

Drivers for Managing Knowledge in the Context of Smart Cities: An Empirical Study

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Summary

Knowledge management is seen as a core element for successful implementation of smart cities projects and initiatives. KM can contribute to make faster, smarter and better decisions, increase productivity, decrease task completion time, and to increase organisational learning and innovativeness. However, so as to create efficient KM strategies, it is critical for smart cities organisations to understand and identify their unique drivers to manage knowledge in their particular environment. The aim of this paper is to investigate the key drivers that have pushed forward the implementation of KM strategies within the context of smart cities. The study deployed an online questionnaire survey conducted via 97 participants from various public and private sector organisations involved in smart cities projects and initiatives. Through the online survey questionnaire respondents were asked to indicate the level of importance of the drivers for managing knowledge in the context of smart cities. The quantitative data has been analysed with the help of statistical techniques such as descriptive analysis and the t-test. Statistical analyses were undertaken using the Statistical Package for Social Sciences (SPSS). The findings of this study revealed that the five most important drivers for managing smart cities related knowledge are: to improve sharing of knowledge related to smart cities agenda, to protect loss of smart cities related knowledge due to key workers' departures, to help integrate knowledge assets related to smart cities agenda, to improve the capture knowledge related to smart cities agenda, and to improve employee's productivity in implementing smart cities agenda. Therefore, smart cities organisations need to carefully identify their key drivers to deploy KM. They need to be aware of the factors that can influence, enable or hinder the effectiveness of KM strategies. Additionally, smart cities organisations leadership and senior management need to create encouraging the supportive corporate culture that contribute to employees' willingness to share their knowledge.

Keywords: drivers, competitive advantage, knowledge management, KM, smart cities.

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Introduction

The concept of a smart cities has been a topic of significant interest and investment in recent years (Gracias et al., 2023) Yigitcanlar et al., (2018) noted that although the initial rationale for the smart city developments was mostly related to environmental (social/ sustainable) concerns, the practice, unfortunately, indicates that only marginal attention is paid to these concerns. Kourtit and Nijkamp (2012) noted that smart cities can be perceived as the result of knowledge-intensive and creative strategies aiming at enhancing the socio-economic, ecological, logistic and competitive performance of cities. Thus, the development of smart cities requires investigating how intellectual capital (IC) and knowledge resources can be leveraged at the city level in order to build strong and sustainable social ecosystems (Kourtit and Nijkamp, 2012; Dameri and Ricciardi, 2015). However, Ardito et al., (2019) noted that previous studies in smart cities related literature have mainly focused on the solutions that target the efficiency and technological advancement of a city's hard infrastructure systems rather than delving into the managerial dynamics and KM problems underlying the development of smart city projects. However, the management of knowledge is increasingly considered an important source of sustainable competitive advantage. Ruess and Lindner (2023) noted that although smart city project implementation has increased, they lack a proper knowledge management (KM) approach to enhance dissemination and exploitation. Israilidis et al., (2021) noted that many smart city projects die after the pilot stage and the lessons learned from previous projects never scale up to inform subsequent implementations. Furthermore, Attour et al., (2022) noted that the challenges linked to the creation, coordination, sharing, reuse and/or development of knowledge within the complex ecosystems of smart cities need to be addressed to develop and facilitate service innovation. This highlights the need to propose an in-depth investigation of the role of KM in the development of smart cities. Therefore, the aim of this paper is to investigate the key drivers for managing smart cities related knowledge. The study deployed an online questionnaire survey conducted via 97 participants from various public and private sector organisations.

Theoretical background

Smart cities

The concept of a smart city is gaining popularity globally as a way to address urbanisation, environmental concerns, and economic growth (Gracias et al., 2023). Using the most innovative technologies, the concept of smart cities has emerged as a model to address the growing urbanisations challenges, improve economic productivity, and to enhance the quality of life of citizens. Olaniyi et al., (2023) noted that the extensive global urbanisation is resulting in complexities in managing basic amenities and resources such as water, electricity, transportation, public education, accommodation, security services, and improved health services to guarantee the city's continuous running and people's welfare. Thus, cities are meeting a growing demand to foster their competitiveness, and to become more efficient more convenient, and to provide better quality of life (Bouton et al., 2015; Joshi et al., 2016) Therefore, many leaders choose to transform cities into "smart cities", as new socio-economic environments in which citizens, enterprises, and governments can more efficiently access services and resources. Nonetheless, the knowledge economy played a significant role in the emergence of the idea of smart cities. In conformity, Ardito et al., (2019) noted that following the principles of the knowledge economy, knowledge is now conceived as the core component that makes cities smart. Thus, smart city decision makers to

develop cities that take advantage of local knowledge and intellectual capital of the population, promote new businesses, and facilitate access to information both locally and internationally.

Knowledge management

The current literature indicates that KM has become a critical area in management, and it has retained the interest of both academics and practitioners during the last two decades (Bhatt, 2001; Durst et al., 2023; Shongwe, 2016). According to Renukappa et al., (2017), knowledge has become the key economic resource and the dominant, perhaps even the only, source of competitive advantage. In accordance, Ardito et al., (2019) noted that knowledge is now perceived to be the main source of organisational competitive advantage (Ardito et al., 2019). Knowledge management refers to the application of collective knowledge to achieve the goals of an organization and its projects (Wang et al., 2022). Kammani and Date (2009) noted that “knowledge management is the deliberate and systematic coordination of people, processes, technology and their knowledge in order to produce sustainable competitive advantage or long-term high performance for the organisation”. KM can be defined as the management process of creating, capturing, structuring, storing, transferring, sharing, disseminating and using knowledge to promote learning and innovation (Shokri-Ghasabeh and Chileshe, 2014; Chiu and Chen, 2016; Wang et al., 2022; Karamat et al., 2019). However, implementing KM strategies without fully understanding the drivers and objectives that had to be met at the outset, often is the reason why many might evaluate KM initiatives as “ineffective” or “a waste of money”. Thus, before embarking on a KM journey, organisations have to understand what it is that they would like to achieve with KM and what value it needs to add to the organisation.

KM has been popularised by its association with innovation and sustainable competitive advantage (Grant and Osanloo, 2014; Karamat et al., 2019; Lin and Hwang, 2014; Shongwe, 2016). Burlov (2018) noted that the emergence of a knowledge economy and recognition of knowledge is a key factor in achieving a competitive advantage make it critical to understand and develop effective approaches to KM. From Resources Based View (RBV) of the firm perspective, the main driver of KM is to use the knowledge assets to establish the strategic decision so as to promote the competitiveness of the organisation. Moreover, KM helps in the effective utilisation of resources, adoption of best practices, rapid response to change and solving specific problems arising within the organisation. It enables the creation, communication and application of knowledge of all kinds to give value to the activities in core competencies (Chiu and Chen, 2016). Nonetheless, the current literature indicates that the need to improve organisations business performance is one of the main driver of KM (Jashapara, 2011; Karamat et al., 2019). Koç et al. (2019) noted that knowledge which is not well captured, expressed, stored, managed, and finally shared is obliged to be corroded and even disappeared. Thus, protecting organisational knowledge against external leakage is a key driver for KM (Koç, Kurt and Akbıyık, 2019).

Drivers for managing smart cities related knowledge

Knowledge is often conceived as the core component of the smart city (Ardito et al., 2019). Laurini (2021) noted that knowledge must be considered as one of the basic infrastructure components for smart cities. Furthermore the establishment of cities relied heavily on knowledge. Ardito et al., (2019) noted that knowledge is fundamental source of value for cities and the practical base upon which smart city plans must engage. However, the current literature indicates that relatively little

is known about effective deployment of KM in smart cities context. Israilidis et al., (2021) noted that in order to maximise the benefits offered through smart city projects, further research to develop appropriate KM practices that support smart city initiatives is needed. The authors asserted the need for research on smart cities from a non-technical, knowledge-focused perspective. Therefore, leveraging new knowledge to create next generation technologies and novel tools is crucial in smart city development (Israilidis et al., 2021). Ardito et al., (2019) noted that smart cities projects should have a functional understanding of the diverse existing processes for knowledge creation and management. Ruess and Lindner (2023) noted that KM at the city scale is an instrument to maintain and strengthen economic competitiveness and increase the quality of life. It represents one of the most important strategies for optimising urban systems because the effectiveness of organisations is built on individual and collective knowledge. Salerno et al., (2014) noted that in the context of the smart city of the future, KM is seen as a core element, enabling the development of different application scenarios. Ruess and Lindner (2023) noted that KM can contribute to resolve current problems in smart city implementation and replication. Moreover, Monzon (2015) noted that lack of knowledge and skills related to smart cities, as well as limited knowledge transfer among smart city projects is a major challenge to smart cities initiatives. Therefore, smart cities organisations need to design specific systems to acquire and analyse the use of knowledge in order to make faster, smarter and better decisions, so that they can achieve a competitive advantage (Owoc and Marciniak, 2013).

Methodology

Leedy and Ormrod (2015) stated that a research methodology is the general approach the researcher takes in carrying out the research project. It is the overall approach to the research process, from the theoretical underpinnings to the collection and analysis of the data. Therefore, it should encompass the rationale and philosophical assumptions that underlie a particular study. The aim of the current study is to investigate the key drivers for managing smart cities related knowledge. In order to achieve this aim, a quantitative method was adopted to collect and analyse data. The philosophical underpinning of this is based on objectivist-positivist paradigms. Questionnaire survey was selected as the data collection tool to answer the research questions. Questionnaire survey instruments have many advantages in the data collection process. They provide a larger geographical coverage for the sample population than case studies or semi structured interviews could provide, they are cost-effective, efficient, and permit anonymity (Bourque and Fielder, 1995; Naoum, 2019). The latter helps ensure that individuals' responses reflect their true beliefs and feelings (Bryman and Bell, 2007). Therefore, online questionnaires were selected for gathering quantitative data for this study. Survey invitations were e-mailed to respondents requesting that they submit their views via an online survey. The online-questionnaire survey variables used in this study were derived from the literature review. The specific questions were written with focus on the response process, the utility of individual questions, and the overall structure and appeal of the questionnaire. More than fifty organisations implementing smart cities projects and initiatives were invited to participate in the questionnaire of which 97 respondents completed the survey. Thus, overall, a total of 97 fully completed and usable questionnaires were received. Saunders et al., (2023) noted that for effective statistical analysis, minimum number of participants should be 30 or more responses. Therefore, 97 responses were deemed appropriate for a survey of this kind. According to Naoum (2019), three typical question types are used in questionnaire surveys: open ended and closed ended for types of question format, and scaled items for opinion questions which require subjective measurement. The study included scaled items for

opinion questions. The final page of the questionnaire provided an option for respondents to offer any further general comments relating to the area of research. Respondents were also able to request a summary of the survey findings to encourage a higher response rate. In this study, Likert-style rating questions were used to explore participants' degrees of agreement or disagreement with a statement, usually on a 5-point or 7-point scale (Fellows and Liu, 2015). Renukappa *et al.*, (2017) noted that a general problem occurs in the application of opinions scales is that respondents tend towards the neutral position. That is, when asked to strongly agree or strongly disagree on a 5-point or 7-point scale, many respondents would prefer to choose "neither agree nor disagree." Therefore, a 4-point Likert item was used in the study to avoid this. The quantitative data has been analysed with the help of statistical techniques such as descriptive analysis and the t-test. The aforementioned tests are suitable for the research because the researcher has compared the responses for public and private sector organisations. Statistical analyses were undertaken using the Statistical Package for Social Sciences (SPSS). The researcher has applied descriptive statistics in order to present the results in an efficient and readable manner.

Findings and discussion

In this section, the key drivers that have fuelled the need for managing knowledge in the context of smart cities are presented and discussed (see Table 1). Drivers are the catalysts that shape transformation in an organisation. In the context of this study, they are the internal and external forces that make KM imperative for organisations to maintain or improve their competitive market position (Du Plessis, 2005). The results presented in this paper are based on the analysis of the quantitative data collected from 97 respondents participated in the online questionnaire. The findings are also substantiated by the relevant literature.

The key drivers for managing knowledge in the context of smart cities

Through the online survey questionnaire respondents were asked to indicate the level of importance of the drivers for managing knowledge in the context of smart cities on a 4-point Likert scale ranging from "Very Important (1)", "Important (2)", "Fairly important (3)" and "Not at all important (4)". It is apparent from Table 1 that the five most important drivers for managing knowledge in the context of smart cities are: to improve knowledge sharing (1.90), to protect loss of smart cities related knowledge due to key workers' departures (1.87), to help integrate knowledge assets related to smart cities agenda (1.86), to improve the capture knowledge related to smart cities agenda (1.81), and to improve employee's productivity in implementing smart cities agenda (1.80). The t-test for equality of means was carried out to investigate whether there were any significant differences between participants of the 'public' and 'private' sector organisations' insights on the importance of the drivers for managing knowledge in the context of smart cities (at the 0.05 significance level) (Table 6.1). According to Black *et al.* (2010), in the t-test, a significant value (p) below 0.05 indicates a high degree of difference of opinion between groups on that variable (in this case, between participants of 'public' and 'private' organisations). Results here show that all smart cities strategies are not significant (>0.05), and therefore, there are no significant statistical variations between the responses of the 'public' and 'private' sector organisations.

Table 1: The level of importance of the reasons/drivers for managing knowledge in the context of smart cities

Drivers	Overall	Public Sector	Private sector	t cal	Significant value(p)
To improve public sector decision making related to smart cities agenda	1.68	1.66	1.70	0.263	0.793
To improve access to key knowledge related to smart cities agenda	1.74	1.71	1.78	0.417	0.677
To identify knowledge assets related to smart cities agenda	1.80	1.82	1.78	-0.304	0.762
To improve the flow of knowledge related to smart cities agenda	1.78	1.71	1.88	0.973	0.333
To help integrate knowledge assets related to smart cities agenda	1.86	1.89	1.82	-0.402	0.688
To improve the capture knowledge related to smart cities agenda	1.81	1.86	1.75	-0.646	0.520
To improve sharing of knowledge related to smart cities agenda	1.90	1.93	1.85	-0.457	0.649
To improve employee's productivity in implementing smart cities agenda	1.79	1.82	1.75	-0.433	0.666
To protect loss of smart cities related knowledge due to key workers' departures	1.87	1.95	1.77	-1.145	0.255
To improve the use of knowledge related to smart cities agenda	1.78	1.80	1.75	-0.347	0.730

To improve sharing of knowledge related to smart cities agenda

With an overall mean value of 1.9, to improve sharing of knowledge related to smart cities agenda is identified as the first most important driver to manage knowledge in the context of smart cities. The result is consistent with the argument of previous studies on the importance of knowledge sharing (Akram et al., 2020; Arsawan et al., 2022). Various studies confirmed that employee knowledge sharing improves organisational performance, competitiveness, growth, innovation capability and absorptive capacity. Akram et al., (2020) noted that sharing the right knowledge enhances the chances of innovative behaviour and encourages employees to be more innovative. Furthermore, various studies highlighted the importance of KM in smart cities organisations to share lessons learned, reduce implementation costs and fostering organizational learning within and across programs (Ruess and Lindner, 2023). José and Rodrigues (2024) noted that the success of smart cities projects depends on the ability to explicitly promote the exchange of knowledge between heterogeneous partners. Thus, without this capability, innovative insights from external partners are more difficult to emerge. The involvement of smart city stakeholders in knowledge sharing has become one of the most prominent strategies for optimizing urban systems (Israilidis et al., 2021). Furthermore, Ardito et al., (2019) highlighted the need for stronger governance capacity to enable and enhance effective cross-organizational knowledge integration and sharing amongst the various smart cities project partners. Israilidis et al., (2021) argued that the quality of life of communities is predominantly based on how information and knowledge is handled and shared across different layers. In smart cities, that knowledge sharing is leveraged for effective and sustainable service delivery as well as a variety of additional desirable organisational outcomes such as increased productivity, decreased task completion time, increased organisational learning and innovativeness. Therefore, it is important to develop strategies to conceptualise the tacit knowledge in more explicit knowledge and shared among the project partners, with the aim of validating the effectiveness of such knowledge for the project goals. However, organisations need to be aware of the various factors, hinders/ barriers and enablers that can influence effectiveness of knowledge sharing implementation within an organisation. Effective knowledge sharing implementation needs right support from the management of the company, and the supportive corporate culture that contribute to employees' willingness to share their knowledge (Titi Amayah, 2013).

To protect/ prevent loss of knowledge due to key workers' departures

In this study, overall mean value of 1.87, to protect loss of knowledge due to key workers departure was the second most important driver for managing knowledge in the context of smart cities. From the RBV and its extension, the Knowledge Based View (KBV) of the firm of the firm perspectives, knowledge as an intangible organisational competitive resource should be developed and protected in an adequate manner. Organisational knowledge loss has emerged as one of the most important corporate risks today (Massingham, 2018). Staff turnover causes leakage and loss of inevitable and valuable organisational knowledge (Massingham, 2018; Lin, Chang and Tsai, 2016). Therefore, employee turnover, particularly movement of highly knowledgeable individuals is considered to be one of the persevering challenges in organisations and represent major implications from a competitiveness perspective (Daghfous, Belkhodja and Angell, 2013). Moreover, Bougoulia and Glykas (2023) noted that business unique and effective tribal knowledge and expertise often reside with specific employees. However, this knowledge is commonly at risk of being lost when these employees leave the organisation. Therefore, using the ISO 9001:2018 clause on organisational knowledge should help organisations to adopt some techniques such as work instructions, checklists, training programs, on-the-job training, and knowledge database to protect knowledge from loss. Knowledge loss reduces organisations capacity to innovate, leads to organisational inefficiency, ineffectiveness, decreases organisational productivity (Massingham, 2018). Therefore, it is necessary for organisations to develop the capability to protect organisational knowledge and to mitigate its leakage so as to develop and maintain competitive advantage. Knowledge protection initiatives should be considered at both strategic and operational levels. At strategic level for example, organisations need to identify the key knowledge resources, develop and implement knowledge protection mechanisms, and the necessary policies and guidelines. While, at operational level, organisations may need to classify, handle and label sensitive knowledge. Furthermore, a supportive technology infrastructure is important to prevent the leakage of knowledge enable and facilitate knowledge protection efforts. José and Rodrigues (2024) noted that knowledge loss can hinder the operations and innovation of smart cities development. This, smart cities organisations need to take appropriate initiatives for knowledge protection, preventing knowledge loss, and to make best use of the advanced technologies opportunities to reduce the waste of important knowledge resources (Zenkert and Fathi, 2023). Furthermore, Bougoulia and Glykas (2023) noted that complying with normative pressures, i.e., international standards also represents a key driver for organisations to protect their sensitive knowledge.

To help integrate knowledge assets related to smart cities agenda

With an overall mean of 1.86, to help integrate knowledge assets related to smart cities agenda has been identified as the third most important driver for managing smart cities related knowledge. In line with the KBV of the firm, which is an extension of the RBV (Grant, 1996), knowledge assets and components are widely recognised as the main determinants of organisation' value creation and corporate performance. Therefore, it is imperative for organisations to understand, integrate and leverage their critical knowledge assets in order to optimise their use and to unpack their value-creating potential. Furthermore, José and Rodrigues (2024) noted that smart cities multi-stakeholder ecosystems are composed of a variety of knowledge 'assets' which represent key drivers of regional innovation, as long as there is the ability to transfer innovations and knowledge among the various stakeholders. However, it is acknowledged that the concept of knowledge assets

has a multidimensional nature (Asiaei et al., 2021). In general, organisational knowledge assets can be classified into human assets (individuals, teams, communities), structural assets (strategies, policies, processes, procedures), and supporting technologies. By their very nature, smart cities projects require coordination and integration of various complex and dynamic knowledge resources. Ardito et al., (2019) noted that smart cities should integrate and combine knowledge about technology, people, and business in order to develop and implement their smart strategies and initiatives. Effective integration of smart cities related knowledge assets should involve public sector (the government), the private sector, the academia, and the wider community. However, smart cities projects partners are often driven by conflicting interests and views (Angelidou, 2014). Moreover, from the institutional theory perspective, governmental laws and regulations shed light on the importance of integrating knowledge assets in organisations. For example, in 2021, the UK government (HM Government, 2021), published strategy to support public sector better manage its knowledge assets. The strategy aimed at investing in organisations knowledge assets (KA) so as to deliver various benefits to economy and society, and to boost productivity and improving the quality of life. Therefore, there is a need to establish a robust capacity to integrate knowledge assets, promote efficient coordination and manage conflicts among the various project partners.

To improve the capture knowledge related to smart cities agenda

To improve knowledge capture is identified as the fourth most important driver for managing knowledge in the context of smart cities, with an overall mean value of 1.81. In accordance, Aggestam and Persson (2010) noted that to achieve KM success, the ability to capture the right knowledge is a key aspect. Moreover, Torabi and El-Den (2017) noted that the higher the level of capturing knowledge (explicit or tacit) the better the KM result. Successful implementation of knowledge capture enables organisational growth, reduces mistakes, improves productivity and operational efficiency, and improve employees' job satisfaction and retention (Balasubramanian et al., 2019). José and Rodrigues (2024) noted that managing the ambiguity, technological uncertainties, and disruptive effects associated with smart cities major paradigm change requires fostering effective knowledge capturing to enhance informed decision-making and promote efficient digital transition. Furthermore, Roblek and Meško (2020) noted that the ability to capture the knowledge and intellectual capital of the various smart cities projects partners and stakeholders is fundamental to enable successful smart cities business development, and to promote business development and enable the flow of information locally and globally. Therefore, there is a need to develop an integrated framework to enable documenting, storing and maintaining records of performance and actions undertaken needs in the smart cities' projects (Israilidis et al., 2021). Hence, organisations implementing smart cities projects need to develop strategies to enable systematic capturing of knowledge, insights, good practice, and lessons learned from previous projects to inform local and national future smart city practice and policies. Nonetheless, knowledge is often tacit in local authorities and can be difficult to capture and harness. Thus, ways in which tacit knowledge can be made more explicit with appropriate knowledge management systems in place needs to be investigated for future practice and policymaking. However, Aggestam and Persson (2010) noted that a lack of awareness of the complex issues related to effective knowledge capturing process and the benefits achieved through it represent the main challenges to effective knowledge capture. Therefore, organisations implementing smart cities projects should be aware of these issues in order to capture critical knowledge successfully.

To improve employee's productivity in implementing smart cities agenda

Finally, to improve employee's productivity in implementing smart cities agenda has been identified as the fifth most important driver for managing knowledge with an overall mean value of 1.8. In conformity, Torabi and El-Den (2017) noted that the most important finding of their study is that KM positively influence organizational innovation, competitiveness, thus, it generates improved organizational productivity. Kianto et al., (2019) noted that KM processes positively influence organizational innovation, competitiveness, thus, it generates improved organizational productivity. Israilidis et al., (2021) implementing KM strategies in smart cities projects can improve organisational performance, decreased task completion time, increased organizational learning and innovativeness and thus, enhance productivity. Palvalin et al., (2018) revealed that there is a connection between KM, specifically, knowledge transfer and productivity. Organisational productivity basically refers to the measure and planned actions an organisation takes to make efficient and effective use of its resources, processes, and strategies to achieve its goals and objectives (Torabi and El-Den, 2017). KM is fundamentally about "getting the right knowledge to the right person at the right time" (Harrinson, 2021). Thus, Zain and Latief (2020) noted that KM is about ensuring organisations ability to learn and make best use of their knowledge assets. Harrinson (2021) stated that adopting and improving KM systems in organisations make them more productive. Effective KM initiatives implementation involves integrating and centralizing the KM assets and making this knowledge accessible so that all employees can benefit from it (Jacobson, 2021). In smart cities context, Israilidis et al., (2021) noted that increased productivity is one of the main benefits of adopting knowledge sharing strategies in organisations. Thus, organizational productivity and effectiveness in organisations implementing smart cities projects can be enhanced by the involvement of smart city stakeholders to share their individual and collective knowledge. However, organisations implementing smart cities projects should be aware of the factors that could influence (enable or prevent) knowledge sharing and thus, impact organisations performance and productivity. Israilidis et al., (2021) and Torabi and El-Den (2017) highlighted the importance of promoting trust and encouraging organisational culture in order to facilitate knowledge sharing in organisations.

Discussion

Identifying the drivers that created the need for integrating KM initiatives in smart cities organisations is vital for effective implementation. This would help organisations to align their KM strategy with the overall organisational strategic goals. In turn, this can facilitate organisations to leverage knowledge as a strategic asset, facilitate optimal resource allocation, overcoming barriers to knowledge sharing and application, and enhancing organisational efficiency and innovation. Additionally, failure to efficiently understand the precise drivers underpinning the adoption of KM can bring about inefficient implementation of KM strategies, plans and policies. Hence, a comprehensive understanding of KM drivers is crucial for smart cities organisations so as to enable successful KM efforts. Smart cities organisations are driven by both internal and external factors to adopt KM strategies. Internal drivers include the drivers that focus on improving organisational performance and protecting organisation knowledge assets. Whereas, external drivers, including coercive pressure (government laws and regulations), normative pressure (international standards), and mimetic pressure (competitive pressure). The KBV of the firm suggests that smart cities organisations can produce extraordinary performance, develop comprehensive solutions and innovations in smart city projects, through appropriate identification,

integration and utilisation of their knowledge assets to sustain competitive advantage. Nonetheless, KBV of the firm suggests that improving employees' ability to gain and utilise knowledge resources has great impacts on their productivity. Thus, creating robust KM systems and strategies that improve knowledge application organizations can significantly improve organisational performance when implementing smart city projects. On the other hand, from institutional theory perspective, organisations may choose to integrate KM strategies in response to normative and mimetic pressures, such as conforming with industry standards and imitating effective practices from other successful implemented projects. For example, smart cities organisations may follow international standards. For instance, using the ISO 9001:2018 clause on organisational knowledge should help organisations to adopt some techniques such as work instructions, checklists, training programs, on-the-job training, and knowledge database to protect knowledge from loss.

Conclusion

This paper explores the drivers that have pushed forward the implementation of KM strategies within the context of smart cities. Knowledge management is essential for organisations to improve and maintain their competitive advantage. KM can promote organisations effectiveness through optimising the use of the individual and collective knowledge. Thus, successful implementation of smart cities projects necessities integrating knowledge assets and components from multidimensional sources. In turn, KM provides an opportunity for city planners and decision-makers to foster collaboration between stakeholders (e.g., the government, academia, private sector, and citizens), to understand and address citizens' needs, and thus to improve the efficiency and effectiveness their processes. Thus, there is a need to capture and share lessons learned from previous projects to inform subsequent development, and to provide both practical and policy recommendations based on feedback from projects to enhance replication. Therefore, efforts need to be directed towards untangling the complexity of KM governance and processes issues of smart cities development considering the multidimensional nature of both within and beyond smart cities projects' boundaries. The findings of this study indicated that the five most important drivers for implementing KM strategies in the context of smart cities are: to improve knowledge sharing, to protect loss of smart cities related knowledge due to key workers' departures, to help integrate knowledge assets related to smart cities agenda, to improve the capture knowledge related to smart cities agenda, and to improve employee's productivity in implementing smart cities agenda. The authors claimed that the KM is fundamental for successful smart cities implementation. However, so as to develop and implement efficient KM strategies, it is critical for organisations to understand and identify their unique drivers to manage knowledge in their particular environment.

Managerial and organisational implications

The paper provides practical implications for the organisations implementing smart cities projects looking to implement KM strategies. It provides the top management with a clear understanding of the important drivers that push an organisations to implement KM strategies. The following recommendations have been drawn up for the government, industry, and organisations to evaluate and act upon.

1. Knowledge sharing: governments should develop knowledge sharing frameworks that mandate regular knowledge exchange among the various stakeholders.

2. Policy: governments should industry players should collaborate to establish industry standards and best practices for implementing KM strategies in the context of smart cities.
3. Organisations should develop robust knowledge retention strategies to mitigate knowledge leakage and loss due to employees' departure.
4. Organisations should develop and support internal KM policies that align with the overall organisational strategic goals and ensure effective capture, retention, application and sharing of knowledge.
5. Organisations should integrate effective mechanisms to enhance capturing of both tacit and explicit knowledge, utilising technologies that facilitate effective capture.
6. Organisations should adopt an organisational culture that values and promotes knowledge sharing and application through adequate incentives systems and leadership support.

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