



# Digital Transformation in The Southeast Asian Region: A Study on ASEAN Cooperation in The Framework of ASEAN Smart Cities Network

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## ABSTRACT

This article aims to discuss how Southeast Asian countries cooperate in building the ASEAN Smart Cities Network (ASCN). The trend of smart city development is driven by the increasing population growth, accompanied by globalization in the field of information technology, especially in data management networks such as the Internet of Things. This research uses a qualitative method with data collection through documentation studies and internet-based studies. The results of this study show that

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cooperation in the context of ASCN is an effort by ASEAN member states to capitalize on the global trend of information and communication technology development regarding digital transformation. This cooperation has attracted the attention of ASEAN extra-regional partners so that it is possible to optimally develop ASCN through partnerships with countries outside ASEAN members. This cooperation also demonstrates the growing connectivity of ASEAN Member States in the global network that can trigger economic growth in the region.

**Keywords:** ASEAN, Cooperation, Digital Transformation, Smart Cities

## 1. INTRODUCTION

Global population growth remains a persistent issue as indicated by worldwide forecast reports. Thus, fulfilling the need for adequate services and resources in urban areas has become a matter of urgency. Necessities such as medicine, education, environment, and transport have become urgent for national governments. In order to maintain the sustainability of these public services, new methods for data management are needed, which must be prioritized by the state. Hence, smart city, a term adopted and absorbed from computing systems driven through practical data management networks among all components and layers of the city itself (Kirimtat et al., 2020). This form of computerized system development leads cities to focus on the use of data management networks such as the Internet of Things (IoT), Big Data, and cloud computing systems. Through the digitalization of data management, there are opportunities for operational and organizational improvements such as traffic control systems, sustainable resource management, quality of life maintenance, and infrastructure development in smart cities.

The smart city trend has been widely implemented around the world for various areas of daily activity needs, both in the form of full city development and individual project design needs. Southeast Asia is a culturally, economically, politically and socially diverse region, with urbanization and digital disruption being two issue areas of concern for stakeholders in the region. There are predictions that by 2050 two-thirds of the region's total population will live in urban areas, so the total population is expected to reach 508 million people, an increase of approximately 214 million people (or 73%) from the total 294 million population as of 2014 (Kong & Woods, 2021). This statement contradicts the opinion expressed by Jones (2002: 199 in Kong & Woods, 2021), which states that Southeast Asia is the least 'urbanized' region or the population generally does not occupy urban areas. The increase in population also encourages the government to immediately make service efficiency and fulfilment of public services, accompanied by a society that is sensitive and educated about the development of information technology (Quiano-Castro et al., 2021; The Economist Intelligence Unit Limited, 2016).

When using smart cities as a concept to deal with the increasing population that leads to urbanization to urban areas and the digitalization of people's daily lives, the concept of smart cities is mainly used to meet the information demands faced by society, where policy integration between regions and even countries is needed in order to facilitate the mobilization of information and resources in the digital era (Kirimtat et al, 2020; Tan et al., 2021) and how a country's government can take action based on "smart" technology to deal with these social issues such as how to address environmental pollution, traffic

congestion, and even the underdevelopment of a country's infrastructure with a cross-border approach (Crumpton et al., 2020; Cruz & Howard, 2021; Vineles, 2018).

Governments at the ASEAN regional level in responding to these issues and conditions also seek to fulfil the demands of society and the situation by creating the ASEAN Smart Cities Network (ASCN), as a collaborative platform in order to strengthen the synergy of efforts to build and develop smart cities in the Southeast Asian region through development cooperation, accelerating banking activities with the state sector, and securing funding flows and relationships from cooperation partners outside the Southeast Asian region (Ismawati & Hartati, 2022; Quiano-Castro et al., 2021). The follow-up to Singapore's proposal to implement the ASCN was first approved at the 32nd ASEAN Summit in 2018, followed by the awarding of a list of pilot cities comprising 26 cities of the organization's member states (ASEAN, 2018). The ASCN programme framework takes an inclusive and non-binding approach and is intended to be a guide that facilitates the development of smart cities in each destination city. Just as every programme launched by ASEAN has strategic outcome expectations, ASCN also has three strategic outcome objectives from the implementation of its "smart" solutions, namely the establishment of economic competition, a sustainable environment including a healthy environmental ecosystem, and the achievement of a higher quality of life for the community (ASCN, 2018). In addition, ASCN also has focus areas for development as a structured reference for implementation, namely civil and social affairs, health and welfare, safety and security, environmental quality, infrastructure development, and industry and innovation (Lee Eun-young, 2018).

To understand how Southeast Asian digital cooperation forms with a focus on the ASCN development framework, the author uses references from several previous studies related to the discussion to be researched. First, the previous study that became the researcher's reference was about the concept of smart city, which is popular due to the accelerated development of information technology and its role as an innovation in regional cooperation (Cruz & Howard, 2021; Kim, 2022; Utomo & Hariadi, 2016). Second, studies on ASCN as a forum for regional cooperation and its implementation in various aspects of people's lives (Ismawati & Hartati, 2022; Kong & Woods, 2021; Lee Eun-young, 2018; Marisa & Andree, 2019; Martinus, 2020; Stephenson & Dobson, 2020). Previous research on the concept of smart cities, especially on the ASCN framework, has provided different perspectives on the form of cooperation strategies that have been carried out by fellow Southeast Asian countries and across regions, and digitalization as a driving factor for smart city development, especially in developing countries. However, these previous studies only focused on the implementation process of ASCN and its benefits on the digitization of human life activities. Therefore, this research examines the implementation of the ASCN platform based on three development focus areas, namely civic and community, health and well-being, and security and safety, which are still limited to the study of previous studies.

This research answers the question, "What forms of ASCN implementation based on the development focus of civil and society, health and welfare, and security and safety have been carried out by countries in the Southeast Asian region?". The purpose of this study is to analyze the forms of cooperation that have been carried out as a form of digital transformation by national governments by presenting examples of cooperation programs per development area, such as the cooperation between Dassault Systems and Virtual 3d

Singapore (France-Singapore), City Government of Banyuwangi and John Wiley & Sons (USA-Banyuwangi), and Alibaba and City Government of Kuala Lumpur (China and Kuala Lumpur).

## 2. LITERATURE REVIEW

Cooperation theory is one of the leading theories in International Relations Studies. In general, cooperation can be defined as an act in which an actor adjusts its behavior to the actual or anticipated preferences of other actors (Keohane 1985: 226 in Paulo, 2014). The conceptualization of cooperation as presented by Keohane contains two important elements Milner (1992), firstly the definition assumes that the behavior of the actors involved is towards a common interest, and secondly that cooperation provides benefits or rewards for the actors involved. Thus, each actor involved in cooperation adjusts its policies and behavior in order to achieve their respective goals. Although, international cooperation is generally recognized with the involvement of state actors, this activity can also be participated in by other non-state actors such as IGOs and NGOs (Dai et al., 2010). As a result, the scope of issues discussed in international cooperation is very broad, which can examine the activities of international organizations in dealing with global environmental problems, the issue of market monopoly conflicts by multinational companies, and even the campaigns of international non-governmental organizations against certain phenomena. So, the scope of discussion of regional development studies such as the ASEAN Smart Cities Network can also be studied using the theory of international cooperation.

Regional cooperation is different from regional integration, this is because countries do not always agree and coexist in carrying out an action due to national backgrounds, political tensions, and even loss of mutual trust between actors (Schiff & Winters, 2002). However, on the other hand, regional cooperation tends to be carried out by geographically close countries due to the similarity of historical backgrounds, interdependence of natural resources and commodity orientation of export-import products between adjacent countries, and easier technical operationalization of cooperation.

Regional cooperation is a middle ground between full independence and full openness, this form of cooperation provides greater room for countries to maneuver in the pursuit of development, but with a limited area of coverage (UN ESCAP, 2004). Thus, regional cooperation can be defined as actions taken by countries within certain geographical boundaries and objectives, in order to achieve the interests of each country. In this research, the focus of the study is the form of Southeast Asian regional cooperation, where the actors of cooperation are state and non-state actors, both ASEAN member states and non-state countries or actors who are partners in cooperation.

The next concept relevant to this paper is smart city. The term 'smart city' has become globally popular due to the development of information technology. A smart city can be defined as an urban development effort under the background of the development and application of information and communication technology and the influence of smart growth urban planning, which is committed to improving the efficiency of urban management, achieving sustainable urban development, and improving the quality of life of urban residents (Huang et al., 2021). According to Harrison (2010 in Albino et al., 2015), a smart city can be defined as a city that connects physical infrastructure,

information technology infrastructure, social infrastructure, and business infrastructure to utilise the collective intelligence of a city. As for other opinions that, smart cities are conditions when investment in human and social capital, as well as traditional (transport) and modern (information communication technology) communication infrastructure drives sustainable economic growth and improves quality of life, through wise management of natural resources and participatory governance (Caragliu et al., 2011: 50 in de Wijs et al., 2017).

The intelligence of a city, as defined above, has characteristics that can then be used to evaluate the performance or achievement of the cooperation programme carried out by the city and the country. Smart city characteristics can be identified into several indicators such as inclusive, resilient, sustainable and dynamic (economic), climate-conscious (environmental), innovative, and livable (Eremia et al., 2017). Therefore, the author will use the concept of smart cities, which is the use of digitalization technology to make critical city infrastructure components and services including city administration, education services, health services, public safety, transportation, and utilities more intelligent, interconnected, and efficient.

### **3. METHODOLOGY**

The researcher used Christopher Lamont's (2015) qualitative approach, which is a method where data collection and description are obtained from non-numerical data analysis. In analyzing the data, the researcher used a case study, which is a method to investigate symptoms or aspects of empirical research. The case study method is an analysis model used to understand the achievement of Southeast Asian regional cooperation through the three focus areas of the ASEAN Smart Cities Network development chosen by the researcher. The data sources used in the research are secondary data sources derived from national and international journal articles, official organizational documents and archives, books, and news related to the implementation of ASCN in the areas of civil and social, health and welfare, and security and safety.

Research data obtained from literature studies and internet-based research, which will be analyzed with discourse analysis, namely the results of obtaining research data will be described. Meanwhile, to ensure data validity, the researcher uses a data triangulation strategy, where the researcher will use at least three ways to verify the phenomenon, description, or facts reported. Researchers triangulate data to ensure the objectivity or validity of research interpretations through a variety of sources.

### **4. DISCUSSION**

#### **4.1 Civic and Social**

Smart cities utilize technology to find innovative and effective ways to improve the delivery of public and municipal services. In this case, good urban governance becomes the goal in ensuring the government's ability to provide better services, decision-making, transparency and accountability, and even information accessibility. Urban governance in developing countries lags far behind that of developed countries, where disasters such as artificial flooding, factory waste distribution, air quality degradation, etc., due to poor urban governance management often occur. Therefore, in order to cope with the increasing population growth, ASEAN member states are seeking cooperation with the

private sector to plan more effective and efficient urban development.

Singapore, as the initiator of the ASEAN Smart City Network since 2014, has been working to develop a "Virtual Singapore" project that combines visualization techniques with large amounts of data (Stockschläger, 2018). Therefore, Singapore collaborated with Dassault Systèmes to use 3DExperienceCity software, a 3D modelling software that uses a combination of images and data - geometric, geospatial, topological, historical, city noise level, infrared temperature, humidity, climate - to create many scenarios that can be simulated (Caesario, 2018b). Utilizing 3DExperienceCity helps cities and their surrounding regions understand and prepare for phenomena such as pandemics, carbon dioxide emissions, and sea level rise. Software-assisted detailed urban planning is expected to prevent infrastructure development mistakes, along with cost and time savings due to digital technology.

This collaboration between the French company and the Singapore city government has successfully created a 3D virtual Singapore programme that is used by the government and interested parties to design urban spaces. In addition, through the World Cities Summit 2018, the Singapore government has demonstrated the Virtual Singapore simulation to the public (Dassault Systèmes, 2018). The Singapore government has also used data tests conducted by this digital platform for sustainable urban planning. The cities that have used this technology in urban planning are Singapore, Jaipur, India, Rennes, and France (Stockschläger, 2018). In Indonesia, the city of PadangPariaman has signed a cooperation contract with Dassault Systèmes in 2018, as an effort by the local government to digitalize the city (Caesario, 2018a).

The implementation of 3D modelling technology has become an alternative choice for cities around the world to develop sustainable urban planning. The diversity of scenarios simulated by this software is expected to prevent social and environmental problems, resulting in the optimization of infrastructure development such as green spaces and the allocation of urban resources such as land, food, water, energy, and even clean air.

#### **4.2 Health and Well-being**

The implementation of smart cities in ASEAN seeks to provide innovative and inclusive solutions to improve the overall well-being of ASEAN communities. The focus of the health and well-being development area is on providing quality and efficiency of key services such as healthcare, housing, and education, by optimizing the use of public resources. This smart city development area is also aligned with the United Nations agenda as part of the Sustainable Development Goals third goal "Health and Wellbeing".

While there are several specific sectors of health and welfare, this paper will focus on the development of education services. One of the benchmarks used in assessing the urgency of the need to develop educational services is by looking at the literacy levels of people in ASEAN. The literacy status of adult individuals in ASEAN in the 2010-2020 period shows that the ASEAN population in six member countries is at 95% or above, including Indonesia. However, inequality is seen in how the number of Indonesians enrolled in and receiving junior secondary education in Indonesia is 78.7% (2017), 78.8% (2018), 79.4% (2019), and 79.6% (2020) (ASEAN Secretariat, 2021). This figure is still relatively low when compared to Malaysia 91.3% (2019) and Vietnam 89.2% (2019). The data shows that efforts are still needed from the government to ensure that Indonesians have access to basic education services that have been made compulsory in Indonesia.

An example of the government's efforts in encouraging the development of regional

education services is by collaborating with other countries or sub-actors. This cooperation is carried out using various innovative solutions, one of which is using technology. The partnership project between Banyuwangi city government and multinational company John-Wiley & Sons is an example of ASCN pilot city cooperation in the health and welfare focus area. This collaboration began with a Letter of Intent between the city government and the multinational company at the ASCN meeting in Singapore in July 2018 (Ismawati & Hartati, 2022). The main purpose of the collaboration between the two parties is to explore e-learning platforms. The effort is in line with the Banyuwangi Government's programme to build and develop a smart village programme called "Smart Kampung", a programme that brings public service facilities closer together by integrating the use of Information Technology into productive economic activities, creative economy, education, and health.

The Banyuwangi government realizes that there is an imbalance in welfare between towns and villages, so it seeks an e-learning solution to overcome the physical obstacle of distance between towns and villages. The online learning syllabus has been disseminated to 25 sub-districts in Banyuwangi. This syllabus is expected to make it easier for students to access information and learning materials. In addition, to support the availability of internet for residents in sub-districts/villages in Banyuwangi, the government is working with the multinational company to provide optical fibre. Currently there are 170 villages out of a total of 189 villages in Banyuwangi that have adequate internet accessibility (Ministry of Information and Communication, 2018).

### **4.3 Safety and Security**

Road safety and security is a global challenge that is also experienced by the Southeast Asian region. According to data from the UN Decade of Action for Road Safety 2011-2020, an average of 1.3 million individuals died on the road and more than 50 million were injured (Kitamura et al., 2018). The World Health Organization also supports this statement by saying that 74% of traffic accidents occur in low-income countries, while when analytical data is combined with middle-income countries, the conclusion is that 90% of incidents occur in low and middle income countries (World Health Organization, 2015). The real condition that countries in Southeast Asia are classified as developing countries with low and middle-income also encourages the desire of ASEAN to be able to overcome this problem.

The causes of traffic accidents in Southeast Asian countries consist of various factors, such as a high number of pedestrians, motorcyclists, automobiles, or specialized vehicles using the roads in an irregular manner; underdeveloped traffic infrastructure; high urbanization of the population to urban areas; and the driving licence system set by social institutions is not strict (Asian Development Bank, 2005; Kitamura et al., 2018). These factors have led Southeast Asian countries to meld traditional and digital efforts to prevent an increase in traffic accidents. Kuala Lumpur as one of the 26 smart city pilot countries in ASEAN is working with Alibaba to strengthen local partnerships by building a sustainable ecosystem. Selangor, a state that includes major Malaysian cities such as Kuala Lumpur and Putrajaya, has the highest average number of traffic fatalities, with 976 cases from 2013-2017 (Khairul Amri Kamarudin et al., 2018). In addition, the background of the cooperation between China (Alibaba) and Malaysia (Kuala Lumpur) is due to China's Digital Silk Road goal of "Smart Infrastructure", which is an effort to integrate sensors, communication networks, and real-time artificial intelligence information

processing (Naughton, 2020).

The factors driving the follow-up efforts on social issues prompted the cooperation between Alibaba Company and the Kuala Lumpur City Government to implement city brain, an Alibaba Cloud service that uses big data and artificial intelligence in cloud computing infrastructure, creating a system capable of processing various data in smart city management. City brain uses real-time information from sources such as loop detectors, traffic light information, and traffic cameras to obtain information on traffic conditions, including incident detection, vehicle queue lengths, vehicle counts, vehicle types, illegal stops, and optimization of traffic signal change rates (Caprotti & Liu, 2020). The system was launched in January 2018 with 382 cameras and 281 traffic lights installed and has become a solution to reduce traffic congestion, cut emergency response times, and increase public transport utilization in the city of Kuala Lumpur (Naughton, 2020; Xinhua, 2018). This initiative by a private Chinese company has increased traffic efficiency in the Chinese city of Hangzhou as a test base by 15% and saved three minutes of average time per vehicle in traffic (Xinhua, 2018). Then, innovations in the form of improving the city's traffic system also encourage the emergence of other digital products such as the agreement between Ant Financial with 6 Malaysian Banks and Alipay for the implementation of cash-free taxi payments and automatic toll payments, resulting in simplification and improvement of user services (Caprotti & Liu, 2020).

Thus, the transition of the public safety and security support system in Malaysia that incorporates artificial intelligence is a manifestation of the consistency of the city government to develop a digital Malaysian urbanization administration system and it is expected that the same efficiency results will occur in Malaysia (Samsurijan et al., 2022).

## 5. CONCLUSION AND RECOMMENDATION

The ASEAN Smart City Network framework has provided a network for ASEAN member states to channel resources from private partners towards the development of digital facilities and infrastructure at the local level. Referring to the three case studies that have been conducted, the three focus areas studied have a high potential for success and sustainability as the outcomes of the three cooperation programs undertaken by the city governments of the respective ASCN pilot cities target a form of long-term cooperation programs. Therefore, although not all the results of the cooperation programs are visible today, at least each ASCN pilot country has started a smart city implementation project in each of the designated cities by utilizing the existing local potential.

The potential of Southeast Asian countries to develop smart cities is also recognized by external partners such as those from the United States, Australia, Japan, China, France and Korea. Thus, despite the shortcomings of Southeast Asian countries in terms of human resources and the availability of both natural and technological resources, the involvement of external partners in local development is very high, as can be seen from the case studies of Indonesia, Malaysia and Singapore that work with foreign partners from France, the United States and China. Assistance in the form of software, internet networking, and installation of digital security products have helped Southeast Asian countries in their efforts to digitalize traditional urbanization responses. Thus, it is hoped that the application of the ASEAN smart city framework can be fulfilled.



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