An Introduction to Smart City Research: A review of The Past And The Future

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ABSTRACT

Smart city is a growing area of research. Its scope is broad as it touches individuals' life, government, and environment. Advancement in digital technologies, particularly the Internet of Things, have enabled cities to become smarter and thus affected many structures (physical, social, etc.). Given such broad scope and the effects the smart city could bring about, the growing numbers of research seems to be inadequate. This paper attempts to review the past studies and identify what have been done and not done. Smart city research related to Southeast Asia in particular is also looked at in this paper. The literature was categorised and discussed under three main aspects concerning the area of management information systems, namely business, organization and technology. Gaps are identified, and future research are called for.

Keywords: Smart city, Literature review, Social organisation, Business, Technology, Southeast Asia.

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INTRODUCTION

The aim of this paper is to provide a quick jumpstart into the field of smart city research. Research on smart city has received much wider attention especially in the past ten years. The advancement in smart city developments worldwide owes to the rapid growth in mobile and sensor development and adoption. The goal of smart city is to enhance quality of life, living conditions as well as sustainability of natural environment through the more active and effective engagement with citizens (Dameri & Rosenthal-Sabroux, 2014). Not only the technologies that are advancing, cities are also changing. Urbanization are happening around the world, and this has created many new social requirements and changes. Therefore, smart city is not only about adoption of new technologies or innovations. The path towards smart city and being a smart city affects various aspects of individuals and social organisations that they are a member. This study attempts to explore this huge area of research and identify current contribution as well as gaps in the area. Existing literature on the area is therefore reviewed.

In addition, the paper looks specifically at smart city literature that have been conducted in or related to Southeast Asia. According to the United Nations Population Division, 65 percent of the population in Southeast Asia will live in urban areas by 2050. The huge percentage draws attentions and needs to efficiently and sustainably manage cities in the region. Therefore, it is worth looking at progress and what have been done in this region. The paper aims to shed some lights on how cities in this 'urbanizing' region can be benefitted from smartising cities.

The following section outline how the researcher selected literature to be studied. The selected literature was explored by analysing research keywords and categorising the previous research into areas, namely business, (social) organization, and technology. Smart city literature focusing on Southeast Asia are then discussed. Gaps are then identified and discussed in the conclusion.

RESEARCH METHOD

The key objectives of this study are to learn from what have been studied in an rea of smart city and identify gaps in the area. The literature review and synthesis is therefore deemed most appropriate.

The researcher did a search in Scopus database smart city and, using smart city and digital technology as search keywords. Other search criteria are publication years, types of publications, and areas. In terms of publication years, studies published from 2010 to 2020 were included. Only journal articles and conference papers were selected, and the included areas of study were social science and business & management. Specified all of the abovementioned criteria, 305 papers were returned.

117 Papers were screened out. The excluded papers were usually about technical aspects of particular technologies without discussing the usages, applications, or relations of the technologies to any context. An example paper was that of Shi J., Ming Y., Fan C., & Tian L. (2017) which discuss the technical aspect of facial recognition technology. Although facial recognition can be applied in many scenarios concerning smart cities, the paper only discussed an appropriate algorithm for the technology

without relating to any specific issues that might impact the algorithm if the technology is used in the context of smart cities. Therefore, the author excluded this paper from the primary search result. In total, 188 research papers were further analysed.

Of particular to the goal of this paper to look specifically at Southeast Asia region, the researcher again conducted a search in Scopus database. Combinations of smart city and the name of each country in Southeast Asia as well as the word 'Southeast Asia' itself were used. Other criteria, including types of publication and publication years remained the same. Search results were as follows:

- Smart city and Southeast Asia returned only 3 papers, and all are related to Singapore
- Smart city and Thailand returned 25 papers. However, if computer science papers, which focused only on advancement of Information Technologies, were excluded, the results would include only 13 papers.
- Smart city and Philippines returned 16 papers, but all are science or applied science papers
- Smart city and Laos returned no result
- Smart city and Myanmar returned 5 papers which were all about science and technology.
- Smart city and Cambodia returned no relevant result
- Smart city and Timor-leste returned no result
- Smart city and Malaysia returned 63 papers
- Smart city and Indonesia returned 9 papers
- Smart city and Vietnam returned 12 papers
- Smart city and Brunei returned only 1 paper
- Smart city and Singapore returned 35 papers, excluding material science, mathematics, and other applied science papers

DATA ANALYSIS AND DISCUSSION

This section presents and discusses the result of literature synthesis. It includes the discussion on definition and scope of smart city, the findings from an analysis of keywords extracted from the previous studies, and the business-organisation-technology perspectives (A framework adopted from Laudon & Laudon (2017)' s MIS textbook)

Definition and scope of smart city

Smart city can be broadly understood as a form of urban innovation, concerning economy, people, lifestyle, governance, mobility, and environment (Nam, *et al.*, 2011). Therefore, smart city development involves investments not only in technologies but also human and social capital as well as organisational and policy innovation (Ojo *et al.*, 2014). In terms of the ultimate goals, smart city efforts should lead to sustainable economic growth and a high quality of life, while at the same time focus on managing well the natural resources through participatory governance. In essence, smart city is a complex "Socio-technical System of Systems" (Ojo *et al.*, 2014), for example economic systems, social systems, environment systems, etc.

From the definition of the smart city, it can be seen that the scope of smart city research involves various aspects. City-infrastructure wise, the scope covers transportation & mobility, energy, water, library, school, and many more. Technology wise, advancement, adoptions, and applications of IoTs, Big Data, Sensors, and AI are among the top lists. Related to technological areas are data issues, concerning data models, data management, data privacy and security, geospatial data, etc. Additionally, the relationship between government and citizen, the way to engage citizen, citizen's roles, individual's lifestyle, the form of communities, politics, and governance are all affected by the urbanization and smartization of the city. Smart city also involves issues concerning digital transformation (Brandt *et al.*, 2016). It is essentially the transformation that affects several components/members of a city.

This list of concerning issues is not definite. In fact, it is only the tip of a smart city iceberg. The next section further reveals what have been covered and uncovered.

Keyword analysis

The 188 papers involve 633 distinct keywords. Unsurprisingly, 'smart cities' or 'smart city' are the most popular with the frequency of 73 and 46 occurrences respectively. However, the word 'smart' have been used in 55 distinct keywords (listed in Table 1), for example, smart government, smart home, smart community, smart neighborhood and smart parking. This is in line with the wide scope of smart city discussed in the previous section. The tag cloud created from the 633 keywords (as shown in Figure 1) also shows that the word smart has been referred to most often, and other often-seen words are digital, data, technology, urban and city. In addition, the figure reveals that technology, ICT, innovation and data are usually involved when researchers think of smart city. In other words, information technologies are considered an important part of smart city. The further analysis into the top 5 keywords apart from smart city (and smart cities) shown in table 2 confirms that the main interest of smart city is concerned with technologies. Social and business aspects are missing from this set of keywords.

Figure 1: A tag cloud of keywords extracted from the previous smart city research included in this study

Table 1: Keywords contain the word 'smart'

Keywords containing smart			
Keyword	**Frequency**	**Keyword**	**Frequency**
smart city	73	smart city-related concerns	1
smart cities	46	smart digital technology	1
smart citizen	3	smart energy	1
smart communities	3	smart energy and smart infrastructure	1
smart government	3	smart governance	1
smart mobility	3	smart grids	1
smart buildings	2	smart healthcare	1
smart home	2	smart human cities	1
smart neighborhood	2	smart learning environment	1
smart parking	2	smart mapping	1
smart tourism destination	2	smart motorways	1
smart urbanism	2	smart old-age care	1
African smart cities	1	smart resident	1
data-driven smart city	1	smart security	1
Geoinformatics and smart city	1	smart sensing	1
human smart cities	1	smart solutions	1
singapore, smart nation, smart urbanism	1	smart storage	1
smart	1	smart sustainable city	1
smart agriculture	1	smart technologies	1
smart cities and homes	1	smart tourism	1
smart cities mission	1	smart urban mobility	1
smart city application	1	smarter cities challenges	1
smart city learning	1	smartization	1
smart city network	1	smartphone application	1
smart city planning	1	smart-sustainability fix	1
smart city systems	1	sustainable smart energy city	1
smart city technologies	1	The "smart cities" project	1
smart city wheel	1		
Total 55 distinct keywords, 186 occurrences			

Table 2: Top 5 keywords (when excluded smart city)

Keyword	Frequency
Big Data	22
ICT/ICTs	19
internet of things	18
digital technologies	11
digital city	6

Keywords containing data or information appeared altogether 79 times, as often as keywords concerning technologies. Various aspects of data and information are studied. Examples are data structures, data economy, data models, quality of data, security, and privacy concerns. The relatively high number of data-related keywords show that an ability of smart city to generate a lot more data is well recognised. However, to be able to fully benefit from the big data (that will be generated from a smart city), research concerning how to structure, store, secure, and manage the data are still needed. Additionally, since technology's providers and city managers (or governors) will have access to data that reveal almost all aspects of citizens' life, data privacy, security, and ethical use of data should be put to priority. From Table 3, nonetheless, keywords related to these areas appear in extremely low number, showing a big gap and a need for further study.

Table 3: Keywords containing data or information

Keywords containing data or information			
Keyword	**Frequency**	**Keyword**	**Frequency**
Big Data	22	Geoinformatics and smart city	1
open data	4	Geospatial information	1
data analytics	2	Informatics	1
data economy	2	information quality attributes	1
Information	2	information security awareness	1
Information insecurity	2	information sharing	1
information islands	2	information society	1
urban informatics	2	information technology	1
3D geospatial data	1	informational footprints	1
3D spatial database	1	information-technological platform	1
Big data visualization	1	infostructures	1
community informatics	1	metadata models	1
data	1	mobile phone data	1
data collection and update	1	public geospatial information	1
data commons	1	public sector information	1
data marketplace	1	research data	1
data mining	1	research data management	1
data ownership	1	secure data contribution	1
data privacy	1	spatial big data	1
data self-determination	1	spatial data infrastructure	1
data structure	1	spatial data mining	1
data-driven decision-making	1	temporal data	1
data-driven smart city	1	temporal-spatial information infrastructure	1
Decentralized data storage	1	transit data	1
digital data	1		
Total 49 distinct keywords, 79 occurrences			

Keywords containing 'urban' are also popular with the total frequency of 58. Examples of keywords, containing 'urban' are smart urban, urbanism, urban planning, urban design, urbanization, etc. Less often-seen keywords are those concerning governance and/or government (with 24 occurrences), citizen (with 18 occurrences), security and/or privacy (with 15 occurrences), and policy (with 7 occurrences).

Interestingly, while lifestyle is included in the definition, only one keyword related to lifestyle, which is "unhealthy lifestyle", appeared only once from 960 occurrences of 633 distinct keywords. This highlights a big gap in the existing literature where focus was mainly put on technological issues. An attempt to categorise existing literature into business-, organisation-, and technology-related studies in the next section further identifies this gap.

Organisational, Business, and Technological aspects concerning smart city

This section discusses what have been done in prior literature on smart city and highlights gaps or issues that have not been addressed. The discussion is categorised into 3 aspects, namely business, (social) organisation and technology. The three aspects are an overarching framework that has been used in Laudon and Laudon's MIS textbook for many years. According to Laudon and Laudon (2017), to successfully apply and manage information systems in any organization, issues related to business, organisation, and technology need to be taken into consideration. Considering smart city an application of several new information systems in a large-scale and complex organisation, the researcher perceives the framework as an appropriate lens which provides a top-eye view of interrelated components of complex problems. The following subsections, therefore, categorise and discuss the existing literature from the aspects of technological, business and (social) organisation, respectively

Technological aspects

The technical aspects of smart city have been widely studied and well covered. Digital technologies that have been studied includes various technologies for various usage scenarios. Examples are:
- Design of a cloud-based backup center (hardware & software platform for data sharing, exchange and backup) for digital highway (Zhou *et al.*, 2019)
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- Blockchain technology and its application to storing and managing citizen's identify in the context of smart city (Rivera *et al.*, 2017)
- Big Data analysis techniques and applications to better understand and manage cities (Balduini *et al.*, 2019)
- Big Data engine for integrating and analysing a large volume of heterogeneous data generated by various sources in the smart city context (Attanasio *et al.*, 2016)
- Experiment to test the performance of Hybrid Adaptive Bandwidth and Power Algorithm to optimize power drain, battery lifetime, delay and packet loss ratio (Sodhro *et al.*, 2019)
- Designed data standards of Internet of Things, covering issues such as real-time acquisition, mass storage and distributed data service of mass sensors (Wang *et al.*, 2014)
- Developed an ontology for the description of smart cities data (Dias *et al.*, 2018)
- Presented a technique of three-dimensional data analytics using dendrogram clustering approach to analyse Big Data generated from smart cities (Azri *et al.*, 2018)
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While there are many issues to cover ranging from design to implementation and performance evaluation, research in this area is quite well advanced. Algorithms, data structure, data exchange, security, infrastructure of hardware and software platforms have been tested and tried. The more important issue is how businesses and (social) organisations can apply these advanced technologies to enhance the 'smartness' of the city, including quality of life and sustainability of environment.

Business aspects

Business models are among the top issues discussed in the previous literature. While Pucihar *et al.* (2019) focused on business models of a particular 'smart' product, which is autonomous vehicles, Brock et al. (2019) looked at different business models that could fit technology-driven companies working on different types of projects within different ecosystems. Markendahl *et al.* (2018) called for a networked business model (instead of a single firm business model) as a smart city solution usually requires a number of entities to be connected and work together, thus involving a number of stakeholders at the same time. Similarly, Bullinger *et al.* (2017) pointed out that to co-create value in smart service ecosystems, existing business models need to be adapted. In short, business models were developed at different levels, for example, at the level of product/service, at the level of technology providers' business, and at the level of city. However, from the scope of smart city outlined in the previous section, sustainability is considered an important goal of smart city management, rather than revenue and profit like in other business cases, yet none of the selected literature examined closely on a business model that would enable a smart city to achieve this goal.

Ecosystem is another topic that has been widely studied, yet from variously different perspectives. Theoretically, the business ecosystem perspective enables researchers to focus on a more interconnected view, rather than a pipeline view, of cross-industry/cross-organisation collaboration. According to Anggraeni *et al.* (2007), economic activities (as well as business and social activities) have changed from stand-alone to interconnected agents. Therefore, an understanding of continuous interaction and behavior of interconnected organizations becomes essential. Strategic management, or the management of a smart city in this context, will involve more multiple theoretical paradigms that explain complex relationships. Studying any social organization from the ecosystem perspective, thus, can be useful in building an overall picture of how the complex relationships are emerged, transformed and organised.

From the selected literature, quite a few studies looked at smart city from the ecosystem perspective. For example, Gupta *et al.* (2019) focused on the design of ecosystem and the distribution of knowledge across the smart city ecosystem. Sarma & Sunny (2017) were interested in the roles of each ecosystem actor in developing and participating in smart city. Alizadeh & Sipe (2015) highlight the need of city for digital strategy as the ecosystem has changed (in becoming smart city) as well as the roles of stakeholders.

In terms of managing smart city, Mgbere *et al.* (2018) designed information model needed for managing smart city construction projects. Waedt *et al.* 2016 discusses the increasing numbers of assets needed in smart city development and highlights city's needs for a better asset management approach that covers automatic asset identification and tracking, safe application of each asset and risk assessments.

How to apply data to manage the city were also studied in several previous studies. Ortner *et al.* (2016) studied the design of interaction process and application supporting decision-making in smart city context. O'Neill & Peoples (2016) looked at data collected from sensors around the city and how they can be used for monitoring well-being and city experiences and thus improving investment in and maintenance of infrastructure and services

To sum up, while the city management approach will change tremendously, only few studies have started to explore this topic. Changing business models as well as ecosystems is another area that has received attention from the IS researchers. However, new business opportunities and challenges opened up from these changes have barely been addressed.

Social organisation aspects

A type of organization that is of concern to this paper is social organisation as one of the important aspects of city is society and social changes around it. Considering the definition of smart city, we can see that social is a huge area involving various issues, such as quality of life, citizenship, citizen's participation, individual's lifestyle, culture, and so on.

Many studies had already attempted to cover a few of these issues. Tian *et al.* (2018), for example, examined the changing role of citizens (in smart city context) and proposed a new concept of smart citizen with four dimensions: slacktivism (and knowledge bubble), personal digitalization, virtual social relationship, and digital life process burden. The researchers suggest that future research focus on how an individual under smart city environment should respond to the four challenging perspectives. Santos *et al.* (2017) observed the real-life city transformation process and proposed strategies, methodologies and best practices for sensitization, civic engagement, social empowerment and sustainable motivation to participate in the co design and co creation of a human smart city. Han & Hawken (2018) highlighted identity (of city), urban culture, and quality of life as one of the main areas that needed to be focused when designing and digitizing a city. Vallicelli (2018) showed that workplace culture is changing by analyzing relevant data from Twitter. The authors believed that transit hubs, urban amenities and new digital services will influence on how workplace culture will be reframed.

While smart city involves all aspects of individual's life, only few of them have been studied. In fact, every touch point that individuals interact with the city (physical buildings and infrastructures) or people (government admins, police, teachers, sale persons, etc) are changing. Therefore, the relationships need to be redesigned. In addition, the new interactions (and relationships) will eventually constructs and reconstructs a city (as a social organization). In summary, smart city will tremendously change the social structures, and the existing literature has touched only the small part of these changes.

Smart city in Southeast Asia

Publications in Scopus that concerns smart city initiatives or projects in Southeast Asia are limited. As mentioned in the research method section, no publications were found for several countries, including Cambodia, Laos and Timor-leste. Only one paper was founded related to smart city in Brunei. The paper compared two methods of controlling traffic congestion and demonstrated how adaptive traffic light system can be used to minimize traffic congestion during peak hours in Brunei. The study focused more on the technological aspect, investigating which algorithm is better in this particular case.

Singapore, Malaysia, Thailand, Philippines, Indonesia and Vietnam appeared to be better studied. More studies were found, and more issues have been researched. Of all the mentioned countries, Singapore is considered the most advanced and well recognised in terms of smart city. According to Nicholls and Kruimel (2019), Singapore's 'Smart Nation' programme has just

started in 2014 but was quickly recognised as a world leader in smart city initiatives. One of the successful initiatives was the 3D digital map of the country which can be used to support urban planning, flood control, and so on. Kong and Woods (2018) critically examined the Singapore's Smart Nation initiative and identified three important issues that must be considered when implementing any smart solutions. The three issues include data-driven feedback loops, effective public-private partnerships, and an integration of past, present and future urbanisms. Lopes (2017) studied and compared six smart cities, including Singapore and found that all smart city initiatives underlie heavily in technologies and followed similar governance model which was a mix of collaborative, open and participatory governance. In essence, technologies and smart governance are key components to smart and sustainable cities. Interestingly, Ho (2017) used Singapore as a case study to highlight the limits of 'smart' initiatives and challenged practitioners, city managers, and governors to put citizens' needs and lifestyles at the center when designing or planning 'smart' solutions.

Specific to Thailand, smart city is usually discussed under the umbrella of Thailand 4.0, the national policy to drive the country with innovation. The Thailand 4.0 initiatives concerning smart city are, for example, industrial Internet of Things and smart farming. Taweesaengsakulthai *et al.* (2019) provided a detailed comparative study of how smart city initiatives were rolled out differently in 3 big cities, namely Phuket, Chiangmai, and Khon Kaen. Phuket was considered the first testbed in terms of smart city in Thailand, followed by Chiangmai and Khon Kaen. Khon Kaen's smart city was mainly driven by local business leaders who together co-established a nonprofit private company and engaged local people to the implementation of the smart city, successfully showcasing the bottom-up approach. From the comparison of the three smart city initiatives, the authors highlighted that a lack of clear and coherent policy statements and the central bureaucratic management made the smart city initiatives slowly developed and not serving the local's needs. Similar to Taweesaengsakulthai *et al.* (2019), Laochankham *et al.* (2019) reviewed and critiqued the national policy concerning smart city development. The authors stated that direction without a clear policy statement and highly centralized bureaucratic management style impede the country from reaching the full benefits of smart city policy implementation. A few other papers (e.g. Kordach *et al.*, 2018; Setthapun *et al.*, 2015) looked at smart city initiatives from the perspective of technology implementation and did not consider the social or business aspects of the smart city.

Focused on Ho Chi Minh city, Nguyen and Nguyen (2018) studied the design of high-rise houses within the framework of the smart city concept and presented an approach that was claimed appropriate for future constructions towards smart city development. Ha and Fujiwara (2015) developed a value-based event tree to value R&D projects especially those concern the movement towards smart city to help drive investment decisions and carefully take into consideration the issues of technological and market uncertainties. Similar to research in other countries, apart from these two papers, the other papers that were yielded from Scopus was more about technical aspects, such as numerical modeling for groundwater management (Glass *et al.*, 2018), and power system modeling for distance protection relay (Huynh and Tran, 2017).

Pratama (2018) compared smart city policy of four Indonesia cities, including Yogyakarta, Surabaya, Magelang, and Madium; all of which were winners of the Indonesian Smart City Index 2015. The author pointed out a lack of specific national-level regulation that guides smart city policy in Indonesia and thus resulting in different conceptualisation of smart city by the four cities. Another attempt to study topics related to smart city in Indonesia was that of Indrawati and Dayarani (2019). The authors looked at indicators using for measuring the index level of smart security and safety in Bandung city of Indonesia. Twenty indicators to measure the index level of smart security and safety were presented. Again, no other attempts were found to understand socialization process as well as social impacts of the smart city implementation on citizens' life.

Particular to the Philippines context, research topics related to smart city are relatively more variety compared to other Southeast Asia Countries mentioned earlier. A smart disaster management system (Alazawi *et al.*, 2014), challenges and opportunities for smart city establishment and the required ICT infrastructures (Al-Maliki, 2018), user acceptance of the smart toilet (Zakaria *et al.*, 2017), traffic congestion and speed assessment using image processing technology (Caprio *et al.*, 2018) are examples. However, their main concerns were on the technical aspects again. Only the paper by Zakaria *et al.* (2017) that studied the issue from users' perspective and not the technical aspect.

In the context of Myanmar, all studies returned from Scopus search were focused on technical aspects. The papers presented implementation of particular technologies to enable the city to be 'smarter' (e.g. the implementation of automatic vehicle license plate recognition system for smart transportation (Lin *et al.*, 2018)) or studied methods promoting more efficiency in particular systems (e.g. an efficient method of optimal routing system for transportation proposed by Soe and Thein (2018)).

Although research related to Smart city in Cambodia, Laos, and Timore-leste papers were not found in the Scopus database, the researcher did additional search in Google Scholar and found few studies attempting to report several technologies implementation and adoption in Timor-leste. For example, Chandra and McNamara (2018) have reported an initiative to implement climate-smart agriculture compared with that of Philippines (as they were both two Australian Aid-funded community-based adaptation programs from 2012 to 2015). The researchers highlighted a combination of multi-level, multi-actor processes and activities that enabled the two cases to integrate adaptation, mitigation and food security outcomes. Papers that were studied in Timor-leste mainly concern climate change/control issues due to the location of the country.

CONCLUSION

This paper attempts to understand what have been researched in an area of smart city and also to identify gaps. Therefore, it selected the existing literature from Scopus database, using smart city and digital technology as search keywords. Only publications (including proceedings and journal papers) from 2010 to 2020 were extracted. The analysis of the literature looked at the definition and scope of the smart city. Keywords often used were derived to see overall pictures and focuses of the past literature. Then, the business, organisational and technical framework adopted in Laudon and Laudon (2017) was used as an analytical lens to see what have been done and highlight the gap that should be addressed in the future. Additionally, smart city research that were conducted in the context of Southeast Asia countries were also examined. The region was specifically selected due to its nature and regional trend that a number of cities are and have been urbanizing rapidly.

The definition and wide-range scope of smart city has substantiated its own importance and the need to study the area from several aspects (apart from technological aspects). The analysis of the selected literature showed that technological aspects are relatively better studied than business and organisational aspects. This is coherent with observation by Lopes (2017). The author mentioned that the majority of literature focused on technical aspects as information and communication technologies were the backbone of smart city initiatives. However, the author also pointed out that other aspects of smart city, such as governance, should be taken into consideration and need to be studied further. For the selected literature that have been categorised as business-related, business models, ecosystems, success factors and failures in implementing smart city, and how to manage a smart city from the new data (that the city can never access before) were the main issues studied in the previous literature. However, smart city transformation processes are complex and involve a number of stakeholders; the issue still requires much more in-depth studies. Social organization wise, only few studies attempted to understand the relevant issues. Changing culture, social relationship, roles of citizen, relationship between government or city manager and citizen, quality of life, condition, structures of power, structures of the society and organisations are yet to be explored and better understood.

The numbers of publications that focused on Southeast Asia region are surprisingly low. Studies in Singapore were found highest in terms of numbers, while no smart city research papers were found related to Laos, Cambodia, and Timor-leste. The analysis of the literature in this group showed similar trend when compared with the bigger pool of smart city literature reviewed in the first part of this paper. The literature that was specific to Southeast Asia were more about technical aspects. Research concerning smart city policy and smart governance policy seemed to get relatively higher attention within this group of literature, yet the number was still very low. Policy discussions and comparisons were seen in Singapore, Thailand, Malaysia, and Indonesia. This is perhaps because these countries have the higher number of big or medium-sized cities compared to other countries in the same region.

It is important to note that literature included in this study is only limited to those that are listed in Scopus database. Therefore, the result might not represent the whole reality nor cover all the studies that have been published. However, since Scopus is one of the most widely-used research databases, the results in this study should at least provide a quick jumpstart into the field, which is the main purpose of this paper.

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