Innovation readiness in public sector service delivery: An explor[1]ation

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ABSTRACT

We set out in this study to examine the mechanisms (specific knowledge management practices) required to operationalize service innovation readiness within public sector service delivery. Data is obtained from 150 service delivery managers drawn from public sector service organizations within the *emirate* of Sharjah. Sampling is undertaking utilizing a 38 factor knowledge management-focused service innovation readiness questionnaire developed from the literature. Analysis of the data is via variable ranking and multidimensional scaling (MDS). The findings of the study suggest the existence of four knowledge management-based imperatives which are construed as managerial mechanisms for public sector service innovation readiness. These are (i) '*Knowledge core competence'* (knowledge as a key strategic asset) (ii) '*Organizational structure'* (internal patterns of organizational communication, authority and relationships) (iii) '*Responsiveness to change'* (propensity to engage in both purposeful and timely behavioral change in response to modulating stimuli), and (iv) '*Innovativeness'* (relative earliness in adopting innovation). The findings lead to a service innovation readiness typology which is oriented towards ensuring that public sector entities are able to effectively and efficiently deliver innovative services that meet both operational mandates and national visions of service expectations.

Keywords: Public Services; Innovation; Readiness; Knowledge Management

1. Introduction

Global interest in the preparedness (readiness) of the public sector to effectively implement and deliver innovation in services is being driven by a number of factors. These include changes in national population profiles, increased availability of hyper-connectivity technology, evolving societal needs and increasing demands for more complex service solutions by citizen users (Tate et al. 2018).

Public sector service organizations seeking to implement and deliver new services are generally under considerable pressure to gain a full understanding of the conditions and managerial mechanisms best suited to ensure that users fully embrace the services they deliver (O'Connor and Fiol 2006; Thomas et al. 2016). One of these conditions is their state of '*readiness'* (Zerfass 2005; Yen et al. 2012; Chen et al. 2014; Thomas et al. 2016; Winand and Anagnostopoulos 2017; AlMalki and Durugbo 2022). In the context of this study, readiness can be defined, drawing from Al-Mazrouie et al. (2021) as "…*the list of activities and plans,*

which can be considered enabling factors, and which should be planned for and executed by stakeholders to prepare for successful change brought about by the implementation and delivery of innovation" (p. 285).

The literature suggests that readiness can have a significant impact on an organization's capacity to successfully innovate in service (Zerfass 2005; Yen et al. 2012; Chen et al. 2014; Thomas et al. 2016; Winand and Anagnostopoulos 2017; AlMalki and Durugbo 2022).

The basic idea behind our study is that readiness for service innovation within the public sector will trigger not only more successful delivery of innovation in public services, but also greater adoption of these services by users (that is, the society/citizens). The theoretical framing of our study is based on the notion that knowledge plays a key role in successful adoption of innovation. As knowledge (and its management) are important antecedents of an organizations capacity to innovate, our theoretical foundations are rooted within the Knowledge-based view of the firm ('KBV') (see Grant 1996; Felin and Hesterly 2007; Scuotto et al. 2022). The KBV is a framework recognized as useful to understand effective innovations (Dıaz-Dıaz et al. 2008; Martín-de Castro et al. 2011; Simao and Franco 2018).

With the above in mind, the primary motivation for our study comes from the paucity of not only academic literature on service innovation readiness within public sector service delivery, but also from a lack of practitioner driven imperatives on this same subject.

In terms of the academic literature, we have observed that there are quite a number of studies highlighting how important innovation readiness is to the organization (see for example, Yen et al. 2012; Chen et al. 2014; Thomas et al. 2016; Winand and Anagnostopoulos 2017; AlMalki and Durugbo 2022). However, these studies have largely not been able to articulate a generally accepted set of specific factors, dimensions or constructs for innovation readiness focused on the public services sector. Instead, most available studies have focused on the private sector (Bugge and Bloch 2016, p. 1467; Demircioglu and Audretsch 2017, p. 1682), with emphasis on the digital arena (Thomas et al. 2016), sports organizations (Winand and Anagnostopoulos 2017) and healthcare (Chen et al. 2014).

Understanding innovation readiness in public services is particularly important because the role of the public sector revolves around developing, framing, deploying and enacting services that impact upon the necessities of everyday life. For these reasons, despite a culture of risk averseness (Arundel 2017; Nicholson-Crotty et al. 2017), the public sector has

largely been responsible for driving or funding a large section of the innovation shaping today's world. The role of the public sector is however greatly impacted by national visions of service expectations which sets out how innovative services are expected to address both existing needs and emerging challenges facing society.

Another academic motivation for our study is that a review of the literature suggests that most of the research on service innovation readiness and the emergent managerial mechanisms and frameworks from these studies are predominantly developed from western settings. Yet, 'readiness' can be impacted by national cultural nuances (Kollmann et al. 2009; Khalil 2011; Khalil and Marouf 2017). Thus, what the academic literature on service innovation readiness seems to be missing are studies developed or contextualized within other geographical locations, such as the Middle East. Our study is therefore set within the context of the public sector in the United Arab Emirates ('UAE'), therefore meeting practitioner driven needs for this study.

We opine that understanding service innovation readiness within the context of the UAE in general and the *emirate* of Sharjah in particular is needed. This is because as Dulaimi (2022) observed, while there is a strong climate for innovation in the UAE, it appears more channeled towards "…*voicing the desire for innovation rather than practical where management are expected to [] making the vision prevalent*" (p. 151). Furthermore, focusing on the UAE is important because service innovation readiness is a topic of growing national interest in the country (see for example, Albeshr and Ahmad 2015; Beshr and Hossan 2018; Alosani et al. 2021). We specifically focus on the *emirate* of Sharjah because existing UAE studies tend to be either Dubai or Abu Dhabi centric. This means that studies presented as focused on the UAE, tend to focus on two out of the seven constituent emirates within the UAE. Our study specifically focuses on service innovation readiness within the public sector of the *emirate* of Sharjah, the third largest emirate within the UAE (by population).

Noting these gaps, our contribution to the literature will be to undertake research specifically focused on fully capturing the mechanisms (specific managerial practices) of service innovation readiness set within the context of public services. Thus, we present the following as our research question.

Research question (RQ): *What are the mechanisms (specific knowledge management-based managerial practices) required to operationalize service innovation readiness within public sector service delivery in the emirate of Sharjah?*

To address this research question, the remainder of this paper is structured in the following manner. In the next section (section 2), we articulate the theoretical framing of our study which is the KBV. In section 3, we set out the key concepts to this study. More specifically, we review literature on '*Service in public sector management*', '*Service innovation*' and '*Service innovation readiness*'. In Section 4, we present the research methodology. Here, we first present an overview of the service environment in the UAE. Our data is based on a questionnaire survey of 150 practitioners. We explain that our survey instrument was improvised from a combination of scale measures developed earlier by Storey and Kahn (2010), Yen et al. (2012) and Chen et al. (2016). We report the results of the data analysis in section 5. Discussions of implications from our findings are presented in Section 6 while we conclude in Section 7.

2. Theory

The literature tells us that knowledge (and its management) are important antecedents of an organizations capacity to innovate (Gopalakrishnan et al. 1999; Pérez-Luño et al. 2011; Capaldo and Messeni Petruzzelli 2015; Donate and Pablo 2015; Costa and Monteiro 2016; Ode and Ayavoo 2020). '*Knowledge'* which is defined as "…*justified true belief*" (Nonaka 1994; p. 15), is critical to innovation because as aptly opined by Thornhill (2006), "…*what an organization knows determines what it can do*" (p. 691). Reference to '*Knowledge management*' implies the formal processes and structures organizations employ to collect, interpret, and internalize knowledge (Storey and Kahn 2010; p. 398).

Knowledge can be construed as strategically, *the* critical resource of an organization. On this basis, ordinarily, the Resource-Based View ('RBV') of the firm, developed by Barney (1991, 1996) will be relied upon to provide explanations on how knowledge as a strategic resource of an organization is likely to bring about, maintain and deliver not only competitive advantage, but also superior performance.

As a developing body of literature, the RBV theory has been well received in the academic literature and extended to various facets of research including (i) knowledge (KBV -

see Grant 1996), (ii) the natural environment (natural-resource-based view- 'NRBV' – see Hart, 1995; Hart and Dowell, 2011) and (iii) innovation (innovation-based view- 'IBV' – see Lichtenthaler 2016; Costello 2018). The RBV theory has also been extended to explain the exploitation of Artificial Intelligence ('AI') resources in organizations, thus leading to an '…intelligence-based view of the firm' (see Lichtenthaler 2019).

The RBV theory offers credible insights on innovation (see Terziovski 2010; Ukko et al. 2016). However, despite innovation being largely dependent on the knowledge base of an organization (Subramaniam and Youndt 2005; Storey and Kahn 2010), the RBV theory hardly provides any explanation about how *specifically* valuable, knowledge is for the organization (AlNuaimi and Khan 2019). Thus, the development of the KBV (see Grant 1996; Felin and Hesterly 2007; Scuotto et al. 2022). Unlike the RBV, the KBV treats knowledge as the organizational resource which is '*Valuable'*, '*Inimitable'*, '*Rare'* and drawn upon on '*Organizational support'* ('VIRO') and one which is critical for the gaining of competitive advantage (see Hayter 2016; Galati and Bigliardi 2017).

3.0 The literature

3.1 Public sector management

In the context of this study, we construe the *'public sector'* as basically the "*…general government (public administration entities at all levels of government, regulatory agencies, and government entities that provide services such as education, health, security, etc) and publicly-owned corporations*" (Arundel et al. 2019; p. 789). Conversely, our reference to '*public sector service organizations'* implies those entities providing services within the public sector whose ownership, funding and budget and legal status emanates solely from the government. In effect, these are entities who *only* undertake welfare, political or economic services on the basis of government authority.

The public sector plays a very significant role in the national economy as demonstrated by its contribution to national Gross Domestic Product (see Arundel et al. 2019). It also plays a significant role in the society in that it is largely at the center of delivering services set to mitigate tensions between individuals, the community and the state (Callender 2001). However, despite its critical economic, societal and political role (Batley and Mcloughlin 2015; Masuku and Jili 2019), the public sector has generally been unable due efficiency challenges to (i) sustain existing levels of service delivery (Karwan and Markland 2006), (ii) improve upon

such levels or in fact (iii) deliver personalized public services (see Pieterson et al. 2007; Ceder and Jiang 2020; Liu and Tao 2022). These limitations in terms of service delivery capabilities has generated intense pressure to innovate among public sector service organizations (Bloch and Bugge 2013; Demircioglu and Audretsch 2017; Arundel et al. 2019; Pólvora and Nascimento 2021; Kaur et al. 2022). Delivering innovation plays a much wider role beyond merely meeting service expectations. This is because the ability of the public sector to deliver innovative services goes a long way in reinforcing the trust of citizens in both public institutions (Kaur et al. 2022) and the government (Arundel et al. 2019).

There are a number of key characteristic of services in the public sector which differs from service delivery in the private sector. For example, public sector service delivery is generally construed as non-*rivalrous*. This means that a service consumed by one individual can still be consumed (even simultaneously), by another (Batley and Mcloughlin 2015). Furthermore, unlike the private sector, the focus of public sector organizations is on delivering services in an equitable (equally accessible - Karwan and Markland 2006) and effective manner (with less emphasis on efficiency).

3.2 Service innovation

'*Service'* is defined as a "…*series of actions and processes of which one would otherwise have expended avoidable effort to achieve*" (Ojiako et al. 2013; p. 532). Innovation on the other hand refers to "…*to a substantial extent [] a recombination of conceptual and physical materials that were previously in existence*" (Nelson and Winter 1982; p. 30). Innovation is a fundamental driver of sustainable competitive advantage within organizations (Capaldo and Messeni Petruzzelli 2015; Chen et al. 2018). It provides organizations with the platform to deliver highly desirable, practical, engaging and beneficial services to customers (Warren et al. 1989; de Brentani 2001; Michalakopoulou et al. 2022). The foundation of our understanding of innovation comes from the work of Schumpeter (1934) who in discussions about the role of organizations in the development of novel resources, noted that organizations sought to innovate by seeking for resources which were new, or on the alternative, by seeking newer means of utilizing resources in existence.

Service innovation is defined as "…*practices to create value for customers, employees, business owners, alliance partners, and communities through new and/or improved service offerings, service processes, and service business models*" (Yen et al. 2012). Service innovation

serves as a major competitive and growth differentiation between organizations (Karmarkar 2004; Helkkula et al. 2018). This makes service innovation a valuable asset of strategic importance to organizations (Yen et al. 2012).

Service innovation is critical to the survival of most organizations (Chen et al. 2016). This is because (i) innovation increases the efficiency of service production, thus lowering operational costs (Mansury and Love 2008) and (ii) services which are characterized as innovative are more than likely to drive the organizations efforts to transform its business (Maguire et al. 2012; Chen et al. 2016). As the capability to innovate in service may represent a distinctive organizational capability, drawing upon Barney's (1991, 1996), RBV of the firm, Chen et al. (2016) opines that service innovation may represent an intangible resource.

Service innovation may either be '*exploratory'* or '*exploitative'* in nature (Jansen et al. 2006). When '*exploratory'*, it implies that the focus of service innovation is on the pursuit of services which are new and focused on an emergent customer or market base. Exploratory innovation is associated with a widening of the knowledge base. Conversely, when '*exploitative'*, it implies that the focus of service innovation is on the pursuit of services for existing service customers or market base. This innovation type entails to use and expansion of existing knowledge (Zhang and Luo 2020). Innovation when is *exploitative* will deepen the core base of an organization's knowledge (Guan and Liu 2016).

3.3 Service Innovation readiness

'*Readiness'* is a matter of interest to those interested in service innovation within the public sector for a number of reasons including (i) an understanding that innovation in service may prompt the emergence of change across various facets of an organization, (ii) the likelihood of unintended consequences of innovative services following its implementation and delivery (Parasuraman 2000) and (iii) a recognition that even the smallest form of innovation in public sector services may bring about significant and disproportionate outcomes to the society (Edquist and Zabala-Iturriagagoitia 2012; Edler and Yeow 2016). Yen et al. (2012) defines '*service innovation readiness'* as "*…a firm's readiness for adopting service innovation based on assessment of its adopting contexts*" (p. 815).

There is a growing interest in '*service innovation readiness'* as a research topic. Over the years, a number of scholars have studied this topic. They include Yen et al. (2012), Chen et al. (2014), Thomas et al. (2016), Winand and Anagnostopoulos (2017), and AlMalki and

Durugbo (2022). Thus, for example, drawing upon data gleaned from Taiwanese service firms, Yen et al. (2012) identified six mechanisms for service innovation readiness. Thomas et al. (2016) examined service innovation readiness in the context of socio-technical systems, identifying four stages of readiness, namely (i) *'Institutional environment'* (focused on national institutional characteristics including legal and regulatory framework, competitive, innovative and entrepreneurial environment (ii) *'Enabling infrastructure'* (consisting of both Information and communications technology infrastructure and markets (iii) '*Supply'* focused on drivers of market supply and (iv) '*Demand*' (focusing on overall propensity for service adoption). Set within the context of non-profit sports organizations in Belgium, Winand and Anagnostopoulos (2017) found that readiness (construed as prior employee awareness of innovation), had a direct impact on attitudes to towards innovation (a similar finding was made by Chen et al. 2014). Readiness for service innovation is likely to be dependent on a wide ranging number of factors which will include (i) '*Technical'*, '*Human'* and '*Operational*' factors (King et al. 1994; Montealegre, 1999). It is also likely to be dependent on the prevailing business and competitive environment (King et al. 1994). Finally, the study by AlMalki and Durugbo (2022) found the existence of three key considerations for service innovation readiness (set within the education sector) as (i) '*Design'* (ii) '*Institutional reform'* (iii) '*Societal value'*. From our review of these literatures, we did not identify a generally applicable framework for service innovation readiness set within the context of public services.

4.0 Research methodology

4.1 The UAE context

The UAE is an independent and sovereign state situated along the south eastern part of the Arabian Peninsula. It is comprised of seven constituent political and religious states known as *emirates*. These entities (which prior to the country's formation in 1971 were all self-independent states), include the *emirates* of Abu Dhabi, Ajman, Dubai, Fujairah, Fujairah, Sharjah and Umm al Quwain. The *emirate* of Abu Dhabi serves as the capital of the UAE while the *emirate* of Dubai serves as the central hub of commercial activity in the country.

The question of the 'readiness' of public sector service organizations in the UAE comes from recent concerns expressed on the state of service innovation within the country. Most importantly, instances where service innovation were clearly needed have been reported in both academic literature (see Abuhejleh et al. 2016; AlNuaimi and Khan 2019; Dulaimi 2022)

and in practice. Thus for example, in a tweet on 22 April 2019, Sheikh Al Maktoum, the *emir* of Dubai shared a picture of long queues at one of the branches of the UAE's public post operator, Emirates Post, calling for improvements in customer service. Recognizing the importance of innovation within public sector, the government of the *emirate* of Dubai has for example, introduced an innovation index which it employs to measure and assess the level of innovation readiness within all Dubai government entities. The government of Dubai has also made significant investments in new technology innovation focused on public sector service delivery. This includes a US$275 million investment in 2016 made under the Dubai Future Accelerators program (Abu Dhabi Chamber 2019). The situation is also similar in the *emirate* of Abu Dhabi where the government has made an investment of US$13.6 billion under the Ghadan 21 program, to enhance innovativeness in public sector services.

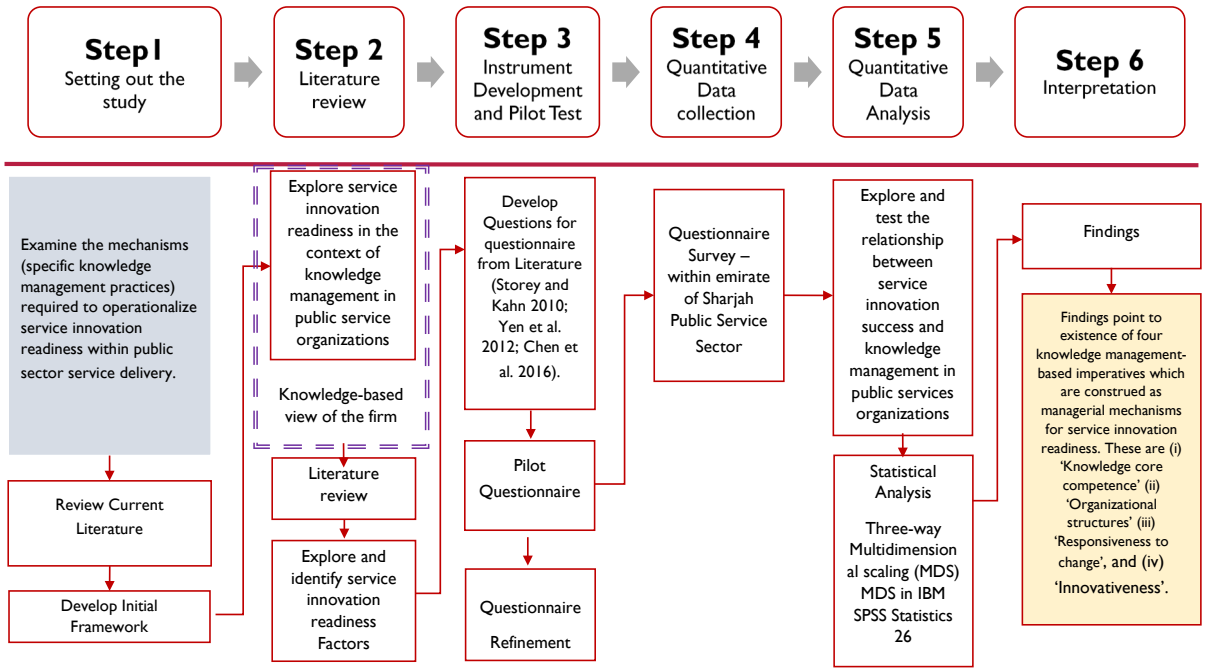
At a national level, the UAE government has recently launched its 'Centennial Plan 2071' which is envisioned as an articulation of the country's vision, 100 years after its formation. Amongst other areas of interest, the vision sets out an ambitious plan for the country to cement its reputation for service innovation under four pillars, namely (i) future-focused government which emphasizes the development of models of innovation for future post-petroleum services (ii) developing future leaders able to shape the future (iii) economic diversification and development of a knowledge-based economy and (iv) the development of a societal cohesiveness. Of particular interest is that the UAE's Centennial Plan 2071 sets out the country's national expectations in terms of how services are to be developed, framed, deployed and enacted within not only privately owned organizations and businesses ('the private sector'), but also more specifically, within government departments and utility companies which forms the public sector component of the UAE economy. The objective of these initiatives being to boost the competitiveness of the country by increasingly focusing on delivering knowledge-intensive services. However, apart from well publicized awareness of public sector innovation coming out of the *emirates* of Dubai and Abu Dhabi, not much is known about service innovation or in fact, service innovation readiness in UAE public sector organizations operating across other constituent *emirates* of the UAE. Thus our focus on service innovation (and readiness) within the *emirate* of Sharjah.

Despite their role amplifying innovation, there is also an appearance in the literature that UAE public sector organizations may actually be resistant or even hostile to innovation (Hijal-Moghrabi et al. 2020). One factor driving this view is the vast amount of literature which

opines that the majority of public sector entities in the UAE are highly centralized and operate with high levels of role formalization (see AlThakhri 2010; Ahrens et al. 2017; AlBadi 2018). The literature opines that formal, bureaucratic and centralized structures are likely to negatively impact upon innovation (Bodewes 2002; Liu et al. 2018). Thus, engaging in innovation may be challenging for a large number of public sector service organizations in the UAE.

We show in Figure 1 (below), a representation in diagram form of the study approach adopted in the study.

Figure 1: Diagrammatical representation of research approach



4.2 Developing the scale measures

In the first phase of the study, we developed scale measures to be employed in our study, drawing earlier studies focused on service innovation (Chen et al. 2016), service innovation readiness (Yen et al. 2012) and the interrelationship between service innovation and knowledge management (Storey and Kahn 2010).

To measure the relationship between service innovation and knowledge management, Storey and Kahn (2010) developed scale measures based on six independent variables; (i) '*Personalization knowledge strategy'*, (ii) '*Codification knowledge strategy'*, (iii) '*Task knowledge'*, (iv) '*Proficiency'*, (v) '*Innovativeness'*, and (vi) '*Sustainable competitive advantage'*. Yen et al. (2012) identified six mechanisms that constitutes an organizations service innovation readiness, namely (i) Strategic investment and (ii) Risk tolerance, grouped under '*Strategic orientation toward service innovation*'; and (iii) service innovation champions, (iv) inter-organizational collaboration, (v) service innovation experience and (vi) technology experience grouped under '*Enabling mechanism for service innovation'*. Chen et al. (2016) developed scale measures for service innovation based on four independent variables: (i) '*Service innovation'*, (ii) '*Market-linking capability'*, (iii) '*Market turbulence*', and (iv) '*Control variables'*.

The scale measures from these three different studies were chosen for two reasons. *First*, is that based the reviewed literature, these were the only scale measures we identified that had been empirically validated. *Second*, drawing from Ojiako et al. (2022; p.5), the complementary nature of the three individual scale measures allowed for their combination into a single survey instrument that could validly be employed to address our research question.

4.3 Description of the questionnaire

The questionnaire consisted of three sections which are structured in the manner now described. The first section of the questionnaire (questions 1 to 24) focused entirely on gathering information focused on the conceptualization of service innovation readiness. This section of the questionnaire, drew the majority of its questions from the three earlier studies with eight questions drawn respectively from Storey and Kahn (2010), Yen et al. (2012) and Chen et al. (2016).

The second section of the questionnaire focused on the operationalization of managerial actions related to service innovation readiness and knowledge management. This

part of the questionnaire drew its questions from Storey and Kahn (2010) and Yen et al. (2012). In total, this section of the questionnaire consisted of 21 questions. Fourteen questions were drawn from Storey and Kahn (2010) while seven questions were drawn from Yen et al. (2012). The third section of the questionnaire focused on evaluating the mechanisms (specific managerial actions) required to operationalize the complex interplay between the various public services organizational factors that encompass service innovation. A total of three questions were presented, all drawn from the Yen et al. (2012) questionnaire.

4.4 Scale measures

All three sections of the questionnaire were framed around a questionnaire developed around independent variables factors measured against a 7-point Likert-type scale (Likert, 1932), ranging from 1 (‘*strongly disagree’*) to 7 (‘*strongly agree’*). In terms of the interrelationship between service innovation readiness and knowledge management, the study by Storey and Kahn (2010) had also been framed against a questionnaire developed around independent variables factors which were measured against a 7-point Likert-type scale (Likert 1932) with 1 (‘*strongly disagree’*) to 7 (‘*strongly agree’*).

The questions used in the entire questionnaire were selected based on relevance, which was determined based on face validity of all scale measures within the three different questionnaires (i.e. Storey and Kahn 2010; Yen et al. 2012; Chen et al. 2016). The process of selection of the scales was undertaken by three of the four authors who undertook a face validity assessment exercise for the three different questionnaires (i.e. from Storey and Kahn 2010; Yen et al. 2012; Chen et al. 2016) using 2 = ‘*very closely matches’*, ‘1’ = ‘*somewhat matches’* and ‘0’ = ‘*not at all’*. The aim was for each of the three authors to set out the degree to which they felt that individual scale measures within each questionnaire (i) was relevant and (ii) addressed a specific research question, and (iii) was not or could not be construed as a duplicate of another question/scale measure. Following this exercise, final summated scores from all three authors were written against each of the scale measures. For each section, the scale measures of ‘3’ were selected (showing agreement of all three panel members). To ensure ‘independence’ of the scale measures, the fourth author did not participate in this exercise and served only as an observer. The scale measures that were used in this study are shown below (Table 1, Table 2 and Table 3).

Table 1: Service Innovation Readiness

Ref	Question	Reference/source
1	The organization's new service development has been successful in achieving better utilization of resources	Storey and Kahn (2010)
2	The organization's new service development has been successful in bringing new clients to the business	Storey and Kahn (2010)
3	The organization's new service development has been successful in retaining existing customers	Storey and Kahn (2010)
4	Relative to the competition . . . This organization's new service development is highly innovative	Storey and Kahn (2010)
5	Relative to the competition . . . The organization is successful at generating innovative new service ideas	Storey and Kahn (2010)
6	This organization has: _ greater knowledge of new service development tasks and activities	Storey and Kahn (2010)
7	In the government in which this organization operates: - Customers' service preferences change rapidly over time	Storey and Kahn (2010)
8	In the government in which this organization operates: Customers look for new services all the time	Storey and Kahn (2010)
9	Our organization employs formalized processes for new service development projects	Yen et al. (2012)
10	Our organization increases investments for service innovation to achieve important strategic goals	Yen et al. (2012)
11	Our organization has developed service that is new to the government	Yen et al. (2012)
12	Our organization has developed service that is new to itself	Yen et al. (2012)
13	Our organization is engaged to improve existing services	Yen et al. (2012)
14	Our organization has created new customer value through service innovation	Yen et al. (2012)
15	Our organization possesses all necessary conditions for adopting service innovation	Yen et al. (2012)
16	Our organization is well prepared for adopting service innovation	Yen et al. (2012)
17	Our organization has developed new services	Chen et al. (2016)
18	Our organization has improved and promoted existing services	Chen et al. (2016)
19	Our organization has repackaged and promoted existing services	Chen et al. (2016)
20	Our organization has extended and promoted existing service lines	Chen et al. (2016)
21	Our organization has introduced new services that competitors do not offer	Chen et al. (2016)
22	Our organization has the ability to retain customers	Chen et al. (2016)
23	Our organization has the customer linking capabilities	Chen et al. (2016)
24	We cater for many of the same customers as in the past	Chen et al. (2016)

Table 2: Service Innovation and Knowledge Management

Ref	Question	Reference/source
25	Formal procedures exist for documenting the ''lessons learned'' from completed new service development projects	Storey and Kahn (2010)
26	New service development knowledge is generally ''stored'' as new processes and routines immediately after project completion	Storey and Kahn (2010)
27	Manuals and handbooks are used extensively to make new service development knowledge available for subsequent use on other projects	Storey and Kahn (2010)
28	New service development knowledge generally remains ''in the heads'' of those individuals executing the activities of the NSD project	Storey and Kahn (2010)
29	During new service development, written reports are used extensively record to new service development knowledge	Storey and Kahn (2010)

30	During new service development organizational problems are solved by interdepartmental teams	Storey and Kahn (2010)
31	During new service development there are high levels of communication between different parts of the organization	Storey and Kahn (2010)
32	During new service development cooperation between departments is usually very high	Storey and Kahn (2010)
33	Would person-to-person socialization in which personnel share mental models, unify cross-functional understanding, and combine individuals' knowledge increase service innovation? *New service development task knowledge: task knowledge in the context of service innovation is the accumulation of experiences, insights, and lessons learned from different activities and functions within an organization.*	Storey and Kahn (2010)
34	Would service innovation increase better by employing both codification and personalization strategies than employing just a single strategy?	Storey and Kahn (2010)
35	Does the use of a personalization strategy lead to greater service innovativeness?	Storey and Kahn (2010)
36	Do prior knowledge and initial know-how levels enhance service innovativeness?	Storey and Kahn (2010)
37	Does reused existing knowledge increase service innovativeness?	Storey and Kahn (2010)
38	Does know-how built up over a number of years and diffused throughout the organization facilitate efforts to develop new services?	Storey and Kahn (2010)
39	Our organization has real-time sharing of operations information with all parties involved	Yen et al. (2012)
40	Our organization has engagement in collaborative planning with parties involved	Yen et al. (2012)
41	Our organization has information platforms upon which we share operation-related information with parties involved	Yen et al. (2012)
42	Our organization collaborates with business partners and responds rapidly to changes	Yen et al. (2012)
43	Managers endeavour to develop new customer-oriented services	Yen et al. (2012)
44	Managers constantly encourage employees to propose ideas that address customer needs	Yen et al. (2012)
45	Managers are open to new service ideas brought up by employees	Yen et al. (2012)

Table 3: Service Innovation and Public Sector Organization

Ref	Question	Reference/source
46	Our organization can easily change its organizational scheme to fit the needs of new services	Yen et al. (2012)
47	Our organization has created service delivery channels and customer interfaces that were not previously offered by our organization	Yen et al. (2012)
48	Our organization has invented processes to enhance customer access to our service (e.g., expand service hours and locations)	Yen et al. (2012)

4.5 Conducting the study

Drawing from Sekaran (1983) and Cavusgil and Das (1997), we now explore seven key considerations that guided the study (i) grammatical, idiomatic, and syntactical equivalence,

(ii) variability and applicability, (iii) piloting, (iv) questionnaire dissemination (v) response equivalence (vi) sampling approach and (vii) the responses.

4.5.1 Grammatical, idiomatic, and syntactical equivalence: Noting that the study was set within the context of the UAE (and to an extent, specific to public sector service organizations within the *emirate* of Sharjah), where Arabic is the official language of business, we agreed early in the study to conduct any data gathering exercise in Arabic. However, it was our intention that any developed data gathering tool was to be translated into English in a manner that ensured that terminology, context and meaning was not lost at the point the questionnaire was to be translated from English into the Arabic language (and vice versa). Thus, we paid particular attention to ensure that grammatical, idiomatic, and syntactical equivalence was preserved between the two versions of the questionnaire (one in Arabic, the other in English). This was particularly important noting that some of the questions within the questionnaire instrument were either long or contained words which could arguably (even within the same context) have different interpretations in Arabic and English. To cater for this challenge, we undertook a number of steps. First, on the point of the draft questionnaire being prepared (in English), one of the co-authors who is a native Arabic speaker and a proficient English speaker undertook to translate the questionnaire from English to Arabic. At the same time, we gave two independent academics (who were native Arabic and English speakers) a copy of the English version of the questionnaire, with the request that they translate the questionnaire into Arabic. On completion of this task, the native Arabic speaking author then gave another two independent academics (who were native Arabic and English speakers) copies of the three different questionnaires in Arabic language with the request to translate the questionnaires back to English. The three translated questionnaires (plus the original questionnaire) were then sent to the other authors (all native English speakers), for grammatical, idiomatic, and syntactical equivalence cross-checking. This entire process was conducted over an approximate period of three weeks.

4.5.2 Variability and applicability: We adopted a triangulated/mixed method research approach for the purposes of this study. A key attribute of triangulation is that it combines different research approaches, methods and methodologies in for example, the analysis of data (Cameron and Molina-Azorin 2011). The use of a triangulated/mixed method research

approaches for data analysis in particular, allows for the development of a better appreciation of the problem being investigated. It also allows for more comprehensive understanding of the evidence (data). In this study, data analysis employed both variable ranking and multidimensional scaling (MDS).

4.5.3 Piloting: Noting concerns about the emergence of confounding variables, in a manner consistent with Chipulu et al. (2014), the questionnaire was piloted among eight engineering management part time PhD candidates at the University of Sharjah. All were very experienced managers with project management expertise situated within the UAE public sector. In particular, their experience meant that they were more than likely to provide valuable critical perspectives of the questionnaire that went wider than a 'Sharjah' perspective. Feedback received from the pilot was employed to undertake various revisions to the survey instrument which was then re-distributed across the same group of PhD candidates until fine-tuned to their satisfaction. The 'final' draft of the questionnaire was then sent back again to the pilot population to assess user-friendliness and 'practicality'.

4.5.4 Questionnaire dissemination: There has been considerable challenge to scholars seeking to establish how survey data can be effectively and efficiently administered to obtain desirable statistical power levels (King et al. 2003). Among the challenges faced by scholars are the questions on whether to send out questionnaires by post (Bachmann and Elfrink 1996), via electronic mail (Michaelidou and Dibb 2006), or to create the questionnaires on web-based portals (Couper 2000; Couper et al. 2001). Having undertaken a careful assessment of priorities (for example, gathering the data during the Covid-19 pandemic) and having reviewed literature which point out that (i) respondents will generally not reply to questionnaires that will take longer than 10 minutes to complete (Galesic and Bosnjak 2009). and (ii) claims that over the last 20 years, response rates from both postal and electronic surveys have reduced significantly (in this case, Sheehan, 2001), we adopted the following research approach.

Two forms of the questionnaire were developed - an online form created on *surveymonkey.com* (in English only) and paper copies (in both English and Arabic). The final questionnaire was disseminated across the entire spectrum of the public sector within the *emirate* of Sharjah. This ranged from local Emirati institutions - such as Sharjah Municipality,

Economic Development Department, Sharjah Private Education Authority to localized national entities – such as the Road and Transport Authority (Sharjah) and Sharjah Electricity and Water Authority. The sample were those of managerial grade, working in service contact roles within the public sector (of the *emirate* of Sharjah). For each respondent, we approached targeted managers directly, requesting that they participate in the study and complete either an online or in-person (paper) version of the questionnaire. In a manner consistent with the snowball sampling approach, every respondent who had agreed to participate in the study was asked to recommend another contact within his or her own professional network. Thus, the data gathering took the form of what is described in the literature as 'non-random purposive sampling'. When an in-person (paper) version of the questionnaire was to be completed, this was conducted on the office premises of the respondents. The data collection exercise was undertaken between June and August 2020.

4.5.5 Response equivalence: In order to ensure response equivalence, we were very conscious of the need to ensure that the distribution of the questionnaires within the public sector in the *emirate* of Sharjah did not seem to be done in an indiscriminate manner. For this reason, we made a very conscious decision to ensure that the questionnaire was widely spread across the entire spectrum of the public sector. Doing this would help ensure that the results eventually obtained from the data-gathering exercise would demonstrate a true reflection of what would have been expected in terms of service innovation and knowledge management within the *emirate* of Sharjah. Our contention is therefore that each of the organizations targeted for sampling suggested some form of '*similarity*' in terms of how it reflected organizational behavior within the *emirate*.

4.5.6 Sampling approach: The sampling approach adopted was consistent with non-random purposive sampling. We had built in certain 'safeguards' to ensure that the sample was appropriate. For example, every 'chosen' respondent was 'vetted' in terms of: (i) managerial position, in other words, all respondents held managerial positions/responsibilities; (ii) practical familiarity with the concept of service innovation and/or knowledge management; and (iii) experience working in the *emirate* of Sharjah within the public sector. While each survey commenced with us conducting a comprehensive briefing about the nature of the study and the characteristics of the questionnaire (Dillman 2007), we also pointedly enquired

for each respondent to confirm that they were an appropriate person to complete the questionnaire.

4.5.7 The responses: In all, a total of 207 'in person'/paper copy questionnaires were collected. However, on collation of all questionnaires, it was observed that a significant number (146) 50 questionnaires were unusable. This occurred for two reasons. First, particularly with the 'in-person' questionnaires, 23 were found to be incorrectly completed, 41 had ticks that were unreadable, 17 were simply not completed in a manner to ascertain where the ticks were. 65 had more than a third of the questions unanswered. These questionnaires were removed leaving 61 questionnaires that were usable from the 'in-person' questionnaires. In terms of the online questionnaires, when the spreadsheet was downloaded from *surveymonkey.com*, it was found that, in a number of instances, more than a third of the questions were left unanswered. These questionnaires were removed leaving 89 questionnaires that were usable from the online version of the questionnaire. In total, 150 usable questionnaires were obtained for the study. A summary of the collected raw data is shown in Appendix A.

4.6 Identification of the variables

The analysis commenced with an initial definition of the variables (one against each question in the questionnaire – making an initial list of 48 variables). In effect, a discretionary selection of variables based upon distinctiveness in order to increase the number of cases per variable for further analysis was undertaken. This was done because on completion of the initial variable definitions, a number of redundancies (duplications), were identified. The discretionary selection of variables commenced with each of the 48 variables being selected (one by one) and then checked against the other 47 variables. If no match was identified, then '*not at all'* with a value of '0' was designated and assigned. Conversely, a value of '1' was assigned when it was determined that a particular variable '*to some extent matched another dimension*'. Finally, when it was determined that a variable '*certainly matched another'*, a value of '2' was designated and assigned. On completion of the initial selection, further examination (a second round of examination) of the '*to some extent matched another dimension'* was undertaken. The essence of this discretionary selection of variables was to allow us to identify redundant variables which were in all sense and purpose, simply

replications (this was logical to occur since the initial 48 variables had been derived from 3 different questionnaires). From the original 48 variables, the most distinctive variables that did not seem to overlap with another variable were identified. There were 38 such variables (10 variables had been identified to overlap with each other). Table 4 shows the labelling of the 'final' 38 variables.

Table 4: Variables' Labels

No.	Variable/Label	Questions/Likert Scale	Reference
1	UseOfResource	The organization's new service development has been successful in achieving better utilization of resources	Storey and Kahn (2010)
2	NewClients	The organization's new service development has been successful in bringing new clients to the business	Storey and Kahn (2010)
3	RetainCustomers	The organization's new service development has been successful in retaining existing customers	Storey and Kahn (2010)
4	HighInnovation	Relative to the competition . . ._ This organization's new services development is highly innovative	Storey and Kahn (2010)
5	NewIdeas	Relative to the competition . . ._ The organization is successful at generating innovative new service ideas	Storey and Kahn (2010)
6	NewActivities	This organization has:_ greater knowledge of new service development tasks and activities	Storey and Kahn (2010)
7	RapidChange	In the government in which this organization operates: _ Customer's service preferences change rapidly over time	Storey and Kahn (2010)
8	CustomerSensitivity	In the government in which this organization operates: _ Customers look for new services all the time	Storey and Kahn (2010)
9	FormalProcesses	Our organization employs formalized processes for new service development projects.	Yen et al. (2012)
10	IncreaseInvestments	Our organization increases investments for service innovation to achieve important strategic goals.	Yen et al. (2012)
11	NewToGovt	Our organization has developed service that is new to the government.	Yen et al. (2012)
12	NewToSelf	Our organization has developed service that is new to itself.	Yen et al. (2012)
13	ImproveExServices	Our organization is engaged to improve existing services.	Yen et al. (2012)
14	NewCustValue	Our organization has created new customer value through service innovation	Yen et al. (2012)
15	Ready4Innovation	Our organization possesses all necessary conditions for adopting service innovation	Yen et al. (2012)
16	AdoptInnovation	Our organization is well prepared for adopting service innovation	Yen et al. (2012)
17	DevelopNewServices	Our organization has developed new services	Chen et al. (2016)
18	PromoteService	Our organization has improved and promoted existing services	Chen et al. (2016)
19	RevampService	Our organization has repackaged and promoted existing services	Chen et al. (2016)

20	ExtendService	Our organization has extended and promoted existing services lines	Chen et al. (2016)
21	CompetitiveService	Our organization has introduced new services that competitors do not offer	Chen et al. (2016)
22	Able2ReatinCustomer	Our organization has the ability to retain customers	Chen et al. (2016)
23	CustomerLinkage	Our organization has the customer linking capabilities	Chen et al. (2016)
24	HistoricalCustomers	We cater many of the same customers as in the past	Chen et al. (2016)
25	LessonsLearnt	Formal procedures exist for documenting the ''lessons learned'' from completed new service development projects	Storey and Kahn (2010)
26	KnowStore	New service development knowledge is generally ''stored'' as new processes and routines immediately after project completion	Storey and Kahn (2010)
27	Procedures	Manuals and handbooks are used extensively to make new service development knowledge available for subsequent use on other projects	Storey and Kahn (2010)
28	KnowInternal	New service development knowledge generally remains ''in the heads'' of those individuals executing the activities of the new service development project	Storey and Kahn (2010)
29	Reporting	During new service development, written reports are used extensively to new service development knowledge (Storey and Kahn, 2010)	Storey and Kahn (2010)
30	Matrix	During new service development organizational problems are solved by interdepartmental teams	Storey and Kahn (2010)
31	Communicate	During new service development there are high levels of communication between different parts of the organization	Storey and Kahn (2010)
32	Cooperation	During new service development cooperation between departments is usually very high	Storey and Kahn (2010)
33	TaskKnowHow	New service development task knowledge: task knowledge in the context of service innovation is the accumulation of experiences, insights, and lessons learned from different activities and functions within an organization.	Storey and Kahn (2010)
34	How2Innovate	Would service innovation increases better by employing both codification and personalization strategies than just a single strategy is employed?	Storey and Kahn (2010)
35	MoreInnovate	Does the use of a personalization strategy lead to greater service innovativeness?	Storey and Kahn (2010)
36	PriorKnow	Do prior knowledge and initial know-how levels enhance service innovativeness?	Storey and Kahn (2010)
37	KnowReUse	Does reused existing knowledge increases service innovativeness?	Storey and Kahn (2010)
38	KnowAccumulate	Does know-how build up over a number of years and diffused throughout the organization facilitates efforts to develop new services?	Storey and Kahn (2010)

4.7 Two-step analysis

The next stage of the analysis was the undertaking of a two-step analysis. Analysis commenced with the 38 variables being subjected to preliminary analysis. This involved ranking the 38 variables and calculating their descriptive statistics. Multidimensional scaling

(MDS) was then conducted to extract the main themes from the respondents' answers to the survey questions.

Multidimensional scaling (MDS) is the overall term for the group of techniques for data reduction proposed by Shepard (1962). Since it is possible to calculate proximities among a range of values, even if they are non-metric or qualitative, MDS has been applied in a wide variety of fields (Borg and Groenen 2005). The objective of MDS is to reduce a large amount of data into smaller amounts that represents most of the variations or patterns within the original dataset. Typically, MDS begins with a dataset containing a large number of entities, which could be variables or cases. Configuration maps will then be constructed from the given dataset in such a way that each point in the map represents a known variable (or case). If the map fits the data well, then variables (or cases) located near each other will have similar properties, while those remote from each other will have dissimilar properties. Hence, the hidden structure of the data, if one exists, can be inferred by studying the relative location of known points in the map.

The three-way MDS in IBM SPSS Statistics 26 was then undertaken using the *Prefscal* algorithm. We first calculated proximities between all pairs of variables. The Square Euclidean (SEUCLID) distance was used as the proximity metric in order to penalize large dissimilarities and, simultaneously, accentuate variation. Next, two separate proximities matrices were created for the expected and belief frames. The proximities were then transformed (using ordinal scaling) into their scalar equivalents in order that the *Prefscal* algorithm could fit the MDS model. Finally, a common (to both the expected and belief frames) *r*-dimensional space of the variables was created using the transformed proximities.

An issue of critical importance for MDS is how many dimensions should be retained in the final solution. There does not exist one criterion that provides a complete solution for taking this decision (Arabie and DeSarbo 1987). Rather, one can adopt a strategy of multi-criteria, including checking the model fit statistics of successively higher dimensional structures and judging the number of dimensions when the addition of dimensions leads to little or no improvement in fit. The number of dimensions is based on other evidence or theory; and the substantive (ergo interpretability) importance of the dimensions is retained.

We adopted a strategy described in Chipulu et al. (2013) to establish the number of dimensions *a priori* based on principal components analysis of the variables. As the variables are all ordinal-scaled, we used categorical principal components analysis (CATPCA). We

conducted CATPCA five times in in IBM SPSS Statistics 26, each time taking a 70% randomly selected sample of cases (from the combined data of expected and belief frames) and specifying that the maximum possible number of components of 38 [the same as the maximum number of variables] be extracted. We then plotted the per cent of variance explained by each CATPCA component for the five models on the same graph and investigated the presence of an 'elbow' or point in the curves where there is no appreciable change in the amount of variance explained by successive components. This allowed for establishing the likely number of meaningful dimensions to be found from the MDS. To decide the final number of dimensions to retain from the MDS, we then examined the results of the MDS, basing our decision on the substantive importance of each dimension.

5.0 Analysis

5.1 Preliminary findings

To indicate the overall distribution of responses across all the variables, Table 5 shows the descriptive statistics of the means of the variables. It can be seen that for most questions respondents at least agreed with the suggested statement (overall mean value is greater 4).

Table 5: Descriptive Statistics of the Means of the variables.

Mean Value		***Count Agree***		***Count Disagree***	
Mean	4.135964912	Mean	76.07895	Mean	67.02632
Standard Error	0.154442673	Standard Error	4.560075	Standard Error	4.497903
Median	3.796666667	Median	61	Median	82.5
Mode	3.273333333	Mode	57	Mode	88
Standard Deviation	0.952048576	Standard Deviation	28.11019	Standard Deviation	27.72694
Sample Variance	0.906396491	Sample Variance	790.1828	Sample Variance	768.7831
Kurtosis	-0.29952793	Kurtosis	-0.74852	Kurtosis	-0.7999
Skewness	0.94591214	Skewness	0.928459	Skewness	-0.94552
Range	3.193333333	Range	87	Range	81
Minimum	2.993333333	Minimum	46	Minimum	11
Maximum	6.186666667	Maximum	133	Maximum	92
Sum	157.1666667	Sum	2891	Sum	2547
Count	38	Count	38	Count	38
Largest(3)	6.026666667	Largest(3)	128	Largest(3)	91
Smallest(3)	3.093333333	Smallest(3)	49	Smallest(3)	16

However, only 13 of the 38 questions resulted in a majority agreement, i.e. at least a value of 5 (slightly agreed), whereas 24 could be considered minority disagreement (value less than 3). Table 6 shows the summary of respondents' responses to the survey questions.

Table 6: Summary of Respondents' Responses to Survey Questions

Variable Name	Description	Mean Value	Count Agree	Count Disagree	Overall Agreement
KnowAccumulate	Does know-how build up over a number of years and diffused throughout the organization facilitates efforts to develop new services? (Storey and Kahn 2010)	6.19	133	11	Majority Agreement
MoreInnovate	Does the use of a personalization strategy lead to greater service innovativeness? (Storey and Kahn 2010)	6.03	128	14	Majority Agreement
KnowReUse	Does reused existing knowledge increases service innovativeness? (Storey and Kahn 2010)	6.05	131	16	Majority Agreement
PriorKnow	Do prior knowledge and initial know-how levels enhance service innovativeness? (Storey and Kahn 2010)	5.91	123	21	Majority Agreement
KnowInternal	New service development knowledge generally remains ‘‘in the heads’’ of those individuals executing the activities of the new service development project (Storey and Kahn 2010)	5.70	120	23	Majority Agreement
TaskKnowHow	New service development task knowledge: task knowledge in the context of service innovation is the accumulation of experiences, insights, and lessons learned from different activities and functions within an organization. (Storey and Kahn 2010)	5.54	113	31	Majority Agreement
How2Innovate	Would service innovation increases better by employing both codification and personalization strategies than just a single strategy is employed? (Storey and Kahn 2010)	5.45	110	32	Majority Agreement
Able2ReatinCustomer	Our organization has the ability to retain customers (Chen et al. 2016).	4.85	106	33	Majority Agreement
HistoricalCustomers	We cater many of the same customers as in the past (Chen et al. 2012).	4.32	85	62	Majority Agreement
NewToSelf	Our organization has developed service that is new to itself. (Yen et al. 2012).	4.97	119	26	Majority Agreement
PromoteService	Our organization has improved and promoted existing services (Chen et al. 2016).	4.21	79	66	Majority Agreement
CustomerLinkage	Our organization has the customer linking capabilities (Chen et al. 2016).	4.74	113	31	Majority Agreement
RetainCustomers	The organization’s new service development has been successful in	4.40	87	52	Majority Agreement

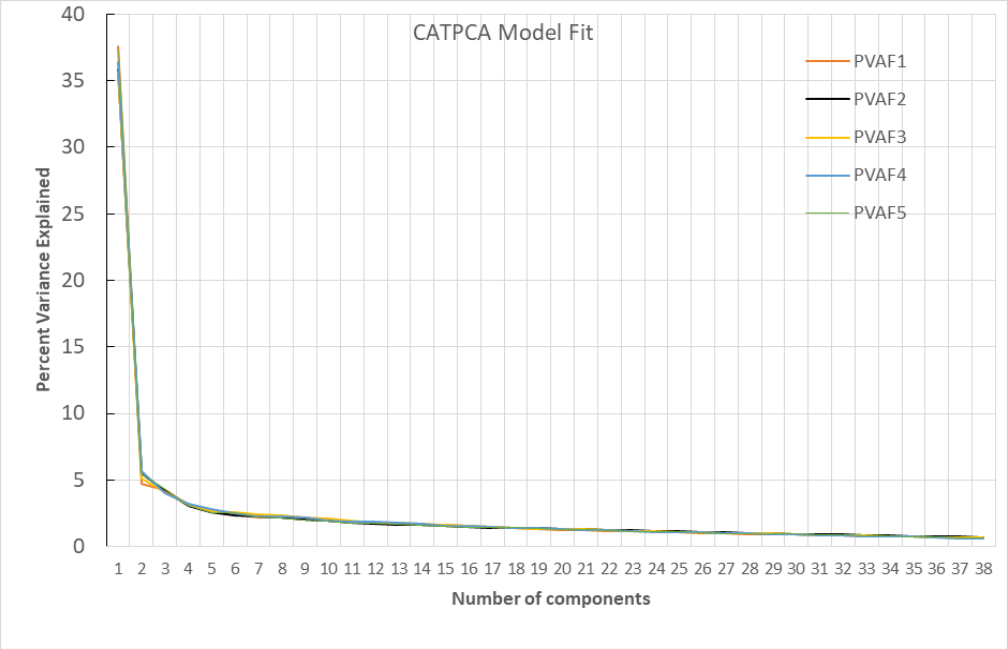
	retaining existing customers (Storey and Kahn 2010)				
CustomerSensitivity	In the government in which this organization operates: (Storey and Khan 2010)_ Customers look for new services all the time	4.02	60	86	Majority Disagreement
ImproveExServices	Our organization is engaged to improve existing services. (Yen et al. 2012).	3.48	59	87	Majority Disagreement
AdoptInnovation	Our organization is well prepared for adopting service innovation (Yen et al. 2012).	4.18	65	81	Majority Disagreement
NewToGovt	Our organization has developed service that is new to the government. (Yen et al. 2012).	3.81	62	84	Majority Disagreement
IncreaseInvestments	Our organization increases investments for service innovation to achieve important strategic goals. (Yen et al. 2012).	3.80	57	83	Majority Disagreement
DevelopNewServices	Our organization has developed new services (Chen et al. 2016).	3.79	66	79	Majority Disagreement
Ready4Innovation	Our organization possesses all necessary conditions for adopting service innovation (Yen et al. 2012).	3.37	58	88	Majority Disagreement
Cooperation	During new service development cooperation between departments is usually very high (Storey and Kahn 2010)	3.27	56	88	Majority Disagreement
FormalProcesses	Our organization employs formalized processes for new service development projects. (Yen et al. 2012).	3.70	60	86	Majority Disagreement
ExtendService	Our organization has extended and promoted existing services lines (Chen et al. 2016).	3.99	74	69	Unsure
Matrix	During new service development organizational problems are solved by interdepartmental teams (Storey and Kahn, 2010)	3.51	65	79	Majority Disagreement
Procedures	Manuals and handbooks are used extensively to make new service development knowledge available for subsequent use on other projects (Storey and Kahn 2010)	3.09	51	91	Majority Disagreement
LessonsLearnt	Formal procedures exist for documenting the ‘‘lessons learned’’ from completed new service development projects (Storey and Kahn 2010)	3.12	53	91	Majority Disagreement
RevampService	Our organization has repackaged and promoted existing services (Chen et al. 2016).	3.72	58	85	Majority Disagreement
Reporting	During new service development, written reports are used extensively to new service development knowledge (Storey and Kahn 2010)	3.27	57	83	Majority Disagreement
RapidChange	In the government in which this organization operates: (Storey and Khan, 2010)_ Customer’s service preferences change rapidly over time	3.73	55	82	Majority Disagreement

NewClients	The organization's new service development has been successful in bringing new clients to the business (Storey and Kahn 2010)	3.65	46	92	Majority Disagreement
NewIdeas	Relative to the competition . . ._ The organization is successful at generating innovative new service ideas (Storey and Kahn 2010)	3.40	58	89	Majority Disagreement
Communicate	During new service development there are high levels of communication between different parts of the organization (Storey and Kahn 2010)	3.05	54	90	Majority Disagreement
NewActivities	This organization has: greater knowledge of new service development tasks and activities (Storey and Kahn 2010)	3.72	57	88	Majority Disagreement
NewCustValue	Our organization has created new customer value through service innovation (Yen et al. 2012).	3.87	66	76	Majority Disagreement
HighInnovation	Relative to the competition . . .This organization's new services development is highly innovative (Storey and Kahn 2010)	3.30	54	88	Majority Disagreement
CompetitiveService	Our organization has introduced new services that competitors do not offer (Chen et al. 2016).	2.99	49	90	Majority Disagreement
KnowStore	New service development knowledge is generally ''stored'' as new processes and routines immediately after project completion (Storey and Kahn 2010)	3.27	49	90	Majority Disagreement
UseOfResource	The organization's new service development has been successful in achieving better utilization of resources (Storey and Kahn 2010)	3.69	55	84	Majority Disagreement

5.2 MDS Dimensionality

Figure 2 (below), shows a plots the per cent of variance explained by each component obtained from the five CATPCA models.

Figure 2: Plot of % of Variance Explained by each Component Obtained from the five CATPCA Models



The full CATPCA results are shown in Table 7 below (showing the outcomes from the five CATPCA models for each of the components).

Table 7: Outcomes from the five CATPCA models for each of the components

CATPCAE Models for Five Components	**Labels**	**PVAF1**	**PVAF2**	**PVAF3**	**PVAF4**	**PVAF5**	**Average**	**Cum. %VAF**
1	UseOfResource	37.584	35.807	35.656	36.386	37.219	36.5	36.5
2	NewClients	4.701	5.485	5.104	5.656	5.43	5.3	41.8
3	RetainCustomers	4.268	4.134	4.089	4.03	4.369	4.2	46
4	HighInnovation	3.105	3.025	3.127	3.178	3.058	3.1	49.1
5	NewIdeas	2.638	2.586	2.677	2.839	2.547	2.7	51.7
6	NewActivities	2.394	2.31	2.546	2.47	2.495	2.4	54.2
7	RapidChange	2.213	2.238	2.405	2.281	2.227	2.3	56.5
8	CustomerSensitivity	2.17	2.142	2.326	2.233	2.167	2.2	58.7
9	FormalProcesses	2.128	2.024	2.151	2.161	2.003	2.1	60.8
10	IncreaseInvestments	1.96	1.943	2.06	1.93	1.894	2	62.7
11	NewToGovt	1.882	1.799	1.953	1.861	1.768	1.9	64.6
12	NewToSelf	1.802	1.717	1.812	1.838	1.705	1.8	66.3
13	ImproveExServices	1.659	1.636	1.795	1.806	1.657	1.7	68.1

14	NewCustValue	1.634	1.588	1.713	1.695	1.558	1.6	69.7
15	Ready4Innovation	1.629	1.569	1.629	1.583	1.524	1.6	71.3
16	AdoptInnovation	1.518	1.47	1.529	1.517	1.449	1.5	72.8
17	DevelopNewServices	1.447	1.425	1.48	1.467	1.444	1.5	74.2
18	PromoteService	1.388	1.41	1.388	1.361	1.419	1.4	75.6
19	RevampService	1.326	1.353	1.341	1.348	1.383	1.4	77
20	ExtendService	1.253	1.306	1.308	1.273	1.276	1.3	78.3
21	CompetitiveService	1.206	1.279	1.298	1.266	1.244	1.3	79.5
22	Able2ReatinCustomer	1.154	1.243	1.261	1.234	1.193	1.2	80.7
23	CustomerLinkage	1.135	1.212	1.168	1.139	1.124	1.2	81.9
24	HistoricalCustomers	1.125	1.137	1.129	1.087	1.083	1.1	83
25	LessonsLearnt	1.071	1.119	1.065	1.049	1.071	1.1	84.1
26	KnowStore	1.004	1.085	1.054	1.043	1.036	1	85.1
27	Procedures	0.993	1.054	1.027	1.001	0.988	1	86.1
28	KnowInternal	0.945	1.01	1.006	0.979	0.981	1	87.1
29	Reporting	0.911	0.979	0.983	0.909	0.957	0.9	88.1
30	Matrix	0.892	0.929	0.924	0.89	0.916	0.9	89
31	Communicate	0.849	0.92	0.849	0.831	0.897	0.9	89.8
32	Cooperation	0.795	0.891	0.836	0.815	0.84	0.8	90.7
33	TaskKnowHow	0.779	0.873	0.801	0.778	0.789	0.8	91.5
34	How2Innovate	0.746	0.807	0.766	0.75	0.776	0.8	92.2
35	MoreInnovate	0.726	0.784	0.745	0.718	0.722	0.7	93
36	PriorKnow	0.696	0.758	0.709	0.654	0.697	0.7	93.7
37	KnowReUse	0.684	0.737	0.686	0.628	0.657	0.7	94.4
38	KnowAccumulate	0.639	0.7	0.652	0.602	0.616	0.6	95

It can be seen that the plots for the five models are almost coincident. This suggests a stability in the variance accounted for by each component across the five random datasets. Examination of the changes in the slope of the lines suggests that the majority of the structure of the data can be captured within the first four dimensions as the per cent of variance accounted for by successive components hardly changes beyond this point. Therefore, four components were extracted in the three-way MDS model, with the foreknowledge that probably only the first four components would be meaningful.

5.3 MDS Dimensions

The MDS model extracted using *Prefscal* algorithm in IBM SPSS Statistics 26 produced a whole battery of model fit statistics. For brevity, only the more commonly used measures are reported here. Kruskal's Stress-I was 0.18 and the variance accounted for was 0.89 (or 89%). Table 8 shows the full MDS model fit statistics. Both measures indicate a good fit. As Shepard's rough non-degeneracy index was 0.69, it can be concluded that the model is unlikely to be degenerate. Overall, the model fitted the data very well.

Table 8: Co-ordinates of Variables for MDS Dimensions

Number	Variable	Dimension 1: 'Knowledge Core Competence'	Dimension 2: 'Organisational Structures'	Dimension 3: 'Responsiveness to change'	Dimension 4: 'Innovativeness'
1	UseOfResource	-479.5317449	-226.8849917	84.57308563	-16.37488827
2	NewClients	-302.6758957	-128.1914452	59.92781071	-55.76719371
3	RetainCustomers	-75.50541662	-404.8878367	-272.483779	-23.95358837
4	HighInnovation	-570.0468008	220.3030239	-33.43166706	41.00623111
5	NewIdeas	-587.5583291	200.2603924	-35.00378632	67.56790868
6	NewActivities	-412.8646409	-219.1672905	83.46109856	-19.27890318
7	RapidChange	-521.8557839	-256.3843632	92.41473011	-7.04093026
8	CustomerSensitivity	-392.4685518	-276.3606488	133.0391577	-26.74730766
9	FormalProcesses	-553.1499349	-174.1641049	105.1996908	57.84798939
10	IncreaseInvestments	-478.7878489	-266.4241437	114.6256924	4.338865963
11	NewToGovt	-536.8397926	-282.1513009	106.2220621	25.78407105
12	NewToSelf	309.3984061	-132.797161	-137.0664809	-49.4299045
13	ImproveExServices	-519.4290152	291.8236085	-65.4896355	76.93872329
14	NewCustValue	-464.8030165	-362.1015591	25.88412304	11.97039231
15	Ready4Innovation	-533.627452	287.117244	-51.34052651	43.00801536
16	AdoptInnovation	-271.344896	-262.6054985	73.58646013	-61.90437103
17	DevelopNewServices	-498.3195965	-335.5009025	-0.848972638	43.53215795

18	PromoteService	-299.3058603	-471.7818919	-127.4762477	56.36873353
19	RevampService	-547.5516454	-231.5363153	95.14491078	0.622639046
20	ExtendService	-297.808493	-407.6692816	-98.77562538	-5.758161086
21	CompetitiveService	-407.6224333	276.7811992	-45.86371338	-23.71404632
22	Able2ReatinCustomer	249.8422716	-213.1955506	-353.8234377	-3.101963055
23	CustomerLinkage	246.8464932	-160.2170704	-189.5613845	-70.36247798
24	HistoricalCustomers	-215.327321	-454.6659422	-220.5488027	111.2501822
25	LessonsLearnt	-442.1576344	298.5404264	-43.5295405	-12.28317098
26	KnowStore	-555.2325677	197.1749808	-0.337693828	19.97886678
27	Procedures	-412.6008515	290.2400394	-35.57033742	-16.92748576
28	KnowInternal	532.0865384	-32.26775741	40.65673206	43.23480627
29	Reporting	-468.2543341	315.069515	-88.03019872	7.479228598
30	Matrix	-509.3373959	269.6764077	-169.2447806	92.2135046
31	Communicate	-376.8346865	288.5636612	-49.2375287	-22.55994933
32	Cooperation	-471.5697675	316.4068801	-56.04090926	3.275802928
33	TaskKnowHow	535.0409318	-48.38987986	87.03739668	167.3889052
34	How2Innovate	530.0859051	-62.35343043	69.80505291	229.2870497
35	MoreInnovate	498.2355036	1.567060951	25.55081679	-0.037236637
36	PriorKnow	519.0472391	-20.29023189	41.58549938	17.32339803
37	KnowReUse	499.5289218	-6.082585323	25.92896277	1.261907773
38	KnowAccumulate	479.9241608	15.44156372	22.10229046	-5.416869391

Table 8 (above) which shows the output of the MDS analysis also shows the dimensional value of each of the 38 questions on the four dimensions in the MDS structure. As in other dimensional reduction techniques, interpreting the dimensions is based on how strongly variables load on each other (see, for example, Carroll and Green 1997; Neophytou and Molinero 2004; Khoja et al. 2016). On this basis, the variables that load strongly on each dimension are highlighted and interpreted as follows (i) *Dimension 1: 'Knowledge core competence'* (ii) *Dimension 2: 'Organizational structures'* (iii) *Dimension 3: 'Responsiveness to change' and* (iv) *Dimension 4: 'Innovativeness'.*

6.0 Discussions

The findings of the study suggest the existence of four specific knowledge management practices that are required to operationalize service innovation readiness within public sector service delivery in the *emirate* of Sharjah. These mechanisms are (i) '*Knowledge core competence'* (ii) '*Organizational structure'* (iii) '*Responsiveness to change'*, and (iv) '*Innovativeness'*. These four findings are now discussed.

6.1 Knowledge core competence

Earlier, we highlighted that KBV literature treated knowledge as *the* critical resource of an organization. In this context, '*Core competency'* refers to the "…*unique signature composed of tangible and intangible assets that are used to differentiate a company from its competitors*" (Harvey 1997; p. 35). Drawing from literature (see Li and Calantone 1998; Campbell 2003; Johnson et al. 2009; Ozkaya et al. 2015), we define '*Knowledge core competence'* as "*organizational knowledge that takes the form of a key strategic asset*".

The acquisition and utilization of knowledge is a key determinant factor to innovate because innovation entails concentrated application and directed coordination of knowledge (Pitt and Clarke 1999). Among the key imperatives that will define an organizations readiness for service innovation are the existence of unique innovation-supporting resources in the form of knowledge, and also the ability of the organization to position such supporting knowledge effectively and efficiently. Critical here is the size of the organization's knowledge base (in effect, the number of knowledge elements the organization possesses (Chen et al. 2021).

The findings on a knowledge core competency for service innovation readiness raises questions on where such knowledge resides. Usually, an organization will seek to leverage knowledge from the human capital of its staff and employees. For example, through informal channels between various staff and employees, knowledge embedded in specific staff and employees can be transferred through a process of socialization, to other staff and employees within the organization (Zhang and Luo 2020). Where such informal social channels do not exist, the organization can make formal arrangements to move these knowledge employees across various units within the organization allowing them to build up these informal information channels.

Organizations can also seek to drive service innovation by disentangling, reconfiguring, and then combining pre-existing knowledge with emergent knowledge to

create new ideas (Puranam and Srikanth 2007). Through this process of knowledge 'coupling' (Chen et al. 2021), the organization seeks to combine knowledge elements from different (heterogeneous) internal units, in the process, accommodating mutual weaknesses which are then combined in a novel way that leads to the generation of new knowledge and ultimately, innovation. This process will require the acquisition of knowledge from different units/domains of the organization, a process which is likely to lead to knowledge enrichment as a more comprehensive understanding of the organization's knowledge base is developed. It may also lead to a need to discard existing organizational routines and processes. This type of knowledge coupling is more likely to drive innovation in new domains, thus enriching the organizations ability to craft creative solutions to challenges it faces. Underlying these efforts requires ensuring that the various operational unit within the organization are tightly coupled together in a manner that will enhance the coordinated transfer of emergent knowledge (Karim and Kaul 2015; Chen et al. 2021). Conversely, the organization can seek to combine knowledge elements from similar (homogenous) units/domains in a manner that leads to the generation of new knowledge and ultimately, innovation. The coupling of such type of knowledge implies reconfiguring similar knowledge within the same domain of the organization to improve current expertise. When similar sets of knowledge are shared, it is rather easy for staff and employees to take in, comprehend, and deploy such knowledge (Lubatkin et al. 2001). We generally expect that coupling knowledge elements from different (heterogeneous) units within the organization is more likely to drive innovation than knowledge gleaned from similar (homogenous) units due to their likely susceptibility to cognitive inertia (see Galati and Bigliardi 2017). In effect, innovation will result from a process which includes combining knowledge within different domains. This then leads to cognitive activity, the enrichment of the knowledge base and the promotion of ideas creation (Taylor and Greve 2006). Conversely, combining knowledge within similar domains is likely to create cognitive inertia, stifle ideas creation, ultimately, limiting innovation (Galati and Bigliardi 2017).

Put together, for Sharjah public sector service organizations, both the development of informal communication channels among staff and employees and the coupling of various operational units within the public sector is likely to broaden and sharpen not only how specific knowledge is understood, but also problem-solving skills, ultimately, leading to innovation. It therefore appears that what is key to innovation within the public sector in

Sharjah may not necessarily be knowledge on its own, but the value created from such knowledge which emanates from the manner of its development, framing, deployment and enactment.

6.2 Organizational structures

'Organizational structure' refers to the pattern of communication, authority and relationships which exist within an organization (Thompson 1967). The findings also suggest that '*Organizational structures'* played a significant role in public services innovation readiness in the *emirate* of Sharjah. Briefly, this finding is generally aligned to the literature that has examined the impact of various forms of organizational structure on innovation performance in influencing organizational innovation performance (Tang et al. 2013; Dedahanov et al. 2017). The literature on the relationship between organizational structures and knowledge and also on innovation performance appears quite mature in that that literature suggests (i) that organizational structure serves as a major variable of knowledge management (Walsh and Ungson 1991; Karsten 1999; Fiedler and Welpe 2010) and (ii) that various forms of organizational structures (centralization, formalization, and integration) may have different impacts on innovation performance (Dedahanov et al. 2017). Furthermore, drawing from Benzer et al. (2017), the literature also suggests that (iii) organizational structure does have an impact on readiness through its influence on resources allocation and use.

Thus, for example, centralization (a feature of the UAE public sector), which is characterized by a concentration of decision making at senior levels of an organization (Fredrickson 1986), encourages less distributed idea generation. In effect, in very centralized organizations, much fewer members of staff are likely to be involved in making decisions. This inevitably means that they will be a lesser range of opinions and ideas available to the organization. Furthermore, in very centralized organizations as some elements of the UAE public service are, there is a high likelihood that vast human capital available to Sharjah public sector organizations will be ignored. The finding from this study amplifies a clear message. The public sector in Sharjah needs less centralization and less role formalization. In its current configuration, public sector service entities within the *emirate* of Sharjah will be unable to forge a relationship between its various units and its human resources in a manner that drives the creation and sharing of knowledge. Generally, as they are more flexible with resource allocation and use, organizations which maintain more morphogenic and evolutionary

structures will generally exhibit higher service innovation readiness capabilities than those who do not (see Stebbings and Braganza 2009; Rafferty et al. 2013). The existence of such structures allows organizations to lay substantial emphasis on the future, focusing in particular on approaches such as scenario planning and risk intelligence (see Marshall and Ojiako 2013; Marshall et al. 2019).What is needed to foster innovation is an organization with more integrated structures and the flexibility in resource allocation and use. Breaking down structures will go a long way in supporting interactive behaviors among service managers working within the *emirate* of Sharjah, thus increasing the willingness of these managers to engage in knowledge sharing. Also, when structures become less structured/centralized, in the absence of extremely strict rules and templates for service delivery, managers are likely to become more adept at knowledge management. However, most public sector service entities in the emirate have largely clearly articulated (and often fiercely protected) service domains. The lack of such integration can be a major impediment to innovation within Sharjah *emirate*.

6.3 Responsiveness to change

The third dimension of public services innovation readiness identified in this study was '*Responsiveness to change'.* Drawing from Santos Bernardes and Hanna (2009), we define '*Responsiveness to change'* as an organization's "*Propensity to draw upon a series of its capabilities in order to engage in both purposeful and timely behavioral change in response to modulating stimuli*". '*Responsiveness'* may be construed as the ability of Sharjah *emirate* public sector service organizations to react to external stimuli and shocks by almost instantaneous implementing and delivering innovation (see Santos Bernardes and Hanna 2009; p. 41). It can mean specific action that public sector service organizations are able to undertake (for example, designing and offering specific services) as a response to change. It also means the capacity and willingness of the public sector to be cognizance of domestic public policy and in the process, listen to and act upon the expressed needs of citizens as relates to the conceptualization, design and delivery of public services. The public sector can achieve such objectives through the use of information radars (see Marshall et al. 2019). This implies heightened use of proactive information gathering and simulation as a way of enhancing requirements identification.

More often than not, responsiveness implies responsibility which means that Sharjah *emirate* public sector must enact some form of obligation and duty to deliver innovative services in a manner and form which is aligned not only with national domestic public policy (as articulated in the UAE Centennial Plan 2071), but also meets all forms of procedural and legal rules and conventions. Often, responsiveness will also involve citizen mobilization and co-production of services in order to ensure that citizens can voice their input into how these services are conceptualized. Ensuring citizen co-production in these services helps ensure that the contemporary demands of citizens does not diverge greatly from procedures to be set out by public service entities.

'*Responsiveness to change'* requires public sector service entities to be able to segment their client base and services. Seeking to fulfil their UAE Centennial Plan 2071 service delivery mandate does not imply that more mundane services (such as refuse collection), will cease to be delivered; however, public service entities need (due to resource constraints) to be able to specify an acceptable level of responsive action (which may be determined by prevailing domestic national public policy in the UAE), on how services are customized and client relationships are managed. Creating any form of responsiveness which is effective will therefore require that public service entities within the emirate to develop insightful knowledge of its customer (made up of citizens and residents of Sharjah) and competitor base (in other words, private sector organizations that have the capacity to deliver similar services) and also what UAE or more specifically, Sharjah emirate public policy allows.

6.4 Innovativeness

The final dimension of public services innovation readiness identified in this study was '*Innovativeness'.* The literature construes innovativeness as "…*the degree to which an individual is relatively earlier in adopting an innovation than other members of his system*" (Rogers and Shoemaker 1971; p. 27). Drawing from Tate et al. (2018), innovativeness in public sector services delivery in Sharjah can take a number of broad forms that include, but not limited to novel means of service framing and conceptualization, newer approaches to delivery of service and novel methods of engaging the citizen-population through newer forms of governance. This view of innovativeness therefore relates to time of actual adoption of such innovation as against when the innovation is actually conceptualized or perceived as necessary. Innovativeness is highly related to the ability of public sector organizations to

acquire, disseminate, use and exploit knowledge (Dasgupta and Gupta 2009; Chen et al, 2010; Mathew et al. 2011; Sankowska 2013). The overall implication is that innovativeness is impacted by knowledge management (Hwang et al. 2020; Steinberg et al. 2021). Where public sector service organizations operate effective knowledge management systems, they are more likely to create the platform to support the creation, dissemination and retention of knowledge that will be useful to drive innovation.

In terms of '*Innovativeness'*, the public sector will be generally more concerned with providing services which are uniquely associated with enhancing community development, cohesion and harmony. This suggests that public sector service organizations are particularly interested in innovation in order not only to create value, but also more specifically, to enhance/ improve how services which are focused on the public good, perform (see Demircioglu and Audretsch 2017; Demircioglu and Audretsch 2019; Arundel et al. 2019; Hijal-Moghrabi et al. 2020), or as Light (1998) observes, "… *doing something worthwhile*" (p. xv). Innovativeness is also important to public sector organizations as it plays a significant role in terms of how the public sector enhances its legitimacy among the population (Demircioglu and Audretsch 2019). More specifically, innovativeness allows for the breakdown of barriers between citizens and government (Tate et al. 2018) and in some instances, it allows for the proactive creation of opportunities for citizens to actively participate in key government decision-making processes. Drawing from Hijal-Moghrabi et al. (2020), a core assumption of innovativeness in public sector services in Sharjah will be that public sector services become more flexible, and also more responsive to the community, ultimately leading to superior performance.

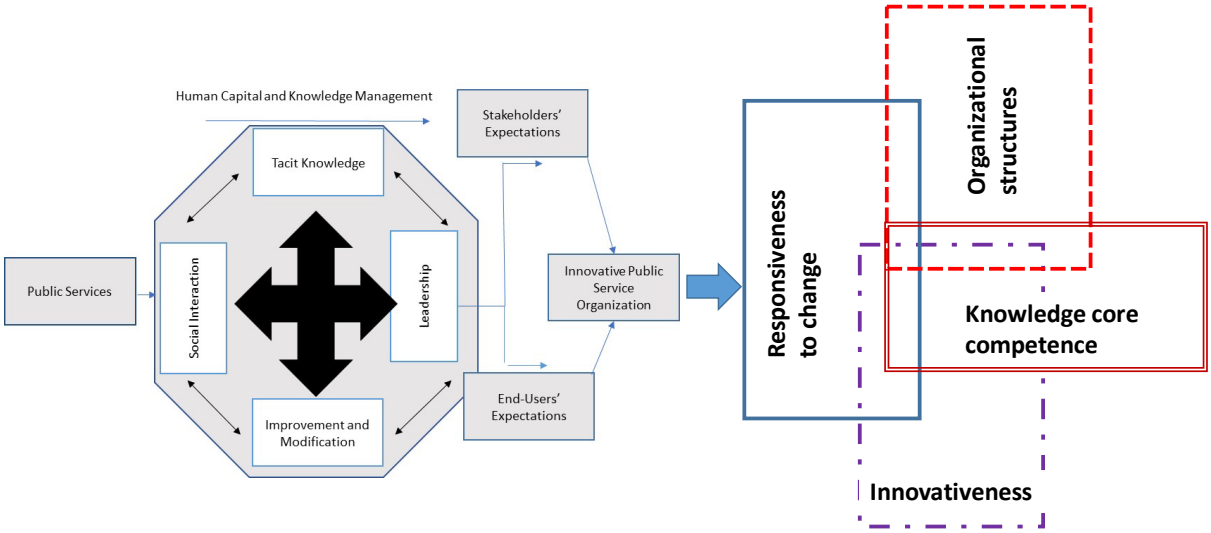
7.0 Conclusions

7.1 Application

What remains of interest to a number of scholars is whether, why and to what extent governments (in the form of the public sector), should innovate in their deliver of public services. To some, such a need appears quite obvious, particularly when such innovation is viewed from the perspective of public policy. There are no arguments that innovation in service drives not only economic growth, but social welfare as well. Such innovation as pointed out in this study can come in different forms. They can for example be infused into the delivery of basic public services (for example, digital car licenses currently being pioneered

by Sharjah Road and Transport Authority). They can also be infused into specific public policy and legal frameworks that are focused on addressing societal problems. In fact, public services innovation has become critical and not simply a matter of necessity for a large number of countries seeking to deliver high levels of quality services to their populations amid increasingly complex needs in society. The UAE is no exception. Thus, driven by the literature which appears to suggest that the public sector may be unprepared to deal with the complex, interconnected and overlapping practices between service innovation and knowledge management practices, the main purpose of this study was to explore innovation readiness within the public services of the *emirate* of Sharjah. In particular, we set out to examine the nature of the readiness relationship that exists between two organizational practices; '*service innovation'* and '*knowledge management'*. Based on a discretionary selection of distinct variables drawn from previous studies (Storey and Kahn 2010; Yen et al. 2012; Chen et al. 2016), a total of 38 knowledge management-based service innovation factors were identified and utilized to develop a knowledge management-based service innovation questionnaire. The study drew on data collected from a questionnaire survey of professionals holding managerial grades in service contact roles within the public sector of the *emirate* of Sharjah. Analysis of the data was via variable ranking and multidimensional scaling (MDS). The findings of the study suggest the existence of four knowledge management-based imperatives which are construed as managerial mechanisms driving service innovation readiness. These are (i) '*Knowledge core competence'* (ii) '*Organizational structures'* (iii) '*Responsiveness to change'*, and (iv) '*Innovativeness'*. The findings lead us to a knowledge management-focused service innovation readiness typology shown in Figure 3 (below), that is focused on ensuring that public sector entities are able to effectively and efficiently deliver innovative services framed within their operational mandate while dealing with complex, interconnected and overlapping organizational practices.

Figure 3: Proposed typology of public sector service innovation readiness



7.2 Theoretical contributions

Our study makes a number of important contributions to the extant knowledge in service innovation readiness.

First, our study highlights an emergent topic which arguably remains empirically under-studied. It also addresses a topic of interest to both service research (see Ostrom et al. 2015) and service operations research (Helkkula et al. 2018). More specifically, Helkkula et al. (2018) had pointed out that there is an urgent need to widen how we understand service innovation. Our study contributed and extended current service innovation readiness literature to the public sector. Furthermore, by conducting our study within the context of the UAE (and specifically, the *emirate* of Sharjah), we sought to explore service innovation readiness in a geographical (and national cultural) context that has been ignored in previous studies. *Second*, the four knowledge management practices which were identified as being required to operationalize service innovation readiness within public sector service delivery represent a useful toolset that can be employed by scholars to assess and evaluate organizational readiness for service innovation. The outcome of such assessments can be used to set out internal templates for effective and efficient readiness for service innovation within public sector organization. *Third*, the four mechanisms also allow scholars to describe not only what specific managerial actions the organization should focus upon, but critically (referring back to the RBV theory which served as our theoretical foundation), the critical resources organizations should focus on integrating into their overall eco-system as a means of enhancing their readiness. The RBV literature (see Laosirihongthong et al. 2014; Yu et al.

2017; McDougall et al. 2019; Al-Hanshi et al. 2022) suggests that firm resources are generally heterogeneous in nature and that the strategic nature of these resources can be further enhanced through their distinctive and non-imitable mix. Thus, for effective service innovation readiness, the emergence of the four managerial mechanisms should be augmented with specific reconfiguration of the organizations routines and processes.

7.3 Practical contributions

Our study makes contributions to practice. For example, the outcome of our study provides key strategic-level pointers for public sector entities on the specific managerial activities required to not only successfully drive innovation in the way and manner to which services are being developed, framed, deployed and enacted, but also ensure that the public sector is operationally pre-disposed, motivated and maintain the right competency to drive through such innovation. More specifically, we opine that the four knowledge management-based imperatives represent risk factors for service innovation readiness. There is already substantial literature on the interdependence of risk factors to support such a proposition (see Williams et al. 1997; Schoenherr et al. 2017). Furthermore, drawing from studies of Bashir et al. (2022), these four factors can also arguably be construed as sources of information flow exchange. Thus, the outcome of this study serves as the foundation for either an emergent practical risk factor or information flow exchange typology that will support managerial effort to drive service innovation and readiness within the public sector.

7.3 Limitations

As perhaps expected, our study does have limitations. However, these limitations are expected to serve as opportunities for future research. The first limitation of our study is that we did not collect respondent demographic data. This was a conscious decision made at the time the study was conceptualized. The reason being that such data would have been more relevant to a study focused on individual-level readiness, a topic which was not necessarily of interest to us. However, on reflection, obtaining such data would have been beneficial as it would have allowed for a simultaneous analysis of individual-level service readiness among public sector managers. The second limitation of our study is that we did not explore the nature of interrelationship between the four dimensions of public services innovation readiness identified in the study. Hence, future studies could undertake such work. Such an

analysis could be undertaken using for example, *fuzzy* Cross-impact Matrix Multiplication Analysis. Understanding such interdependencies will allow scholars to develop a more detailed insight of which factors directly or indirectly impact the various facets of service innovation readiness and the strength of such impact. Finally, although we had earlier highlighted the political role of the public sector, the impact of political imperatives in service operations readiness was not considered in this study. It should be a matter of interest for future studies. Recent studies by Sundström et al. (2017) and Desmarchelier et al. (2019) have found that service innovation processes involve negotiation which are inherently political. However, both studies do acknowledge that despite a general acceptance on how important service innovation is to the public sector, there is very little research focused on its politics and power-play dynamics.

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Appendix A: Summary of Respondents' Responses to Survey Questions

Question	Questions/Likert Scale	1. Extremely Disagree	2. Strongly Disagree	3. Slightly Disagree	4. Unsure	5. Slightly Agree	6. Strongly Agree	7. Extremely Agree	Total
1	The organization's new service development has been successful in achieving better utilization of resources.	11	36	37	11	19	31	5	150
2	The organization's new service development has been successful in bringing new clients to the business.	11	12	69	12	30	4	12	150
3	The organization's new service development has been successful in retaining existing customers.	9	11	32	11	47	26	14	150
4	Relative to the competition . . ._ This organization's new services development is highly innovative.	46	24	18	8	18	27	9	150
5	Relative to the competition . . ._ The organization is successful at generating innovative new service ideas.	44	23	22	3	17	30	11	150
6	This organization has:_ greater knowledge of new service development tasks and activities.	6	47	35	5	19	28	10	150
7	In the government in which this organization operates: Customer's service preferences change rapidly over time	17	24	41	13	23	20	12	150
8	In the government in which this organization operates: Customers look for new services all the time	10	21	55	4	14	22	24	150
9	Our organization employs formalized processes for new service development projects.	23	33	30	4	14	32	14	150
10	Our organization increases investments for service innovation to achieve important strategic goals.	11	38	34	10	17	24	16	150
11	Our organization has developed service that is new to the government.	18	29	37	4	20	25	17	150

12	Our organization has developed service that is new to itself.	6	2	18	5	73	25	21	150
13	Our organization is engaged to improve existing services.	51	16	20	4	15	20	24	150
14	Our organization has created new customer value through service innovation.	12	30	34	8	30	27	9	150
15	Our organization possesses all necessary conditions for adopting service innovation.	51	22	15	4	14	29	15	150
16	Our organization is well prepared for adopting service innovation.	5	6	70	4	23	25	17	150
17	Our organization has developed new services.	21	24	34	5	34	16	16	150
18	Our organization has improved and promoted existing services.	11	21	34	5	34	28	17	150
19	Our organization has repackaged and promoted existing services	21	21	43	7	22	24	12	150
20	Our organization has extended and promoted existing services lines	11	26	32	7	47	13	14	150
21	Our organization has introduced new services that competitors do not offer.	68	11	11	11	21	19	9	150
22	Our organization has the ability to retain customers.	11	11	11	11	45	35	26	150
23	Our organization has the customer linking capabilities.	8	9	14	6	73	26	14	150
24	We cater many of the same customers as in the past.	13	22	27	3	33	31	21	150
25	Formal procedures exist for documenting the ‘‘lessons learned’’ from completed new service development projects.	65	14	12	6	15	26	12	150

26	New service development knowledge is generally ‘‘stored’’ as new processes and routines immediately after project completion.	45	22	23	11	13	28	8	150
27	Manuals and handbooks are used extensively to make new service development knowledge available for subsequent use on other projects.	67	14	10	8	11	28	12	150
28	New service development knowledge generally remains ‘‘in the heads’’ of those individuals executing the activities of the new service development project.	4	6	13	7	25	18	77	150
29	During new service development, written reports are used extensively to new service development knowledge.	60	11	12	10	22	23	12	150
30	During new service development organizational problems are solved by interdepartmental teams.	51	11	17	6	25	27	13	150
31	During new service development there are high levels of communication between different parts of the organization.	73	8	9	6	18	25	11	150
32	During new service development cooperation between departments is usually very high.	61	12	15	6	14	27	15	150
33	New service development task knowledge: task knowledge in the context of service innovation is the accumulation of experiences, insights, and lessons learned from different activities and functions within an organization.	3	15	13	6	15	26	72	150
34	Would service innovation increases better by employing both codification and personalization strategies than just a single strategy is employed?	6	8	18	8	19	22	69	150
35	Does the use of a personalization strategy lead to greater service innovativeness?	4	4	6	8	13	28	87	150
36	Do prior knowledge and initial know-how levels enhance service innovativeness?	2	5	14	6	9	34	80	150
37	Does reused existing knowledge increases service innovativeness?	2	4	10	3	11	39	81	150

38	Does know-how build up over a number of years and diffused throughout the organization facilitates efforts to develop new services?	1	5	5	6	11	31	91	150