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Employee perception of impact of knowledge management processes on public sector performance

Sultan Ali Al Ahbabi, Sanjay Kumar Singh, Sreejith Balasubramanian and Sanjaya Singh Gaur

Abstract

Purpose – *The application of knowledge management (KM) is critical to public sector firm as it is to private sector firm. However, despite its significance, the academic enquiry of KM in public sector is at its nascent stage. This forms the motivation of the present work; this paper aims to analyze and understand the intricate relationship between KM processes and public sector firm performance in terms of operational, quality and innovation performance.*

Design/methodology/approach – *A comprehensive KM processes–performance framework consisting of seven constructs (four constructs of KM processes and three constructs of KM performance) and their underlying factors was developed through an extensive literature review. The employee perceptions of these seven constructs were captured on a five-point Likert scale using a country-wide survey in the UAE public sector. The 270 valid responses captured were then used to first validate the KM framework and then test the hypothesized relationships between KM processes and KM performance.*

Findings – *The findings show that all four KM processes (knowledge creation, knowledge capture and storage, knowledge sharing and knowledge application and use) had a positive and significant impact on operational, quality and innovation performance of public sector in the UAE.*

Research limitations/implications – *The findings confirm the validity and reliability of all the seven constructs and their underlying factors and the assessment framework. Overall, this study fills a gap in the literature about applying/implementing a KM framework for the public sector and therefore significantly contributes toward the theoretical advancement of the field. However, the study does acknowledge the use of perceptual measures of individual employees as a limitation instead of more objective measures to capture the impact KM processes on KM performance.*

Practical implications – *The strong and significant impact of KM processes on firm performance is expected to provide the impetus for practitioners and policymakers to implement and leverage from KM processes and improve firm performance in the public sector.*

Originality/value – *A comprehensive development, validation and assessment of a KM framework for the public sector has not been attempted previously anywhere, let alone UAE, and hence constitutes the novelty of this work.*

Keywords *United Arab Emirates, Firm performance, Public sector organizations, Knowledge management*

Paper type *Research paper*

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1. Introduction

Knowledge management (KM) as an academic and practice-based discipline has witnessed significant interest in recent years (Mariano and Awazu, 2016). However, the focus of most of these studies has been in the private sector *vis-à-vis* the public sector (Oluikpe, 2012; Ringel-Bickelmaier and Ringel, 2010). Moreover, a structured literature

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review of KM in the public conducted by Massaro *et al.* (2015) shows that the existing KM studies are fragmented and failed to develop a cohesive body of knowledge. This scattered and limited understanding of KM in the public sector (Friis, 2002; Cong and Pandya, 2003; Oluikpe, 2012) is a major concern given that knowledge is as critical a resource to public sector as it is to private sector (Willem and Buelens, 2007; Massaro *et al.*, 2015), and that KM for the public sector is no longer a choice but an imperative if the respective country's public sector wishes to survive in the unfolding era of privatization, liberalization and globalization. Today, public sector entities are forced to move away from traditional, bureaucratic approaches to more managerial ones (Sandhu *et al.*, 2011) because citizens now expect the same levels and standards of service from government entities that they receive from the private sector. For instance, all too often, citizens complain about the waiting times at government departments, having to go to multiple government agencies for one service, as well as a general lack of convenience in accessing government services. Massaro *et al.* (2015) highlighted that public sector entities face greater pressures for representativeness, accountability and responsiveness than private sector firms. Therefore, governments are at risk of falling behind unless they start establishing strong KM goals and strategies as a potential way to address these challenges (OECD, 2007). Overall, the need and significance of KM for the public sector are overwhelming. Therefore, the question now is no longer that of whether public sector need KM, but rather how they can effectively reap benefits from KM.

The central tenet of KM is to ensure efficient, effective and extensive implementation of KM processes, namely, knowledge creation, knowledge capture and storage, knowledge sharing and knowledge application and use, to achieve the desired organizational performance outcomes (Von Krogh, 1998; Alavi and Leidner, 2001). Unlike the private sector where the main objective is to maximize revenue and profits, the three important pillars of public sector performance are innovation, quality of service delivery and operational efficiency of services (Cong and Pandya, 2003). Unfortunately, to date, none of the studies in the literature have comprehensively assessed the impact of KM processes on these three pillars of public sector performance, though there have been few studies in public sector that looked at the impact of KM processes on human resource related aspects such as job fit and employee motivation. Moreover, the relatively limited number of studies that have investigated KM processes in the public sector have been largely fragmented and *ad hoc*, investigating only a sub-set of issues in isolation such as knowledge creation (Purcarea *et al.*, 2013; Akehurst *et al.*, 2011) and knowledge sharing (Xue *et al.*, 2011; Syed-Ikhsan and Rowland, 2004) rather than considering all aspects together in a holistic manner. A comprehensive understanding of the relationships between KM processes and performance would enable practitioners and policymakers to prioritize the implementation of KM processes in line with public sector performance goals (considering all three performance aspects). Furthermore, it would also enable public sector to identify and make improvements (efficiency and effectiveness of implementation) to those existing KM processes found to be lagging in delivering the desired performance.

The above gap in the literature formed the motivation of this research, which aims to develop, validate and apply a multidimensional KM processes-performance framework for the public sector, covering all key KM processes and performance.

The specific objectives are as follows:

- to develop the relevant constructs for KM processes and performance for the public sector;
- to develop a comprehensive KM processes–performance framework that captures the interrelationships between the constructs; and
- to empirically validate the KM framework and test the relevant hypotheses proposed in the study.

The UAE was carefully selected for this KM investigation because the relevance of the study would be much greater for countries who, like the UAE, are trying to shift toward a knowledge-based economy from an oil-based economy in the wake of declining oil prices. Also, the UAE is one of the few countries in the region that have given strategic importance to KM for its social and economic development (Al Mansouri *et al.*, 2018; Siddique, 2012). Moreover, the UAE has been a pioneer in developing KM initiatives as part of its 2021 vision (DSG, 2014) and to date has made great progress toward this goal, which is reflected by the fact that UAE was ranked first in the Arab world and 42nd overall in the knowledge economy index created by the World Bank (DSG, 2014). Therefore, the UAE provides a perfect context for examining the significance/potential of KM processes' implementation in improving public sector performance.

The rest of this paper is structured as follows. In Section 2, we investigate the fragmented KM studies in the public sector, including the UAE, in conjunction with KM studies in the private sector to develop the relevant KM constructs for the public sector. In Section 3, a comprehensive KM framework and related hypotheses for the study are proposed. Section 4 explains the research methodology undertaken in this study. In Section 5, analysis and findings of the study including validation of the constructs and framework and hypotheses test results are provided. Section 6 discusses the study's findings and the implications, along with limitations and recommendations for future research.

2. Developing knowledge management constructs and items for the public sector

Though most of the earlier KM studies in the public sector are narrow in scope, the fragmented contributions of these various studies, when considered together, have provided many critical aspects necessary for the development of a comprehensive KM processes–performance framework for the public sector. However, given that the private sector has seen more significant advancement in KM than the public sector, we also reviewed KM studies in the private sector to identify important aspects that can be carefully adopted by the public sector. This is further justified by the fact that public sector is becoming more closely aligned to the private sector to ensure that it is getting the full value of its investments and is effectively monitoring and measuring its performance (Al-Raisi and Al-Khouri, 2010).

A comprehensive review of published studies in KM from leading databases such as SCOPUS, Web of Science, Elsevier, Emerald and Science Direct was carried out to identify the important aspects of the KM framework. The relevant KM constructs and underlying factors/items for the public sector identified from the literature are provided in Table I. Though it can be argued that a host of other constructs and items could be found in the KM literature, no other constructs and underlying items appeared to be as consistent and relevant in the public sector than those given in Table I.

2.1 Knowledge management processes

KM processes are fundamental actions that an organization performs in processing and manipulating its knowledge resources (Holsapple and Joshi, 2000). Some authors have referred to them as KM activities, while others have called them KM tasks or KM processes, but regardless of what they are referred to, they conceptually represent the same thing. They make up the central components of the KM framework because they inform the practitioners of the major activities that should be undertaken to operate successfully with their available knowledge resources. There are several approaches to classifying KM processes. One way of describing KM processes is by dividing them into four key phases, namely, knowledge creation, knowledge capture and storage, knowledge sharing and knowledge application and use (McAdam and Reid, 2000).

Table I Measurement items of KM for the public sector

Constructs and items – KM processes	*Literature source*
Knowledge creation (KMC): my organization	
Has mechanism for creating and acquiring knowledge from different sources such as employees, customer, business partners and competitors (KMC1)	Lawson (2003)
Encourages and has processes for the exchange of ideas and knowledge between individuals and groups (KMC2)	Lawson (2003)
Rewards employees for new ideas and knowledge (KMC3)	Lawson (2003)
Has mechanism for creating new knowledge from existing knowledge (KMC4)	Lawson (2003)
Knowledge capture and storage (KMCS): my organization	
Responds to employees' ideas and documents them for further development (KMCS1)	Lawson (2003)
Has mechanisms in place to capture knowledge from employees, customers and business partners (KMCS2)	Lawson (2003)
Has mechanism in place to patent and copy right new knowledge (KMCS3)	Lawson (2003)
Captured knowledge is codified and is stored in company's knowledge repositories (KMCS4)	Lee and Wong (2015)
Stored knowledge is readily accessible for employees who need it (KMCS5)	Lawson (2003)
Knowledge sharing (KMSH): my organization	
Sends out timely reports and newsletters to employees, customers and other relevant organizations (KMSH1)	Lawson (2003)
Conducts regular symposiums, lectures, conferences and training sessions to share knowledge (KMSH2)	Lawson (2003)
Employees are encouraged to frequently participate in informal discussions to share knowledge (KMSH3)	Lee and Wong (2015)
Employees use latest files sharing systems to share knowledge efficiently (KMSH4)	Own contribution
Knowledge application and use (KMAU): my organization	
Has processes and systems in place for applying knowledge learned from past experiences (KMAU1)	Lawson (2003)
Application of knowledge is enhanced by mechanisms in place that match sources of knowledge to problems (KMAU2)	Lawson (2003)
Employees are encouraged to apply useful proposals/ideas in practice (KMAU3)	Lee and Wong (2015)
Employees are encouraged to apply their knowledge to solve problems (KMAU4)	Lee and Wong (2015)
Constructs and items – Public sector performance	
Innovation Performance (INVP): In my organization, there is a high extent of:	
Service innovation (e.g: introduction of a new service; changes to improve an existing service) (INVP1)	Windrum (2008)
Service delivery innovation (new or altered ways of supplying public services) (INVP2)	Windrum (2008)
Administrative and organizational innovation (changes in organizational structures and routines) (INVP3)	Windrum (2008)
Conceptual innovation (developing new views and challenging existing assumptions) (INVP4)	Windrum (2008)
Policy innovation (changes to thinking or behavioral intentions) (INVP5)	Windrum (2008)
Systemic innovation (new/improved ways of interacting with other firms and sources of knowledge) (INVP6)	Windrum (2008)
Quality Performance (QP): In my organization	
The appearance of physical facilities is in line with the services offered and is visually appealing (QP1)	Parasuraman *et al.* (1988)
Promise with regards to the service offered are always kept (QP2)	Parasuraman *et al.* (1988)
The equipment's used are up-to-date (QP3)	Parasuraman *et al.* (1988)
Customers are always provided with individualized attention (QP4)	Parasuraman *et al.* (1988)
Customers always feel safe in their transactions with the employees in my organization (QP5)	Parasuraman *et al.* (1988)
Employees always show willingness to help customers (QP6)	Parasuraman *et al.* (1988)
Employees always are sympathetic and reassuring to customers with problems (QP7)	Parasuraman *et al.* (1988)
Operational Performance (OP): In my organization	
Day to day operational expenses have reduced (OP1)	Cong and Pandya (2003), Curristine *et al.* (2007)
Employee productivity has increased (OP2)	Curristine *et al.* (2007)
The service delivery cycle time has reduced (OP3)	Curristine *et al.* (2007)

2.1.1 Knowledge creation. This phase refers to a firm's ability to generate innovative ideas and solutions (Marakas, 1999). The creation of knowledge resources does not occur in abstraction from the presently available knowledge and capabilities of the firm (Alavi and Leidner, 2001). The creation of knowledge across functional boundaries requires the

capability to generate new applications from existing knowledge and to exploit the unexplored potential of new skills. Nonaka's (1994) dynamic theory of organizational knowledge creation provides a theoretical backdrop against which to conceptualize the knowledge creation process. According to Nonaka (1994), organizational knowledge creation is a more wide-ranging and dynamic concept and is described as the interplay between tacit and explicit knowledge. Locke *et al.* (1997) highlighted the importance of involving employees and providing opportunities for them to voice their opinions and suggestions through participative decision-making processes for generating new ideas. However, this involves not only the creation of new knowledge from scratch but also the reconfiguration of existing pieces of knowledge to create new knowledge (Lynn *et al.*, 1996). On this issue, Chong *et al.* (2011) found that employees who work together in a team are more efficient at creating new knowledge. Similarly, brainstorming sessions are also found to be effective for generating new ideas (Hutchinson and Quintas, 2008). Furthermore, reward systems established to acknowledge new ideas were found to be successful in motivating employees (Altinay *et al.*, 2008).

2.1.2 Knowledge capture and storage. Studies have shown that even if a firm creates new knowledge, it may not necessarily result in storage (Argote *et al.*, 1990). Therefore, it is important to capture such knowledge and make it available for the organization in the future (Stein and Zwass, 1995). Also, it is important for organizations to capture both types of knowledge: explicit and tacit. The capture of explicit knowledge is the systematic approach of gathering, organizing and refining information in a way that makes information easy to find and facilitates learning and problem-solving (Dalkir, 2005). For example, explicit knowledge about standardized work can be easily captured in writing. The capture of tacit knowledge is the process of collecting information about the experiences and expertise of the individuals in an organization and making it available to anyone who needs it (Dalkir, 2005). However, some tacit knowledge (e.g. innovation and creativity) cannot be easily captured (Moorman and Miner, 1997). Therefore, knowledge capture cannot be considered as a purely mechanistic "add-on" because it also involves the discovery, organization and integration of knowledge into the "fabric" of the organization. Knowledge has to be captured and codified in such a way that it can become a part of the existing knowledge base of the organization. Each organization has a history which provides a backdrop for the growth and evolution of the organization. Each organization also has a memory. The embodiment of the organizational memory is the experience of its employees combined with the tangible data and knowledge stores within the organization (Walsh and Ungson, 1991). Now, with increasing advancements in technology, organizations can easily codify, digitalize and securely store knowledge with redundancy. As knowledge is not static, it is important to delete knowledge that is obsolete and replace it with new knowledge to ensure that knowledge repositories are up to date (Wong and Aspinwall, 2005). Also, employee willingness is just as important as codification, as storing knowledge is often considered as an additional responsibility by employees.

2.1.3 Knowledge sharing. In a knowledge-based economy, knowledge sharing is increasingly viewed as critical to organizational effectiveness (Quigley *et al.*, 2007), especially for those seeking to gain a competitive edge over others (Felin and Hesterly, 2007). It can be defined as the "activities of transferring or disseminating knowledge from one person, group or organization to another" (Lee, 2001). Studies have argued that knowledge sharing among employees significantly impact the performance of both public and private sector organizations (AlShaima *et al.*, 2016; Silvi and Cuganesan, 2006; Xue *et al.*, 2011). According to Al Hussain *et al.* (2012), governments' ability to enhance services depends greatly on knowledge sharing across the organizational spectrum.

Knowledge sharing involves sharing of both tacit and explicit knowledge. While the latter can be shared in formal, systematic language among employees (Nonaka and Takeuchi, 1995) such as through the intranet, electronic email and shared databases, the former

poses a challenge for organizations for two reasons. First, employees' tacit knowledge, which is personal and context-specific, is by its nature very difficult to transfer. Second, tacit knowledge sharing is typically voluntary/non-compulsory (Lin *et al.*, 2008). Therefore, in the case of tacit knowledge sharing, employees should be willing to share their knowledge with colleagues, which can be difficult. Gore and Gore (1999) highlighted that the interaction which takes place within a team environment forms a kind of foundation for the effective externalization of an individual's tacit knowledge into organizational knowledge. Arnold *et al.* (2000) have suggested that firms should encourage collaborative problem-solving and provide opportunities for employees to share their tacit knowledge with each other. Therefore, organizations should arrange meeting sessions where employees are free to share their knowledge, ideas and information with others (Coyte *et al.*, 2012), as well as promote informal face-to-face social interactions to encourage the sharing of tacit knowledge (Chong *et al.*, 2011). The evidence in the literature so far suggests that it is harder to share knowledge within public sector organizations because most people associate knowledge with power and potential promotion opportunities.

2.1.4 Knowledge application and use. Knowledge becomes important when it is used and applied to create value for an organization. Knowledge application and use is the process of using knowledge for a purpose; this occurs when knowledge is put into action for decision-making or policy-making. Employees learn through experience about how to deal with types of enquiries more efficiently. For instance, the frequent use of certain kinds of information can help employees locate this information more quickly as they become aware of the location in which the information resides. Knowledge is useless if it is not used. This implies that the other capabilities of a firm in terms of creating, storing and sharing knowledge resources are irrelevant if the firm cannot apply and use the original knowledge resources efficiently (Mahmoudsalehi *et al.*, 2012). People do not just passively receive knowledge; rather, they actively interpret it to fit with their own situations and perspectives. The utilization of knowledge increases one's expertise in a domain of action, and a user therefore becomes an expert through repetitive practice. An employee's capability of utilizing a relevant knowledge base in decision-making and problem-solving situations allows a firm to respond more effectively to environmental changes. Organizations should therefore encourage employees to use and apply what they know and what they have learned, and to use or combine accessible information from the organization's knowledge repository to both solve existing problems and to come up with new products and services to bolster the organization's competitive advantage (Chan and Chao, 2008).

2.2 Public sector performance

Performance benefits/improvement of KM processes is critical to justify investment in KM processes. However, for firms to assess the performance improvement from KM processes' implementation, they first need to devise and operationalize performance measures. Performance measures allow firms to see evaluate and report performance, identify problems and bottlenecks, set new objectives and targets, determine future courses of action and facilitate internal and external benchmarking (Gunasekaran *et al.*, 2004). Bond (1999) stated that performance measurement would indicate whether a company should continue with its current strategy or make adjustments.

The precise measurement of benefits and progress regarding KM implementation is of the utmost importance for an organization to ensure that the overall objectives of the KM exercise are being fulfilled. Many organizations are embracing KM processes, but few of them are able to implement them successfully to see the benefits.

In the case of public sector performance, the three traditional pillars are innovation, quality of service delivery and operational efficiency of services (Cong and Pandya, 2003). These three important pillars of public sector performance are re-iterated by a collaborative study

on government performance by the UAE Government in association with Deloitte (TGS, 2013).

2.2.1 Innovation performance. Innovation can be defined as a process that directly connects new ideas to the development of a newly introduced product, process or service (Aboelmaged, 2012). Similarly, West (2002) defines innovation as new or improved methods of producing, creating and providing services, as well as improving ways in which to work more productively. More specifically, innovation in the public sector can be defined as the "the introduction of new elements into a public service—in the form of new knowledge, a new organization, and/or new management or procedural skills, which represents discontinuity with the past" (De Vries *et al.*, 2015). This definition also implies that innovation is not merely about generating new ideas, but that such skills also should be exercised into practice.

Evidence from the literature illustrates the importance of KM in bolstering a firm's innovative capabilities (Chang and Lee, 2007; Tseng *et al.*, 2011). For instance, Cantner *et al.* (2011) have investigated innovative companies and identified that KM is a critical factor contributing to their success. Inkinen *et al.* (2015) found KM to have a positive impact on innovation performance in the Finnish private sector. Recent studies in developed countries have shown that innovation in the public sector is more important than it may be in the private sector (EPSIS, 2012). Developed countries are using innovation in the public sector as a means to address growing budgetary pressures and for meeting new societal demands. However, the type of innovations identified within the public sector is in fact quite broad. This review identified several types of innovation. Innovation in terms of service and delivery includes the creation of new public services or changes to existing services (Windrum, 2008; Damanpour *et al.*, 2009) and new or altered ways of supplying public services (Windrum, 2008). Administrative and organizational innovation, according to Aboelmaged (2012), refers to maintaining effective administrative innovation performance that triggers business growth and encourages better values for firms and societies in a rapidly changing environment. Administrative and organizational innovation can potentially promote redesign and changes in work systems, skill enhancement, management systems and incentives (Yamin *et al.*, 1997). It also refers to new procedures, policies, management methods and organizational forms. Such innovation explicitly helps firms deal with the turbulence of external environments and is a significant driver of long-term business success in dynamic markets (Ussahawanitchakit, 2012). Conceptual innovation includes the introduction of new concepts, frames of reference and new paradigms that help to reframe the nature of specific problems and their possible solutions (Bekkers *et al.*, 2011). According to Windrum (2008), conceptual innovation in the public sector consists of the development of new views and challenges to existing assumptions. Policy innovation, on the other hand, includes changes to organizational thinking or behavioral intentions (Windrum, 2008), while systemic innovation refers to new or improved ways of interacting with other organizations and alternative sources of knowledge.

2.2.2 Quality performance. Quality in this context is defined as "an essential property of products (goods and services) in which high-quality products are those that meet customer needs, do not fail during use, and pose no threat to human well-being" (Juran, 2004). Quality management, however, involves an integrated approach to achieving and sustaining high-quality output, focusing on the maintenance and continuous improvement of processes and the prevention of defects at all levels and for all functions of the organization, to meet or exceed customer expectations. (Flynn *et al.*, 1994). Governments are increasingly considering ways in which to improve public sector service quality (UKCeMGA, 2007). It is important to note, though, that knowledge is an integral part of the quality management process for a firm to achieve continuous improvement and performance excellence. Cong and Pandya (2003) have emphasized how KM is important for public sector to improve their quality of delivery and decision-

making. Understanding the relationship between KM and quality performance has been said to be vital for the public sector (Akdere, 2009). SERVQUAL, a multi-item scale for measuring service quality, is now widely used in the public sector (Parasuraman *et al.*, 1988). For instance, Muktar *et al.* (2013) have used SERVQUAL to assess quality performance in the Pakistani public sector, while Ilhaamie (2010) has used it to evaluate service quality in the Malaysian public sector.

2.2.3 Operational performance. While various measures comprise operational performance in the public sector, a review of studies conducted by international bodies, such as the ECB (2006), the OECD (2007) and the IMF (2008), and others such as Curristine (2007) and Goel *et al.* (2010) have shown that operational performance within the public sector is mainly aimed at reducing costs and improving both the timeliness of service delivery and productivity. Cong and Pandya (2003) have pointed out that KM increases efficiency and productivity of public sector, and according to Curristine (2007), the public sector must also strive to reduce the service delivery cycle time.

3. Framework development and hypotheses

The main purpose of implementing KM processes is that it should improve firm performance. Given the interconnected nature of the KM constructs, understanding the interrelationships is pivotal to comprehend the scope of both the problems and the opportunities associated with KM in the public sector. Theoretical frameworks provide a way to conceptualize these complex relationships. While several studies in the private sector have investigated the relationships between KM processes and firm performance (Darroch and McNaughton, 2003; Lee and Choi, 2003; Schulz and Jobe, 2001; Tanriverdi, 2005), in the case of public sector, only a limited number of studies that have looked at the relationship between KM processes and performance and that too the focus was more on innovation performance. At present, there is little or no understanding of how KM processes impact quality and operational performance in the public sector. Given that innovation, quality and operational performance are the three pillars of public sector performance, ideally, investment in KM processes should have a positive impact on each of these performances. However, previous studies such as Darroch and McNaughton (2002) and Cantner *et al.* (2011) have highlighted that different KM processes impact performance differently. Therefore, like several private sector studies (Chong, 2006; Gholami *et al.*, 2013), understanding the impact of individual KM processes on three pillars of public sector performance is critical for public sector practitioners to prioritize the implementation of new KM processes or to reassess their existing KM processes in line with their performance goals. The following relationships are being explored.

3.1 Knowledge management processes and innovation performance

While there is only limited understanding on the impact of KM processes on innovation performance of the public sector, overwhelming number of studies in the private sector have demonstrated a strong impact of KM processes on innovation performance.

Explored the relationship between each of KM processes (knowledge creation, knowledge capture and storage, knowledge sharing and knowledge application and use) and innovation performance and found a significant and positive association between each KM processes and innovation performance in the Malaysian manufacturing sector. Cantner *et al.* (2011), in his large-scale empirical investigation, found strong evidence of positive relationships between KM processes and product and process innovation.

Jiang and Li (2009) found significant positive impact of KM processes (knowledge creation and knowledge sharing) on the innovation performance (a measure of product innovation, R&D spending and patents) of German firms engaged in strategic alliances with each other. Similarly, Liao and Chuang (2006) found a significant positive relationship between KM

processes (combined) and innovation performance (product innovation and process innovation) among large firms in Taiwan.

Ashok *et al.* (2016) found a positive association between investment in KM processes and innovation performance (both radical and incremental innovation) among information technology service firms in a multi-country study. Kamhawi (2012) found a positive association between KM activities and innovation performance among leading firms in Bahrain. Kiessling *et al.* (2009) found a positive relationship between KM processes and innovation performance among Croatian firms.

Lin (2007) found a positive association between knowledge sharing practices and firms' innovation capability among Taiwanese firms. Sáenz *et al.* (2012) found a positive association between knowledge sharing and innovation performance among Spanish and Colombian medium-high and high technology firms. López-Nicolás and Meroño-Cerdán (2011) found a significant positive impact of knowledge capture and storage on innovation performance among Spanish firms. Darroch (2005) found a significant and positive association between knowledge dissemination, knowledge acquisition and innovation performance among firms in New Zealand. Chang and Lee (2007) found knowledge capture and storage to positively impact innovation performance (administrative and technical innovation) among Chinese firms. Gloet and Terziovski (2004) found a positive relationship between KM processes and innovation performance when a simultaneous approach of "soft human resource management practices" and "hard information technology practices" are implemented among Australian and New Zealand firms.

Hence, we posit the following hypotheses:

H1A. Knowledge creation will have a positive impact on innovation performance.

H2A. Knowledge capture and storage will have a positive impact on innovation performance.

H3A. Knowledge sharing will have a positive impact on innovation performance.

H4A. Knowledge application and use will have a positive impact on innovation performance.

3.2 Knowledge management processes and quality performance

Several authors have stressed the importance of KM as a cornerstone in the quality improvement process (Zetie, 2002; Linderman *et al.*, 2004; Akdere, 2009; Loke *et al.*, 2012). For instance, Zetie (2002) highlighted that an organization's quality manual is the depository of its process knowledge. Similarly, Lyons *et al.* (2008) highlighted the importance of KM processes for continuous quality improvement such as planning, execution and evaluation of performance. Some authors have linked quality improvement to specific KM processes such as knowledge creation (Kolesar, 1994).

However, despite these studies, empirical evidence on the impact of KM and quality performance is scant in the private sector, let alone public sector. This is mainly because KM and quality management are viewed as unrelated fields (Akdere, 2009). Therefore, like innovation performance, understanding the impact of KM processes on quality performance is important for KM and quality professionals to develop and design effective KM programs in line with the organizational quality goals.

Hence, we posit the following hypotheses:

H1B. Knowledge creation will have a positive impact on quality performance.

H2B. Knowledge capture and storage will have a positive impact on quality performance.

H3C. Knowledge sharing will have a positive impact on operational performance.

H4C. Knowledge application and use will have a positive impact on operational performance.

3.3 Knowledge management processes and operational performance

Limited studies have looked at the impact of KM processes and operational performance in the private sector and have found a positive association between the two. For instance, Fugate *et al.* (2009) investigated the relationship between KM processes and operational performance among US manufacturing firms and found a significant positive association between the two. Tan and Wong (2015) found a significant and a positive relationship between KM processes and operational performance (measure of cost, time and productivity) using data collected from manufacturing firms in Malaysia. Wang and Wang (2012) empirical investigation found a positive relationship between tacit knowledge sharing and operational performance among high-tech Chinese enterprises. Chen (2016) highlighted the importance of KM in the operational performance in the tourism sector.

While the relationship between KM processes and operational performance is promising for the private sector, the relationship has not been explored previously in the public sector. Hence, we posit the following hypotheses:

H1C. Knowledge creation will have a positive impact on operational performance.

H2C. Knowledge capture and storage will have a positive impact on operational performance.

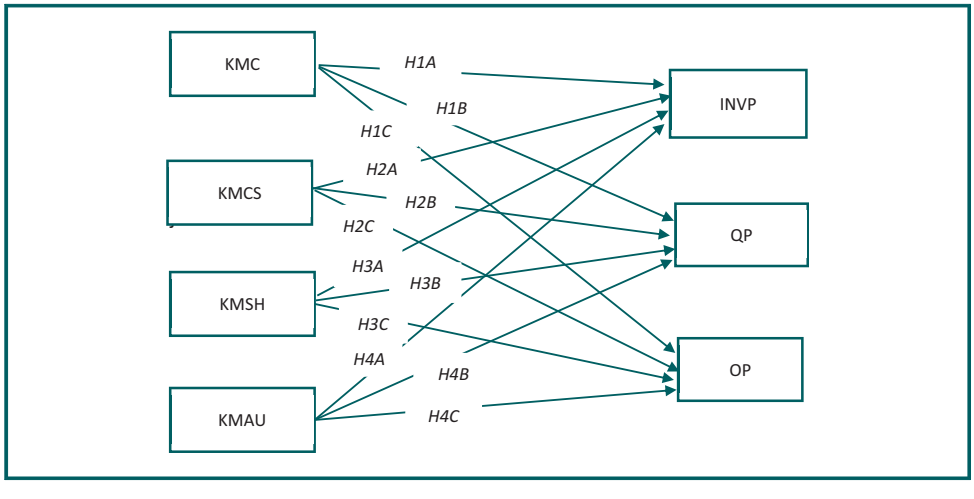
H3C. Knowledge sharing will have a positive impact on operational performance.

H4C. Knowledge application and use will have a positive impact on operational performance.

To summarize, the seven KM constructs (four KM processes and three KM performances) and the 12 hypotheses proposed together form the KM processes–performance framework for the public sector, as shown in Figure 1.

Now that we have developed the framework, the next stage is to validate the proposed framework and test the hypotheses proposed in the study. The survey-based research methodology undertaken to achieve this is explained in the next section.

Figure 1 Proposed research framework



4. Research methodology

A survey-based research methodology, the most widely used method within business and management research (Saunders *et al.*, 2016), was undertaken to validate the proposed KM framework and for testing the hypothesis as surveys are an effective tool to capture individual perceptions and for investigating cause and effect relationships (Ghauri and Gronhaug, 2002). Moreover, it allows structured data collection from a large representative sample population, thereby enhancing the generalizability of the findings to a larger population.

The underlying factors within each construct, as given in Table I, are organized in the form of a survey questionnaire. Each item was measured on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). To ensure the content and face validity, the survey questionnaire was given to six senior managers in the UAE public sector and one senior academic with expertise in KM to review the survey instrument. The review mainly included checking the appropriateness of each item, readability, selection of terminology, clarity and ease of understanding on the intended objective of the question, as well as the relevance of the items of the UAE public sector. Several suggestions were received, and based on them, appropriate modifications were made to improve the survey instrument, including re-arranging the survey questions and reducing the survey length.

After finalizing the survey instrument, the invitation was sent in Summer 2016 to various public sector authorities in the UAE to participate in the study. A total of 12 public sector entities across the UAE took part in the survey, resulting in 318 responses. Of the 318 responses, 48 incomplete responses were removed, leaving 270 valid responses. The demographic details of the survey responses are shown in Table II.

The study acknowledges the limitation of only collecting data from 12 public sector entities as it limits the generalizability of findings. However, the fact that most of these public sector entities we surveyed were large umbrella entities comprising several sub-entities with different functions and performance goals enhances the generalizability to some extent. For example, the municipality had several sub-entities within, with each having different functions and performance goals such as food safety, environmental, buildings, drainage and irrigation, transportation and sewage treatment.

Table II Demographic details of respondents

Classification	*Responses*	*(%)*
Firm ownership		
Federal government entity	92	34
Local government entity	134	50
Semi-government entity	44	16
Total	*270*	*100*
Headquarters of the organization		
Abu Dhabi	236	87
Dubai	31	12
Others	3	1
Total	*270*	*100*
Number of employees		
Less than 250	159	59
251-500	63	23
501-2,000	26	10
2,0015,000	5	2
>5,000	17	6
Total	*270*	*100*

However, before proceeding with the analysis, we checked for any potential issues of common method bias (CMB) and non-response bias. CMB is a problem that occurs when one respondent answers all of the self-reported questionnaire involving multiple constructs (Podsakoff *et al.*, 2003). In fact, prior to collecting data, procedural remedies suggested by Podsakoff *et al.* (2003) such as informing respondents about the data confidentiality and anonymity were used to prompt them to answer as honestly as possible. After data collection, one of the most widely used methods to check CMB is Harman's single factor test, to investigate whether any single-factor accounts for the majority of the total variance (Podsakoff *et al.*, 2003). If the majority of the variance (greater than 50 per cent) is explained by one factor, then CMB exists. The results of the exploratory factor analysis by constraining all items to one factor revealed that the total variance was only 36 per cent, demonstrating that CMB was not a major issue in this study. For non-response bias, responses of early respondents were compared to that of late respondents, with the underlying assumption that the opinions of late respondents were representative of the opinions of the theoretical non-respondents (Rogelberg and Stanton, 2007). The t-test revealed no significant difference between the two groups for all the items, indicating that non-response bias was not a problem in this study (Armstrong and Overton, 1977).

5. Analysis and findings

The first phase of framework validation is checking the convergent and discriminant validity of the constructs.

5.1 Convergent validity

The unidimensionality of each of the seven constructs was tested using first-order confirmatory factor analysis (CFA). The CFA was conducted separately for KM processes and firm performance. The results as seen in Tables III and IV indicate a strong convergent validity. The confirmatory factor loading (which indicates the correlation between the individual items and the corresponding construct) of all items except one (OP1) were well above 0.5 and significant at $p < 0.001$, demonstrating strong convergent validity (Anderson and Gerbing, 1988). The one item in operational performance that failed to load was excluded from further analysis. Importantly, the overall model fit ($\chi 2$/DF) and goodness of fit indices (CFI; TLI; RMSEA) were all near the acceptable range (Bagozzi and Yi, 1988), further validating the unidimensionality of the constructs. Also, the average variance extracted (AVE) was greater than 0.50, indicating strong convergent validity (Fornell and Larcker, 1981).

5.2 Discriminant validity

The discriminant validity test is conducted to ensure that items representing different constructs are not related to each other. In other words, correlation of items representing different constructs should be low. Tables V and VI shows the pair-wise correlation between the items for KM processes and performance. The results indicate that the inter-correlation between the constructs was less than suggested threshold of 0.85 (Kline, 2005). Furthermore, the square root of the AVE exceeded each pairwise correlation between the constructs (Fornell and Larcker, 1981). The results imply strong discriminant validity.

5.3 Test for reliability of the constructs

Reliability is a measure of internal consistency. The most accepted measure for reliability is Cronbach's alpha (Cronbach, 1951). The coefficient alpha ranges from 0 to 1, in which a high score indicated high reliability. The acceptable threshold for reliability is 0.70 (Nunnally and Bernstein, 1994). The reliability scores of each of the seven constructs are provided in Tables V and VI. The results demonstrate strong reliability for all of the constructs.

Table III First-order CFA result for KM processes

Constructs and items	*Standardized regression weight*	*S.E.*	*t-value*
KM Creation (KMC)			
KMC1	0.721	Initially constrained to 1	
KMC2	0.812	0.089	13.175***
KMC3	0.743	0.107	11.683***
KMC4	0.872	0.093	13.717***
KM Capture and Storage (KMCS)			
KMCS1	0.754	Initially constrained to 1	
KMCS2	0.762	0.078	12.614***
KMCS3	0.675	0.087	10.803***
KMCS4	0.770	0.087	12.153***
KMCS5	0.784	0.086	12.572***
KM Sharing (KMSh)			
KMShar1	0.742	Initially constrained as 1	
KMShar2	0.776	0.088	13.017***
KMShar3	0.798	0.090	13.353***
KMShar4	0.770	0.083	12.858***
KM application and use (KMAU)			
KMAU1	0.863	Initially constrained as 1	
KMAU2	0.901	0.050	20.956***
KMAU3	0.807	0.053	16.341***
KMAU4	0.813	0.052	16.659***

Notes: Goodness of fit indices: Chi-square/df = 2.819; CFI = 0.922; TLI = 0.946; RMSEA = 0.66; ***$p < 0.001$

Table IV First-order CFA result of public sector performance

Constructs and items	*Standardized regression weight*	*S.E.*	*t-value*
Innovation Performance			
INVP1	0.837	Initially constrained to 1	
INVP2	0.873	0.055	18.525***
INVP3	0.836	0.058	17.222***
INVP4	0.918	0.052	20.266***
INVP5	0.872	0.055	18.502***
INVP6	0.911	0.054	19.983***
Quality Performance			
QP1	0.625	Initially constrained to 1	
QP2	0.745	0.118	10.289***
QP3	0.722	0.124	10.054***
QP4	0.829	0.114	11.134***
QP5	0.847	0.110	11.306***
QP6	0.869	0.102	11.507***
QP7	0.873	0.112	11.539***
Operational Performance			
OP1	0.390[a]	Initially constrained as 1	
OP2	0.911	0.440	5.672***
OP3	0.530	0.254	5.312***

Notes: Goodness of fit indices: Chi-square/df = 2.941; CFI = 0.964; TLI = 0.973; RMSEA = 0.041; ***$p < 0.001$; [a]Failed to load (loading <0.5)

Table V Mean, standard deviation, reliability, AVE and correlation for KM processes

Construct (No. of items)	*Mean ($\bar{X}$)*	*SD*	*Cronbach's alpha*	*AVE*	*KMC*	*KMCS*	*KMSh*	*KMAU*
KMC (4)	3.93	1.47	0.864	0.62	–	0.63**	0.61**	0.66**
KMCS (5)	3.62	1.64	0.865	0.56	0.63**	–	0.69**	0.67**
KMSh (4)	3.83	1.57	0.854	0.60	0.61**	0.69**	–	0.74**
KMAU (4)	3.85	1.54	0.911	0.72	0.66**	0.67**	0.74**	–

Note: $^{**}p < 0.01$

Table VI Mean, standard deviation, reliability, AVE and correlation of public sector performance

Construct (No. of items)	*Mean ($\bar{X}$)*	*SD*	*Cronbach's alpha*	*AVE*	*INVP*	*QP*	*OP*
INVP (6)	3.59	1.96	0.951	0.77	–	0.62**	0.45**
QP (7)	3.92	1.75	0.918	0.63	0.62**	–	0.48**
OP (3)	3.46	1.10	0.711	0.55	0.45**	0.48**	–

Note: $^{**}p < 0.01$

5.4 Descriptive statistics

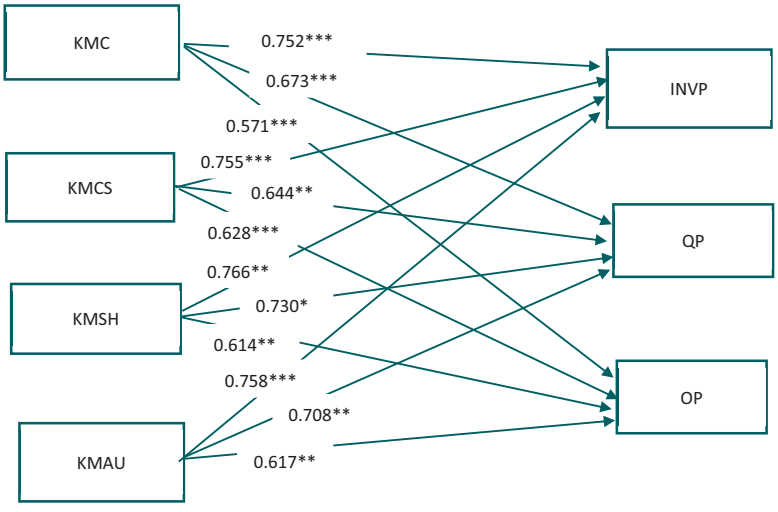
The relative importance of each construct is understood using descriptive statistics. The combined mean ($\bar{X}$) and standard deviation (SD) of the constructs are shown in Tables V and VI. As seen in Table V, for KM processes, the implementation is moderate, with $\bar{X}$ ranging from 3.62 to 3.93 and with knowledge capture and storage (KMCS) receiving the lowest score, while knowledge creation (KMC) received the highest score. Again, a high degree of variability of KM processes implementation shows that the implementation is not consistent. In addition, the fact that none of the KM processes scored above 4.00 shows that respondents in general agree that there is significant room for improvement in KM processes in the public sector. Finally, concerning firm performance, $\bar{X}$ ranged from 3.46 to 3.92, with quality performance receiving the highest score. However, both quality performance (SD = 1.75) and innovation performance ($\bar{X}$ = 3.59; SD = 1.96) had high variability. In the case of operational performance, though the performance is moderately low ($\bar{X}$ = 3.46), the SD is also relatively low (SD = 1.10), indicating consistency in the responses.

Now that the seven first-order constructs have been validated, we can proceed to testing the hypotheses proposed in the study. The results of the hypotheses tests are explained in the next section.

5.6 Structural equation modeling and hypotheses test results

Structural equation modeling (SEM), a statistical technique for representing, estimating and testing hypothesized relationships (Rigdon, 1998), was used for this study. Several studies in KM have previously used SEM to assess the causal relationships such as between KM processes and performance (Gholami *et al.*, 2013). The main advantage of SEM over other approaches is that it can test relationships between unobserved latent constructs (Lei and Wu, 2007). Although there are no strict guidelines on the sample size for SEM, the minimum sample size recommended by researchers is approximately 200 (Kline, 2005; Lei and Wu, 2007), though a sample size of 100-150 with no missing values was found to provide valid results (Muthén and Muthén, 2002; Tinsley and Tinsley, 1987; Anderson and Gerbing, 1988). Hence, the final sample size of the study (n = 270), comparable to that of other studies such as Gholami *et al.* (2013), was sufficient for conducting SEM. The strength of the hypothesized relationships and their significance are shown in Figure 2.

Figure 2 Model fit and strength of the hypothesized relationships



Notes: Goodness of fit indices: Chi-square/df = 3.109; CFI = 0.891; TLI = 0.910; RMSEA = 0.063; ***$p < 0.001$

The results indicate that all the 12 hypotheses are supported. Table VII gives the summary of the hypotheses test results. Regarding the strength of the relationships, standardized path coefficients in the structural equation model with absolute value <0.30 represent small effect, between 0.30 and 0.70 represent medium effect and >0.70 represent large effect (Kline, 1998).

The results of *H1A*, *H1B* and *H1C* show that the impact of knowledge creation is the highest on innovative performance (β = 0.752, $p < 0.001$), while the impact is moderate for both quality performance (β = 0.673, $p < 0.001$) and operational performance (β = 0.571, $p <$ 0.001). This is not surprising, given that new knowledge creation is more fundamental for

Table VII Summary of hypotheses test results

Hypothesis	*Construct*	*Relationship*	*Significant Yes/No*	*Effect*	*Hypothesis supported Yes/No?*
H1A	KMC → INVP	Positive	Yes	Large	Yes
H1B	KMC → QP	Positive	Yes	Moderate	Yes
H1C	KMC → OP	Positive	Yes	Moderate	Yes
H2A	KMCS → INVP	Positive	Yes	Large	Yes
H2B	KMCS → QP	Positive	Yes	Moderate	Yes
H2C	KMCS → OP	Positive	Yes	Moderate	Yes
H3A	KMSH → INVP	Positive	Yes	Large	Yes
H3B	KMSH → QP	Positive	Yes	Large	Yes
H3C	KMSH → OP	Positive	Yes	Moderate	Yes
H4A	KMAU → INVP	Positive	Yes	Large	Yes
H4B	KMAU → QP	Positive	Yes	Large	Yes
H4C	KMAU → OP	Positive	Yes	Moderate	Yes

innovative performance than for the others. However, there is still scope in the UAE public sector to focus on knowledge creation to improve quality and operational performance. The findings of *H2A*, *H2B* and *H2C* are also similar, revealing that the impact of knowledge capture and storage is the highest on innovation performance ($\beta = 0.755$, $p < 0.001$) and moderate for quality performance ($\beta = 0.644$, $p < 0.001$) and operational performance ($\beta = 0.628$, $p < 0.001$). With regard to *H3A*, *H3B* and *H3C*, the results show that the impact of knowledge sharing is strong on both innovation ($\beta = 0.766$, $p < 0.001$) and quality performance ($\beta = 0.730$, $p < 0.001$), while moderate on operational performance ($\beta = 0.614$, $p < 0.001$). Similarly, the results of *H4A*, *H4B* and *H4C* show that the impact of knowledge application and use is strong on both innovation ($\beta = 0.758$, $p < 0.001$) and quality performance ($\beta = 0.708$, $p < 0.001$) while moderate on operational performance ($\beta = 0.617$, $p < 0.001$).

6. Discussions and conclusions

Although the impact of KM processes on performance was found to vary, i.e. KM processes, was found to have the strongest impact on innovative performance, followed by quality performance and operational performance, the results in general are promising as each of the individual KM processes was found to impact positively on KM performance across all three performance dimensions. The findings are comparable to the findings in the private sector such as Zack *et al.* (2009) and Al-Ahbabi, Singh, Gaur, and Balasubramanian (2017), who investigated the relationship between KM processes and firm performance (combined measure of innovation, quality and operational performance) and Liu *et al.* (2004), who found a significant positive relationship between KM processes and firm's competitiveness (which include quality performance and innovation performance as sub-measures among others). This implies that KM processes can not only improve the performance of private sector but also public sector. Having said that, the mean values of each of the KM processes (3.62-3.93) and KM performance (3.46-3.93) are in the moderate range, and therefore, there is plenty of scope in the public sector to improve KM processes implementation. The perceived moderate scores of KM processes and performance is not surprising given that it is only recently that UAE has started implementing KM processes as part of its long-term goal of moving toward a knowledge-based economy. More focus is required to improve the extent of implementation, especially those processes that are lagging behind such as knowledge capture and storage. More training programs, workshops and seminars on KM processes' implementation as well as leveraging KM processes to foster improvement in innovation, quality and operational performance could help improve the moderate scores received for KM processes and KM performance. Future studies therefore could also look at the antecedents to KM processes such as enablers and barriers impacting KM processes as it would enable the UAE public sector to better leverage the enablers and minimize/eliminate the barriers, leading to higher scores for KM processes and subsequently higher scores for KM performance. Also, increase in the federal-level and state-level budget allocation for KM could see the perceived mean scores of KM processes and KM performance increasing in the future.

The results provide several practical/managerial implications and theoretical/research implications. The strong and significant impact of KM processes on firm performance is encouraging for the sector and is expected to provide impetus for practitioners and policymakers to implement KM processes in the public sector. Also, the findings imply that the public sector should consider implementing all KM processes instead of focusing solely on one or a few individual KM processes. Although the results of this study may vary by country, given the fact that most of the underlying objectives and operations of public sector are similar in most countries, especially in the Gulf Cooperation Council countries, where there is considerable resemblance in the public sector, the findings, including the framework, can be a good starting point for practitioners and policymakers in other countries for implementing KM processes in the public sector.

There are several research implications of this study. First, it fills a critical gap in the literature by developing a comprehensive KM framework for the public sector. Researchers have previously highlighted the need for a comprehensive and unified framework, as each of them has addressed only certain aspects of KM (Cong and Pandya, 2003). Hence, the proposed framework in this study is both novel and significant. Second, each of the proposed first-order constructs of the KM framework are validated in this study and hence will be useful for researchers to conduct future investigations. As construct development and validation is at the epicenter of theory building (Venkatraman, 1989), this study significantly contributes toward the theoretical advancement of KM in general. Also, given the fact that most of the previous KM research in the public sector and in general has focused mainly on developed countries in the West and developing countries in Asia, such as Malaysia and India, this study fills a gap by focusing on the UAE/Middle-Eastern region.

However, the study has some limitations. The main limitation of this study is the fact that data were collected only from 12 public sector entities in the UAE, although they had several sub-entities within. Therefore, the impact of KM processes on KM performance may not truly represent the UAE public sector performance. Moreover, given the limited literature on KM processes and performance in the public sector, the findings of this study are only directional at its best.

Future studies with increased participation from more public sector entities is required to enhance the validity and generalizability of the findings and tease out more managerially relevant implications. The other limitation is the use of perceptual measures to capture KM processes and KM performance, though, in this case, this is justified because of the lack of availability of published processes and performance data. If the data become available, future research can focus on using actual and preferably more objective data on processes and performance. Moreover, the construct proposed needs to be further validated and tested in different contexts. Future studies could use the framework as such or refine/adapt the framework to suit other contexts, including those in the private sector. Overall, given the conceptual comprehensiveness of the proposed framework, it is expected to significantly improve the application of KM in the public sector.

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