

The Role of Knowledge in Service Innovations: A Study of Sri Lankan Service-Dominant Business Organisations

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Abstract

Organisations can overcome low levels of innovation through developing dynamic innovation capabilities, which can be improved through organisational knowledge. The purpose of this study is to examine the impact of organisational knowledge as an antecedent of dynamic service innovation capabilities (DSIC) on developing service innovations (SI) among service-dominant business organisations in Sri Lanka. Based on three theoretical frameworks, this study examines the impact of knowledge management capabilities (KMC) and knowledge absorption capabilities (KAC) on DSIC in developing SI dimensions. A quantitative survey through a self-administered questionnaire collected data from 160 service organisations that disproportionately represented certain Sri Lankan service sectors; insurance/banking/other financial services, health care, entertainment/hotel, telecommunications, professional services and IT/ICT. Data were analysed with the SPSS and SmartPLS software using structural equation analysis to test the five hypotheses established. The findings of this study show a significant, positive impact from KMC on DSIC. KMC also positively impacts KAC, and KAC positively and significantly impacts DSIC. Therefore, it is noteworthy that KAC has an indirect impact on the relationship between KMC and DSIC. Furthermore, DSIC has a significant effect on SI. The results revealed that organisational knowledge is a significant antecedent of DSIC. The findings also suggest that managers/policymakers should focus on internal knowledge processes in order to absorb the external knowledge necessary to support DSIC.

Keywords: Service innovation, Dynamic service innovation capabilities, Knowledge management capabilities, Knowledge absorption capabilities.

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Introduction

The service sector plays a dominant role in the economies of most countries because the modern world has come to rely increasingly on service economies, where many advanced countries generate more than 70% of their gross domestic production (GDP) from services (Hsieh et al., 2013). In the Sri Lankan context, the contribution of the service sector towards the GDP of the country has increased rapidly over time. In 2019, in value-added terms, the service sector contribution to the GDP was 58.24 %, whereas contributions from the agricultural and industrial sectors were only 7.42% and 27.4%, respectively (Central Bank of Sri Lanka, 2019). Most service industries exist in highly competitive markets (Kariyapperuma, 2016). Therefore, firms that operate in the service industry have to continuously explore new ways to gain, and retain sustainable competitive advantages (Hsieh et al., 2013).

In this regard, innovations play a critical role in gaining sustainable competitive advantages for firms (Witell et al., 2015). Furthermore, innovations differentiate firms from competitors in the industry and maximise an organisation's value and well-being (Hertog et al., 2010, p. 490). Service firms today are expected to delight customers with their creativity and innovation, and Kandampully (2002, p. 19) explained innovation as a firm's foresight in "think(ing) for the customer" by creating services that "drive" the marketplace to offer superior value to the customer. Therefore, service sector organisations also need to consider building competitive advantages more than ever due to intense competition in the sector (Hsieh et al., 2013). However, although innovation is now even more critical for service organisations to gain competitive advantages, in the present context, in most service sector business organisations in Sri Lanka, the level of innovation is not significant (Abeyagoonasekera, 2014). This is quite evident as the Global Innovation Index has ranked Sri Lanka 90th in 2017, 88th in 2018, and 89th in 2019 among 143 countries (Cornell University, INSEAD, WIPO, 2019). Kelegama (2013) stated that Sri Lanka's industrial and service sector exports have not been satisfactory since 2000. He also identifies lack of innovation and limited markets as the root causes for low export performances. All these evidences related to innovation reveal that the level of innovation in Sri Lanka is abysmal. Hsieh et al. (2013) emphasise the importance of innovation from a business perspective, as innovation is the key to economic growth, competitive advantage, and sometimes, even for survival. Hertog et al. (2010) have argued that creating organisational innovations require different dynamic innovation capabilities, and for service organisations, service innovations (SIs) can be determined by dynamic service innovation capabilities (DSIC).

DSIC is still an emerging research area that needs in-depth studies examining the determinants that contribute to and develop DSIC (Zheng et al., 2011; Wijekoon & Galahitiyawe, 2015; Kariyapperuma, 2016). Hence, it is vital to investigate the determinants of DSIC in developing SIs in Sri Lankan service-dominant business organisations. Researchers have generally analysed firm-level and individual-level factors when studying the determinants of dynamic capabilities (DCs) (Barney, 1991; Henderson & Cockburn, 1994; Nelson & Winter, 1982; Peteraf, 1993). The Knowledge-based Theory highlights the importance of superior access to and integration of specialised knowledge for resource and capability-based advantages (Grant, 1996a, cited in Denford, 2013). However, knowledge-based capabilities have not been sufficiently studied in the existing literature as one of the essential firm-level factors influencing DSIC. Hence, a lack of theoretical clarity is evident in the impact of knowledge management capabilities (KMC) and knowledge absorption capabilities (KAC) on DSIC. Hertog et al. (2010) explained in the PdH framework that organisations require dynamic innovation capabilities to create innovations. Thus, these researchers have also argued that DSIC should have an impact on SI. Based on the arguments of Hertog et al. (2010), Kariyapperuma (2016) empirically examined the effect of DSIC on SI, and discussed the involvement of human capital and social capital of organisational top management teams on organisational top management's DSIC in the context of Sri Lankan services. Despite this, Kariyapperuma (2016) claims that the impact of DSIC on SI remains inconclusive. In the context of Sri Lankan services DSIC have not been studied through the lens of knowledge-based capabilities. Thus, the purpose of the current study was to investigate the impacts of KMC and KAC on DSIC in developing SI, underpinned by the Dynamic Capability Theory (DCT), the PdH framework (Hertog et al., 2010) and the Knowledge-based Theory (Grant, 1996).

The Knowledge-based Theory assumes that resource and capability-based advantages are derived from superior access to and integration of specialised knowledge (Grant, 1996a, cited in Denford, 2013). Chien and Tsai (2012) explored the relationship between knowledge resources and organisational performance from different perspectives. Moreover, Liu and Tsai (2009) studied the relationship between KMC, KAC and innovation management capability. Though the theory highlights the necessity of DSIC for SI, and the possible influence of knowledge-based capabilities in determining DSIC, the literature has not reached a consensus on how knowledge-based capabilities impact DSIC. Therefore, to address this gap, service firms need to determine how vital organisational knowledge is in developing SI through DSIC to achieve success in the face of market competition. Therefore, to provide valuable insights for service-dominant

firms to increase their level of innovations through organisational knowledge, the current study attempts to answer the following questions: What is the impact of KMC on DSIC? How does KAC affect the relationship between KMC and DSIC? What is the impact of DSIC on SI?

The present study was directed towards achieving three objectives. Based on the theoretical gap in the area of DSIC related to what determines DSIC, and whether and how KMC influence DSIC (Lin et al., 2012; Wijekoon & Galahitiyawe, 2015; Lee & Tsai, 2005), the present study proposed that DCT considers organisational knowledge as another antecedent of DSIC. Accordingly, the first objective of this research was to empirically test the impact of KMC on DSIC in developing SI. Furthermore, Liao and Wu (2009) have revealed that an organisation's absorptive capacity is a significant intermediary factor between knowledge management (KM) and developing innovation capabilities. Based on the insights received from that study, the second objective of the current study was to examine whether KAC mediates the relationship between KMC and DSIC. Since the relationship between DSIC and SI (Pai et al., 2013; Janssen et al., 2012; Kariyapperuma, 2016) has scarcely been tested in any context, and particularly not in the Sri Lankan context, based on the empirical gap identified, the third objective of this study was to investigate the impact of DSIC on SI. Accordingly, this study theorises the relationships among KMC, KAC, DSIC and SI.

The present study will expand the extant theoretical knowledge by identifying organisational knowledge as a firm-level antecedent of DSIC through integrating DCT and the Knowledge-based Theory. The existing literature has suggested several different firm-level factors such as physical and monetary resources, competencies, processes, routines, and organisational cultures (Barney, 1991; Henderson & Cockburn, 1994; Nelson & Winter, 1982; Peteraf, 1993), and individual-level factors such as creativity, as determinants of DSIC. However, the lack of research examining knowledge-based capabilities in determining DSIC is addressed by the current study, which investigates organisational knowledge as an antecedent of DSIC by examining the impact of KMC and KAC on DSIC in developing SI. Furthermore, the role of KAC as a mediator of the relationship between KMC and DSIC has not been sufficiently addressed in the literature as well (Grandinetti, 2016; Castro, 2015; Escribano et al., 2009; Gray, 2006). Therefore, the present study investigated the mediating impact of KAC on the above relationship in the Sri Lankan context. Most empirical studies have investigated DC in the manufacturing sector, and there is a lacuna in studies in the service sector. Hence,

the present study will address this gap in the service innovation literature as well, by integrating DCT and the Knowledge-based Theory.

The proceeding sections of this paper are structured as follows: in the next section, the literature on the current research domain is rigorously reviewed by explaining SI, DSIC, KMC and KAC to determine the antecedents of DSIC from an organisational knowledge perspective. This is followed by a discussion of DCT in relation to developing SI, based on the insights obtained from the Knowledge-based Theory, as explained in the extant literature. Subsequently, the hypotheses are advanced, and the conceptual framework is presented. Then, the methodology and the data analysis are outlined, followed by the research findings, and a discussion of the theoretical and managerial implications of the findings. Finally, the limitations of the study and future research areas are set down, along with some concluding remarks.

Literature review

Service innovation

The inherent characteristics of services make it more challenging to define service innovations in organisations than product innovations (Berry et al., 2006). Services are an intangible combination of processes, people, skills, and materials. Goldstein et al. (2002) have defined the outcome of complex patterns of careful integration, and combination of knowledge by different parties that result in a planned or designed service as a service innovation. Ostrom et al. (2010) have come up with a similar definition of SI that contends that SIs consist of new and/or improved service offerings, service processes, and service business models, which together create value for different stakeholders such as customers, employees, business owners, alliance partners, and communities. Furthermore, Hertog et al. (2010) state that a SI is a new service experience or service solution that may consist of a new service concept, new customer interactions, new value system/business partners, a new revenue model, or a new organisational and technological service delivery system.

Service innovations can sometimes significantly improve renewals or reproductions of the existing services or can sometimes be entirely original services (Sundbo & Gallouj, 2000; Finland's Research Agency, 2010; Van Ark et al., 2003). For renewal to become an innovation, the renewal must be new not only to its developer but in a broader perspective as well (Finland's Research Agency, 2010), including to its customers,

employees, business owners, alliance partners, and communities (Ostrom et al., 2010). Service Innovation (SI) is a multidisciplinary process of designing, realising, and marketing combinations of existing and/or new services and products (Flikkema et al., 2007). Structurally new technological, human or organisational capabilities are required for SI (Van Ark et al., 2003). According to the DCT, Hertog et al. (2010) have explained that DSIC impacts SI in service contexts similar to the impact of dynamic innovation capabilities on innovations in the manufacturing sector.

The Resource-based view (RBV) and the Dynamic capability view (DCV)

In the resource-based view, the emphasis is on resources and their implications for firm performance. This view describes the firm's ability to deliver sustainable competitive advantages when its resources are managed, so that the output cannot be easily imitated by rivals (Kariyapperuma, 2016). Recognising the resources described by the RBV is the most important procedure for a firm. Helfat and Peteraf (2003) proposed a definition for resources under the RBV as an asset or input that can produce tangible or intangible outcomes that an organisation owns, controls or has access to on a semi-permanent basis. Accordingly, resources should be valuable, rare, inimitable and non-substitutable. However, rapid market changes and customer preferences or available technology often put the firm's competitive position in danger. Under these circumstances, the static RBV is not sufficient to explain the resulting dynamism (Wijekoon & Galahitiyawe, 2015). The Dynamic Capability View (DCV) adds to the RBV, and compliments the latter by resolving some of the questionable issues in it.

The DCV attempted to overcome the shortcomings of the RBV by stating that resources might be necessary in a stable market. Still, competencies are crucial for long-term performance in dynamic situations (Wijekoon & Galahitiyawe, 2015; Kariyapperuma, 2016). Scholars have referred to the role of DC as the capacity of an organisation to create, extend, or modify the resource base that consists of all tangibles, intangibles, humans and, last but not least, the capabilities, intentionally and with determination (Helfat & Peteraf, 2003).

Innovation in dynamic capability is described in the study of Wang and Ahmed (2007), where they classify the elements of DC as adaptive capability, absorptive capability, and innovative capability. Innovative capability describes the ability to develop new products and/or markets through aligning strategic innovation orientation with creative behaviours and processes (Wang & Ahmed, 2007). Because of the distinctive

attributes of services, and their impact on the dynamics of service innovation processes, discussions on innovation capabilities are lacking in the service field (Djellal & Gallouj, 2010). Hertog et al. (2010) proposed six dynamic service innovation capabilities: sensing user needs and technological options, conceptualisation, bundling, co-producing and orchestrating, scaling and stretching, and learning and adapting. These capabilities are essential to stimulate innovation in services, offer the customer a new service, and market it successfully (Kariyapperuma, 2016).

Determinants of dynamic service innovation capabilities

Hertog et al. (2010) have identified certain critical problems with the dynamic innovation capability approach relating to service-oriented firms. Thus, where these capabilities come from, which influential factors exist, and whether these factors are internal or external to the firm, have not been discussed sufficiently in the scholarly literature (Kariyapperuma, 2016). Eisenhardt and Martin (2000) describe the antecedents of dynamic capabilities as “processes to integrate, reconfigure, gain, and release resources to match and even create market change”. The determination of DSIC has been analysed from different perspectives, such as those of the individual, top management team, firm, network-level or contextual level (Zollo & Winter, 2002). Firm-level determinants of dynamic capabilities include physical and monetary resources, competencies, processes, routines, and organisational culture (Barney, 1991; Henderson & Cockburn, 1994; Nelson & Winter, 1982; Peteraf, 1993). However, when studying determinants of DC, researchers have focused more on firm-level factors rather than on knowledge-based capabilities, which can also be considered antecedents of DSIC.

Knowledge-based theory and innovation capabilities

Kanter (1988) points out that innovations are knowledge-intensive (as cited in Quintane et al., 2011). Moreover, Dougherty (1992b) has recognised knowledge as an essential organisational feature that plays a dominant role in promoting organisational innovations. Schumpeter (1934) views creation from the knowledge perspective, and suggests that innovation can be operationalised as an outcome from the knowledge-based perspective. Quintane et al. (2011) explain innovation as an artefact that contains the knowledge required to understand the process from which it has been generated, and the manner in which it can be generated.

The Knowledge-based Theory is still evolving, and there is insufficient consensus among scholars for it to be recognised as an established theory per se (Grant, 1996). The approach is built based on the resource-based view (Grant, 1996). It proposes that the unique abilities that help create and exploit valuable knowledge enhance outcomes (Grant, 1996). It is interesting to study how this knowledge improves the results of a firm. According to Hooff and De Ridder (2004), organisationally available knowledge is an essential resource. Liao and Wu (2009) see knowledge resources as sources of competitive advantage in an economy that values the importance of information. Even though businesses have abundant information, they are often unsuccessful in managing that information (Liao & Wu, 2009). Here, the roles of KM and knowledge absorption come into play. The importance of KMC and KAC has been discussed in the manufacturing context with respect to accelerating the release of a new product by shortening the product development phase, and time-to-market for new products (Liu & Tsai, 2009). Yet, these innovation antecedents have not been sufficiently discussed for service innovations, though the service context faces similar pressures due to the highly competitive business environment.

Knowledge management capability

As Nonaka (1994) and Sveiby (2001) explain, value creation occurs due to the implicit or explicit transfer of knowledge between individuals in an intangible value chain, and lies in the conversion of different types of knowledge, though the creation of knowledge is not limited to individuals. Moreover, Kogut and Zander (1992), Spender (1996) and Chiva and Alegre (2005) explain that firms play an active role in creating knowledge as they serve simultaneously as sources of new knowledge or learning and as mechanisms for transferring social knowledge. The KMC of a firm refers to the firm's ability to prepare and deploy knowledge-based resources with other complementary resources in the firm (Tseng, 2015). According to Gold et al. (2001), the main facets of KMC are knowledge acquisition, knowledge conversion, knowledge application, and knowledge protection. Each aspect of KMC significantly affects innovation management capability (Liu & Tsai, 2009). Hence, the more active the KMC of a firm, the more successful will be its innovation management capability (Liu & Tsai, 2009).

Knowledge absorption capability

The dynamic nature of the business environment has stressed the importance of knowledge as a dominant source of competitive advantage (Jansen et al., 2005). According to Cohen and Levinthal (1990), a firm's ability to recognise new external knowledge, assimilate that knowledge, and apply it to commercial products to survive selection pressures is termed its absorptive capacity. Jansen et al. (2005) defined absorption capability as recognising, assimilating and applying new external knowledge. Zahra and George (2002) identified four dimensions of absorptive capacity that constitute potential and realised absorptive capacity. These researchers explained the importance of managing these dimensions of absorptive capacity successfully to obtain superior performance. Firms are enabled to continually renew their knowledge stock if they focus on the acquisition and assimilation of new external knowledge (i.e., potential absorptive capacity). However, firms may sometimes suffer from the costs of purchase without gaining the benefits from exploitation. Conversely, firms may fall into a competence trap even though they may earn short-term profits through exploitation, if they focus on transformation and exploitation, i.e., realised absorptive capacity. (Ahuja & Lampert, 2001).

According to Jansen et al. (2005), even though there is a developing interest in absorptive capacity, an insufficient number of studies has focused on the intensity and multidimensionality of the concept. These researchers suggest that organisational antecedents may affect absorptive capacity and lead to different performance outcomes.

Theoretical background

SI is identified as a multidisciplinary process comprising designing, realising, and marketing combinations of existing and/or new services and products (Flikkema et al., 2007). These products require structurally new technological, human or organisational capabilities in the service organisation (Van Ark et al., 2003). Creating organisational innovations requires different DCs (Hertog et al., 2010). DC can be defined as the ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments (Teece et al., 1997). In the DCT, Hertog et al. (2010) explained that DSIC impacts SI in the service context. As elaborated in the PdH framework, service organisations need dynamic service innovation capabilities to create innovations in a similar manner to which dynamic innovation capabilities impact innovations in the manufacturing sector (Hertog et al., 2010).

However, there is a lack of studies on DC for two reasons (Zheng et al., 2011, p. 1035). First, the conceptualisation of DC is still vague and inconsistent as it is an emerging research area. Secondly, the construct requires operationalisation. However, Kariyapperuma (2016) studied SI in Sri Lanka, and has operationalised DSIC. He explained that in an organisation, the social capital and human capital of top organisational management impact the creation of DSIC. The study has examined the impact of DSIC on SI dimensions. A vast array of researchers has studied different firm-level factors and individual-level factors (Barney, 1991; Henderson & Cockburn, 1994; Nelson & Winter, 1982; Peteraf, 1993) that impact the operationalisation of DC. The Knowledge-based Theory highlights the importance of superior access to and integration of specialised knowledge for resource and capability-based advantages (Grant, 1996a, cited in Denford, 2013). However, knowledge-based capabilities have not been sufficiently studied in the existing literature as one of the critical firm-level factors influencing DSIC.

Knowledge gained from information processing plays a critical role in developing DC in organisations (Zheng et al., 2011). The Knowledge-based Theory assumes that resource and capability-based advantages are derived from superior access to and integration of specialised knowledge (Grant, 1996a, cited in Denford, 2013). Liao and Wu (2009) presented KM as an essential asset in this knowledge economy. KM deals with one of the important tangible resources of an organisation, on which its performance rests (Wong & Wong, 2011). According to Liao and Wu (2009), KM positively affects an organisation's performance and, thereby, the organisation's success. Hence, it is fundamental to business success (Liao & Wu, 2009). KM is a set of clearly defined processes or approaches used to discover the critical knowledge necessary for KM operations (Liu & Tsai, 2009). It is also essential for determining new products and strategies that strengthen human resource management in achieving enterprise goals (Liao & Wu, 2009). Harrison and Samaon (2002) point out that many companies have begun to consider innovation as a critical factor in gaining competitive advantages. Thus, knowledge becomes an essential element in maintaining sustainable innovation. Therefore, Chien and Tsai (2012) explored the relationship between knowledge resources and organisational performance from different perspectives. In addition, Liu and Tsai (2009) examined and explained the relationship between KMC, KAC and innovation management capability. Based on the above research, and drawing from the Knowledge-based Theory, this study contributes to the DCT by describing the impact of KMC and KAC on developing DSIC in the process of creating SI dimensions. In other words, this study offers 'knowledge' as another determinant of DSIC.

Hypotheses and conceptual model

Knowledge management capabilities and dynamic service innovation capabilities

Creating organisational innovations requires different dynamic capabilities (Hertog et al., 2010). In this regard knowledge gained from information processing plays a critical role in developing the dynamic capabilities of organisations (Zheng et al., 2011; Wijekoon & Galahitiyawe, 2015). The knowledge available to organisations is a crucial resource (Hooff & De Ridder, 2004), and is also a core competence essential to face business challenges (Tseng, 2015). It is a source of competitive advantage in an economy that values information (Liao & Wu, 2009). KM is a set of clearly defined processes or approaches used to discover the critical knowledge necessary for different KM operations (Liu & Tsai, 2009). Effectively enhancing the value of the knowledge resource through the following activities, viz., knowledge acquisition, knowledge conversion, knowledge application, knowledge sharing and knowledge protection, is called “Knowledge Management” (Gold et al., 2001; Liu & Tsai, 2009). Each facet of KMC significantly affects innovation management capability (Liu & Tsai, 2009). A firm with dynamic capabilities can integrate, and redeploy knowledge resources, and as a result, achieve more excellent performance (Chien & Tsai, 2012).

As explained by Lin et al. (2012) and Lee and Tsai (2005), if firms are capable of more effective acquisition, sharing, and utilisation of knowledge about the market, these organisations can comprehend market dynamism better than their competitors, and thus, create innovative products to satisfy customers and market demands. Chien and Tsai (2012) further state that the more knowledge resources a firm has accumulated, the greater the DC it can develop. Based on the above mentioned literature, the present research study proposes that,

H₁: Knowledge management capabilities of firms influence their dynamic service innovation capabilities in developing service innovation dimensions.

Knowledge management capabilities and knowledge absorption capabilities

Knowledge resources may be embedded in organisational processes and routine activities (Teece, 2000 cited in Chien & Tsai, 2012). Prior related knowledge resources

are necessary (Cohen and Levinthal, 1990) for determining new products and strategies that strengthen human resource management in achieving enterprise goals (Liu & Tsai, 2009). Researchers suggest the positive influence of specific human resource management activities on the development of employee learning capability and learning motivation (Minbeava et al., 2003 as cited in Liu & Tsai, 2009). Moreover, knowledge sharing capacity in KMC is responsible for transferring or spreading knowledge to others from individuals, groups, and organisations (Lee, 2001 as cited in Liu & Tsai, 2009). When employees actively share self-knowledge with their colleagues, it may upgrade related technology and operations for the acceptor (Liu & Tsai, 2009). In addition, if knowledge granting behaviour among colleagues becomes part of the organisational culture, employees may further upgrade their learning motivation (Liu & Tsai, 2009). In addition, accumulating existing knowledge resources in knowledge resources storage may also facilitate learning (Cohen and Levinthal, 1990). When an organisation has many knowledge resources, it should also have efficient learning mechanisms (Chien & Tsai, 2012). Chien & Tsai (2012) also suggest employee learning capability and learning motivation as key facets in knowledge absorption capability. Therefore, based on the above literature, the current study proposes that,

H₂: Knowledge management capabilities influence knowledge absorption capabilities.

Knowledge absorption capabilities and dynamic service innovation capabilities

The Knowledge-based Theory explains the requirements for superior access to and integration of specialised knowledge for resource and capability-based advantages (Grant, 1996a, cited in Denford, 2013). Zahra and George (2002) identified two dimensions of absorptive capacity that constitute potential, and realised absorptive capacity. Firms are enabled to continually renew their knowledge stock if they focus on the acquisition and assimilation of new external knowledge (i.e., potential absorptive capacity). However, they may suffer from the costs of acquisition without gaining benefits from exploitation. Conversely, firms may fall into a competence trap even though they may earn short-term profits through exploitation, if they only focus on transformation and exploitation (realised absorptive capacity) (Ahuja & Lampert, 2001).

Further, they may not be able to respond effectively to environmental changes (Wijekoon & Galahitiyawe, 2015). This indicates that knowledge resources might not be effectively

translated into DC without effective and balanced absorption capacity dimensions. The recognition and assimilation (potential absorptive capacity) of knowledge allows the firm to renew its knowledge stock. Knowledge transformation and exploitation (realised absorptive capacity) enable the firm to leverage the absorbed knowledge into innovation action. Hence, based on the above literature, the present research study postulates the following hypothesis.

H₃: Knowledge absorption capabilities influence dynamic service innovation capabilities in developing service innovation dimensions.

The mediating effect of knowledge absorption capability

In the Knowledge-based Theory, Grant (1996a as cited in Denford, 2013) emphasised the significance of superior access to and integration of specialised knowledge for resource and capability-based advantages. Hawass (2010) states that the firm's ability to access variant knowledge domains is a mandatory step towards effective KM, even though it is insufficient to complete the process. Hawass further explained that individuals empowered by their firm's structural flexibility should absorb this knowledge to create organisational capabilities. Liao & Wu (2009) revealed that the organisation's absorptive capacity was a significant intermediary factor between KM and developing innovation capabilities. However, Liu & Tsai (2009) pointed out that knowledge resources might not be effectively translated into DC without learning. Thus, the influence of learning mechanisms provides insights into how DC works from a process perspective (Liao & Wu, 2009). Van Den Bosch et al. (1999) (as cited in Liao et al., 2009) concluded that absorptive capacity plays a mediating role in creating new knowledge. Darroch & McNaughton (2003), as cited in Liao et al. (2009) also found that knowledge acquisition had a more indirect than a direct influence on innovation. Accordingly, weighing all of the above arguments, the present study proposes that,

H₄: Knowledge absorption capability mediates the relationship between knowledge management capability and dynamic service innovation capabilities in developing service innovations.

Dynamic service innovation capabilities and service innovations

Hertog et al. (2010) and Teece et al. (1997) explained that DSIC impact SI. DC can be defined as “the ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece et al., 1997). The unique traits of services suggest that using DC to determine SI might be a favourable alternative to selecting a firm’s capacity to develop and implement new service concepts (Teirlinck & Spithoven, 2013). In this regard, scholars have taken very different approaches to DC and SI.

The assimilation approach assumes that the concepts and tools developed for innovation in manufacturing sectors can be imported to the service sector (Janssen et al., 2012; Gallouj, 1994 as cited in Tether, 2005; Wijekoon & Galahitiyawe, 2015). In simple terms, this approach postulates that the micro-foundations for dynamic innovation capabilities that are relevant for manufacturing firms can be translated into service sectors (Fischer et al., 2010; Kindstrom et al., 2012). The demarcation approach includes the theories addressing the unique traits of services and SI processes. This approach emphasises the fundamental differences in SI compared to innovations in goods. The synthesis approach comprises theories in which insights from the previous two approaches (i.e. Goods versus Service) are taken and configured into a more integrated conceptualisation. This approach proposes a wide range of innovation routines, including sensing user needs and technological options, conceptualising, (un)bundling, coproducing and orchestrating, scaling and stretching, and learning and adapting (Hertog et al., 2010). Accordingly, Janssen et al. (2012) established a positive relationship between dynamic service innovation capabilities and service innovation performance. Therefore, to verify this relationship, the current research study proposes that,

H₅: Dynamic service innovation capabilities influence service innovations

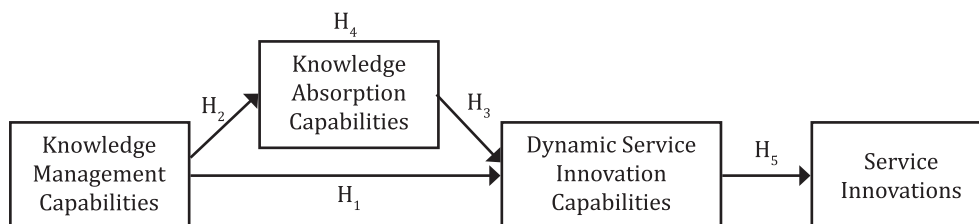


Figure 1: Conceptual framework

Methodology

The current study adopted a positivist paradigm combined with a deductive approach using a survey research strategy. It includes five hypotheses based on the DCT, the PdH framework, and the Knowledge-based Theory. The study is a conclusive, descriptive, cross-sectional research study (Sekaran and Bougie, 2016), and it attempts to explain the individual direct relationships between KMC and DSIC, DSIC and SI, and the indirect impact of KAC on the relationship between KMC and DSIC. A cross-sectional survey was conducted to gather perceptions on KMC, KAC, DSIC and SI from respondents serving in organisations' top management, all of whom comprised the study sample (Saunders et al., 2016).

This causal research study has adopted a quantitative choice using service sector organisations as the unit of analysis. Senior managers working in six types of service-oriented firms from six industries, namely, insurance, banking, other financial services, health care, entertainment, hotel, telecommunications, professional services and IT/ICT, were recruited to collect data in the 4th quarter of 2018, and the 1st quarter of 2019. The survey instrument was developed as a structured, self-administered questionnaire, based on previously empirically validated measurement scales. It consisted of 81 questions under five sections, which measured service firms' demographic variables and the four study variables: SI, DSIC, KMC and KAC. A sample consisting of 32 respondents was selected, and a pilot study was done to assess face validity and internal consistency before the final data collection process. The researcher employed the disproportional stratified sampling technique to ensure large enough sub-samples for each strata analysis across the selected six Sri Lankan service industries in the present study. The researcher increased the sampling fraction (often called oversampling) for minority groups (service industries that had small numbers of organisations), so that reliable parameter estimates could be generated for such industries (Stoker, 1989 as cited in Kariyapperuma, 2016).

Measures

Apart from the four items in section one of the questionnaire used to measure the demographic variables of service firms, section two of the questionnaire included twenty-eight items to measure the study's independent variable, which is KMC. KMC was measured in terms of four dimensions/lower order constructs, namely, knowledge acquisition (10 items), knowledge conversion (05 items), knowledge application (07

items) and knowledge protection (06 items). All items were chosen based on the scale developed by Gold et al. (2001) for knowledge management. The third section of the questionnaire included eighteen items to measure the mediating variable of the study, which is KAC. KAC was measured through two dimensions: potential absorptive capacity (06 items) and realised absorptive capacity (12 items) using the scale developed by Jansen et al. (2005). The fourth section of the questionnaire included twenty-one items to measure the fourth variable, DSIC (Hertog et al., 2010). DSIC was measured using (altogether) 21 items under five dimensions: sensing user needs and technological options, conceptualising, co-producing and orchestrating, scaling and stretching, and learning and adapting. All items in sections two, three and four were measured using a seven-point Likert-type scale ranging from 1 (Strongly disagree) to 7 (Strongly agree).

The scale measuring the fourth variable, SI, included ten questions that measure SI (the dependent variable). The ten items measured the six dimensions of the SI construct. The six dimensions are: new service concept, new customer interactions, new value systems/ business partners, new revenue model, new organisational delivery system, and new technological delivery system. All the items were developed based on the scale created by Hertog et al. (2010) and validated in the Sri Lankan context by Kariyapperuma (2016) for use in service industries. All items were measured using a five-point Likert-type scale ranging from 1 (Do not agree at all) to 5 (Agree to a great extent).

Data analysis and results

In total, 350 questionnaires were distributed, and 160 were collected, out of which 157 were used for data analysis after the data cleaning process. Data cleaning, descriptive statistics, common method bias, non-response bias, tests for normality, linearity and homoscedasticity, multicollinearity, and unidimensionality analysis were performed with SPSS before inferential analysis before step into structural equation modelling (Galahitiyawe & Jayakody, 2019). The data analysis was done based on the SEM data analysis method using SmartPLS software. As Sarstedt et al. (2019) recommend, the two-step method was adopted to assess the measurement and structural models. Accordingly, the measurement model was initially developed to test the reliability and validity of the data. This was followed by testing the structural model to assess the five relationships hypothesised in the present study.

The study's unit of analysis is independent organisations or strategic business units of organisations that focus on innovation. One hundred and fifty-seven usable observations

were collected. The composition of the sample is as follows; 22.3% in professional services, 19.1% in the hotel/ entertainment service sector, 18.5% in IT/ ICT, 17.8% in banking, insurance and other financial services, the same percentage (17.8%) in health care services, and 4.5% in telecommunications.

Analysis of the number of employees in the 157 organisations has revealed that 77 organisations had less than 200 employees, and 28 organisations had more than 1000 employees. Twenty-six organisations had between 201 and 400 employees, 17 organisations had between 401 and 600 employees, five organisations had between 801 and 1000 employees, and four organisations had between 601 and 800 employees. Among the sample organisations, thirty-five organisations have been in operation between eleven and fifteen years, and three have been operating between forty-one and forty-five years. Fifty-five per cent (55.5%) of organisations, which is the majority of organisations, have been in operation for less than fifteen years.

Measurement model

Data were tested for common method bias and multivariate assumptions before performing confirmatory factor analysis. According to Hair et al. (2014), the threshold ($\lambda > 0.5$) was considered for testing the convergent validity of items. Items loading less than 0.5 were removed, and the model was re-tested to check for validity. Afterwards, standardised factor loadings were used to calculate the reliability and validity of the data. The statistical results for reliability and validity testing, shown in Table 1, reveal that all latent variables in the model are at satisfactory levels of convergent validity ($AVE > 0.5$), composite reliability ($CR > 0.7$) and discriminant validity (AVE). According to Table 1, all the study variables' AVE (Analysis of Variance Extracted) values and CR (Composite Reliability) values are higher than 0.5 and 0.7, respectively. Therefore, the convergent validity of the measurement scale is established.

Table 1: Reliability and validity of measures

Latent Variables	No of Items	AVE	Composite Reliability (CR)	Cronbach Alpha	AVE vs SMC			
					DSIC	KAC	KMC	SI
DSIC	21	0.542	0.926	0.910	0.708			
KAC	18	0.534	0.912	0.860	0.579	0.731		
KMC	28	0.547	0.966	0.911	0.514	0.626	0.736	
SI	10	0.600	0.950	0.881	0.214	0.124	0.107	0.712

Notes: (1) DSIC – Dynamic Service Innovation Capabilities; (2) KAC – Knowledge Absorption Capability; (3) KMC – Knowledge Management Capability; (4) SI – Service Innovation.

There are two endogenous constructs of the current study; DSIC and SI. The coefficient of determination (R²) value of DSIC is 0.604, indicating a satisfactory level of the model’s explanatory power concerning DSIC. Similarly, the coefficient of determination (R²) value of SI is 0.041, revealing an acceptable level of the model’s explanatory power.

Structural model and hypotheses testing

The current study’s endogenous variables’ f² effect sizes have been calculated by removing the exogenous variables from time to time. The results generated by removing KMC and KAC in two different situations are above 0.02 and below 0.15, respectively, indicating only a small impact on dynamic SI capability. The blindfolding-based cross-validated redundancy measures or Q² values of DSIC and SI are 0.258 and 0.162, respectively. Since these values are above zero, a lesser predictive relevance of the path model for the constructs is indicated.

Table 2: f² Effect size and q² effect size

Removal of KMC				
Impact on Dependent Variable	Path Coefficient	f ² Effect Size	Adjusted R ² Value	Q ² Value
DSIC	0.529	0.389	0.275	0.162
Removal of KAC				
Impact on Dependent Variable	Path Coefficient	f ² Effect Size	Adjusted R ² Value	Q ² Value
DSIC	0.632	0.112	0.395	0.258

The first hypothesis (H1) of the study has proposed that KMC impacts DSIC. The path coefficient obtained for this proposed relationship is 0.586, which indicates a moderate positive association between the two variables. Moreover, the significance of the relationship is also recorded as a 95% confidence interval since the p-value is less than the critical value of 0.05. Therefore, hypothesis H1 is supported. The impact of KMC on KAC has been suggested in the second hypothesis (H2). According to the path coefficient value obtained (0.222), the relationship is weakly positive. Therefore, at the 95% confidence level, the association is recorded as significant with a p-value greater than 0.05. Thus, the proposed hypothesis, H2, is accepted. The impact of KAC on DSIC has been suggested in hypothesis H3. There is a weak, positive association between the two variables as the path coefficient value is 0.463. Since the p-value is less than the critical value of 0.05 at the 95% confidence level, the association is significant, and hypothesis H3 is accepted. Following the process mentioned above, the fourth hypothesis of the current study has been tested. The direct effect of KMC on DSIC has been tested, excluding the mediator variable. As the immediate impact is significant with a p-value of zero at the 95% significance level, the mediator variable was added later, and the indirect effect was assessed. The result generated for the indirect effect is significant at the 95% significance level with a p-value of 0.000.

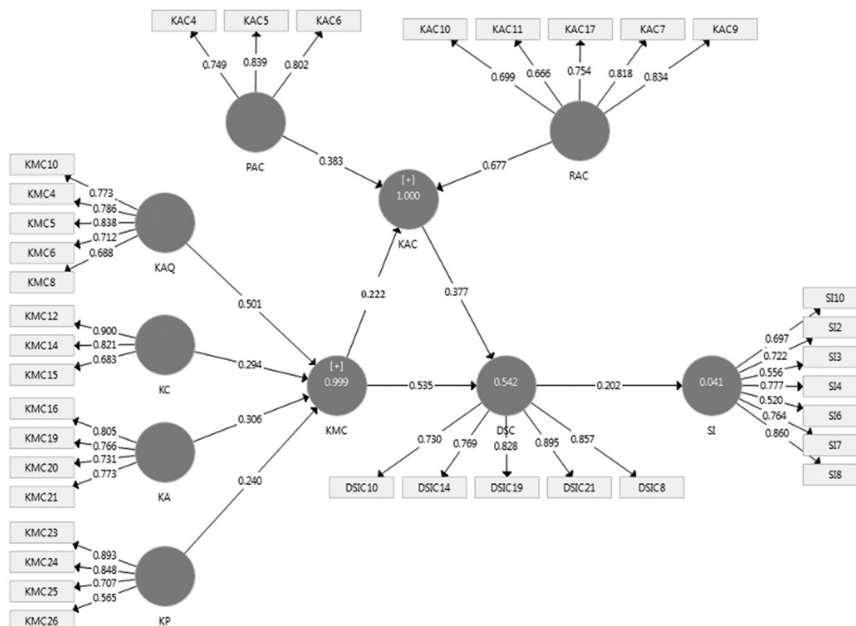


Figure 2: Output path diagram of the structural model

Table 3: Results of hypotheses testing (H₁ - H₄)

Without the Mediator					
Hypothesis /Effect	Path	Path Coefficients	T Statistic	P Values	Decision
Direct Effect	KMC - DSIC	0.633	19.332	0.000	Supported
With the Mediator					
Hypothesis /Effect	Path	Path Coefficients	T Statistic	P Values	Decision
Direct Effect	KMC - DSIC	0.536	19.324	0.000	Supported
Direct Effect	KMC - KAC	0.222	2.067	0.000	Supported
Direct Effect	KAC - DSIC	0.377	6.496	0.000	Supported

This study also used the variance accounted for (VAF) value (VAF = indirect effect/total effect, and total effect = indirect effect + direct effect) (Hair et al., 2014) to measure the mediating effect size. The VAF value was 29.6% = $[0.253 / (0.253 + 0.633)]$, indicating a partial mediation in the structural model. Therefore, it can be concluded that there is a partial mediation of KMC on the relationship between KMC and DSIC. Thus, hypothesis H4 is accepted.

The fifth hypothesis of the current study proposed an impact of DSIC on SI. As Table 4 illustrates, there is a weak, positive association between the two variables as the path coefficient value is 0.203. Since the p-value is less than the critical value of 0.05 at the 95% confidence level, the association is significant, and hypothesis H5 is accepted.

Table 4: Results of hypotheses testing (H₅)

Hypothesis /Effect	Path	Path Coefficients	T Statistic	P Values	Decision
Direct (H ₅)	Effect	DSIC - SI	0.203	0.000	Supported

Discussion

Innovation plays a critical role in achieving sustainable competitive advantages for firms (Witell et al., 2015; Zhu et al., 2014). Given that fact, it is apparent that most service industries operate in highly competitive markets, and firms in these industries need to

continuously explore new ways to develop, and retain competitive advantages (Hsieh et al., 2013). With the increase in size and complexity of the service sector resulting from economic globalisation, scholars have examined how companies can maintain their competitive advantages through service innovation practices (Tsou & Chen, 2020). Despite the truth of these scholarly arguments, in the present context, specifically in most Sri Lankan service sector business organisations, the level of innovations is not significant (Abeyagoonasekera, 2014; Cornell University, INSEAD, WIPO, 2019). Therefore, to develop SI, according to the Dynamic Capability Theory, Hertog et al. (2010) have emphasised that DSIC is essential.

Be that as it may, DSIC is still an emerging research area and needs operationalisation (Zheng et al., 2011; Kariyapperuma, 2016) since it is a theoretically and empirically under-researched concept. This study applied firm-level factors, such as physical and monetary resources, competencies, processes, routines, and organisational cultures (Barney, 1991; Henderson & Cockburn, 1994; Nelson & Winter, 1982; Peteraf, 1993), and individual-level factors such as creativity, in assessing dynamic capabilities. However, knowledge capabilities, which can also be considered one of the critical firm-level factors that influence DSIC, have not been sufficiently studied in the existing literature. Chien and Tsai (2012) explored the relationship between knowledge resources and organisational performance from different perspectives. Furthermore, Liu and Tsai (2009) studied and explained the relationships between KMC, KAC and innovation management capability. The present study attempted to extend the Dynamic Capability Theory by considering organisational knowledge as another firm-level antecedent of DSIC. Therefore, the purpose of the present study was to explore the impact of KMC and the mediating effect of KAC on DSIC in its relation to developing SI in service-dominant business organisations.

The present study was directed towards achieving three objectives. Due to the lacuna in the existing theoretical and empirical literature on dynamic service innovation capabilities, the first objective focused on investigating the relationship between KMC and DSIC in Sri Lankan service sector firms. Besides this relationship, the present study builds the argument that organisational KAC is a significant intermediary factor in the relationship between KM and the development of innovation capabilities (Liao & Wu, 2009; Liu & Tsai, 2009). Therefore, the second objective was directed towards studying the mediating impact of KAC on the relationship between KMC and DSIC, based on the theoretical underpinning of knowledge absorption contained in the Knowledge-based Theory (Zahra & George, 2002). Furthermore, based on the PdH framework in the

Dynamic Capability Theory, Hertog et al. (2010) have explained the significant impact that DSIC has on SI. Therefore, due to the prevailing empirical gap in DSIC and SI in the Sri Lankan service context, the third objective was to examine the relationship between DSIC and SI in the Sri Lankan context.

Findings of the present study revealed that service-dominant business organisations with high levels of KMC in terms of knowledge acquisition, knowledge conversion, knowledge application and knowledge protection, are capable of developing DSIC. These results align with the findings of Lin et al. (2012) and Lee and Tsai (2005), which also point out that firms with more effective acquisition, sharing, and utilisation of knowledge related to markets can better utilise market dynamism, and create innovative products to satisfy customer and market demands. This is because the knowledge thus obtained can efficiently assist firms in capturing changing customer preferences and product technologies. In addition, a better focus on customers and competitors allows firms to gain sufficient information about market demands and rivals' strategies to develop innovative products.

This study also found that the ability to sense and react to the market environment and changes in technological advancements, consumer tastes and demands, which are the first DSIC of the PdH model, results from the KMC of an organisation (Likoum et al., 2020). Information about customers' needs, competitors, suppliers' strategies and other market factors makes up a treasured portion of a firm's knowledge base. Thus, KM is fundamental in building dynamic capabilities and searching for innovative opportunities (Abubakar et al., 2019).

The second DSIC of the selected mode, 'conceptualising,' also depends heavily on the organisation's knowledge base. Conceptualising involves smartly combining new and existing service elements into an integrated service configuration experienced as new to the market (Hertog et al., 2010). According to Nasir (2010), KMC would enable a firm to develop rare and valuable knowledge through learning, another service innovation capability of this model, and subsequently, build upon, and spread that rare knowledge throughout the organisation to enhance innovation. According to Normann (2002), the bundling and unbundling capability of services are ways of creating service offerings that are newly bundled, enriched, blended or, are the opposite, that is, recently unbundled, stripped down to the bare essentials. For SI, the most significant gains are made by companies initiating and dominating service systems that bring new value to customers (Jong & Hertog, 2010). Thus, KMC would enable companies to acquire and create these

new SI in terms of bundling the services to satisfy customer demand for convenience and/or unbundling, and specialising the service offering to make the customer able to afford the offering. Furthermore, KMC would enable companies to innovate service bundles faster than their rivals through knowledge creation, protection, and absorption.

The fourth DSIC, co-producing and orchestrating, depends on the knowledge gained externally from new business partners and/or actors on the broader value network (Hertog et al., 2010). KMC facilitates co-producing and orchestrating resources and capabilities across the value chain by allowing the company to acquire knowledge about suppliers in the industry, generate new knowledge from existing knowledge, and exchange knowledge with its business partners and actors in the value chain (Hertog et al., 2010). In addition, to be competitively ahead in the marketplace, it is vital to globalise the business.

The fifth DSIC, scaling and stretching, is necessary to remain competitive in a globalised marketplace (Jong & Hertog, 2010). Stretching can easily be taken too far. Firms will need to refrain from pressures to diversify away from their core competencies with low entry barriers to services. Again, finding the proper balance is the key here. Winter and Szulanski (2001, p. 737) state that replication involves exploitation and exploration. It offers many opportunities for learning, adaptation, and fine-tuning of a successful business model enabled by knowledge. The sixth and final DSIC, according to Hertog et al., (2010), is the learning and adapting capability, which is the capacity of a firm to deliberately learn from the way SI is managed currently, and subsequently adjust the overall service innovation process. KM is far more important for deliberate learning and adapting, as KMC provides the ability to use feedback from projects to improve subsequent projects, benchmark performances, and apply knowledge learned from mistakes and experiences.

The present study's findings revealed that the higher the level of KMC, the higher the KAC. Liu and Tsai (2009) and Cohen and Levinthal (1990) have found a similar relationship between KMC and KAC. They have explained that an organisation's existing knowledge and the related KM process will affect the recognition of knowledge value, knowledge assimilation, and usage. Moreover, Liu and Tsai (2009) explain that employees are encouraged to actively engage in self-knowledge sharing with their peers and colleagues in the organisation. This is a successful KMC that upgrades the capability to use related technology and operations for the acceptor, which is identified as KAC. Furthermore, if KMC practices like making such knowledge granting behaviour

become a part of organisational culture and this trend is perpetuated, this will further upgrade employees' learning motivation.

According to the present study's findings, KAC positively impacts DSIC; therefore, the third hypothesis was also statistically supported. Liu and Tsai (2009) revealed that employee learning capability significantly influences innovation management capabilities. This implies that if an organisation's employees and systems possess higher levels of learning capabilities, that organisation's innovation performance will be facilitated. Accordingly, organisations need to initiate mechanisms to absorb and realise the knowledge available internally and externally to boost organisational innovation capabilities.

According to the present study's findings, KAC partially mediates the relationship between KMC and DSIC, and the fourth hypothesis is also statistically supported. The Knowledge-based Theory explains the requirement for superior access to and integration of specialised knowledge for resource and capability-based advantages (Grant, 1996a, cited in Denford, 2013). In this regard, Hawass (2010) has stated that a firm's ability to access variant domains of knowledge is a mandatory step towards effective KM, even though it is not sufficient to complete the process. Hawass further explains that individuals empowered by their firm's structural flexibility should absorb this knowledge to create organisational capabilities. Liao and Wu (2009) evidenced that the organisation's absorptive capacity was a significant intermediary factor between KM and developing innovation capabilities. There are only a very few studies that have investigated the impact of KAC as a mediating variable. One of them is the study of Pai et al. (2013), where the researchers discovered that using its potential and realised absorption capabilities, an organisation can utilise the acquired knowledge efficiently. The findings of this study also claim that even though firms can be exposed to the same amount of external knowledge flows, every firm might not derive equal benefits from these knowledge flows (Escribano et al., 2009), since each firm needs to absorb, assimilate and integrate these flows into their unique organisational knowledge and innovation processes. In this sense, KAC appears as a promising capability that improves and complements KMC (Castro, 2015).

The fifth hypothesis of the study is also supported since the findings demonstrated that DSIC have a significant positive impact on SI. According to Pai et al. (2013), DC has a positive and direct influence on organisational innovation performance. Janssen et al. (2012) also established the positive relationship between DSIC and SI performance.

The current findings extend the basic logic that dynamic innovation capabilities are critical for innovation in service organisations (Morgan et al., 2009; Verona & Ravasi, 2003; Danneels, 2004). Teece et al. (1997) explained that to develop new services continuously and to comprehend the underlying business logic of service provision, firms must develop DC that can enable service innovations. Kariyapperuma (2016) explained that service firms need to adapt their resource base to evolving customer demands and market trends such as increased demand for services, and shape their environment through innovation and collaboration with their customers and other key actors.

Therefore, the present study's findings revealed that KMC is essential to develop DSIC in developing SI dimensions in Sri Lankan service-dominant business organisations. Furthermore, the results emphasised the importance of KAC, which partially mediated the relationship between KMC and DSIC in developing SI. Finally, the study highlighted the necessity of DSIC for service-dominant business organisations to establish SI dimensions to outperform challengers in the face of intense market competition. Therefore, the present study empirically verified the critical need for organisational knowledge when service-dominant business organisations develop DSIC to achieve SI dimensions. Furthermore, the research findings identified organisational knowledge as an antecedent of DSIC based on the Dynamic Capability Theory, Knowledge-based Theory and the PdH framework.

Theoretical implications

The study made several significant theoretical contributions. To the best of the author's knowledge, no study has been done on knowledge capabilities as an essential organisational level factor that influences DSIC. Hence, by introducing KMC as an antecedent of DSIC, this research attempted to open up the "black box" of determinants of dynamic innovation capabilities, and in so doing, extended the existing DCT of Hertog et al. (2010).

Secondly, it was highlighted by Van Den Bosch et al. (1999) and Liao et al. (2009) that absorptive capacity plays a mediating role in the creation of new knowledge. Even though many firms can be exposed to much the same forms of external knowledge, not every firm will gain similar benefits from this knowledge. This is because it is necessary to absorb, assimilate, and integrate this external knowledge into firms' unique organisational knowledge and innovation processes (Castro, 2015). However,

the mediating impact of KAC has only been conceptually discussed in the recent past (Grandinetti, 2016; Castro, 2015; Escribano et al., 2009; Gray, 2006). Thus, despite the importance of KAC as a mediator, the sparse empirical findings in the extant literature were inconclusive. Therefore, findings related to the mediating impact of KAC uncovered in this study, would contribute significantly to the empirical literature on KAC.

Thirdly, the literature lacks focus on service sector innovations compared to manufacturing sector innovations (Hertog et al., 2010; Kariyapperuma, 2016). Hence, there is a gap in the available literature related to dynamic innovation capabilities and knowledge-based capabilities domains, specifically in the service sector. Given the above lacuna, this study will contribute to the empirical literature on DISC. The present study was conducted on DSIC and SI among 157 service firms across 06 service-dominant industries. Therefore, the present study can be considered the first performed in the Sri Lankan context which has blended dynamic innovation capabilities with knowledge-based capabilities. It is thus an essential contribution to the prevailing (inconclusive) evidence on the relationship between DSIC and SI in the Sri Lankan context.

Managerial implications

The results of this study also have important implications for managerial practice. First, the study findings proved empirically that KMC stimulates the development of DSIC in service organisations. Thus, managers working in service organisations should actively pay attention to the alignment of internal and external knowledge with organisational goals (what should be done) and organisational strategies (how it should be done). Consequently, managers of those service firms aspiring to improve their firms' competitive edge through innovative capabilities should be mindful about practising knowledge acquisition, knowledge conversion, knowledge application, and knowledge protection as methods of enhancing innovation capability. To achieve this, they can consider implementing new systems, networks and mechanisms within the firm which are firmly linked with the external environment to acquire, convert, apply and protect new knowledge in the firm for the development of DSIC. Developing Standard Operating Procedures (SOPs), conducting continuous learning and training programmes, and facilitating inter-organisational collaborations for synergy advantages will ensure the consistent commitment of every employee towards KM throughout the organisation.

Secondly, as the research results revealed, the significant influence of KAC on the relationship of interest confirmed that DSIC could arise due to KAC as well, and this

influence leads to a higher level of the total effect of KMC on DSIC. This result indicates that managers need to realise the importance of developing KAC across the organisation. To this end, top-level managers can ensure that new and existing operational level employees conveniently adopt best practices by developing manuals, blueprints and documents related to organisational processes. In this way, top-level managers can encourage employees to develop new ideas, implement 'buddy systems' for recruits and facilitate experience-sharing sessions. Further, implementing efficient and effective mechanisms to address customer complaints, and recording them for future reference should be an essential part of knowledge absorption and sharing.

Finally, as empirically validated by the current study, the fact that DSIC leads to SIs highlights the importance of managerial awareness concerning the value of DSIC in enhancing innovations. This result implies that managers should focus on improving signalling user needs and technological options, conceptualising, bundling capabilities, co-producing and orchestrating, scaling and stretching, and learning and adapting. Given that the service market is competitive and complex, managers should continuously attempt to improve their service strategies. To this end, they can explore blue ocean markets to gain the first-mover advantage. Further, the management of service firms can consider training their operational level employees for better communication and customer relationship management (CRM), along with establishing the required facilitating platforms like CRM systems. Moreover, to capture changes in market trends sooner than competitors, firms can implement different customer observation methods and ghost shopping mechanisms as market survey strategies. Accordingly, organisational policymakers could scrutinise their internal KM and absorption processes to maximise external and internal knowledge to capture advancements in SI dimensions that facilitate the innovation of novel service offers to customers.

Limitations and directions for future research

Despite the attention given to a thorough preparation for, and the conducting of this research, it does have several limitations, which will now be discussed. Firstly, the analysis was performed using a sample of Sri Lankan firms in six service-intensive sectors. The specific cultural, political, and economic context of Sri Lanka may make the results of the current study less generalisable to other contexts. Since the cultural context is an attribute of the service itself, it has certain important implications for both the service customer and the service provider. Secondly, the lacuna in the existing literature, of a sound theoretical and empirical base to the construct of DSIC, limited

the researcher to basing his study on the inconclusive and emerging literature. This is because the DSIC and SI dimensions of the present study were limited to the PdH framework explained by Hertog et al. (2010). Finally, the dimensions of KMC and KAC adopted for this study had not been studied explicitly in the service context, unlike the dimensions of DSIC, which had. Therefore, there may be a lack of compatibility of the KMC and KAC dimensions used in the study, in relation to the service context.

In terms of future research, service innovation itself is highly context-based, and therefore, there might be differences in impacts coming from the industrial context. Thus, future studies can be conducted focusing on a specific service industry or comparing different service sector industries to examine how KMC and KAC impact DSIC differently.

Future research studies can expand this study into other types of service organisations that have not been included in the present study, which may make up a large part of the service sector in a particular economy. According to the United Kingdom Standard Industrial Clarification (UKSIC, 2007), many industrial sectors that have not been considered in this study can be classified as service industries. Thus, future studies could extend the model proposed by this study to other service sector industries, using a larger sample of service organisations.

Thirdly, in investigating the antecedents of DSIC, this study used a quantitative methodology coming under the purely positivist research paradigm. Qualitative methods can be used in future studies under the interpretive research domain to explore and better understand additional antecedents of DSIC. Therefore, the present study opens up alternative avenues for future research to uncover novel relationships among knowledge-based theories, DSIC and SI.

Conclusion

The purpose of this study was to contribute to the existing body of knowledge by determining the antecedents of and operationalising DSIC, which are essential in developing SIs from an organisational knowledge perspective. The current study has made three theoretical and empirical contributions. By introducing KMC as an antecedent of DSIC, and identifying KAC as a mediator, this study examined the determinants of dynamic innovation capabilities, and extended the existing Dynamic Capability Theory by observing it through the lens of knowledge. Furthermore,

this study can be considered an attempt to contribute to the prevailing inconclusive evidence regarding the relationship between DSIC and SIs in the Sri Lankan context. The study also emphasised the development of mechanisms, networks, systems, and procedures for managers to acquire better knowledge, and convert, apply, and protect extant organisational knowledge, and also advocated continuous evaluation and distribution of such knowledge among organisational members. Finally, the study explained the importance of developing organisational knowledge-based capabilities to enhance organisational innovativeness in service-dominant firms. This would facilitate such firms to develop the SI dimensions required to outperform their rivals in a fiercely competitive market.

References

- Abeyagoonasekera, A. (2014, May 07). *The road to overcome poverty*. Daily FT: <http://www.ft.lk/article/290046/Lakshman-Kadirgamar-Institute-promotes-Innovation--The-Road-to-Overcome-Poverty>
- Abubakar, A. M., Elrehail, H., Alatailat, M. A., & Elçi, A. (2019). Knowledge management, decision-making style and organisational performance. *Journal of Innovation & Knowledge*, 4(2), 104-114.
- Ahuja, G., & Lampert, M. C. (2001). Entrepreneurship in the large corporation: A longitudinal study of how established firms create breakthrough inventions. *Strategic Management Journal*, 22(6-7), 521-543.
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Berry, L. L., Wall, E. A., & Carbone, L. P. (2006). Service clues and customer assessment of the service experience: Lessons from marketing. *Academy of Management Perspectives*, 20(2), 43-57.
- Central Bank of Sri Lanka. (2019, April 2020). *Publications: Central bank of Sri Lanka*. Retrieved May 2020, from Central bank of Sri Lanka: <https://www.cbsl.gov.lk/en/publications/economic-and-financial-reports/annual-reports/annual-report-2019>
- Chien, S.-Y., & Tsai, C.-H. (2012). Dynamic capability, knowledge, learning, and performance. *Journal of Organisation Change Management*, 25(3), 434-444.
- Chiva, R., & Alegre, J. (2005). Organisational learning and organisational knowledge: Towards the integration of two approaches. *Management Learning*, 36(1), 49-68. <https://doi.org/10.1177/1350507605049906>

- Cohen, M. W., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128-152. <https://doi.org/10.2307/2393553>
- Cornell University, INSEAD, WIPO. (2019). *Global Innovation Index 2019 - Creating Healthy Lives — The Future of Medical Innovation*. Fontainebleau, Ithaca, and Geneva.
- Danneels, E. (2004). Disruptive technology reconsidered: A critique and research agenda. *Journal of Product Innovation Management*, 21(4), 246-258.
- Denford, J. S. (2013). Building knowledge: developing a knowledge-based dynamic capabilities typology. *Journal of Knowledge Management*, 17(2), 175-194. doi:10.1108/13673271311315150
- Djellal, F., & Gallouj, F. (2010). Services, innovation and performance: general presentation. *Journal of Innovation Economics & Management*, 1(1), 5-15. <https://doi.org/10.3917/jie.005.0005>
- Dougherty, D. J. (1992b). Interpretive barriers to successful product innovation in large firms. *Organization Science*, 3(2), 179-202.
- Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 21, 1105-1121.
- Escribano, A., Fosfuri, A., & Tribó, J. A. (2009). Managing external knowledge flows: The moderating role of absorptive capacity. *Research Policy*, 38(1), 96-105.
- Fischer, T., Gabauer, H., Gregory, M., Ren, G., & Fleisch, E. (2010). Exploitation or exploration in service business development? Insights from a dynamic capabilities perspective. *Journal of Service Management*, 21(5), 591-624.
- Flikkema, M., Jansen, P., & Van Der Sluis, L. (2007). Identifying neo-Schumpeterian innovation in service firms: A conceptual essay with a novel classification. *Economics of Innovation and New Technology*, 16(7), 541-558.
- Galahitiyawe, N., & Jayakody, J. (2019). Managing product complexity and variety for operational performance through an integrated green supply chain. *Colombo Business Journal*, 10(1), 19-43. <https://doi.org/10.4038/cbj.v10i1.40>
- Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organisational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185-214.
- Goldstein, S. M., Johnston, R., Duffy, J., & Rao, J. (2002). The service concept: The missing link in service design research? *Journal of Operations Management*, 20(2), 121-134.
- Grandinetti, R. (2016). Absorptive capacity and knowledge management in small and medium enterprises. *Knowledge Management Research & Practice*, 14(2), 159-168.
- Grant, R. M. (1996). Prospering in dynamically competitive environments: Organisational capability as knowledge integration. *Organisational Science*, 7(2), 375-387.

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- Gray, C. (2006). Absorptive capacity, knowledge management and innovation in small entrepreneurial firms. *International Journal of Entrepreneurial Behaviour & Research*, 12(6), 345-360.
- Hair Jr, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modelling (PLS-SEM). *European Business Review*, 26(2), 106-121. <https://doi.org/10.1108/EBR-10-2013-0128>
- Harrison, N., & Samaan, D. (2002). *Technology management: Text and international cases*. McGraw-Hill.
- Hertog, D. P., Van der Aa, W., & de Jong, M. W. (2010). Capabilities for managing service innovation: Towards a conceptual framework. *Journal of Service Management*, 21(4), 490-514.
- Hawass, H. H. (2010). Exploring the determinants of the reconfiguration capability: a dynamic capability perspective. *European Journal of Innovative Management*, 13(4), 409-438.
- Helfat, C. E., & Peteraf, M. E. (2003). The dynamic resource-based view: Capability lifecycle. *Strategic Management Journal*, 24(10), 997-1010.
- Henderson, R. M., & Cockburn, I. (1994). Measuring competence? Exploring firm effects in pharmaceutical research. *Strategic Management Journal*, 15, 63-84.
- Hooff, B., & De Ridder, J. (2004). Knowledge sharing in context: the influence of organisational commitment, communication climate and CMC on knowledge sharing. *Journal of Knowledge Management*, 8(6), 117-130.
- Hsieh, J. K., Chiu, H. C., Wei, C. P., Yen, H. R., & Cheng, Y.C. (2013). A practical perspective on the classification of service innovations. *Journal of Services Marketing*, 27(5), 1-33.
- Hult, G. T., Hurley, R. F., & Knight, G. A. (2004). Innovativeness: Its antecedents and impact on business performance. *Industrial Marketing Management*, 33(5), 429-438.
- Jansen, J. J., Bosch, F. A., & Volberda, H. W. (2005). Managing potential and realised absorptive capability organisational antecedence matter. *Academy of Management Journal*, 48(6), 999-1015
- Janssen, M., Alexiev, A., Den Hertog, P., & Castaldi, C. (2012). A multi-level multidimensional approach for measuring dynamic capabilities in service innovation management. *Paper presented at the DRUID 2012*, (pp. 19-21). Copenhagen, Denmark.
- Jong, M. W., & Hertog, P. H. (2010, June). Strategic innovation in service industries: Managing shifting boundaries. In 2010 7th *International Conference on Service Systems and Service Management* (pp. 1-6). IEEE.
- Kandampully, J. (2002). Innovation as the core competency of a service organisation: the role of technology, knowledge and networks. *European Journal of Innovation Management*, 5(1), 18-26.
- Kanter, R. M. (1998). Three tiers for innovation research. *Communication Research*, 15(5), 509-523.

- Kariyapperuma, K. (2016). *The effect of upper echelons human and social capital on dynamic service innovation capabilities: an empirical study of Sri Lankan service-dominant business organisations*. Doctoral dissertation, Postgraduate Institute of Management, Colombo
- Kelegama, S. (2013). Sri Lanka's lack of innovation limits export growth. 18th annual general meeting, National Chamber of Exporters of Sri Lanka.
- Kindstrom, D., Kowalkowski, C., & Sandberg, E. (2012). Enabling service innovation: A dynamic capabilities approach. *Journal of Business Research*, 66(8), 1063–1073. <https://doi.org/10.1016/j.jbusres.2012.03.003>
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(3), 383-397. <https://doi.org/DOI: 10.1287/orsc.3.3.383>
- Lee, T.-S., & Tsai, S. H.-J. (2005). The effects of business operation mode on market orientation, learning orientation and innovativeness. *Industrial Management & Data Systems*, 105(3), 325-348.
- Liao, S. H., & Wu, C. C. (2009, April). The relationship among knowledge management, organisational learning, and organisational performance. *International Journal of Business and Management*, 04(04), 64-76.
- Likoum, S. W., Shamout, M. D., & Harazneh, I. (2020). Market-sensing capability, innovativeness, brand management systems, market dynamism, competitive intensity, and performance: an integrative review. *Journal of the Knowledge Economy*, 11(2), 593-613.
- Lin, R.-J., Chen, R.-H., & Ting, C.-Y. (2012). Turning knowledge management into innovation in the high-tech industry. *Industrial Management & Data Systems*, 112(1), 42-63.
- Liu, P.-L., & Tsai, C.-H. (2009). A study on the relationship between knowledge management, knowledge absorption and innovative management capabilities in Taiwan's high-tech industries. *International Journal of the Computer, the Internet and Management*, 17(1), 1-17.
- Morgan, N. A., Slotegraaf, R. J., & Vorhies, D. W. (2009). Linking marketing capabilities with profit growth. *International Journal of Research in Marketing*, 26(4), 284-293.
- Nasir, U. M. (2010). Impact of knowledge management and inter-organisational system on supply chain performance: the case of the Australian agri-food industry. *Doctoral dissertation*, Curtin University, Australia
- Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. Harvard University Press.
- Nonaka, I. (1994). A dynamic theory of organisational knowledge creation. *Organization Science*, 5(1), 14-37.
- Normann, R. (2002). *Service management: Strategy and leadership in a service business* (3rd ed.). Wiley.
- Ostrom, A. L., Bitner, M. J., Brown, S. W., Burkhard, K. A., Goul, K., Smith-Daniels, V., Demirkan, H., & Rabinovich, E. (2010). Moving forward and making a difference: Research priorities for the science of service. *Journal of Services Research*, 13(1), 24-36.

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- Pai, F. Y., Chang, H. F., & City, H. (2013). The effects of knowledge sharing and absorption on organisational innovation performance—A dynamic capabilities perspective. *Interdisciplinary Journal of Information, Knowledge, and Management*, 8, 83-97.
- Peteraf, M. A. (1993). The cornerstone of competitive advantage: A resource-based view. *Strategic Management Journal*, 14, 179-191.
- Quintane, E., Casselman, R. M., Reiche, B. S., & Nylund, P. A. (2011). Innovation as a knowledge-based outcome. *Journal of Knowledge Management*, 15(6), 928-947. doi:doi.org/10.1108/136732711111179299
- Sarstedt, M., Hair, J. F., Cheah, J. H., Becker, J. M., & Ringle, C.M. (2019). How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australasian Marketing Journal*, 27(3), 197-211.
- Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research methods for business students* (7th ed.). Pearson Education.
- Schumpeter, J. A. (1934). *The theory of economic development*. Harvard University Press.
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill-building approach* (7th ed.). Wiley.
- Spender, J. C. (1996). Organisational knowledge, learning and memory: three concepts in search of a theory. *Journal of Organizational Change Management*. 9(1),63-79
- Sundbo, J., & Gallouj, F. (2000). Innovation as a loosely coupled system in service. *International Journal of Services Technology and Management*, 1(1), 15-36. <https://doi.org/10.1504/IJSTM.2000.001565>
- Sveiby, K.-E. (2001). A knowledge-based theory of the firm to guide strategy formulation. *Journal of Intellectual Capital*, 2(4), 344-358. <https://doi.org/10.1108/14691930110409651>
- Teece, D. J. (2007). Explicating dynamic capabilities: the nature and micro-foundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319-1350.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
- Teirlinck, P., & Spithoven, A. (2013). Proper R&D management and strategic decision making in small firms in knowledge-intensive business services. *R&D Management*, 43(1), 37-51. <https://doi.org/10.1111/j.1467-9310.2012.00701>
- Tether, B. S. (2005, June). Do services innovate (differently)? Insights from the European innovabarometer survey. *Industry and Innovation*, 12(2), 153-184. <https://doi.org/10.1080/13662710500087891>
- Tseng, S. M. (2015). The effect of knowledge management capability and customer knowledge gaps on corporate performance. *Journal of Enterprise Information Management*, 29(1), 51-71.
- Tsou, H. T., & Chen, J. S. (2020). Dynamic capabilities, human capital and service innovation: the case of Taiwan ICT industry. *Asian Journal of Technology Innovation*, 28(2), 181-203.

- United Kingdom Standard Industrial Classification. (2016, January 16). *Standard industrial classification*. United Kingdom: <https://www.ons.gov.uk/methodology/classificationsandstandards/ukstandardindustrialclassificationofeconomicactivities/uksic2007>
- Van Ark, H.H., Broersma, L., & Den Hertog, P. (2003). *Services innovation, performance and policy: A review, synthesis report in the framework of the project Structurele informatievoorziening in Diensten (SIID) (Structural Information Provision on Innovation in Services)*. Strategy, Research & International Co-operation Department Directorate-General for Innovation.
- Van Den Bosch, F. A., Volberda, H. W., & De Boer, M. (1999). Coevolution of firm absorptive capacity and knowledge environment: Organisational forms and combinative capabilities. *Organization Science*, 10(5), 551-568.
- Verona, G., & Ravasi, D. (2003). Unbundling dynamic capabilities: an exploratory study of continuous product innovation. *Industrial and Corporate Change*, 12(3), 577-606.
- Wang, C., & Ahmed, P. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Review*, 9(1), 31-51.
- Wijekoon, A., & Galahitiyawe, N.W.K., (2015) Innovativeness of Sri Lankan IT firms: The roles of knowledge management and dynamic innovation capabilities. 12th International Conference on Business Management(ICBM), University of Sri Jayewardenepura. 7th -8th December 2015. Colombo, Sri Lanka.
- Winter, S. G., & Szulanski, G. (2001). Replication as strategy. *Organization Science*, 12(6), 730-743.
- Witell, L., Anderson, L., Brodie, R. J., Colurcio, M., Edvardsson, B., Kristensson, P., Lervik-Olsen, L., Sebastiani, R., & Wallin Andreassen, T. (2015). Exploring dualities of service innovation: implications for service research. *Journal of Services Marketing*, 29(6-7), 436-441.
- Wong, W. P., & Wong, K. Y. (2011). Supply chain management, knowledge management capability, and their linkages towards firm performance. *Business Process Management Journal*, 17(6), 940-964.
- Zahra, S. A., & George, G. (2002). The net-enabled business innovation cycle and the evolution of dynamic capabilities. *Information Systems Research*, 13(2), 147-150.
- Zheng, S., Zhang, W., Wu, X., & Du, J. (2011). Knowledge-based dynamic capabilities and innovation in networked environments. *Journal of Knowledge Management*, 15(6), 1035-1051.
- Zhu, F. W., Sun, X. X., Miller, J., & Deng, Z. J. (2014). Innovations in knowledge management: applying modular design. *International Journal of Innovation Science*, 6(2), 83-96.
- Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organisational Science*, 13(3), 339-353.