

Optimizing the Role of ICT and Citizen Participation: Analysis of Smart City Governance Implementation in Jakarta, Indonesia and Kuala Lumpur, Malaysia

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Abstract. The implementation of Smart City Governance (SCG) in Southeast Asia has gained attention as a way to improve urban life by integrating Information and Communication Technology (ICT) and citizen participation. This study examines the implementation of SCG in two Southeast Asian cities, Jakarta, Indonesia, and Kuala Lumpur, Malaysia, through online news articles analysis and data Twitter. The study employs a qualitative research method using NVivo 12 Plus software for data analysis. The study finds that the use of ICT in smart city governance in Jakarta and Kuala Lumpur has increased citizen participation through social media and government apps, especially Twitter. Analysis of Twitter data highlights the importance of monitoring public sentiment and differences in views related to the implementation of smart city governance. Citizen participation has a significant impact in improving transparency and the quality of public services. Digital inclusion is key in ensuring inclusive citizen participation and overcoming gaps in access. The study recommends that Jakarta can learn from Kuala Lumpur's success and enhance its communication strategies to increase public awareness and participation while also improving the quality and accessibility of ICT services to facilitate citizen engagement. This research provides insights for policymakers and practitioners in the development of SCG in Southeast Asia.

Keyword: Smart City Governance, ICT, Citizen Participation, Jakarta, Kuala Lumpur, NVivo 12 Plus Analysis.

1 Introduction

In today's digital age, the use of social media and online news platforms like Twitter has changed the way governments, citizens, and the general public interact [1]–[3]. Jakarta, the

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Indonesian capital, and Kuala Lumpur, the Malaysian capital, have adopted the principles of smart city governance by optimising the role of Information and Communication Technology (ICT) and citizen participation [4]–[6]. Twitter analysis revealed that in recent years, residents of Jakarta and Kuala Lumpur have actively used the platform to convey views, complaints, and aspirations related to urban issues [7], [8]. Online news is also an important source of information for the public to follow the development of smart city government projects and related policies.

Previous research has shown that data analysis from Twitter can provide valuable insights into public perceptions and responses to urban issues and government policies. For example, a study conducted by Bakar et al. (2022), Hirsh (2017), Vichiensan et al. (2022), Wang et al. (2022), Yap et al. (2021), and Zhao et al. (2019) revealed that the use of Twitter by residents of Jakarta and Kuala Lumpur reflects their interest in improving infrastructure, public transport, and sustainable environmental management [9]–[14].

In addition, online news analysis has also proven to be a significant source of information for understanding the implementation of smart city governance in Jakarta and Kuala Lumpur. According to research conducted by Parlina et al. (2021), online news broadly covers government projects related to the application of smart technology, citizen participation, and policies that drive sustainable city growth [15]. Other research by Ahmad & Jolly (2017) and Rocha et al. (2023) suggests that a combined analysis between Twitter data and online news can provide a more comprehensive understanding of citizens' views and preferences on smart city development. They show that integrating data from these sources can help in formulating more responsive and effective governance strategies [16], [17].

Analyzing Twitter data and online news is crucial for understanding public perceptions and responses to smart city governance in Jakarta and Kuala Lumpur. Residents' engagement on Twitter reveals their interest in infrastructure, public transport, and sustainable environmental management. Online news analysis also provides insights into government projects related to smart technology, citizen participation, and policies driving sustainable city growth. Further research is needed to optimize the role of ICT and citizen participation in smart city governance. Combining Twitter data and online news analysis can provide a comprehensive understanding of citizens' views and preferences on smart city development, enabling the formulation of responsive and effective governance strategies. This integrated approach is essential for enhancing the implementation of smart city initiatives and promoting inclusive citizen participation in shaping the future of Jakarta and Kuala Lumpur.

Referring to previous research using Twitter analysis and online news, emphasising the importance of data from these sources in gaining an in-depth understanding of the implementation of smart city governance in Jakarta and Kuala Lumpur. In this study, we will analyse how the governments of Jakarta and Kuala Lumpur use ICT and citizen participation in the implementation of smart city governance. The analysis of data from Twitter and online news will provide a comprehensive insight into the perception and response of citizens to government initiatives to improve the quality of life in both capitals.

2 Research Method

The study will select representative samples from Jakarta, Indonesia, and Kuala Lumpur, Malaysia, including stakeholders involved in smart city governance. The sample will take into account demographic diversity, geographical regions, and citizen participation. Twitter analysis and online news analysis will be used to track government-related conversations in smart cities in Jakarta and Kuala Lumpur. The researchers will analyse relevant tweets to identify patterns, feelings, and problems in citizen conversations. Online news analysis will gather articles and reports related to smart city governance in both cities.

The text analyses Twitter analysis and online news data using NVivo 12 Plus to identify key issues in citizen conversations and news [18]. Quantitative analysis measures patterns, trends, and relationships between issues related to smart city governance using frequency, sentiment, and inter-topic correlations. The study aims to analyse the role of ICT and citizen participation in the implementation of smart city governance in Jakarta and Kuala Lumpur. The findings will discuss and understand the feelings and analysis of public conversations on social media [19], including recommendations for improving the effectiveness of smart city governance. The conclusions will provide a deeper understanding of the implementation of smart city governance and citizen participation in these cities.

3 Results and Discussion

The use of ICT in smart city governance in Jakarta and Kuala Lumpur has increased citizen participation through digital platforms such as social media and government apps. People in both cities actively use Twitter to express aspirations, complaints, and ideas about urban issues. However, gaps in access to and understanding of technology persist, potentially reducing participation among community groups.

Social media, such as Twitter, significantly facilitates communication between governments and citizens [20], [21]. Citizens can interact with government accounts, share input, and access urban policies, enabling participation in decision-making, policy direction, and increased transparency. Jakarta and Kuala Lumpur differ in ICT implementation strategies, digital infrastructure maturity, policy, and government engagement. Collaboration between governments, private sector, and civil society is crucial for addressing technical challenges, regulatory barriers, and inclusive citizen participation through ICT.

3.1 Trends in Public Sentiment Smart City Governance

Twitter data analysis highlights the significance of monitoring public sentiment on urban issues in Jakarta and Kuala Lumpur. Governments can identify trends, concerns, and problems using analytical tools. However, managing Twitter's high volume, irrelevant content, and diverse opinions can be challenging. Jakarta uses social media for official information and government campaigns, while Kuala Lumpur focuses on official information and campaigns. Strategies tailored to local contexts are needed to optimize social media's role in smart city governance.

Citizens' opinions on Twitter vary on the implementation of smart city governance, with some expressing positive feelings about technological innovation, efficiency, and improved quality of life. Government participation in understanding benefits and concrete measures can strengthen citizens' positive feelings towards smart city governance initiatives.

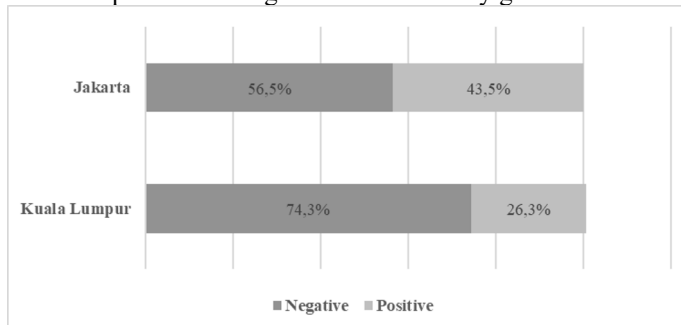


Fig. 1. Total of public sentiment around Smart City Governance Implementation in Jakarta, and Kuala Lumpur using NVivo 12 Plus.

Based on data analysis using NVivo 12 Plus, such as in Fig. 1, trends in public sentiment toward Smart City Governance Implementation in Jakarta and Kuala Lumpur were revealed. Kuala Lumpur has a dominant negative sentiment, with 74.3% expressing negative views and 26.3% expressing positive views. Jakarta has a more balanced atmosphere, with 56.5% of negative views and 43.5% of positive views. The findings offer valuable insights for research on optimizing ICT roles and citizen participation in smart city governance. Understanding and addressing the specific concerns and challenges faced in the implementation of each city's plan is essential to optimizing citizen participation and improving public perception.

In addition, the Twitter data revealed a significant impact on citizens' participation in smart city governance in Jakarta and Kuala Lumpur. Involving citizens in policy planning, decision-making, and evaluation improves transparency, accountability, and the quality of public services [22], [23]. Twitter sentiment analysis shows that citizens' participation in decision-making impacts their attitude towards smart city governance. Jakarta residents expressed negative feelings about traffic congestion, infrastructure development, and public services, while Kuala Lumpur residents expressed positive feelings about increased transport efficiency and technology access. Governments should proactively manage citizens' feelings, correct shortcomings, and strengthen open communication to build citizen confidence in smart city governance implementation. By actively providing input, communicating aspirations, and collaborating with governments, citizens can contribute to policy planning, decision-making, and evaluation of urban programs. This participation increases government transparency, accountability, and improves public service quality. By involving citizens in decision-making, governments can access local knowledge, understand citizens' needs, and respond with more relevant and effective solutions.

Analysis of Twitter data revealed that citizen participation on the platform can raise public awareness of urban issues and encourage broader dialogue. Public discussions on Twitter can expand the scope of citizen participation, engage new groups, and encourage innovative thinking and joint problem-solving. Although Jakarta and Kuala Lumpur show significant citizen participation, differences in engagement, topics discussed, and government responses can affect the implementation of smart city governance.

Citizens' participation is essential, and digital inclusion is essential to overcome gaps in access, skills, and socio-economic disparities. Governments should ensure inclusive participation, considering the challenges faced by vulnerable or unrepresented groups on Twitter.

3.2 Word Cloud Trends around Smart City Governance

Cloud Word analysis provides visualizations that describe words that often emerge and are related to the role of ICT and citizen participation in the implementation of smart city governance in Jakarta (Fig. 2) and Kuala Lumpur (Fig. 3). The word cloud provides a clearer understanding of the topics most discussed, and the main concerns of the community related to the application of information and communication technologies and citizen participation in efforts towards smart cities.



Fig. 2. Word cloud smart city governance implementation in Jakarta using NVivo 12 Plus and wordart.com.

Analysis of a Word Cloud By considering the words that emerge in the Word Cloud, one can gain insight into key issues related to the role of ICT and citizen participation in the implementation of smart city governance in Jakarta, Indonesia. Here are a few phrases of analysis based on those words; The high frequency of the words "kasih" and "terima" indicates the importance of interaction between government and citizens in implementing smart city governance in Jakarta. Effective exchange of information and ongoing communication between governments and citizens are essential to creating greater involvement in urban decision-making.

The emergence of the words "rute", "naik", "halte", and "turun" indicates that public transportation is a significant issue in the implementation of smart city governance in Jakarta. Increased efficiency, optimal route availability, and a good travel experience for citizens are objectives to be achieved through the use of ICT. The words "arah" and "koridor" indicate the importance of effective urban space management in smart city governance in Jakarta. Good corridor planning and arrangement can improve transport efficiency, reduce congestion, and improve citizens' travel experience. The word "silakan" indicates the importance of readiness and accessibility to urban services for citizens. Encouraging citizen participation and providing easy and clear access to services and information are important aspects of creating a more inclusive and citizen-oriented city.

The Word Cloud analysis highlights the importance of public transportation, city space management, and citizen participation in Jakarta's smart city governance. Enhancing ICT and citizen participation is crucial for creating smarter, more sustainable cities [24], [25]. Key factors include good communication, increased transport efficiency, and accessible services.



Fig. 3. Word cloud smart city governance implementation in Kuala Lumpur using NVivo 12 Plus and wordart.com.

Analysis of Word Cloud by considering the words that emerge in Word Cloud can provide an overview of key issues related to the role of ICT and citizen participation in the implementation of smart city governance in Kuala Lumpur, Malaysia. Here are a few phrases of analysis based on those words; The emergence of the words “bas” and “lalu” indicates that public transportation, especially buses and routes, have become a significant issue in the implementation of smart city governance in Kuala Lumpur. Optimizing the transport system, increasing efficiency, and improving the quality of public transport services can enhance citizens’ mobility and improve urban quality of life.

The words “untuk”, “kami” and “anda” indicate the importance of collaboration between governments and citizens in implementing smart city governance. Citizens’ participation in decision-making and giving input to governments is essential to creating cities that are more responsive to their citizens’ needs. The frequency of the word "maaf" indicates the presence of awareness of difficulties or obstacles in the implementation of smart city governance in Kuala Lumpur. The importance of overcoming these challenges with effective and responsive solutions is something to be taken into account in efforts to create smarter and more sustainable cities.

The words “akan” and “boleh” indicate efforts to increase citizen participation and the government’s readiness to receive input and feedback from citizens. A government that is open and responsive to the aspirations and needs of its citizens will help build a more inclusive and participatory city. The emergence of the word “tren” indicates the importance of the use of technology and ICT in the implementation of smart city governance in Kuala Lumpur. Following the latest technology trends and using them effectively can help improve efficiency, transparency, and the quality of public services [26].

The Word Cloud analysis highlights the focus on public transportation, citizen participation, difficulty management, and technology in Kuala Lumpur's smart city governance. Key factors include collaboration between governments and citizens, increased transport efficiency, and technological solutions to create a smarter, more sustainable city [27], [28].

4 Conclusion

Based on the analysis of NVivo 12 Plus, the study concluded that Twitter data analysis and citizen participation played a crucial role in smart city governance in Jakarta and Kuala Lumpur. Sentiments on Twitter vary regarding the implementation of smart city governance, but active citizen involvement can improve transparency, accountability, and the quality of public services. The importance of strategies tailored to local contexts and digital inclusion is also a key highlight in optimizing the role of social media in smart city governance.

In addition, the study also found that the implementation of smart city governance in Jakarta was heavily influenced by the interaction between government and citizens in performing ICT roles and citizen participation. Public transport, city space management, and citizen participation are the focus in the effort to create a better smart city in Jakarta. Meanwhile, in Kuala Lumpur, public transportation, citizens’ participation, difficulty management, and the use of technology are key concerns in the implementation of smart city governance. Cooperation between governments and citizens, increased transport efficiency, as well as the application of appropriate technological solutions are key factors to be considered in efforts to create a smarter and more sustainable city in Kuala Lumpur, Malaysia.

This research has made important contributions to the theory and practice of smart city governance. The findings highlight the importance of analyzing Twitter data and citizen participation in understanding public sentiment and improving the implementation of smart city governance. The recommendations can be used by governments in Jakarta, Indonesia,

and Kuala Lumpur, Malaysia, to optimize the role of ICT and citizen participation in efforts to create smarter and more sustainable cities. In addition, the study also highlights the importance of strategies tailored to local contexts and digital inclusion in smart city governance. These findings can provide guidance for researchers and practitioners to develop and implement effective measures in building better smart cities.

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