

# A MATURITY MATRIX FOR ASSESSING SERVICE INNOVATION CAPABILITY

## COMPETITIVE PAPER

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## ABSTRACT

Small and medium-sized enterprises (SMEs) in the service sector must consistently and continuously innovate and adapt to ensure their survival (Gebauer *et al.*, 2012). Achieving this depends on their service innovation capability, which describes the capacity to deploy resources to develop and improve services (Giannopoulou *et al.*, 2011). Despite its significance, the literature lacks practical measurement or management tools, the omission of which ensure the economic benefits of service innovation will never be fully realised within Irish SMEs (Kohler *et al.*, 2013). In an attempt to eliminate much of this ambiguity, this paper provides a substantial academic and practical contribution by rigorously developing the foundation of a staged model to measure its maturity. The proposed matrix extends existing maturity models through its application in the services sector and represents an important step towards understanding the evolution of the constituent dimensions of service innovation capability.

## INTRODUCTION

There is growing consensus in the service literature that firm survival does not depend on a singular innovation, but on the ability to continuously innovate (Lillis *et al.*, 2015; Saunila, 2016). Accordingly, in order for service SMEs to sustainably innovate or compete, they must be in possession of an effective service innovation capability (SIC), a dynamic capability enabling them to continuously develop and improve their services (den Hertog *et al.*, 2010; Gryszkiewicz *et al.*, 2013; Stryja *et al.*, 2013). Theory argues that execution of this capability allows SMEs to strategically practice service innovation and utilise their limited resources to maximum capacity and profitability (Pöppelbuß *et al.*, 2011; Prajogo and McDermott, 2014). However, there is an imbalance in the literature and the management of service innovation capability remains a central dilemma for most service companies (Müller-Prothmann and Stein, 2011; Saunila, 2014).

For instance, research to date has focused only on singular service innovations (Song *et al.*, 2009), the innovation capability of manufacturers (Essmann and du Preez, 2010), or the service innovation capability of very specific types of service firms (Giannopoulou *et al.*, 2011), with scant attention to understanding the evolution of SIC or the extent to which it is present in an organisation. This lack of research attention means that SMEs are unaware of their service innovation capability or how to improve their innovative maturity mode (Hipp and Grupp, 2005; Jin *et al.*, 2014).

Maturity models are widely recognised as performing such a function (Wendler, 2012). They assume progress is made in distinct stages and capture capability maturity at a moment in time, positioning an organisation against defined best practices and assisting with solutions for change (Becker *et al.*, 2009; Curley *et al.*, 2012; Randeree *et al.*, 2012). While it would be erroneous to say that innovation capability has been neglected entirely in existing maturity model literature, there are failings (Esterhuizen *et al.*, 2012a). Indeed, despite their successful application across a wide variety of domains, only limited research effort has been made concerning their application in services (Rapaccini *et al.*, 2013). Existing maturity models tend to focus on large organisations (Essmann and du Preez, 2010), or those involved in technology and software development (Paulk *et al.*, 1999; Donnellan *et al.*, 2011), which are too broad to account for the specificities of service SMEs and fail to reflect their unique characteristics (McDermott and Prajogo, 2012).

Therefore, the objective of this paper is to take the next logical step, following established guidelines to meticulously develop a Service Innovation Capability Maturity Matrix (SICMM) which can provide the basis for evaluating SIC through its components and supporting informed decisions concerning the allocation of scarce resources to return the greatest value (Maier *et al.*, 2012). Through this contribution, it is the ambition of the authors to enhance the academic discussion of service innovation capability and provide insights to those attempting to enhance the SIC of their own SME through a holistic, capability-based framework.

The paper is structured as follows. First, the existing body of knowledge regarding maturity models is discussed in addition to their appropriateness to this discipline. Next, the process followed in the development of the Service Innovation Capability Maturity Matrix is outlined, demonstrating the high degree of academic rigor which forms the basis for this work, prior to presentation of the matrix itself. Finally, the paper concludes with theoretical and management implications and the next steps in this on-going project.

## **MATURITY AND MATURITY MODELS**

Maturity can be used as an indicator to measure organisational capability and has been applied in various contexts with distinct purposes (Andersen and Jessen, 2003). In the context of maturity models it refers to a fully developed or perfected state, or the extent to which specific activities or processes are defined, managed, measured, controlled, and effective, the result of which are consistent results that improve performance (Persse, 2001; Wademan *et al.*, 2007; Burger *et al.*, 2011; Pöppelbuß and Röglinger, 2011; Wendler, 2012). However, in spite of the successful application of maturity models to a number of domains, few have been applied to services (Rapaccini *et al.*, 2013; Jin *et al.*, 2014).

Maturity models are rooted in software development and were aimed originally at reducing defects and increasing productivity through an emphasis on organisational practices (Essmann, 2009). These models were so successful, they resulted in more than the streamlining of processes and instead changed the behaviour of organisations, stressing the importance of activities that were repeatable, measurable, and continuously improved (Paulk, 2009). As a consequence, this approach became very influential and quickly spread to other industries, becoming the standard for process modelling and organisational maturity assessments (Hynds *et al.*, 2014). Successive capability maturity models have been successfully applied to many management domains using similar principles and adapting their structure or content to a new context (Arveson *et al.*, 2010).

Regardless of the large number of application domains, the objectives of these models are highly similar. Their general purpose is to assess the current situation in an organisation, facilitate benchmarking, and offer guidelines for improvement (Wendler, 2012). They are based on the assumption that organisational change and evolution occurs in predictable patterns and are thus structured hierarchically into discrete, sequential levels, or stages, that depict the typical evolution of measured objects which are assessed against criteria.

Predominantly, their structure is very similar as they are based on the original software capability maturity model (CMM) (Paulk, 2009). Typically, they consist of between three and six progressively arranged levels of maturity that describe the increasing sophistication of qualitative or general requirements in the field of application (Müller-Prothmann and Stein, 2011). However, while the number of levels may vary, the key stipulation is that they are distinct, well-defined, and demonstrate a logical progression (De Bruin *et al.*, 2005). The original CMM is accepted as the de facto standard and is most frequently used as the basis for

their development. Therefore, with the majority of models, the initial level of maturity has no requirements and represents a chaotic state, 2-4 are focused on increasing the discipline and effectiveness of routines, while the highest level is concerned with continuously improving the capability (Kruger and Snyman, 2005). Maturity models can be divided into two categories: maturity grids or matrices, and capability maturity models, with the latter building upon the former by employing measurement variables which reflect maturing entities and the degree to which they are present (Moultrie *et al.*, 2007; Golev *et al.*, 2015).

There is an abundance of evidence that implementing a maturity model can lead to organisational improvement and superior results, generally achieved through more predictable performance (Ibbs *et al.*, 2004; Gibson *et al.*, 2006). They also have a function in enhancing the understanding of a specific area and identifying best practices (Essmann, 2009). Because of this they have been frequently adapted and augmented to complex concepts that cannot be improved at once (Khatibian *et al.*, 2010).

### **DEVELOPING THE SERVICE INNOVATION CAPABILITY MATURITY MATRIX**

In developing the SICMM, it was important that a logical structure was followed. To achieve this, literature providing guidance and general design principles on the formation of maturity models was closely consulted (Pöppelbuß and Röglinger, 2011; Maier *et al.*, 2012). Through reference to these texts it was possible to synthesise best practices in the form of a composite development process which can be seen on Table 1.

	<b>1. Develop model architecture and structure</b>	<b>2. Define central capability areas</b>	<b>3. Decide capability maturity characteristics</b>	<b>4. Populate models' cells</b>
(De Bruin <i>et al.</i> , 2005)	✓	✓	✓	✓
(Becker <i>et al.</i> , 2009)	✓	✓	✓	✓
(Van Steenbergem <i>et al.</i> , 2010)	✓	✓	✓	✓
(Pöppelbuß and Röglinger, 2011)	✓	✓	✓	✓
(Röglinger <i>et al.</i> , 2012)	✓	✓	✓	✓
(Maier <i>et al.</i> , 2012)	✓	✓	✓	✓
<b>Composite maturity model development stages</b>	Devise the model's architecture and decide on the number of maturity levels and their characteristics.	Define central capability areas.	Use insights from literature to apply capability areas to maturity levels.	Populate the model, positioning capabilities in a matrix where their characteristics are depicted at each level of maturity.

**Table 1: Composite Maturity Model Development Stages**

The composite maturity model development process consists of four phases, developing the models architecture and structure, defining the central capability areas, deciding on capability maturity characteristics, and population of the models' cells. Each of these stages involve key decision points in the models formation and collectively ensure rigorous and systematic guidelines are adhered to.

### 1. Devise the Models Architecture and Fundamental Structure

*Devise the models architecture:* In devising the models' architecture, it was decided to follow the common design principle of representing organisational maturity through cumulative, progressive stages, where higher levels build upon the requirements of the lower levels (De Bruin *et al.*, 2005; Maier *et al.*, 2012). With regard to the maturing entity, the options of applying a unidimensional sequence of steps, or the more prevalent multi-dimensional maturity assessment were available (Becker *et al.*, 2009). Due to the level of abstraction and difficulty directly observing service innovation capability, the latter option was chosen (Hogan *et al.*, 2011).

*Decide on the number of maturity levels and their characteristics:* During the process of determining the maturity levels and their characteristics, the literature was closely consulted to ensure theoretical rigor (Van Steenberg *et al.*, 2010). Following best practice, higher maturity levels represent a higher proficiency at executing key service innovation enabling capabilities and it was stipulated that all requirements for a level and previous levels must be met before an organisation can be allowed to progress to the next (Pöppelbuß and Röglinger, 2011). Existing models generally describe either divergent or domain specific maturity stages and often use similar nomenclature to describe different levels of maturity (Chung-Yang *et al.*, 2014). In order to overcome this, themes were instead identified and the emergent views combined to create an integrated, composite model. The levels selected are Initial, Managed, Defined, Measured, and Optimising and are detailed on Table 2 below. Together they illustrate the evolutionary path that an organisation's capability takes from ad hoc and immature execution to that which is more disciplined and mature (Wendler, 2012).

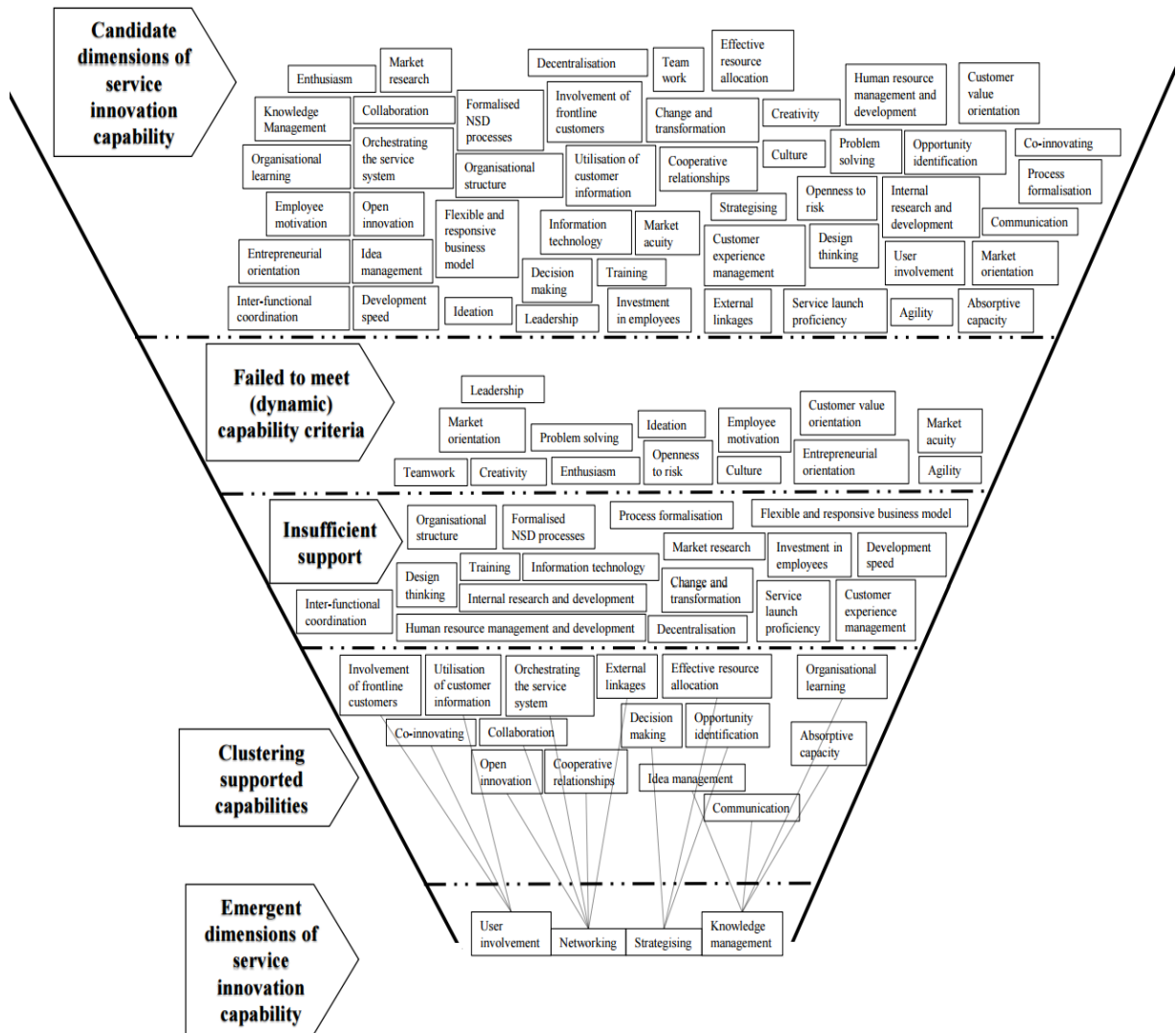
5	Optimising	A final idealistic state that represents best practice. Processes are precisely formalised and continuously improved.
4	Measured	Metrics monitor and evaluate formalised procedures to ensure they are predictably managed and controlled.
3	Defined	The breakthrough stage where there are defined plans, standardised processes, and engaged management.
2	Managed	Inconsistent and reactive management processes, but represents the emergence of formalisation.
1	Initial	Short-term focus, conservative toward innovation, with ad hoc, undisciplined processes.

**Table 2: Service Innovation Capability Maturity Levels**

The Initial stage is chaotic, reactive, and undisciplined, characterised by ad hoc capability execution, little standardisation, and the absence of a shared understanding. After the implementation of some basic management measures, stage two is more controlled. There is some policy or strategy implementation, but guidelines are not widely adhered to; and with no feedback mechanisms, results cannot be monitored. In the third stage, the Defined stage, often referred to as the breakthrough level, competences are now defined and the organisation is concerned with their consistent execution. At the Measurement stage, the organisation introduces quantitative metrics to more comprehensively control capability execution. At the final stage, Optimising, focus is on the continuous improvement of capabilities. This level is considered an idealistic state which represents the highest possible level of service innovation capability maturity, or best practice.

## **2. Define Central Capability Areas**

As the result of an extensive literature review incorporating studies of innovation capability and service innovation success factors, 50 candidate capability areas were identified (Van Riel *et al.*, 2004; Menor and Roth, 2007; den Hertog *et al.*, 2010). Capability areas are the criteria that must be developed to achieve maturity and it was critical that they were complete, correct, and theoretically justified (De Bruin *et al.*, 2005). From this large list, the number was reduced through the elimination of items that failed to meet capability criteria. Consequently, 15 items were removed that described a behavioural characteristic, trait, proclivity, or aspect of an organisation's culture, rather than actions manifested in activities, routines, or processes (Helfat *et al.*, 2007). From the surplus, a further 17 items were removed due to insufficient evidence or a lack of support that they were a critical dimension of, or enabled service innovation capability in SMEs. The remaining candidate capabilities were then subjected to a grouping and categorisation exercise and ultimately clustered around four capability areas. An image depicting this process can be seen in Figure 1.



**Figure 1: Process of Identifying Dimensions of Dynamic Service Innovation Capability**

Initially, while there appeared to be little consensus in the literature surrounding the construct of service innovation capability, underlying commonalities that both met capability criteria and were widely supported could be identified. Specifically, these were user involvement, knowledge management, strategising, and networking (Blommerde and Lynch, 2014). Instead of considering these individual factors in isolation, the paper supports the outlook that a holistic view of their management should be taken to enhance success. Table 3 below shows the support for each of these dimensions across the literature, while the following section outlines these capability areas.

<b>Dimension</b>	<b>Authors</b>
<b>User Involvement</b>	(Alam and Perry, 2002; Magnusson, 2003; Froehle and Roth, 2004; Lundkvist and Yakhlef, 2004; Lettl, 2007; Menor and Roth, 2008; Payne <i>et al.</i> , 2008; Agarwal and Selen, 2009; Carbonell <i>et al.</i> , 2009; Essmann, 2009; den Hertog <i>et al.</i> , 2010; Larbig-Wust, 2010; Zhou, 2010; Hogan <i>et al.</i> , 2011; Salunke <i>et al.</i> , 2011; Svendsen <i>et al.</i> , 2011; Nicolajsen and Scupola, 2011; Ordanini and Parasuraman, 2011; Janssen <i>et al.</i> , 2012; Sjödin and Kristensson, 2012; Cheng <i>et al.</i> , 2012; Milutinovic and Stosic, 2013; Dadfar <i>et al.</i> , 2013; Santos-Vijande <i>et al.</i> , 2013; Rapaccini <i>et al.</i> , 2013; Jin <i>et al.</i> , 2014).
<b>Knowledge Management</b>	(Lawson and Samson, 2001; Harigopal and Satyadas, 2001; Numprasertchai and Igel, 2004; Adams <i>et al.</i> , 2006; du Plessis, 2007; Lundvall and Nielsen, 2007; Smith <i>et al.</i> , 2008; Essmann, 2009; den Hertog <i>et al.</i> , 2010; Storey and Hull, 2010; Zhou and Wei, 2010; Delgado-Verde <i>et al.</i> , 2011; Rasmussen and Nielsen, 2011; Janssen <i>et al.</i> , 2012; Esterhuizen <i>et al.</i> , 2012b; Mehrabani and Shajari, 2012; Chen and Fong, 2012; Gryszkiewicz <i>et al.</i> , 2013; Jin <i>et al.</i> , 2014).
<b>Strategising</b>	(Chase and Hayes, 1991; Sundbo, 1997; Lawson and Samson, 2001; Stewart and Fenn, 2006; Adams <i>et al.</i> , 2006; Siguaw <i>et al.</i> , 2006; Menor and Roth, 2007; 2008; Essmann, 2009; den Hertog <i>et al.</i> , 2010; Arveson <i>et al.</i> , 2010; Huang, 2011; Song <i>et al.</i> , 2011; Giannopoulou <i>et al.</i> , 2011; Rubalcaba <i>et al.</i> , 2012; Clausen <i>et al.</i> , 2012; Gryszkiewicz <i>et al.</i> , 2013; Holtzman, 2014; Jin <i>et al.</i> , 2014; Roper and Xia, 2014; Fox and Royle, 2014).
<b>Networking</b>	(Bessant <i>et al.</i> , 2003; Adams <i>et al.</i> , 2006; Mohannak, 2007; Essmann, 2009; den Hertog <i>et al.</i> , 2010; Hsueh <i>et al.</i> , 2010; Rampersad <i>et al.</i> , 2010; Ngugi <i>et al.</i> , 2010; Salunke <i>et al.</i> , 2011; Mitrega <i>et al.</i> , 2012; Kindström <i>et al.</i> , 2012; Mu and Di Benedetto, 2012; Janssen <i>et al.</i> , 2012; Roxenhall, 2013; Gryszkiewicz <i>et al.</i> , 2013; Mustak, 2014; Rusanen <i>et al.</i> , 2014).

**Table 3: Key Dimensions of Service Innovation Capability and Supporting Authors**

*Capability Area 1 - User Involvement:* This capability area is universally agreed upon by academics (Agarwal and Selen, 2009; Salunke *et al.*, 2011; Jin *et al.*, 2014). The explanation for this resides in the simultaneous production and consumption of services, with the implication that user involvement is not only a basis of production, but a decisive factor in an organisation's SIC (Milutinovic and Stosic, 2013). It highlights the importance of understanding the role of customers in value creation and utilising their participation to improve existing services or develop new services. The formerly predominant view of customers merely as a passive audience has now evolved to one where they are considered a major source of innovation and are actively involved in all stages of service innovation including, creation, development, production, and delivery (Lettl, 2007; Nicolajsen and Scupola, 2011). Lundkvist and Yakhlef (2004) argue that customers can also be used as resources and are important sources of inputs, including development capabilities or knowledge that an organisation does not possess. In the context of this study, user involvement capability refers to the organisation's ability to employ multiple methods for involving service users in the development of innovations, ensure their involvement at many stages, and integrate users in multiple roles.



*Capability Area 2 - Knowledge Management:* Many researchers have highlighted the importance of knowledge management (KM) as an enabler, input, or support of service innovation capability (Lawson and Samson, 2001; den Hertog et al., 2010; Esterhuizen et al., 2012a). It is an umbrella term describing a variety of interlocking activities which manage and deploy knowledge for innovative purposes (du Plessis, 2007; Delgado-Verde et al., 2011). Mehrabani and Shajari (2012: 166) propose that KM refers to the “structures, methods, and technologies organised to deliver strategically useful knowledge throughout an organisation”, where Chen and Fong (2012: 13524) describe it as a firm’s “capacity to reconfigure and align the processes that explore, retain, and exploit knowledge”. From this it can be reasoned that a critical aspect of this capability area is the design and implementation of structures and systems to manage knowledge relating to service innovation (Rasmussen and Nielsen, 2011).

Creating and absorbing knowledge is key to exploiting opportunities for innovation across unique situations and contexts and is fundamental to effective environmental scanning, problem solving, organisational learning, decision making, and the generation of ideas (Harigopal and Satyadas, 2001; Adams *et al.*, 2006). Through the effective management of knowledge, organisations can improve their decision making, integrate data, enhance collaboration, and reduce the risk and uncertainty surrounding service innovation (Adams *et al.*, 2006; Essmann and Du Preez, 2009; Mehrabani and Shajari, 2012; Jin *et al.*, 2014). Hence, knowledge management capability leverages processes to support the effective use of knowledge for service innovation.

*Capability Area 3 - Strategising:* There is widespread acknowledgement of the importance of strategising to service innovation capability (Lawson and Samson, 2001; Giannopoulou et al., 2011; Gryszkiewicz et al., 2013). Rubalcaba et al. (2012) describe strategy as a prerequisite for any innovative activity, while Huang (2011) considers the development and management of a clear service innovation strategy as necessary to maximise and exploit a firm’s service innovation potential. It enables firms to align their service innovation strategy to the overall strategy of the business, appropriately use resources, promote creativity and experimentation, and balance market needs with service offerings (Jin et al., 2014).

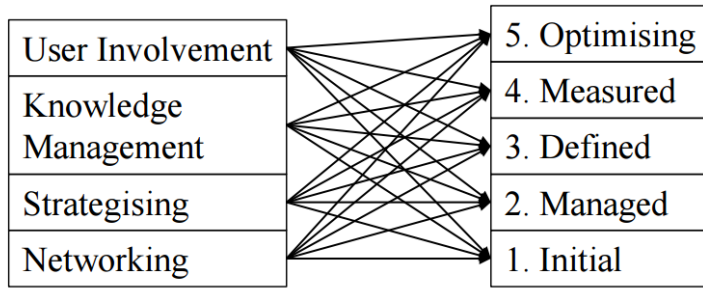
The capability is manifested by how firms define their goals and objectives, identify focus areas, and allocate their resources (Gryszkiewicz *et al.*, 2013). Roper and Xia (2014) detail how strategic decision making enables SMEs to overcome their resource constraints in the selection of projects, determine the most effective manner to undertake them, and evaluate acceptable levels of risk and complexity. While firms may be able to innovate in a non-routine or ad hoc manner without a strategy, goals, or a common vision, it is unlikely that they will be able to do so persistently (Essmann, 2009; Clausen *et al.*, 2012). Strategising is regarded then, as the capability of an organisation to allocate resources, identify specific areas of focus for innovation, and set goals and objectives that service innovations can be developed in pursuit of.

*Capability Area 4 - Networking:* Numerous authors outline the importance of orchestrating and managing networks for value creation and service innovation (den Hertog et al., 2010; Kindström et al., 2012; Janssen et al., 2012). Networking can be described as “the process of innovating services through combining the ideas, knowledge, capabilities, and technologies of more than two interconnected actors” (Mustak, 2014: 152). Mu and Di Benedetto (2012) consider it the ability of an organisation to exploit existing ties with external entities and to explore new ones, while Essmann (2009) describes it as facilitating and managing communication with external stakeholders, building relationships with stakeholders and suppliers, and working across organisational boundaries. It describes utilising suppliers, partners, and clients for access to external knowledge and market insights, or collaborating in the design or production of a service (Mustak, 2014).

Increasingly, new services are being realised through combinations of service functions brought about by a coalition of providers, including parties in the value chain and actors in the wider value network (Chesbrough, 2003). As a consequence, understanding this capability requires a perspective which considers firms not as passive participants in a network, but as strategically building, managing, and leveraging them to their advantage (Mu and Di Benedetto, 2012). There are a variety of motives for engaging in networking behaviours, including, access to diverse resources and capabilities, the distribution of costs and risk, a reduction in environmental uncertainty, enhanced knowledge transfer and organisational learning, reduction in cycle times, and faster and more efficient commercialisation and diffusion of innovations (Mu and Di Benedetto, 2012; Mitrega *et al.*, 2012; Mustak, 2014; Rusanen *et al.*, 2014). However, the overarching incentive is the enhancement of service innovation capability and enabling outcomes which are greater than what could be realised by a firm independently (Ngugi *et al.*, 2010; Hsueh *et al.*, 2010). Hence, this process area refers to the organisation’s ability to configure and manage networks, effectively select beneficial partners, and proactively build networks for service innovation.

### **3. Application of Capability Areas to Maturity Levels**

As illustrated in Figure 2, the four identified capability areas were mapped to the maturity levels to enable clear descriptions of their behavioural characteristics at each level of maturity (Maier *et al.*, 2012).



**Figure 2: Mapping Capability Areas to Maturity Levels**

***User Involvement Capability Maturity Levels:*** The behavioural characteristics of the user involvement capability at each stage of maturity were derived from Essmann (2009), Arveson et al. (2010), Müller-Prothmann and Stein (2011), and Jin et al. (2014).

*1. Initial:* Users play little or no role in the development of service innovations. They are simply considered as buyers of the service and it is assumed that service developers know what they want.

*2. Managed:* Users are involved through study and observation, but there is little to no direct contact. Ideas primarily come through internal channels such as sales reports, feedback, and complaints. The role of the user in innovation is focused on defining the requirements for new or improved services.

*3. Defined:* Users are consulted at various stages in the development of service innovations and directly asked about their needs. There is a systematic identification of potentially valuable users to ensure their wishes, requirements, and ideas are incorporated into existing and new service innovation projects. They are considered as experts and information sources and they are surveyed for market analysis and definitions of service requirements.

*4. Measured:* Users are co-designers and have an active, ongoing role and influence on innovation development processes. The firm uses proactive market research techniques to interact with users and they are integrated both into the early stages of ideation and service development and in the verification and testing of new services or service improvements, prior to their launch.

*5. Optimising:* Users play an intrinsic role in innovation processes and are consistently involved at key decision points. The organisation views users as partners and their ongoing relationship extends beyond single projects. There is constant user participation and interaction through customer groups or clubs which maintains their input and cooperation. Some users are involved as co-designers and co-producers and assist with the creation of solutions that are broad in scope.

***Knowledge Management Capability Maturity Levels:*** The behavioural characteristics of the knowledge management capability at each level of maturity were derived from Essmann (2009), Müller-Prothmann and Stein (2011), and Jin et al. (2014).

*1. Initial:* There is little or no intention or effort made to formally manage activities surrounding organisational knowledge. Any strategies or processes for knowledge management occur in an unconscious way, that are neither systematic or uniform. There is very poor organisational communication and a limited flow of information or feedback. The organisation does not have the capacity to attend to information coming from external environments.

*2. Managed:* There is little conscious thinking by employees and actions are guided by past experiences, observations, the recognition of patterns, and intuition; which are difficult to share with others and occur at an individual level. Any knowledge management practices that occur, take place in a non-structured manner, but there is more effective management of certain types of information coming from selected external sources.

*3. Defined:* Adequate vertical and horizontal communication occurs through a basic infrastructure or architecture organised to support knowledge management. This structure is defined to improve knowledge management and roles and responsibilities are clarified. Tools are introduced to facilitate information flow and employees express insights or ideas to others in the group and develop shared understandings. There is no collective or coherent group action, but employee understanding and actions are changed through conscious elements shared at the group level. Knowledge is gathered, documented, and communicated and there is a steadily growing learning culture that considers failure as an opportunity to learn.

*4. Measured:* Knowledge management initiatives are well established in the organisation. An integrating process occurs at the group level that changes the collective understandings of the group. Conversations are held to promote the collective mind and mutual adjustments and negotiated actions are achieved. Knowledge management is more deeply integrated into processes. Quantitative criteria are determined to measure and provide feedback on knowledge-oriented performance and foster learning from both successes and failures.

*5. Optimising:* KM is deeply integrated into the organisation and continually improved upon. There is a high level of understanding of KM performance of the organisation's practices. Individuals readily teach and mentor each other. There is regular transparent and open communication. Learning now occurs at an organisational level. KM is an automatic component of organisational structures, systems, and procedures and captures the way groups communicate and interact. Successful experiences become embedded into the organisation as routines. The organisation uses its knowledge to continuously improve processes. Efforts are directed towards improving an organisation's learning culture and the procedures and concepts of KM are embedded in the treatment of personnel, processes, and the organisation's culture.

***Strategising Capability Maturity Levels:*** The behavioural characteristics of the strategising capability at each level of maturity were derived from Essmann (2009), Arveson et al. (2010), Müller-Prothmann and Stein (2011), and Jin et al. (2014).

1. *Initial:* Strategy gets little attention and few formal strategic planning activities are conducted. As a result, any innovation strategy is inexplicit or restrictive and there is little to no strategic management of service innovation. The firm are primarily concerned with tactical or operational planning that occurs in an ad hoc manner by senior management behind closed doors. The majority of the organisation's time is spent 'putting out fires' and they have no long-term goals.

2. *Managed:* Some elements of strategic planning and strategic performance management occur, often inconsistently. Strategy is defined, refined, and communicated to a greater extent, but this tends to be primarily implicit and informal and not go far beyond budgeting. Strategic planning tends to be a financial concern that does not go much further than forecasting revenue, costs, and capital requirements. Strategic planning behaviours are inconsistently applied and often lead to poor results. The planning processes are not rigorous, occurring only infrequently, and tend to be reactionary.

3. *Defined:* Strategy is clear and accepted. Formal and comprehensive structures are in place that allow for organisations to engage in strategic planning and management, primarily using simple forecasting tools. The strategy and objectives are clearly developed and communicated. Service innovation begins to become aligned with the overall objectives of the business. However, there is a static focus on current capabilities, rather than alternatives and the firm does not engage with staff in strategy development. Processes are in place to manage resource allocation and ensure sufficient availability to innovation projects.

4. *Measured:* Strategy is used as a reference guide. It drives the organisation's focus and informs decision making. There is formal engagement with employees in the planning process and plans are regularly developed and revised by cross-functional teams. In-depth analysis occurs that assists with understanding the future organisational success factors. There is dynamic rather than static resource allocation that creates new capabilities or redefines the market. There is broad implementation of organisational standards and methods surrounding strategy and its management, which are then measured.

5. *Optimising:* Processes for the development of service innovation strategies are institutionalised. The strategy and objectives are derived from a holistic view of the organisation and drive critical organisational decisions. Strategic planning excellence is embedded in the organisation and continuously improved. This is done through the regular evaluation of an organisation's performance compared with its strategic goals. It then adapts and corrects processes as necessary to maintain continuous improvement. There is regular communication of the strategy and objectives and 'ownership' by employees at all levels in the form of participation and commitment. The strategic planning framework is shaped around tomorrow's concept of the business and this foresight supports risk management and ideation by identifying upcoming trends, opportunities, and threats. These foresight methods also influence and adjust the strategy. All strategic planning is aligned to operational management and resource allocation is in line with the overall strategy. Strategic planning is embedded in the culture of the organisation, is evaluated, and adapted if necessary.

**Networking Capability Maturity Levels:** *The behavioural characteristics of the networking capability at each level of maturity were derived from Essmann (2009), Burger et al. (2011), Müller-Prothmann and Stein (2011), and Rapaccini et al. (2013).*

1. *Initial:* Little or no networking and collaboration occurs with external parties. There is no stakeholder participation and a conservative attitude towards opening organisational boundaries for knowledge sharing or cooperation. Suppliers and other actors are not involved in developing or improving services. No attention is paid to their possible contribution or the impact that changes due to innovations may have on other supply chain actors.

2. *Managed:* Only internal representatives of business functions that will be impacted by changes are involved in service innovation projects, but the organisation begins to understand the importance of involving external parties in innovation and their conservative attitude softens.

3. *Defined:* There are defined and deployed practices for networking and informal networking is encouraged. Knowledge is shared, to a moderate extent, across organisational boundaries. There is a greater involvement of internal stakeholders in defining the market requirements, designing service content, and modelling the delivery process etc. Some external stakeholders also have an input, primarily those that are involved with the delivery of detailed tasks related to service innovations.

4. *Measured:* All relevant stakeholders are integrated into service innovation activities. There is continuous feedback and cross-organisational cooperation. The organisation initiates collaborations and alliances that spread risk and establish new sources of revenue. Both internal and external parties that may be interested in or impacted by the new or changed services are identified, and if possible, are involved.

5. *Optimised:* There is widespread involvement of the skills and knowledge of external parties at this maturity level. Complementary groups are identified and collaborative practices are institutionalised. Open innovation and cooperation with stakeholders inspires new services and processes in addition to incremental improvements to existing services. Both internal and external parties that may be interested in or impacted by changes are identified and involved. Relationships with highly skilled external parties such as research groups and consultants are established, maintained, and exploited to continuously improve service innovation-related processes and their management.

#### **4. Populate the Models' Cells**

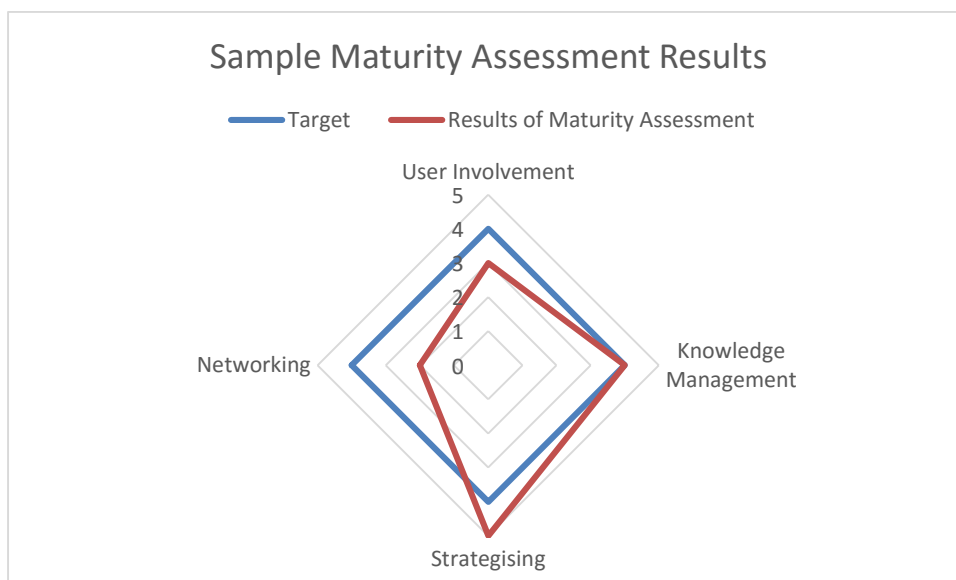
Table 4 below depicts the developed Service Innovation Capability Maturity Matrix, where each of the capability areas are represented in addition to descriptions of their characteristics at all levels of maturity. A maturity level is achieved when all the characteristics of that level and the preceding levels have been satisfied.

	<b>Strategising</b>	<b>User Involvement</b>	<b>Knowledge Management</b>	<b>Networking</b>
<b>Maturity Level 5: Optimising</b>	Strategic planning excellence is embedded in the organisation and continuously improved. There is regular communication of the strategy and objectives and 'ownership' by employees. The strategic planning framework is shaped around tomorrow's concept of the business. All strategic planning is aligned to operational management and resource allocation is in line with the overall strategy.	Users play an intrinsic role in innovation and are consistently involved at key decision points. The organisation views users as partners and their ongoing relationship extends beyond single projects. There is constant user participation and interaction.	Individuals readily teach and mentor each other. There is regular, transparent, and open communication. Learning now occurs at an organisational level. Successful experiences become embedded in the organisation as routines.	There is widespread involvement of external parties' skills and knowledge. Complementary groups have been identified and collaborative practices are institutionalised. Relationships with highly skilled external parties such as research groups and consultants, are established, maintained, and exploited to improve service innovation processes and their management.
<b>Maturity Level 4: Measured</b>	Strategy is a reference guide that drives the organisation's focus and informs decision making. There is formal engagement with employees in planning processes. Here in depth analysis occurs that assists with understanding the future organisational success factors. There is dynamic rather than static resource allocation that creates new capabilities or redefines the market.	Users are co-designers and have an active, ongoing role and influence on innovation development, where their wishes and ideas are transformed into service requirements. The firm uses proactive market research techniques to interact with and integrate users into the stages of ideation, service development and in the verification and testing of new services or service improvements prior to their launch.	An integrating process occurs at the group level that changes the collective understandings of the group. Conversations are held to promote the collective mind and mutual adjustments and negotiated actions are achieved. Knowledge management is more deeply integrated into processes. It fosters learning from both successes and failures for consistent improvement.	All relevant stakeholders are integrated into service innovation activities. There is continuous feedback and cross-organisational cooperation. The organisation initiate collaborations and alliances that spread risk and establish new sources of revenue. Both internal and external parties that may be interested in or impacted by the new or changed services are identified, and if possible, are involved.
<b>Maturity Level 3: Defined</b>	Strategy is clear, accepted, and communicated. Service innovation begins to become aligned with the overall objectives of the business, however, there is a static focus on current capabilities, rather than alternatives and the firm does not engage with staff in strategy development. Processes are in place to manage resource allocation and ensure sufficient availability to innovation projects.	Potentially valuable users are systematically identified and consulted at various stages in the development of service innovations and directly asked about their wishes, requirements, and ideas. Users are considered as experts and information sources and are surveyed for market analysis and the definition of service requirements.	Knowledge is gathered, documented, and communicated. Tools are introduced to facilitate information flow and adequate vertical and horizontal communication occurs. Employees express insights or ideas to others in the group and a shared understanding is developed. There is a steadily growing learning culture that considers failure as an opportunity to learn.	There are defined and deployed practices for networking and informal networking is encouraged. Knowledge is shared, to a moderate extent, across organisational boundaries. There is greater involvement of stakeholders in defining market requirements, design of service content, and modelling the delivery process etc.
<b>Maturity Level 2: Managed</b>	Strategy is defined, refined, and communicated to a greater extent, but this tends to be primarily informal and not go beyond forecasting revenue, costs, and capital requirements. There is an inconsistent and reactionary application of strategic planning elements that often leads to poor results.	Users are involved through study and observation, but there is little to no direct contact. Ideas primarily come through internal channels such as sales reports, feedback, and complaints. The role of the user is focused on defining the requirements for new or improved services.	Employee actions are based on past experiences and observations. They are guided by the recognition of patterns and intuition, which is difficult to share with others and occurs at an individual level.	Only internal representatives of business functions that will be impacted by changes are involved in service innovation projects. The organisation begins to understand the importance of involving external parties in innovation and their conservative attitude softens.
<b>Maturity Level 1: Initial</b>	Strategy gets little attention and few strategic planning activities are conducted. Any innovation strategy is inexplicit. The firm are primarily concerned with operational planning and have no long-term goals.	Users play little to no role in the development of service innovations. Customers are simply considered as buyers of the service and it is assumed that service developers know what they want.	Little effort is made to pass on knowledge. There is very poor organisational communication and a limited flow of information or feedback.	Little or no networking and collaboration occurs with external parties. There is no stakeholder participation in developing or improving services and a conservative attitude towards opening organisational boundaries for knowledge sharing or cooperation.

**Table 3: The Service Innovation Capability Maturity Matrix**

Once the assessment has been completed, the results may be plotted on a radar chart, similar to the mock-up depicted in Figure 3. Because the capability areas are independent of each other, it is possible for them to simultaneously achieve different maturity levels and visualising the results allows an organisation to clearly see where their areas of strength and weakness are, or the contrast between their current and targeted performance (Duffy, 2001).

In the example below, the organisation is aiming for maturity level four across all capability areas. However, they have achieved only maturity level 1 with their networking capability and 3 with user involvement capability. Knowledge management capability has achieved maturity level 4, while they have exceeded their objective with strategising capability, which is at the highest level of maturity. The results of this assessment may then become the foundation for an incremental or radical action plan that guides the organisation through an enhancement strategy in a logical and structured way. Specifically, it allows them to focus on areas where they are weak and consult the characteristics described regarding higher levels of maturity to begin informed targeted improvement initiatives.



**Figure 3: Sample Maturity Assessment**



## CONCLUSION

Acknowledging that service innovation capability is a complex phenomenon, this paper makes a first attempt to grasp its intricacy, building upon earlier work and combining its key dimensions, strategising, knowledge management, user involvement, and networking, with the maturity model concept (Blommerde and Lynch, 2013; Blommerde and Lynch, 2014). Through this adaptation of the capability maturity model framework, it is possible to ensure consistent and repeatable capability execution that leads to reduced variability, continuous improvement, and higher performance. This proposed conceptual framework, SICMM, is designed to support further research into the measurement and development of an organisation's service innovation capability dimensions and identify directions for their future improvement, and as a result overall service innovation capability. High SIC maturity ensures low variability and consistent, continuously improved services, meaning the model has potential value not only as an assessment tool, but as a guide to support the improvement of capabilities.

This paper has concretely detailed the elemental dimensions that constitute service innovation capability in SMEs, in addition to outlining their maturation path through five qualitatively distinct stages as an organisation reach maturity. The paper provides insights into the critical importance of an organisation's service innovation capability and provides a solid foundation upon which future research in the area can be built. Prior to this, little was known regarding the management or evolution of service innovation capability, but through a thorough review of its success factors it was determined that performance in this area is rooted in four critical capability areas, or dimensions.

Despite the application of maturity models in a number of domains, few have been applied in the context of services and none to service innovation capability (Jin *et al.*, 2014). Existing models from other fields cannot be directly transferred as they are neither service specific or consider the unique characteristics of SMEs. SICMM addresses this research gap through mapping and combining research findings from the SIC field with the maturity modelling concept. The development of this model adhered to established guidelines in devising its architecture and deciding on the number of maturity levels and their characteristics; defining capability areas by identifying repeatable success factors, using the literature to apply capability areas to maturity levels that reflected their evolution; and finally to populate the cells of the model.

Little is known regarding service innovation capability from a management perspective, so this novel study precipitates a deeper understanding and offers numerous insights. A consequence is that in the future organisations will no longer have to rely on trial and error, but can use the model as a gap analysis tool or roadmap to achieving higher maturity and enhancing their performance. In the same manner as the capability maturity model for software became a standard, SICMM could be promoted similarly across the service sector (Wendler, 2012). It will be used to support assessment, establish common domain language, and facilitate benchmarking through its application as a reference framework. It is envisioned that it will provide the basis for practitioners to analyse and improve the service innovation capability of their organisation, in addition to forming the starting point for further work which will use variables to quantitatively measure the extent to which these capability areas are present in organisations through a diagnostic tool, that in turn evaluate overall service innovation capability maturity.

### **Next Steps**

Despite its rigorous theoretical development, the model presented has yet to be tested and validated through empirical evidence. The hypothesis that a higher maturity level in one, or most likely a combination, of the capability areas will result in higher overall service innovation capability maturity presently lacks empirical confirmation. The next steps are to operationalise the model and, if necessary, refine it to ensure it can be utilised in an empirical setting. The intended design of this study is a large-scale survey, followed by the statistical analysis of results. Therefore, this paper can be considered as the starting point towards developing a quantitative model of service innovation capability maturity. Next, it is necessary to identify assessment instruments based on the aforementioned capability areas which will facilitate a quantitative evaluation. Progress is currently underway to locate measures that can be administered through surveys and will guarantee reliability in the results of the maturity assessment.

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