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Innovation Ecosystem in the Small and Medium Enterprises: A Theoretical Perspective

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Abstract

Open innovation has so far been studied mainly in high-tech, multinational enterprises. This conceptual paper on innovation ecosystem studies scrutinizing open innovation practices that has been applied by firms focusing on small- and medium-sized enterprises (SMEs). Within the review, we defined the innovation ecosystem, explaining on the innovation issues in SMEs, open innovation as well as close innovation. SMEs pursue open innovation primarily for market-related motives such as meeting customer demands, or keeping up with competitors. Their most important challenges with open innovation are securing the trade secrets. However, SMEs have option either to proceed with open innovation or closed innovation. Open and close innovation has its benefit and weakness; therefore SMEs must identify their main objectives in the business. The future directions of this issue are discussed.

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INTRODUCTION

It is important to understand what small and medium sized enterprises (SMEs) are in order to tackle the weakest part. However, there is no standardized definition of SMEs. On the other hand, the key criterion that most countries use of statistical principles is the number of persons employed (Holmes & Gibson 2001). In Malaysia, SMEs definition is divided into two categories; manufacturing and services firms. For manufacturing firms, SME is defined as companies with less than 200 full time employees and the sales turnover not more than RM50 million. While for services sectors, it is being defined as companies with less than 75 full time workers and sales turnover not more than RM20 million. Small and medium sized enterprises face the inherent tension of being dependent on external partners to complement their internal innovation activities while having only limited resources to manage innovation processes.

Innovation ecosystem comprises of start-ups, stakeholders, and investors that create several solutions in the form of incubators, accelerators and workshops that aims to solve precise and generalised problems.

SMEs can move faster and are more agile than their larger counterparts (Schumpeter 1949) since the front line team in the SMEs communicate directly with their customers and understand their customers' needs better. At the same time, the back line team can provide and create the solution to the demand of the customers. Normally in the SMEs, the front and back line team is comprised of the same people. The ability of SME to understand their customers can generate product with its own demand, given a minimum threshold of publicity.

Understanding the process of innovation practices will improve firm's competitive advantage and increases the chances of SMEs survival since the estimated failure rate for Malaysia SMEs is 60 percent (Ahmad & Seet, 2009). The total contribution of SMEs is in the Malaysia economy is approximately 37 percent of the total GDP or $410 billion (Lee, 2018). Therefore, it is essential to discover innovation practices of the Malaysian SMEs. This will allow the firms to identify and focus their direct on the areas that require improvement.

The study of innovation, has focused wide attention and has resulted in a huge literature (Wolfe, 1994). But the perceptive of innovative behavior in firms remain undeveloped as the outcome of innovation research have been uncertain and conflicting (Fernández-Esquinas, van Oostrom, & Pinto, 2017; Freel & Robson, 2017; Keupp, Palmié, & Gassmann, 2011; Vanhaverbeke, Frattini, Roijakkers, & Usman, 2018). The present literature proposes slight direction for SME managers to apply innovation in their firm (Meyer & Goes, 1988; Van de Ven, Angle, & Poole, 2000). According to Kimberly and Evanisko (1981) innovation influences the introduction of products or services or the process of producing them.

DEFINITION OF INNOVATION ECOSYSTEM

Innovation ecosystem is being defined as the complex connection that are created between organisational or partners which the main goal is to facilitate technology advance and innovation (Jackson, 2011). It enables collaboration in innovation in which firms with complementary resources combine them to provide a clear, customer-related solution. The solution can be in the form of new or improved product, features, specification, process or service.

Resources may be highly specific to the particular firm (Barney, 1991; Crook, Ketchen, Combs, & Todd, 2008). Resources that the firm requires but which cannot be obtained in markets will have to be developed by the firm itself in an often long process (Dierickx & Cool, 1989; Teece, Pisano, & Shuen, 1997). The collaborative solution can produces a unique value that cannot be generated by the firms individually. In a thriving ecosystem, better profits are created from collaborative solutions that go beyond initial R&D investments.

Constructing and establishing inter-reliant links among ecosystem players is vital to generate and sustain the innovation outcome.

INNOVATION IN SMEs

Previous studies suggests that innovations can be defined in structure, strategy and administrative processes (Damanpour, 1987) and could include new management practices or the introduction of a new organizational structure (Walker, 2006). According to Klewitz, Zeyen, and Hansen (2012), innovation is defined as a new or significantly improved product (good or service) introduced to the market, or the introduction within an enterprise of a new or significantly improved process, as well as organisational and marketing innovations, including new logistics or distribution methods. This definition is in agreement with several scholars such as Thompson (1965), Yamin, Mavondo, Gunasekaran, and Sarros (1997) and Khan (2016). Innovation can be new to an industry, organization, or sub-unit. According to Damanpour (1991), innovativeness is more precisely represented when multiple rather than single innovations are considered.

According to Schumpeter's (cited in Narayanan, 2001) SMEs are good in innovation and poor in commercialization. In order for SMEs to survive, they might lose some of the good qualities. The most valued practices that might be forgo, is their informality, less bureaucracy, and innovation (Temperley, Galloway, & Liston, 2004). These are the tension that SMEs need to go through in order to survive and performed.

Small firms with proper innovation management may choose not to grow, but still manage to survive. Firms that have well planned innovation management will be able to survive(Juárez, Escobar, & Guzmán, 2017). "As the industry matures, organizational innovation becomes central, and high rates of exit emerge and this suggests that, organizational innovation will be associated with survival (Cefis & Marsili, 2005, pg. 1171). The study by Cefis and Marsili (2005, pg. 1188) find that "organizational innovation play a key role in enhancing the chances of survival (up to 25%) and in creating competitive advantage for firms".

Innovation matters for all types of firms, new as well as established. As Schumpeter (1942) emphasizes, innovation is a powerful vehicle for new firms to successfully enter the market and undermine the established firms. Also, established organizations need to innovate to maintain their competitive position in the face of new and emerging or "disruptive" technologies (Christensen, 2010).

Research on radical innovation are important to the economic sustainability of firms for comparative advantage and long-term survival (Koberg, Detienne, & Heppard, 2003). Radical innovations are those innovations developed by a firm and those that are also new to the industry (Reichstein & Salter, 2006). Centralization and informal structures tend to support radical process adoption, which suggests that regardless of size, organizations match their structure for the innovating situation (Ettlie, Bridges, & O'Keefe, 1984). SMEs are known for their centralization management and informal structures, thus they are more prone to innovation.

The literature strongly suggests that large firms may not be radical innovators, primarily because of structural inertia (Acs & Audretsch, 1991). Firms are prone to the forces of bureaucratic inertia (Tornatzky & Fleischer, 1990). The key factor that contributes to such inertia is the number of employees that work in large firms. The numbers of employees make it difficult to manage large firms, so these firms develop layers of administrative staff and formal rules of communication to adapt to this situation (de Jesus Pacheco, ten Caten, Jung, Navas, & Cruz-Machado, 2018; Terrien & Mills, 1955).

Kanter (1985) and Simon, Elango, Houghton and Savelli (2002) argued that radical innovations, tend to generate high returns, are more predominant in small compared to large firms. This is because it is easier for small firms to make such adjustments compared to large organizations (Kanter, 1985).

Open Innovation and Intermediation

Firms that propose product innovation should concentrate on new product development or improvement of technologies while firms introducing new organizational methods as process innovation should focus on knowledge and management culture (Ilker Murat & Birdogan, 2011). In order to create, collect, incorporate, distribute, and manage resources in the organization effectively, firms must propose structures and systems that ease the flow of knowledge (Nonaka & Takeuchi, 1995). The term knowledge is used in this study to indicate the extent to which a firm produces knowledge internally and relates it to attain a competitive advantage that is in innovation. Specifically, the phrase knowledge refers to the knowledge created inside the firm (as a result of learning, exploration, knowledge-sharing, etc.) and finally applied to create new process that add value to the customer and improve the firm's competitive position (Ahn, Lee, & Lee, 2006; Power & Waddell, 2004).

However, the most difficult task for SME is to materialize the idea to cater the demand. SMEs must go through several phases to ensure that the new product created is marketable. New product development (NPD) is the process used to develop new ideas into final product and services output. NPD process consist of six stages that starts with Research or discovery (R&D) stage, product design stage, concept testing, built prototype, test marketing stage and commercialization or launch stage. All these processes require resources and fund.

The term open innovation was first introduced to explain the actions of innovation that firms involve in to generate knowledge and capture its value from its connections with the outside environment (Chesbrough, 2006). The definition by Huizingh (2011) is also in agreements with Chesbrough's defination, when he refer open innovation as an acquisition of external knowledge through interaction with external parties across borders. The different forms of business deal with external parties change in illustrating connections of the depths and levels of trust between the players (Dahlander & Gann, 2010).

Open Innovation vs. Closed Innovation

Knowledge resources are critical to the process of innovation of a firm. "Whether the knowledge is internally generated or externally acquired, what an organization knows determines what it can do" (Thornhill, 2006, pg. 691). The role of knowledge in creating competitive advantage by resource-based view is clear. Knowledge can hold as assets of value, rareness, imitability, and organizational (VIRO) (Barney, 1991) engagement. These assets are central to firm performance (Barney, 1991). Knowledge has been described as the crucial resource that differentiates the firm from their competitors (Kogut & Zander, 1996; Spender, 1996). Knowledge can restrain and direct a firm's ability to take action (King & Zeithaml, 2003; Leonard-Barton, 1992) in order to improve their innovative. In open innovation knowledge may enhance a firm's chances of creating and implementing innovations (Chesbrough, 2017) by achieve important synergies and restructuring their knowledge portfolios (Freel & Robson, 2017). Exposure to knowledge understanding will enhance new concepts, sharpens problem-solving skills, and facilitates learning (Pisano, 1994; Zahra & George, 2002) towards innovation. This will helps firms to develop valuable, unique capabilities (Winter, 1987), which create the foundation for attaining competitive advantage.

Proper of managing innovation allows the firm to react to an internal or external opportunity, and use creativity to introduce new ideas, processes or products (Kelly & Kranzberg, 1978). Innovation is important for survival, not only for new firms introducing new products or creating new markets, but also for current firms that need to continuously innovate to combat the threat of new technologies (Christensen, 2010). Banbury and Mitchell (1995) show that in the established industry that introduce frequent incremental innovations and are able to support them in the market have a higher probability of survival.

Powell and Grodal (2005), highlighted the importance of network for knowledge generation, however, Narasimhan and Narayanan

(2013) highlighted that innovation may not necessarily occur within the firm. The firm is free to choose between closed or internal innovation in the form of internal R&D and open innovation in the form of collaboration with external parties who may be individuals or organizations.

Knowledge collaborations take place among three players: enterprise, academia, and markets. SMEs can collaborate with their clients, supplier, competitors, universities and research lab in the discovery phase of a new product. They form the basis of product innovation. External collaboration can benefit future growth. Open innovation is paired to enterprise's creation and not a substitute to the firm's invention. However, SMEs that practices open innovation are vulnerable to certain risk such as danger of copying, imitation and reverse engineering(Oakey, 2013). These risks can be minimised if the firm operates in an ecosystem under intellectual property law.

Several scholars agrees that closed innovation is the effective measure in generating new product in SMES (Hossain, 2015; Manzini, Lazzarotti, & Pellegrini, 2017; Oakey, 2013; Rauter, Globocnik, Perl-Vorbach, & Baumgartner, 2018). However, according to Chesbrough (2003) closed innovation is less effective, since many projects are abandon in the R&D stages by the managers because they do not invest in ideas to support long-term development, but more emphasis on short-term profits.

Open innovation in SMEs tends to team up for product introductions while closed innovation in SMEs tend to cooperate for incremental invention(Wynarczyk, Piperopoulos, & McAdam, 2013). Several studies have shown that cooperation for SMEs needed for the commercialization stage than in the idea discovery stages of innovation (Hossain, 2015; van Hemert, Nijkamp, & Masurel, 2013). However, Lichtenthaler (2011) found that most SMEs prefer closed innovation over open innovation.

FUTURE DIRECTIONS

Literature on innovation management research have failed to deliver clear and reliable findings, rational advice to managers, and convincing 'best practice' solutions (Tidd, 2001). For instance, firms that produce breakthrough innovations use other management practices than those that focus on incremental innovation (Leifer & Rice, 1999). Executives are therefore confronted with an overwhelmingly complex literature and very little practical guidance (Drazin & Schoonhoven, 1996).

R&D data used as an innovation indicator tends to favor large firms compared to SME due to the fact that SMEs' R&D efforts are often informal (Hossain, 2015). SME plays a significant effect to the country's economy development, however SMEs are still under researched in the open innovation literature (Wynarczyk et al., 2013) Lots of literature regarding open innovation focusing on large firms (Wynarczyk et al., 2013). Given internal resource constraints to innovation in small firms (Rothwell & Dodgson, 1991), the potential in this area should explore in many possibilities. Studies on open innovation in SMEs largely consider high-tech SMEs. Future studies may give more emphasis on SMEs that are not in high-tech industries (Hossain, 2015).

Therefor the questions whether open innovation strategies are suitable to be implemented in resource constrained SMEs to overcome the resources limitation (Gassmann, Enkel, & Chesbrough, 2010), nevertheless, open innovation has higher risk to expose the trade secret of the SMEs.

CONCLUSION

Open innovation is benefiting SMEs in the commercialization phase rather that new product development phase. At the same time, SME need to be more careful in terms of the intellectual property (IP) since SME has limited budget to spend on all their technologies. SME need to bear in mind that they need to be careful with the information that they revelled to the external parties. SMEs that involved with open innovation are more significant for new product innovation than for incremental innovation. Open innovation brings some measurable effects along with some indirect benefits. In the innovation ecosystem, with R&D activities, SMEs may consider R&D-related activities such as meeting customer demands and remaining competitive. Collaboration with external parties is costly and lengthy process. Hence, adopting new management paradigm is necessary for SMEs.

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