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A Review of The Mediating Role of Innovation Capability in Intellectual Capital Studies: Radical and Incremental Innovation

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5 Innovation capability is known as the potential to generate new ideas, identify new market opportunities and implement marketable innovations, by leveraging on existing resources and capabilities towards leading to superior firm performance and increased sustainable competitive advantage. Therefore, this study presents a range conceptual analysis of the role innovation capability in intellectual capital studies particularly. The primary objective is to look at how innovation capability is explored as mediator in intellectual capital literature. Recently, the role of innovation capability value drivers focused through incremental and radical recently into literature. This research has been viewed, first as a contribution to refinement of the existing innovation capability literature with respect to numerous dimensions used, and Second, the relationship between innovation capability and intellectual capital and organizational performance been theoretically inspected. Thirdly, how radical, and incremental innovation capability plays significant mediating role in intellectual capital study. Finally, this study proposed some hypotheses about the possible conditioning of the impact factor on the innovation capability as the mediating role in intellectual capital and organization performance literature.

Keywords: Innovation Capability, Radical Innovation, Incremental Innovation, Intellectual Capital, Mediator

INTRODUCTION

The potential for innovation is recognised by exploiting existing capital and capacity to contribute to superior corporate success and improved sustainable competitive advantage and to find new markets, to develop new opportunities and to introduce marketable technologies. Therefore, this study presents a range conceptual analysis of the mediating role innovation capability in intellectual capital studies particularly. The primary objective is to look at how innovation capability is explored as mediator in intellectual capital literature. The role of innovation capability value drivers focused through radical and incremental recently into literature. This research has been viewed, first as a contribution to refinement of the existing innovation capability literature with respect to numerous dimensions used, and Second, the relationship between innovation capability and intellectual capital and organizational performance been theoretically inspected. Thirdly, how innovation capability plays significant mediating role in intellectual capital study. Finally, this study proposed some hypotheses about the possible conditioning of the impact factor on the innovation capability as the mediating role in intellectual capital literature.

Innovation Capability

Organisational survival in today's competitive and global landscape is dauntingly challenging, calling for the attainment of competitive advantage as the most appropriate solution (Barney, 1991; Hinterhuber, 2013; Porter, 1985; Weerawardena and Mavondo, 2011). Competitive advantage or competitiveness is conceptualised based on the influence of resource and a company's unique or inimitable capability (Hatani *et al.*, 2013; Kamukama *et al.*, 2011; Yaseen *et al.*, 2016).

Due to reduced product life cycle and high turnover rate of new product in the current competitive landscape, innovation has posed a significant importance towards the success or failure of an organisation. The innovation capacity has therefore emerged as one of the abilities highly examined by academics, as their dynamic capacity enables organisations to orient and adapt to environmental opportunities (Saunila, 2016). Dynamical capacity can be divided into three components, according to Wang and Ahmed (2007): adaptability, absorption, and innovation capacity. Innovation capability in particular is deemed as a major and essential component of dynamic capability, with Breznik and Hisrich (2014) highlighting the similarities and differences of the relationship between the two capabilities. It has been concluded that dynamic capability can be replaced with innovation capability, prompting Aramburu *et al.* (2015) and Teece (2007) to state that dynamic capability is the new generation's categorisation of innovation capability.

Besides, innovation capability can be described in a wide-ranging manner and terms, whereby Drucker (1985) has stated that "innovation is not a change, but it creates". The concept can be extended beyond, allowing the understanding that it is emerging as a key tool in achieving competitive advantage despite being the most challenging aspect in management Breznik and Hisrich (2014). Innovation capability, according to Hii and Neely (2000), is described as "the capacity to generate new ideas, recognise new market opportunities, and introduce marketable innovations using existing resources and capabilities."

Relevant literature regarding innovation capability has offered various viewpoints associated with other terms, such as innovation, innovation performance, organization innovation, new product development, innovativeness, and product innovation (Calik *et al.*, 2017). Scholars have concentrated their attention on the broader view of innovation (Al-Dujaili, 2012; Elsetouhi *et al.*, 2015; Gronum *et al.*, 2012; Maboudi *et al.*, 2015; Salim and Sulaiman, 2011; Wu *et al.*, 2008), type of innovation (Elsetouhi *et al.*, 2015), process and product innovations (Carmona-Lavado *et al.*, 2010; Prester *et al.*, 2016), innovativeness (Ibrahim *et al.*, 2009), and new product development (Hsu and Fang, 2009) respectively. However, innovation capability in particular has attracted scholarly interest into firm capability towards innovation in various specific aspects and contexts (Aramburu *et al.*, 2015; Khan, 2016; Mathuramaytha, 2012; Menor *et al.*, 2007; Saunila, 2016; Subramaniam and Youndt, 2005; Xiaobo and Sivalogathan, 2013; Zerenler *et al.*, 2008). As a result, the aim of this research is to determine the role of innovation capacity in mediating the relationship between intellectual capital and organisational performance.

1.1.1 Definition of Innovation Capability

Innovation is a complex process of translating opportunities into innovative concepts and adding value to goods or services by leveraging technological advancements. As a result, a fair practise is the most important factor in putting an idea into action, and several researchers have proposed innovation capability as a multi-faceted construct for value development (Ibrahim et al., 2009). The term 'innovation capability' itself can be defined in many ways, where it is described as the potential of a firm to generate innovative output using collective knowledge, skills, and resources with the purpose of adding value to the firm and its stakeholders (Hogan *et al.*, 2011). Meanwhile, Neely and Hii (1998) have referred to it as the potential of a firm, region or country to produce innovative output in terms of product, process, marketing idea or workplace ethics. They have also outlined three reasons directly related to the influence of innovation capability possessed by an organization, which are: organisational characteristics, management, and conducive environment.

Moreover, innovation capability is also acknowledged as a firm's ability to rearrange and develop their resources and organizational capabilities for the purpose of innovating (Aryanto *et al.*, 2015; Madanmohan, 2003; Yang, 2012). Meanwhile, Duodu and Rowlinson (2016) has referred to ⁷ as the firm's capability to explore and exploit existing resources, whereas Kim (1997) has mentioned it as the potential to create new and useful knowledge based on previous knowledge. Furthermore, Lawson and Samson (2001) have offered similar definition, stating that it is the propensity to transform knowledge and ideas continuously into innovative products, processes, and systems for the firm and stakeholder's benefit. Additionally, Mention and Bontis (2018) ¹⁸ have suggested for innovation capability to be considered as the fourth variable of IC alongside human capital, structural capital and relational capital.

Furthermore, according to Davila et al. (2006), a company's innovation potential is determined by its employees' and management's competence, constructive behaviour, and motivation to improve their ability to innovate. Contrary to ² popular belief, innovation potential is often influenced by the external world. "Innovation capacity is the internal driving energy used to produce and explore radical and new ideas and concepts, to experiment with solutions for possible patterns of opportunity detected in the market's white space, and to then turn them into marketable and successful innovations," according to Assink (2006). (pp. 219). Following that, Olsson et al. (2010) described it as an organization's ability to continually adapt innovation in response to environmental changes, needs, and market demand.

Therefore, it can be concluded that innovation capability is influenced by internal and external factors that can explain the factors of firm's innovation process and its subsequent outcome (Iddris, 2016). Thus, Saunila (2016) has concluded that it must have these features at the minimum:

- i. the potential or ability to produce innovations,
- ii. internal capability,
- iii. continuous, and
- iv. aims to add value for the firms or its stakeholders.

Therefore, the importance of innovation capability as a drive in achieving competitive advantages (Mathuramaytha, 2012) is undeniable, as well as its key role in promoting growth and wealth creation (Yang, 2012). Furthermore, firms that have high level of innovation capability have been identified to be twice more profitable compared to their counterparts (Tidd and Bessant, 2009). Hence, developing innovation capability in a firm is crucial and undeniable as it is fundamental for their survival and growth (Davila *et al.*, 2006; Teece *et al.*, 1997; Yusr, 2016). Moreover, Menguc *et al.* (2014) has also acknowledged the RBV approach to posit that innovation capability is capable of utilizing the resources and transferring input into the desired innovative output and drive for superior performance. Therefore, this study has opted to adhere to the definition of Hogan *et al.* (2011) to define innovation capability as a firm's ability to produce innovative output using collective knowledge, skills, and resources with the purpose of adding value to the firm and its stakeholders.

1.1.2 The Dimensions of Innovation Capability

Due to the importance of innovation capability in creating competitive advantage and emerge successful in an organization (Mathuramaytha, 2012), scholars have concentrated on using it as the main construct, mediator, and moderator, or as an dependent construct in studies regardless of the context and field of study. It has been conceptualised as a uni-dimensional or multi-dimensional construct accordingly. Studies using it as a uni-dimensional construct have not mentioned specific dimension (Keskin, 2006; Mathuramaytha, 2012; Yeh and Ku, 2017; Zehir *et al.*, 2015), whereas when utilised as a multi-dimensional construct, two or more dimensions have been used to measure the innovation capability (Aryanto *et al.*, 2015; Menguc *et al.*, 2014; Yusr, 2016).

According to Gatignon *et al.* (2002), innovation can be classified and defined based on: (1) the degree of product complexity (i.e. the number of subsystems), (2) types of innovation (i.e. generational or architectural), (3) the locus of innovation in a product's hierarchy (i.e. core or peripheral), and (4) the characteristics of innovation (i.e. incremental/radical, competence-enhancing, and compliant). A systematic literature review by Iddris (2016) encompassing 51 articles related to firm's innovation capability has successfully identified a diverse set of dimensions used by scholars to measure innovation capability. It includes: knowledge management, organisational learning, organisational culture, collaboration, idea management, creativity, innovation strategy, and leadership. Knowledge management has been revealed to have the highest relative index of innovation capability, whereas innovation strategy has scored the lowest. Meanwhile, Saunila and Ukko (2014) have investigated the

influence of innovation capability's intangible aspects in SMEs, using these elements: (1) support culture, (2) employee welfare, (3) employee skills and innovativeness, (4) leadership practices, (5) development of individual knowledge, processes, and tools for managing ideas, (6) external sources for information, and (7) links to strategic goals. Furthermore, Aryanto *et al.* (2015) has also investigated the role of innovation capability as a mediator between strategic Human Resource Management and performance in Indonesia's Software Industry, by employing sensing capability, combination capability, and relational capability. Additionally, a recent work by Yeh and Ku (2017) has also examined the effect of innovation capability as a mediator from the perspective of knowledge exchange, using process innovation as a dimension. Therefore, these studies have allowed scholars to explore the impacts either by direct or indirect relationship, regardless of the field and context of study (Calantone *et al.*, 2002; Jung, 2015; Saunila, 2016; Noordin, 2014; Wang and Chen, 2013; Yang, 2012).

Meanwhile, a meta-analysis report by Chang *et al.* (2014) has highlighted the potential relationship of radical innovation and incremental innovation between organizational market and orientation firm performance. However, looking into the influence of radical and incremental innovation requires researchers to treat both as separate constructs. Another review by Slater *et al.* (2014) has also reiterated that radical innovation capability is the most difficult element in the context of developing a dynamic capability in an organization. The inference has been made with the inclusion of senior leadership, organisational culture, radical product innovation process, organisational characteristics, and product launch strategy as the sub dimensions of radical innovation capability. Hence, incremental and radical innovation capacities both have drawn several academics recently.

Early 20's century has revealed the concentrated effort in IC research to examine the mediating role of innovation capability between IC, its components and firm performance, via the dimensions of innovation capability that varies across sectors, contexts, and measurement constructs. Menor *et al.* (2007) has investigated two dimensions of innovation capability, which are product and process innovation in measuring the mediation role between IC with performance. Furthermore, Aramburu *et al.* (2015) has worked on the effect of new generation of idea and innovation project management as different constructs of innovation capability. It has resulted in both dimensions being used to explore its mediatory effect on the relationship between structural capital and performance in a work conducted for a tech-based firm in Cambodia. Besides, Carmona-Lavado *et al.* (2013) has also used service innovativeness, whereas Khan (2014) has employed organization innovation respectively in investigating the mediatory role of innovation capability in their studies, which are related to IC.

Apart from the numerous works exploring innovation capability, scholars have also focused on IC areas and concentrating on investigating radical and incremental innovation capability respectively as they are the most established dimensions (Dewar and Dutton, 1986). Factoring in the RBV approach of competitive advantage, Xiaobo and Sivalogathan (2013) have highlighted that knowledge should be acquired to generate new, improved, and refined technique of producing output, creating added value to an organisation and driving for operational efficiency. Radical innovative capability has been defined by Subramaniam and Youndt (2005) as "the capability to generate innovation that significantly transforms existing products and services", whereas incremental innovation capability is "the capability to generate innovation that refines and reinforces the existing products and services". An alternative definition by Menguc *et al.* (2014) has outlined radical innovation capability as the capability to produce products without significant disruption or deviation from customer's prior knowledge or requiring new learning curve. Meanwhile, incremental innovation capability refers to firm's capability to produce

innovative product showing minimal changes compared to the existing routines, operations, and knowledge. Both dimensions are subsequently involved in the process of learning and using different sets of resources in an organization (Slater *et al.*, 2014).

Radical innovation capability is specifically involved in the creation of new markets (Chang *et al.*, 2014) and rendering current products obsolete (Beck *et al.*, 2016). It allows firms to attain quicker market penetration, greater customer loyalty at premium prices, accelerated cash flows, reduced cash flow volatility and vulnerability, and substantial cost reductions (Tellis *et al.*, 2009). Furthermore, in terms of leveraging the technology and knowledge, radical innovation capability has transformed the existing knowledge and rendering it obsolete, “morphing” old knowledge into a significantly new product (Subramaniam and Youndt, 2005). However, market failure theory has stipulated that uncertain success and the tendency towards failure are greater in radical innovation due to higher risks (Beck *et al.*, 2016; Chandy and Tellis, 1998). Risks associated with the dimension are protection of new idea, product or service sustainability in market, and product commercialization. Furthermore, many firms fail to recover their investments on radical innovation compared to incremental innovation (Perin *et al.*, 2016). The scenario has been explained by Assink (2006) in Figure 2.9, whereby incremental innovation remains within the boundaries of the existing market, processes, and technology in a firm (Figure 2.9: lower left) and carries lower market-acceptance and financial risks. In contrast, radical innovation either utilises an existing technology within new market or penetrating an existing market with new technology (Figure 2.9: top left and bottom right), as well as posing a new technology in a new market altogether (Figure 2.9: top right). It is exposed to a higher level of risk. Nevertheless, radical innovation can drive organisations to achieve sustainable competitive advantage in the long term by generating economic rents (Beck *et al.*, 2016; Slater *et al.*, 2014).

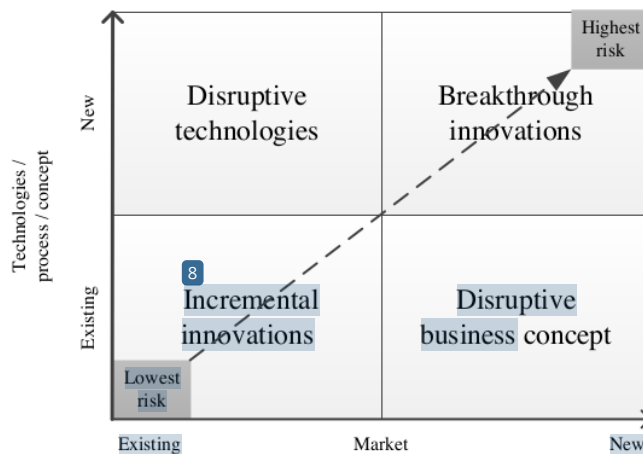


Figure 1: Innovation Application Space
Source: Assink (2006)

Incremental innovation capability in general is a product offering less fundamental changes to any existing products (Chang *et al.*, 2014), targeting customers of the current market. It also disrupts an existing technological trajectory in the context of technology (Gatignon *et al.*, 2002), but it is focused on accumulating and strengthening existing and dominant knowledge, which is subsequently becomes refined (Abernathy and Clark, 1985). Furthermore, it has displayed more significant relationship with firm performance (Xiaobo and Sivalogathan, 2013), as it poses less and smaller angle of risk, is less uncertain, and more predictable due to the presence of existing customer base and market framework (Boso *et al.*, 2016). Besides, incremental innovation capability can also enhance the effect of new product performance due to higher customer involvement during the stage of product design, as it is primarily reliant on the existing resources, knowledge, and experience (Calantone *et al.*, 2002).

Hence, radical and incremental innovation capability both enable an organization to attain higher performance, whether directly or indirectly (Carmona-Lavado *et al.*, 2010; Perin *et al.*, 2016; Xiaobo and Sivalogathan, 2013; Yang, 2012). Their differences have been depicted accordingly in Table 2.14. Besides, they have both been employed in scholarly works when measuring mediation effect in IC field. Many scholars (Jung, 2015; Agostini *et al.*, 2016; Prester *et al.*, 2016; Subramaniam and Youndt, 2005; Wang and Chen, 2013) have utilised them as a dimension of innovation capability, as the dependent variable, in measuring the direct impact of IC to innovation capability. Subramaniam and Youndt (2005) in particular has utilised them as two different constructs when investigating the relationship between IC and innovation capability, whereas Xiaobo and Sivalogathan (2013) have measured the effect of innovation capability as a mediator using the two dimensions. Nevertheless, the important role that radical and incremental innovation capability plays in other fields of study is undeniable. It has shown moderating effect on customer and supplier's involvement in design (Menguc *et al.*, 2014) and a mediating effect between high-performance work systems and bilateral innovative capabilities (Wang and Chen, 2013). Another study by Jung (2015) has introduced a new variable as the third dimension of innovative capability, which is the minor level of innovative capability. It is defined as innovative capability that does not introduce a new product to the market, but the definition is in full contradiction with previous scholars.

Table 1: Comparisons of Radical and Incremental Innovation Capability

Elements	Radical Innovation Capability	Incremental Innovation Capability
Type of product	• Produce new product	• Refine existing products
Type of market	• New market	• Existing market
Technology usage	• Disrupt the prevailing technology	• Enhance prevailing technology
Knowledge usage	• Disrupt the prevailing knowledge	• Enhance prevailing technology
Skill needed	• Need high set of skills	• Need moderate set of skills
Level of risk	• High and unpredictable	• Low and more predictable
Long term effect	• Achieve sustainable competitive advantage and more predictable	• Unpredictable

Nevertheless, different mediating effects of radical and incremental innovation, particularly in the relationship between IC and its components to the firm performance, remain limited in theory, and is unclear regarding its worthiness for further study and empirical testing (Saunila and Ukko, 2014). Thus, this study is employing radical and incremental innovation capability as two dimensions of innovation capability. Table 2.15 presents the dimensions of innovation capability employed by studies related to IC, innovation capability and firm performance accordingly.

Table 2: Dimensions of Innovation Capability in Previous Study

Dimension of Innovation Capability	Role of Innovation Capability	Authors (Year)
• Product innovation	Dependent Variable	Leitner (2015)
• Product innovation capability • Process innovation capability	Mediator	Menor <i>et al.</i> (2007)
• New generation idea • Innovation project management	Mediator	Aramburu <i>et al.</i> (2015)
• Service Innovativeness	Mediator	Carmona-Lavado <i>et al.</i> (2013)
• Organization innovation	Mediator Moderator	Khan (2014)
• Incremental innovation capability • Radical innovation capability	Independent variable	Yang (2012)
	Dependent Variable	Subramaniam and Yound (2005) Wang and Chen (2013) Jung (2015) Agostini <i>et al.</i> (2016)
	Mediator	Xiaobo and Sivalogathan (2013)

• Radical innovation capability	Dependent Variable	Delgado-Verde <i>et al.</i> (2011, 2016)
	Moderator	Carmona-Lavado <i>et al.</i> (2010) Perin <i>et al.</i> (2016)
• Non specific	Mediator	Mathuramaytha (2012)
	Dependent Variable	Sivalogathan and Wu (2015)

As presented in Table 2, innovation capability is seen in many roles by scholars, including as dependent variable, mediator, and moderator. Besides, the table shows that the dimension used in each of the research are diverse such as product innovation, process innovation and organization innovation. However, there are very limited studies that have employed radical and incremental innovation capability as the dimensions. Therefore, this study used radical and incremental innovation capability to measure innovation capability of incubatees.

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