

# The Role of Collaborative E-Government in Surabaya Intelligent Traffic System: A Case Study of Surabaya, Indonesia

**Irfan Murtadho Yusuf, Retno Sunu Astuti, Kismartini**

Faculty of Social and Political Sciences

Universitas Diponegoro

Semarang, Jawa Tengah 50275, Indonesia

[irfan.murtadho@gmail.com](mailto:irfan.murtadho@gmail.com), [retnosunu@gmail.com](mailto:retnosunu@gmail.com)

[kismartini@live.undip.ac.id](mailto:kismartini@live.undip.ac.id)

**Dedy Afrizal**

Sekolah Tinggi Ilmu Ekonomi Tuah Negeri Dumai

Sukajadi, Dumai Kota, Kota Dumai, Riau 28812, Indonesia

[dedyafrizal26@gmail.com](mailto:dedyafrizal26@gmail.com)

**Jumadil Saputra**

Faculty of Business, Economics and Social Development

Universiti Malaysia Terengganu

21030 Kuala Nerus, Terengganu, Malaysia

[jumadil.saputra@umt.edu.my](mailto:jumadil.saputra@umt.edu.my)

## Abstract

Nowadays, the population growth and high stream of urbanization in the cities led to various issues, including road traffic accidents rate. Cities have attracted many researchers' attention not only dynamism of its change that so fast, but world population movement from rural to urban areas or cities, such as Surabaya. The accident rate in Surabaya city keeps increasing and becomes more complex as a society still tends to use private vehicles. This situation has led to serious impacts, i.e. uncontrolled accidents. Surabaya Intelligent Traffic Systems (SITS) is one of the e-government implementations aiming to improve city safety and reduce accident rates in Surabaya. This study aims to analyse the role of collaborative e-government in SITS program. The design of this study is a qualitative approach through a semi-systematic review approach. The data were collected from relevant previous studies, such as books, journals, and reports that focus on collaborative e-government in Surabaya Intelligent Transportation System. The result showed weaknesses in the coordination among the stakeholders and no legal rule to regulate SITS application. Therefore, Surabaya Government needs to enhance cooperation among relevant stakeholders to optimize collaborative e-government and establish a legal law to rule SITS. In conclusion, this study has successfully identified and analysed the role of collaborative e-government in the Surabaya Intelligent Traffic Systems program. Therefore, collaborative e-government needs four principles, including value, technology, economic, and citizen drove.

## Keywords

Collaborative government, e-government, Surabaya Intelligent Traffic System, road traffic accidents rate

## 1. Introduction

Cities have become entities that attract many researchers' attention due to the dynamism of its change so fast, but almost 50 percent of the world population will move to the city (Ansell and Gash 2008). This problem also happened in Surabaya, i.e. increasing population and high stream urbanization leads to various problems such as seen in the level of road traffic accidents. In Singapore, surveillance activities have dramatically increased, especially in public space as on public transportation or road. The government records people driving for further government research data (Purwanti, 2016; Jiow & Morales, 2015).

Table 1. Traffic accident and public order violation

No	Year	Traffic Accident	%	Public Order violation (Theft with/without violence)	%
1	2015	1.136	34	8.354	33
2	2016	879	26	10.105	40
3	2017	1.365	40	7.063	28
Total		3.380	100	25.522	100

Source: Central Bureau of Statistic, (2018)

Table 1 displays that traffic accidents extremely increased 40 percent in 2017 than in 2016 at 26 percent. Meanwhile, on the graphic of order violation, the highest violence is in 2016 at 40 percent. This value shows that Surabaya still has a high-level accident until the end of 2017; nevertheless, public order violation showed a decreasing trend in 2017.

Table 2. Total installed CCTV

Year	Installed CCTV
2019	612
2017	108
2015	58

Source: processed data from *LAKIP Surabaya and SITS to improve the quality of public service in Transportation Office of Surabaya city*

The emergence of the smart city concept has encouraged Surabaya to innovate to be a city that is both comfortable and safe for its people. The government under regulation Number 23 the Year 2014 on Local Government Regulation, Chapter XXI states the local government of Surabaya about applying surveillance system to support digital city program. Surabaya installed 612 surveillance security camera systems in 2019 and 23 cameras could identify via face recognition (Eppstein 1998). Retrieved from [www.medcom.id](http://www.medcom.id) stated that by maximizing the technology system, the government of Surabaya expected to increase public awareness in driving and improve the quality of community security (Wahyudrajad 2019). This research will analyze how collaborative e-government in managing Surabaya Intelligent Traffic System plays a role in controlling traffic accidents.

### 1.1 Objectives

The accident rate in Surabaya city keeps increasing and becomes more complex as a society still tends to use private vehicles. This situation has led to serious impacts, i.e. uncontrolled accidents. Surabaya Intelligent Traffic Systems (SITS) is one of the e-government implementations aiming to improve city safety and reduce accident rates in Surabaya. This study aims to analyze the role of collaborative e-government in SITS program.

## 2. Literature Review

### 2.1 E-Government

Electronic government, or popularly called e-government, is used to improve the quality of services between government entities (G2G), between government and people (G2C), between government and businesses (G2B), and other networks using information and communication technology (ICT). Holmes defines e-government as a term referring to the usage of innovation in specific, using the web, provision of good public service, customer-oriented and costs more effectively, and getting better results (Holmes, 2001; Deddy, 2020). Holmes defines e-government as a term referring to the usage of innovation in specific, using the web, provision of good public service, customer-oriented and costs more effectively, and getting better results (Holmes 2001; Muslimin 2018). The gap of transparency and information between citizens and the government might affect the level of public trust. Such conditions felt by the public towards the government indicated a decline in public trust. Hence, improving information from the government to the public can help increase public perceptions and influence expectations of trust by narrowing the information gap between the public and the government (Welch 2012).

E-government in Indonesia started in 2001, initiated by Presidential Instruction No. 6 the Year 2001, mentioning the government agencies and offices to apply telecommunication, media, and information in supporting interagency stakeholders. The ability to exchange information through government departments is described as one of the key

components of sharing knowledge (Makedon et al., 2015). The emergence of e-government encourages the city of Surabaya to create Surabaya Intelligent Transportation System. Moreover, based on the enforcement of the “One Agency, One Innovation” regulation (Ministry of Empowerment of State Apparatus and Bureaucratic Reforms Regulation Number 19 Years 2016) stating that every regency/city should make one innovation of public service every year. Intelligent Transport System is the integration between information systems as well as communication technology and transportation infrastructure, vehicles and road users. The development of this system was initially carried out to reduce congestion and traffic accidents. However, the system is now fully integrated among multi actors of stakeholders addressing in decision making.

Intelligent Transportation System has been developed in the many Asia Pacific and Oceania countries, such as Singapore, Japan, Australia, Malaysia, South Korea, and China. In Singapore, for instance, the implementation of transportation surveillance systems has a significant impact on traffic management control. In some cases like traffic accidents, the intelligent transportation systems had helped the police in the investigation as supported with smart face recognition systems to enforces the regulation (Jiow and Morales 2015). The concept of collaborative governance is a form of governance in which public and private actors work together in distinctive ways to establish laws and rules for providing good public service (Ansell and Gash 2008). Moreover, there are many ways to interpret collaborative governance. Typically, the aims are to involve government, private, civil society in achieving collective goals. In addition, some scholars use the term “collaborative” to describe a process to recognize by groups of interests (Purwanti, 2016).

## **2.2 Collaborative Governance**

The concept of collaborative governance is a form of governance in which public and private actors work together in distinctive ways to establish laws and rules for providing good public service (Ansell and Gash 2008). Moreover, there are many ways to interpret collaborative governance. Typically, the aims are to involve government, private, civil society in achieving collective goals. In addition, some scholars use the term “collaborative” to describe a process to recognize by groups of interests (Purwanti, Nurul Dwi, 2016). The discrepancies between these prominent concepts of collaborative governance indicate at least five dimensions; the first, this taps into the public-private parts and essentials digging whether collaboration seen may bring governmental and non-governmental actors together. The second dimension is a collaboration that public actors collaborate to initiate. Finally, the last dimension is related to a multi-organizational process, restricted to organized interests or broad public involvement (Batory and Svensson 2019). Therefore, the collaborative governance emphasizes process design constructed by the multi-actor partnership. Consequently, the collaborative governance highlights the process design constructed by the multi-actor partnership.

## **3. Methodology**

This study used a semi-systematic review approach to analyse and identify the knowledge gaps based on a descriptive qualitative study. It provides an understanding of the complex area and aims to build the state of knowledge and map a field of research (Snyder 2019). Moreover, previous studies, book and summary reviews were used to explain and review the role of collaborative e-government in the Surabaya Intelligent Transportation System.

## **4. Results and Discussion**

### **4.1 Collaborative E-Government in Managing Road Traffic Systems**

Information and technology cannot currently be divided by organization, whether profit-oriented organizations or non-profit oriented ones. The adoption of technology in the government sector aims to provide good information as an effort to enhance services to the public to increase transparency, effectiveness, efficiency, and accountability in the administration of government. According to the Open Government Directive (2009), collaboration strengthens the effectiveness of government by promoting alliances and collaboration within the central government, across government levels and within the government and private sectors. Collaboration emerges due to a desire for sharing culture and integrated regulation to improve efficiency, effectiveness, transparency, and accountability in administering the government. Meanwhile, factors that influence the creation of e-Government. Richard (2014) argues that the critical enablers for e-Government remain technology, citizens, and processes. It is also supported by Al-Khoury (2012), and Richard (2014) claims that the core of e-Government encompasses citizens, technology, value and economy. Collaborative e-Government framework considering as follows:

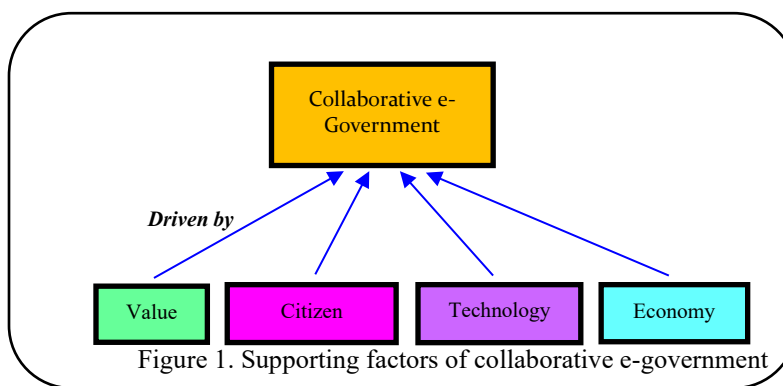


Figure 1. Supporting factors of collaborative e-government

#### 4.1.1 Value

Value-driven factors made the government provide better decision-making capabilities, boost good service provisions and achieve domain-specific goals. In addition, value has a significant impact on how the implementor creates more innovation to answer all restraining factors. For example, the program of “one agency, one innovation” has triggered the government to solve traffic accidents. Collaboration in managing traffic is crucial to deal with one actor to support the SITS and decrease accidents. The government has managed cooperative works among Transportation Office, Big City Resort Police ((Local term: Polrestabes) of Surabaya, Court (local term: Pengadilan Negeri) of Surabaya to crackdown traffic offenders.

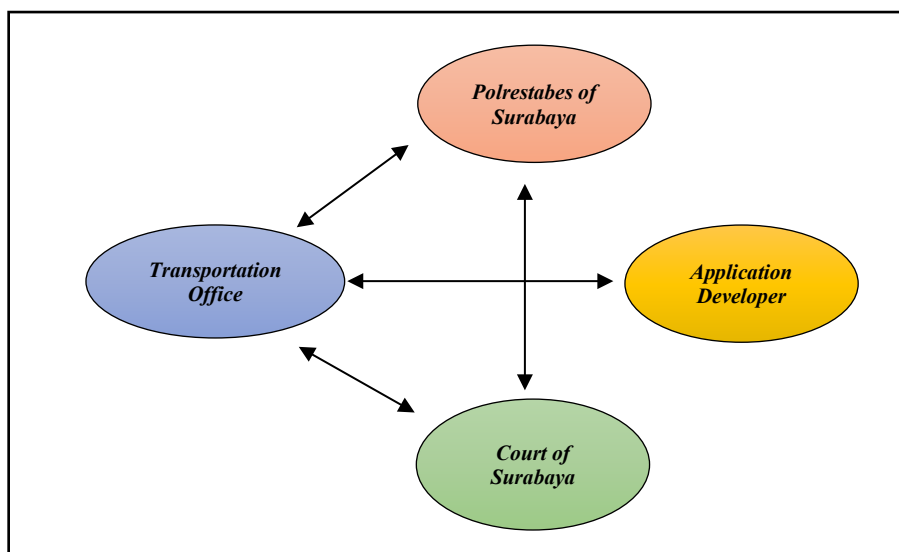


Figure 2. SITS concept

#### 4.1.2 Citizen

The citizen force has driven the government to provide a citizen participation platform to participate and interact with the governments. Citizen involvement is also the success key to managing road traffic accidents. By SITS application, the community can access current traffic situations or directly report to the government if there is an accident. Furthermore, through Facebook and Twitter, SITS also distributes video recordings for the public as a form of education on various types of violations committed by drivers and openness about current incidents; SITS even uses Facebook as a channel to embrace society.



Figure 3. SITS Information through Facebook

#### 4.1.3 Economy

Efficiency is a factor to create an ITS system in managing road traffic accidents. However, a lack of Human resources is the biggest challenge in enforcing traffic laws (Sulistyanto 2017). The small number of police resources had affected the management of the traffic system, as the ideal structure is 1:350; instead, it was currently 1:750 coverage in one zone (city/district) in 2017 (Movanita 2017).

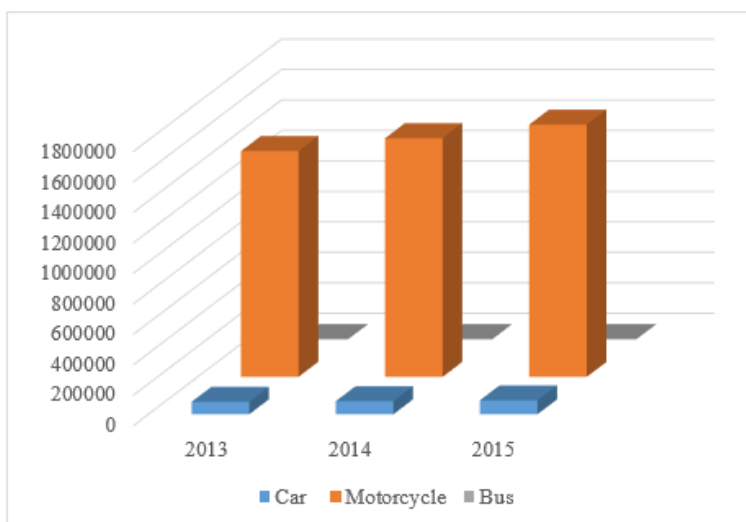


Figure 4. Total number of vehicles in Surabaya City

Figure 4 indicates that from years 2013 until 2015, motorcycles had dominated the roads in Surabaya. The number of motorcycles was 1.655.891 and cars at 91.043 in 2015, and lastly, the number of the bus at 2.936 in 2015 (BPS 2018). It was not proportional concerning the comparison on the number of human resources to surveillance and to carry out the function of law enforcement. Hence, SITS is significantly necessary to assist the regulation task to prevent such conditions as crime and manage the number of vehicles; thus, the number of accidents eventually be reduced. In addition, adopting technology can save the budget. It also has an excellent effect for Surabaya city that it can save such budget as spending on procurement of papers for ticketing, which are replaced by electronic mail (Wijayanto 2019).

#### 4.1.4 Technology

Technology-driven forces have encouraged policymakers to cooperate and innovate by offering complimentary and easy-to-use communication resources and networks. Technology also helps the government connect multi actors and continuously innovate over collaboration, for instance, enabling to sync data, people, and resources together. According to Gray (2017), technology also plays a leading role as a collaboration tool. However, it is also considered on whom it is implemented. Successful technology adoption is complex because it relies on conceptualization, design, implementation, adoption, and usage (Bwalya 2018). SITS integrates ICT with transport engineering to carry out the planning, operation, maintenance and regulation of the transportation system. Additionally, SITS system also synchronize with the civil registry service (local term: *Disdukcapil*) in which the system works if someone violates the traffic, the violator will be automatically be recorded in the ITS database in the form of a face, vehicle plate number, type of vehicle used, time of the incident, and also the offenders or violators are required to pay the fine within 15 days. Furthermore, if they do not confirm the system, they will be automatically blocked by electronic registration and identification (ERI) (Sulistyanto 2017).

#### 4.2 The Barriers of Surveillance System in Surabaya

In Singapore, the level of surveillance activities conducted by the authorities has increased dramatically, especially in public places such as on public transport or the road. Drivers have also been recording videos of their driving experiences and publicizing controversial driving behaviours. In some severe accidents, the police will also use the recordings for prosecution purposes (Jiow and Morales 2015). However, the implementation of Surveillance systems in Jakarta impacts deterrence towards the perpetrator as there will be no reason to be denial (Abdi 2018). In a nutshell, CCTV effectively detects, reduces violations, and preventing any types of criminal acts (Taylor, Lee, and Willis 2017; Wells et al. 2006). On the other hand, Surabaya, which has applied new technology, met a disruption as a common city with a new technology uptake a new challenge to adapt. According to Merilee S. Grindle in Subarsono (2005), successful implementation is affected by two variables, content of policy and context of policy.

Additionally, the content consists of how the target group interest in the scope of policy was, the benefits by the target group, and whether the program is on target. On the other hand, the context covers strategic actors, characteristics of agencies, compliance and acceptances. Like other metropolitan cities, the implementation of surveillance systems faces such obstacles as lack of understanding and obeying the rules, insufficient coordination among agencies, and overlapping regulations. Grindle Theory was used in this study to analyse the problems. SITS is a unique platform for integrating traffic.

Nevertheless, SITS still face some obstacles, such as control, especially at the time of reporting. It is because SITS platform is different to human eyes in which the community can directly interact with stakeholders related to these problems or press the panic button on the application system. Meanwhile, SITS is only limited to the community

##### *External Barriers*

**Lack of Understanding on Traffic Regulation;** As seen in table 1, the understanding and awareness of obeying traffic rules in Surabaya are still weak. Thus, the government and police departments should make socialization or dissemination about traffic awareness as their necessity.

**Unstable Electricity;** The program will succeed if it is provided with adequate facilities and infrastructure. Sometimes Surabaya had unstable electricity conditions as mentioned by (Sari 2018); SITS (Surabaya Intelligent Traffic System) has problems related to communication networks, while the electricity is down, it affects the surveillance system (CCTV). The capacity of the internet also has different quality which creates another challenge to provide equally speed internet in Surabaya.

##### *Internal Barriers*

**Regulation must follow the dynamic of life;** The highly dynamic culture of city life will undoubtedly impact new challenges in meeting quality public services. According to Solution Architect Ericsson Indonesia (Setiaji 2019) retrieved from Techinasia.com, IoT (Internet of Thing) has three main elements, i.e. Physical infrastructure, Internet Network and Application. Hence, the government under Presidential Regulation Number 95-year 2008 about One Data Nation is supposed to integrate within agencies to strengthen. Thus the results can be used as a reference for decision making in planning development and problem-solving.

**Coordination among stakeholders is weak; The accident when Gubeng Street was sink in 2018 and was successfully resolved not more than one week was one of governmental breakthroughs in public service.** Through surveillance cameras, the government was able to monitor the roadwork progress. Therefore, the government should learn and will be enforced to build coordination among multi-stakeholders in reducing the number of traffic accidents. As a leading government in Intelligent Traffic Systems in East Java, Surabaya has collaborated with other regional governments to support the implementation of SITS and conducted transferring knowledge. On the other hand, Law Enforcement of E-TLE was still considered unsuccessful. The government was not able to integrate data on vehicle owners.

Furthermore, it needs coordination among the Transportation office, the police, and other related agencies; otherwise, it was only settled for Surabaya (Haq 2019). At last, the number of cameras installed up to 2019 was 23, which were able to identify details of violations. In conclusion, there was a need to increase the number of CCTV and improve coordination among stakeholders.

## 5. Conclusion

In conclusion, the findings of this study suggest that collaborative e-government is significantly necessary to be implemented. Additionally, the success in collaborating intelligent traffic systems is influenced by a sustained value-driven, citizen-driven, economic driven, and technology-driven. This study is expected to contribute to the literature as the findings are closely related to multi stakeholders' theory consisting of government, business, academician, non-government organization, and mass media. Hence, this model is beneficial to respond to what society needs and to create a better collaboration considering the elements of collaborative e-government

## Acknowledgements

We would like to thank you for Universiti Malaysia Terengganu for this excellent collaboration work.

## References

- Abdi, Alfian Putra. 2018. "Cerita Pelanggar E-Tilang : Tak Sangka Ada Kamera Yang Mengawasi." *Al-Khourri, Ali*. 2012. "EGovernment Strategies the Case of the United Arab Emirates (UAE)." *European Journal of EPractice* 17(September 2012):126–50.
- Ansell, Chris, and Alison Gash. 2008. "Collaborative Governance in Theory and Practice." *Journal of Public Administration Research and Theory* 18(4):543–71. doi: 10.1093/jopart/mum032.
- Batory, Agnes, and Sara Svensson. 2019. "The Fuzzy Concept of Collaborative Governance : A Systematic Review of the State of the Art." *Central European Journal of Public Policy* 13(2):28–39. doi: 10.2478/cejpp-2019-0008.
- BPS. 2018. *Banyaknya-Kendaraan- Bermotor-Menurut-Jenisnya-2009-2015*. Surabaya.
- Kelvin J. Bwalya. 2018. *The E-Government Development Discourse: Analysing Contemporary and Future Growth Prospects in Developing and Emerging Economies*.
- D Holmes. 2001. *EBusiness Strategies for Government*. Nicholas Brealey Publishing.
- Eppstein, David. 1998. "Finding the k Shortest Paths." *SIAM Journal on Computing* 28(2):652–73.
- Haq, Ahmad Zaimul. 2019. "Tunggu Payung Hukum , E-Tilang Masih Berlaku Untuk Plat L." *Tribun*.
- Jiow, Hee Jhee, and Sofia Morales. 2015. "Article Hee Jhee Jiow Lateral Surveillance in Singapore." *Surveillance & Society* 13(3/4):327–37.
- Makedon, Fillia, Calliope Sudborough, Beth Baiter, Grammati Pantziou, and Marialena Conalis-Kontos. 2015. "A Safe Information Sharing Framework for E-Government Communication Fillia." 1–11.
- Movanita, Ambaranie Nadia Kemala. 2017. "Polri Akui Jumlah Personel Polisi Belum Ideal Polri Akui Jumlah Personel Polisi Belum Ideal." *Kompas.Com*, February.
- Muslimin, W. 2018. "Determinants That Influence Citizen's Usage of Different E-Government Services: A Malaysian Case Study." The University of Queensland.
- Nurul Dwi Purwanti. 2016. *Collaborative Governance (Kebijakan Publik Dan Pemerintahan Kolaboratif, Isu-Isu Kontemporer)*. Yogyakarta: Center for Policy & Management Studies FISIPOL Universitas Gadjah Mada .
- Richard, Olusoyi Olatokunbo. 2014. "E-Government In Developing Countries : The Case Of Nigeria Olusoyi Olatokunbo Richard , Ashaye." (April).
- Sari, Agustin Eka Karina. 2018. "Efektivitas Sistem Pengawasan Dengan Cctv Dalam Meningkatkan Kedisiplinan Berlalu Lintas Di Kota Surabaya."
- Setiaji, Danang. 2019. "Apa Itu Smart City Dan Tantangan Penerapannya Di Internet of Things Dan Smart City

- How It Works : Internet of Things.” 1–8.
- Snyder, Hannah. 2019. “Literature Review as a Research Methodology : An Overview and Guidelines.” *Journal of Business Research* 104(March):333–39. doi: 10.1016/j.jbusres.2019.07.039.
- Subarsono, AG. 2005. “Analisis Kebijakan Publik: Konsep, Teori Dan Aplikasi.”
- Sulistiyanto, Arief. 2017. “Polri Akui Jumlah Personel Polisi Belum Ideal.” *Kompas*, February, 16592601.
- Taylor, Emmeline, Murray Lee, and Matthew Willis. 2017. “Trends & Issues Police Detainee Perspectives on CCTV.” *Australian Institute of Criminology Trends & Issues in Crime and Criminal Justice* (537):1–13.
- Wahyudrajad. 2019. “Interviewed by Hadi, Syaikhul, 2019. CCTV Di Surabaya Sudah Dilengkapi Pengenal Wajah.” 2019.
- Welch, Eric W. 2012. “The Rise of Participative Technologies in Government.” *Transformational Government through E-Gov Practice: Socioeconomic, Cultural, and Technological Issues* (December):347–67.
- Wells, Helene, Troy Allard, Paul Wilson, and Helene A. Wells. 2006. *Crime and CCTV in Australia: Understanding the Relationship*. 1st ed. Australia: Centre for Applied Psychology and Criminology, Bond University.
- Wijayanto. 2019. “Terapkan Teknologi Informasi, Pemkot Surabaya Hemat Anggaran Rp 19 M.” *Radar Malang (Jawa Post)*, March.

## Biographies

**Irfan Murtadho Yusuf** a student of Doctoral Public Administration in Universitas Diponegoro. His First degree in Public Administration Program in Universitas Diponegoro years 2018, and Finished Master Program of Public Management in Universiti Utara Malaysia years 2020. He is a candidate doctoral who really interests in e-Government research, and environmental management.

**Retno Sunu Astuti** is a doctoral holder and works as a senior lecturer in the Department of Public Administration who interests in governance, public management and public policy. As a senior lecturer, she has been works as head of center for policy and development strategy studies, and secretary of Master Public Administration Program, Universitas Diponegoro. She is also a member of the team for drafting Indonesian National Work Competency standards in the Professional, Scientific and Technical activity category, Research and Development of Science Main Group in the Public Policy Analyst Position.

**Kismartini** is a Doctoral holder and works as a senior lecturer in the Department of Public Administration, Faculty of Social and Politics, Universitas Diponegoro, Semarang. As a lecturer she has been invited as a speaker in several universities, an examiner, and the reviewer for journal and proceeding articles, and also has published numerous articles and books. Her expertise is in Public Policy Analysis, Environmental Management, and Research Method. In addition she is also a member of IAPA (Indonesian Association for Public Administration), and ASIAN (Asosiasi Ilmuwan Administrasi Negara). Since her works in education, she has served in academic positions, including as Head of Department of Public Administration, FISIP, Universitas Diponegoro (2004-2008); as a Secretary of The Public Administration Doctoral Study Program (2014-2016); as Chair of the Master of Public Administration Study Program (2016-2021).

**Dedy Afrizal** is a lecturer in Management Program, STIE Tuah Negeri Dumai, Riau, Indonesia. Received the Master degrees from Universiti of Riau Indonesia, 2013. Moreover, he is PhD candidate at Universiti Utara Malaysia. His current research interest includes E-Government, e-Service, and Technology Adoption in public sector.

**Jumadil Saputra** is a PhD holder and works as a senior lecturer in the Department of Economics, Faculty of Business, Economics and Social Development, Universiti Malaysia Terengganu, Malaysia. He has published 125 articles Scopus/ WoS indexed. As a lecturer, he has invited as a speaker in numerous universities, the examiner (internal and external), the reviewer for article journal and proceeding, the conference committee, journal editorial board, and others. He is a professional member of the International Business Information Management Association (IBIMA), Ocean Expert: A Directory of Marine and Freshwater Professional, and Academy for Global Business Advancement (AGBA). His research areas are Quantitative Economics (Microeconomics, Macroeconomics, and Economic Development), Econometrics (Theory, Analysis, and Applied), Islamic Banking and Finance, Risk and Insurance, Takaful, i.e., financial economics (Islamic), mathematics and modelling of finance (Actuarial).