performance (Lawson & Samson, 2001; Smith et al., 2008). IMIP can also generate revenues for organizations (Elton et al., 2002), and the application of Innovation Project and Portfolio Management helps improve company performance (Cooper et al., 1998; Matheson & Matheson, 1998). Oirere (2015) reported that innovation positively impacts financial performance, profitability, and market share of SMEs. Roos (2016) discovered that innovation improves the manufacturing efficiencies of SMEs by reducing productivity costs. Specifically, Rosenbusch et al. (2011) also established through meta-analysis that innovation process outcomes positively affect SME performance. Thus, it is hypothesized that innovation (through innovation processes) will positively affect SME performance.

5.2 Innovation process and outcome and company performance

Based on the KBV, innovation process (the generation of innovation) is characterized by new knowledge creation (Quintane et al., 2011), where creative problem solving and new product development can transpire and generate innovation results (Tang, 1998; Anbari & Kwak, 2004). Through literature review and theorization of innovation process, broad innovation process encompasses innovation process, IMIP, and IPPM. As aforementioned, this study argues that innovation can be studied as a process and an outcome, indicating that the impact of innovation process on company performance and its outcome must be explored. Hence, it is hypothesized that innovation process and outcome will impact company performance.

5.3 SME performance research gap

Increased innovation performance enhances customer value relationships and positive financial outcomes (Dekoulou & Trivellas, 2017). Although some researchers discovered a positive link between innovation outcome and SME performance (Rosenbusch et al., 2011), others found contrasting results (Amara et al., 2008; De vrande et al., 2008). Essentially, the innovation results/outcomes (and its impact on company performance) are what matters, and it appears that SMEs are still grappling with the fact that they must better understand how innovation activities and innovation management can influence/impact company performance (Fu, 2018). Innovation is critical to achieve operational efficiency (Hsueh & Tu, 2004). Companies with greater innovativeness are more successful in achieving better financial performance (Calantone et al., 2002). Nofal et al. (2014) observed that the overall performance of the organization should reflect in the company's operational and financial performance. As such, it can be proposed that operational and financial performances are part of SME performance.

Therefore, this study broadly hypothesizes that innovation processes and their outcome positively impact the operational and financial performance of SMEs, as shown in Figure 1.

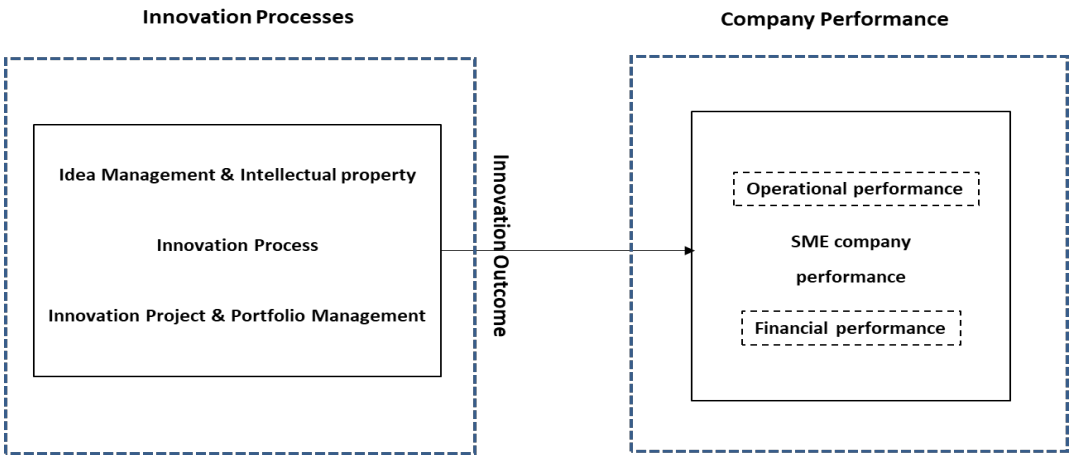

Figure 1: Proposed conceptual framework on innovation and its impact on SME performance (source: author)

6. Discussion and conclusion

Looking at innovation through the lens of KBV provides some novel insights that differ from the traditional view of the organizational innovation process.

The key outcome of innovation is innovation performance, which is realised through innovation processes. The ideal definition of innovation performance include a linear and holistic approach and encompass all determinants of the development and diffusion of innovations (Edquist et al., 2018). In typical innovation process literature, extant concepts relied on the input–output relationship and a process view to describe innovation performance (Linton, 2009). Their focus is on innovation as a process per se, i.e., stage model and process research, and innovation performance is the outcome generated from an innovation process, which includes the development and implementation of innovation activities (Chen & Huang, 2009). Such perspective is certainly comprehensible, given that innovation frequently involves progression from one thing (such as a new discovery or idea) to another (implementation/adoption) through intervening processes (development) (Ritala et al., 2020). Viewing innovation on the basis of KBV, some researchers asserted that innovation is essentially about knowledge (Tidd et al., 2005), and new knowledge is created and used through innovation activities (Trott, 2005). Therefore, this study closely examined what activities constitute innovation (as new knowledge creation) and proposes that, in addition to the traditional generic innovation process, IMIP and IPPM are critical innovation activities, as those are key activities featuring new knowledge creation and its application to create value (Andreeva, 2009). Furthermore, the new knowledge creation in this process contains not only innovation per se, but also how innovation process is managed to engender innovation. Therefore, the knowledge creation process is crucial for innovation through the selection and implementation of new ideas, products, or organizational developments, and solving unexpected problems or meeting unmet customer needs (Soo et al., 2004). This new perspective sheds light on how innovation is created on the basis of KBV.

Given that an organization's ability to transform and exploit knowledge will determine its level of innovativeness (Goh, 2002; Tidd et al., 2005), taking a KBV of innovation processes will help better understand "transforming knowledge" (through new knowledge creation) and "exploiting knowledge" (through value creation and capturing). As a result, it will be easier to assess an organization's level of innovativeness on the basis of its causality. Bu examining the broad innovation process, generation of new ideas and creative problem solving will converge into new product development processes and yield innovation results (Tang, 1998; Anbari & Kwak, 2004). One of the problems encountered by a traditional innovation process approach is its generic nature and, when taking a process perspective, it fails to capture innovation outcomes (Fu, 2018). Nevertheless, if we view the innovation process as encompassing not only the innovation process, but also ideas management, intellectual property, and innovation project and portfolio management, we can discover and incorporate more valuable insights into innovation as an outcome. The answer to the question of what constitutes an innovation (innovation's definition as an outcome) may be found by examining innovation processes in greater detail. IMIP will certainly be able to capture the number of patents and their derivations (Whittington et al., 2009). It will also cover the starting point or front end of any innovation, creating ideas and how such ideas should be managed. Separately, IPPM will reflect which are the innovations adopted or adoption of innovations, a widely adopted outcome measure, and the resources allocated to such innovations (Bell, 2005; Leiblein & Madsen,

2009). Moreover, it can provide insights into how many innovation projects are underway, at which stage, their success rates, the ratio of radical and incremental innovation projects, and so on. All of these innovation activities reflect the true nature of knowledge work, which is increasingly structured around projects, temporary task forces, and temporary cross-functional teams. Collectively, the broad innovation process will be able to capture innovation as a process and innovation as an outcome in its original concept. Therefore, on the basis of the KBV, this study postulates that innovation can be seen and thus researched as a process and an outcome.

Such fresh perspective offers new lens and opportunities to research innovation. As a result, specifically, on the basis of the KBV, this research proposes a conceptual framework pertaining to the impact of innovation on SME performance (refer to Figure 1), under which all the new perspectives and discoveries are integrated by: 1) conceptualizing innovation processes to include: innovation process, IMIP, and IPPM; 2) conceptualizing innovation as a process and an outcome; and 3) proposing innovation processes positively impacting SME performance. The pointer 2) will strive to answer the questions as to what innovation activities constitute and what constitutes an innovation as discussed earlier on.

As we know, from a strategic management perspective, connecting knowledge and performance should be one of the most important aspects of any knowledge-based theory of the firm. However, this is the area where the current body of literature leaves the most questions unanswered. Although many scholars recognized the importance of knowledge creation in developing competitive advantage of a firm, they have not been able to draw a strong causality between the organizational behaviors in creating knowledge and firm performance and hence, the underlying mechanisms remain unclear (Schulze & Hoegl, 2006). In this study, on the basis of the KBV, a new conceptual framework is proposed (refer to Figure 1) to examine the broad innovation process, including, idea management and intellectual property, innovation process, and innovation portfolio and project management, and their direct impact on SME performance. The findings of this study can shed light on how new knowledge creation in the innovation process directly impacts SME performance and hence connects knowledge and firm performance through innovation processes. It can help better understand how knowledge creation is effectively managed (through studying innovation as a process) or evaluated (through studying innovation as an outcome). Specifically, this study aims to contribute the following novel insights into literature. First, a new conceptualized innovation and its impact on SME performance conceptual framework, in which, for the first time, innovation process and outcome will be taken into consideration as part of innovation performance to directly impact SME performance. Second, based on the KBV, broad innovation process will include key innovation activities, i.e., idea management and intellectual property, innovation process, and innovation project and portfolio management. This is a new research angle worth exploring. Such fresh perspective provides new lens to viewing innovation as a process and an outcome. It also contributes to the understanding of new knowledge creation in the innovation process by recognizing not only innovation as new knowledge creation, but also new knowledge about how innovation is managed. Third, theorizing the innovation process and developing a conceptual framework around it will expand the KBV knowledge repertoire and help the research community better understand how innovation emerges from the KBV. Fourth, research results for the innovation–performance relation of SMEs are inconsistent and sometimes even controversial. As a result, empirical testing of the proposed research framework will contribute to the development of the innovation–performance relation of SMEs.

Overall, the proposed conceptual framework must be empirically tested and validated to enrich the concepts of KBV theory and innovation management. Although this proposed framework focuses on SME firm-level innovation, this study acknowledges that innovation involves individuals, teams, organisations, networks, platforms, ecosystems, communities, and industries, as well as broader environments, such multiple layers of innovation, which will make the research on innovation management challenging from the concept and empirical study perspectives (Gupta et al., 2007). However, this study only covers an the organizational or firm-level perspective of innovation on the basis of the KBV, which is an obvious limitation of the proposed study and can thus serve as a future research direction.

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