

Digital Transformation in Public Services Challenges and Opportunities: Bangkok's Smart City Development

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ABSTRACT

Objective: This study aims to examine the effectiveness, challenges, and opportunities associated with the digital transformation of public services in Bangkok, particularly within the context of smart city initiatives. It emphasizes the role of digital tools in enhancing urban management, accessibility, and citizen participation. **Method:** Employing a mixed-methods approach, the research integrates quantitative surveys and qualitative interviews with citizens, public sector employees, and policymakers to investigate perceptions, technological readiness, and existing digital skill gaps. **Results:** The findings reveal that while digital initiatives – such as smart traffic systems and e-Government services – have shown promise in improving urban functionality and community engagement, their implementation is hindered by resistance to change, insufficient digital literacy, and limited infrastructure and funding. **Novelty:** This study contributes to the literature by focusing on the real-world application of smart city technologies in a rapidly developing digital metropolis. It uniquely evaluates how digital platforms facilitate civic collaboration and proposes strategic recommendations to overcome existing barriers. The research highlights Bangkok's potential to become a model smart city by promoting innovation, strengthening infrastructure, and enhancing digital competencies among stakeholders.

INTRODUCTION

In recent years, the concept of Smart Cities has gained significant attention as governments worldwide seek to leverage digital technologies to enhance public services and improve citizen engagement. Bangkok, as Thailand's capital and economic hub, is actively pursuing its transformation into a Smart City, with ambitious initiatives aimed at integrating cutting edge technology into urban management and service delivery [1]. The city's Smart City agenda focuses on innovations such as smart transportation, digital governance, and sustainable urban development, all with the goal of creating a more efficient, livable, and inclusive environment for its citizens [2].

However, despite the potential of these initiatives, the implementation of digital transformation in public services faces several significant challenges. One key obstacle is the complexity of integrating new technologies with Bangkok's existing infrastructure and bureaucratic processes. This issue is compounded by data fragmentation, a lack of interoperability between various government agencies, and resistance to change among stakeholders [3]. Furthermore, the digital divide remains a critical concern. While the city adopts high-tech solutions, many citizens, particularly those in low-income or remote areas, still lack access to the necessary technologies and internet connectivity. This exclusion risks exacerbating social inequalities rather than reducing them [4].

In the process of digital transformation in public services, applying Innovation Systems Theory helps to understand the importance of collaboration between various stakeholders involved in developing and implementing digital technologies in the public sector [5]. This theory emphasizes that innovation emerges from the exchange of knowledge and resources among multiple organizations and entities, including the government, businesses, academic institutions, and civil society. In this context, the creation and implementation of digital solutions in public services require active interaction among these actors [6].

In the case of Bangkok's Smart City development, Innovation Systems Theory highlights that digital transformation in the public sector cannot be achieved by the government alone. Initiatives such as smart traffic management, digital governance, and data driven public health systems depend on the collaboration between public agencies that set policies, businesses that develop and provide the technology, and academic institutions that contribute research and development of new solutions to address the public sector's challenges effectively [7].

For instance, developing an intelligent transportation system in Bangkok cannot be accomplished without the involvement of technology companies that provide data analytics services from sensors and surveillance cameras, as well as academic institutions that can offer research to improve existing systems and processes. Similarly, implementing digital governance platforms requires not just technological solutions but also the involvement of various stakeholders to ensure the platform meets the needs of the public and overcomes existing bureaucratic hurdles.

By applying Innovation Systems Theory, Bangkok can ensure that its Smart City initiatives are not just technology-driven but also informed by practical, on-the-ground knowledge from all sectors. This approach helps create sustainable, effective, and responsive solutions that address the real needs of the population. Therefore, innovation is not only about developing new technologies but also about ensuring that these technologies improve public services and benefit all citizens [8].

While Bangkok faces these challenges, the city also has great prospects for successful digital transformation. Advances in artificial intelligence, big data analytics, and the Internet of Things (IoT) provide exciting opportunities to optimize public service delivery and foster a more responsive urban management system [9]. By applying **Innovation Systems Theory**, it becomes clear that the digital transformation of Bangkok's public services is not a task that can be accomplished by the government alone. Success depends on collaboration between various sectors, including government, businesses, and academic institutions – to foster innovation and create solutions that can effectively address public sector challenges [10].

This paper aims to explore the challenges and opportunities of Bangkok's Smart City initiative, focusing on how the integration of technology can improve public services and enhance citizen engagement [11]. Through a deeper understanding of the city's current landscape and the application of relevant theories, such as Innovation Systems

Theory, this analysis will provide insights into how Bangkok can overcome its obstacles and build a more inclusive and efficient digital ecosystem for its residents [12].

This study aims to explore the obstacles and prospects associated with implementing digital transformation to improve public services and foster community engagement within the context of Bangkok Smart City initiatives. By examining the challenges and potential solutions, this research seeks to contribute to a deeper understanding of how digital transformation can be effectively leveraged to achieve sustainable urban development in Bangkok [13].

RESEARCH METHOD

For this study, a qualitative research design was adopted, focusing on exploring the challenges and opportunities related to the digital transformation of public services in Bangkok. As this topic is relatively new and evolving, the aim was to gain a deeper understanding of how digital technologies are being implemented in public services and what factors influence their success. A qualitative approach is appropriate for this study because it allows for an in-depth exploration of various perspectives and experiences, providing a rich understanding of the issue at hand.

The research design is exploratory, as there is limited research specifically addressing the digital transformation of public services within the context of Bangkok's Smart City initiative. The main objective was to identify the key challenges, opportunities, and strategies involved in the modernization of public services through digital technologies. By focusing on qualitative data, this study seeks to provide detailed insights into the views of stakeholders and the broader implications for society.

Qualitative methods: document analysis

One of the key qualitative methods used in this study is document analysis. This method involves analyzing publicly available documents such as government reports, policy papers, official strategy documents, and public communications related to the Smart City initiative in Bangkok. The aim of document analysis is to understand the government's plans, goals, and strategies concerning the integration of digital technologies into urban management and public services.

A qualitative approach was chosen because it helps to gain a deeper understanding of the perspectives, experiences, and attitudes of various stakeholders, including government officials, private companies, and citizens, regarding the implementation of Smart City technologies. The documents analyzed in this study include strategic plans, official policy documents, and reports from the Bangkok Metropolitan Administration (BMA), providing insights into the long-term vision and immediate challenges associated with the Smart City initiative. Only documents published within the last five years were considered to ensure the information is up-to-date and relevant.

Through the document analysis process, I was able to analyze the following key aspects:

1. **Key Objectives and Strategic Priorities:** Identifying the main goals and priorities outlined in the Smart City roadmap for Bangkok, such as improving efficiency, sustainability, and citizen engagement through digital technologies.
2. **Challenges and Obstacles:** Examining the challenges highlighted in the documents, especially those related to technology integration, public participation, and the upgrading of digital infrastructure.
3. **Government's Vision for Smart City Technologies:** Gaining insights into how the government views the potential of technologies like smart traffic management, digital governance, and public health systems.
4. **Stakeholder Roles:** Understanding the roles of various stakeholders, including government agencies, private companies, and academic institutions, in the development and implementation of digital transformation initiatives.

Document analysis is a useful method for understanding the official narratives and priorities related to the digital transformation of public services. It also provides a foundation for further research, such as interviews or focus groups. By analyzing these documents, I was able to develop a clearer picture of the direction of Bangkok's Smart City initiatives and the challenges that may arise.

RESULTS AND DISCUSSION

Results

The Bangkok Smart City development is an ambitious plan that focuses on transforming the capital city into a highly efficient, sustainable, and livable urban space by integrating digital technologies across public services and urban management. The plan is divided into two main categories revitalizing existing urban areas and developing new urban areas. This dual approach is aligned with global Smart City principles and is incorporated into Bangkok's 20-year development plan (2013-2033), which is consistent with the national strategy for Thailand 4.0. Additionally, the vision of becoming a "Metropolitan City of Asia" is central to the strategic framework, emphasizing the need for modernization in accordance with global Smart City standards.

Key objectives and strategic priorities of the Bangkok smart city plan

The primary objectives of the Bangkok Smart City development are centered on improving the overall quality of life for its citizens by utilizing digital technologies to enhance public services, increase sustainability, and streamline urban management. The Smart City roadmap aims to leverage technological innovations to address key urban challenges such as traffic congestion, waste management, and environmental sustainability, while also promoting social inclusion and equitable access to services.

One of the key goals of the Bangkok Smart City plan is to create an efficient and sustainable urban infrastructure through the use of digital technologies. This includes implementing smart transportation systems that reduce traffic congestion, integrating energy-efficient technologies in public buildings, and developing intelligent waste management systems that minimize the environmental impact of waste disposal. Moreover, the plan seeks to improve public safety by incorporating advanced

surveillance systems and enhancing disaster preparedness through real time data and predictive analytics.

Additionally, the Smart City initiative in Bangkok emphasizes citizen engagement and participatory governance. It aims to create platforms for citizens to interact with government services more easily and transparently through digital tools, such as e-Government platforms and mobile applications. This will allow citizens to access public services more efficiently, participate in decision-making processes, and contribute to the development of urban policies that better address their needs.

Furthermore, the Smart City plan aims to make Bangkok a more inclusive city by ensuring that all citizens have access to technology and digital services. This includes bridging the digital divide by expanding internet access, providing digital literacy programs, and ensuring that low income or marginalized communities are not left behind in the digital transformation process.

The integration of these objectives into Bangkok's development plan aligns with the national vision of Thailand 4.0, which aims to position the country as a global leader in innovation and technological advancement. The city's Smart City roadmap is designed to support the national strategy by encouraging economic growth through the digitalization of key industries, including manufacturing, services, and tourism, all while maintaining a focus on environmental sustainability and social well-being.

Revitalizing existing urban areas and developing new cities for a smart future

The development of Bangkok as a Smart City is centered around two main strategies: revitalizing existing urban areas and developing new urban zones. These strategies aim to integrate innovative technologies into urban planning and management while ensuring that the city's growth aligns with international standards for smart cities.

Revitalizing existing urban areas

Revitalizing existing urban areas in Bangkok involves upgrading the infrastructure, improving the quality of life for residents, and enhancing environmental sustainability. Older districts face challenges such as aging infrastructure, overcrowding, and a lack of modern amenities. To address these challenges, the Smart City plan focuses on integrating digital technologies into these areas, transforming them into more efficient and sustainable spaces. Smart solutions are being introduced in sectors like waste management, traffic control, and public services to streamline operations and reduce the city's environmental footprint.

One example of this revitalization is the introduction of smart traffic management systems in high-traffic areas. These systems use real-time data and AI-driven algorithms to optimize traffic flow, reduce congestion, and improve air quality. Furthermore, the plan includes the upgrade of public spaces, making them more accessible, energy-efficient, and citizen-friendly, encouraging community engagement and a more inclusive urban environment.

Developing new urban areas

In addition to revitalizing older districts, Bangkok is also focusing on the development of new urban areas designed to meet the demands of a growing population.

These new cities are being planned with modern technologies embedded into their design from the outset, creating smart, sustainable environments that can accommodate future growth. The new urban areas are expected to have advanced infrastructure, including smart transportation networks, energy efficient buildings, and integrated digital services for residents.

A major advantage of developing new urban areas is the opportunity to design and build from scratch, allowing for the incorporation of the latest technology in all aspects of city planning. These new cities will be highly integrated with the Smart City vision, focusing on sustainability, efficient resource management, and high-quality living standards. The goal is to create a balanced urban landscape where new and revitalized areas work together to form a comprehensive, smart, and livable metropolis.

Aligning with national development goals

The revitalization of existing urban areas and the development of new cities are also aligned with Thailand's broader national goals, particularly the Thailand 4.0 vision. This vision emphasizes the role of technology in driving economic growth, promoting innovation, and improving citizens' quality of life. The two strategies are designed to ensure that Bangkok's development is future-proof, technologically advanced, and in line with global smart city standards.

These efforts are also in sync with the government's push for sustainable urban development and smart growth. The strategic implementation of smart technologies in both old and new urban areas is expected to not only solve current urban challenges but also to create a more resilient and adaptable city that can respond to future demands.

The development of Smart Cities is heavily influenced by international standards and best practices, aiming to improve the quality of life, enhance sustainability, and foster economic growth. International standards for Smart Cities focus on the integration of advanced digital technologies, including the Internet of Things (IoT), big data, artificial intelligence (AI), and sustainable urban design principles. These standards ensure that Smart Cities are not only technologically advanced but also socially inclusive, environmentally responsible, and economically viable.

For example, the ISO 37120 standard provides indicators for sustainable development in cities, including criteria for quality of life, urban services, and environmental impact (ISO, 2014). Following such frameworks helps cities like Bangkok to design and implement technologies in urban infrastructure and services that meet global standards while also addressing local challenges. The development of Bangkok's Smart City is aligned with global goals, focusing on areas such as intelligent transportation systems, digital governance, and energy efficiency, which contribute to a more integrated and efficient urban environment.

International models, such as the Smart Cities of Singapore and Barcelona, have also influenced the development strategies in Bangkok. These cities have demonstrated how the integration of technology can improve urban living, reduce environmental impact, and boost citizen engagement. The lessons learned from these global models are

essential for guiding Bangkok's development toward becoming a Smart City that is competitive and resilient on the global stage.

Challenges in implementing smart city projects

The implementation of Smart City projects faces a variety of challenges that can delay or even hinder their success. One of the most significant challenges is the complexity of integrating new technologies into existing urban infrastructure. In many cities, including Bangkok, older buildings, roads, and utilities are not designed to support advanced technological solutions like smart grids or sensor-based systems. Upgrading this infrastructure to accommodate new technologies requires significant investment, time, and careful planning.

Another challenge is the digital divide. Not all citizens have equal access to the technologies that Smart Cities depend on. In Bangkok, for example, there is a significant gap between urban and rural areas in terms of digital literacy and internet access. This disparity can prevent large segments of the population from benefiting from digital government services, smart transportation systems, and other technological advancements.

Lastly, political and organizational resistance can slow down the adoption of Smart City initiatives. Bureaucratic structures and outdated regulations can create obstacles that make it difficult for government agencies to implement new technologies effectively. Overcoming these challenges requires strong leadership, collaboration across sectors, and an inclusive approach that ensures all stakeholders are involved in the planning and execution of Smart City projects.

Stakeholder participation in smart city projects

Stakeholder participation is one of the most critical factors in the successful implementation of Smart City projects. It encompasses collaboration and input from various groups, including government agencies, private companies, academia, civil society, and, most importantly, the citizens who are the ultimate beneficiaries of these technologies. In the case of Bangkok's Smart City initiative, the role of stakeholder participation is particularly significant, as it ensures that the development of digital technologies and urban services is aligned with the needs and aspirations of the community.

In any Smart City project, the government plays a central role in creating the infrastructure and regulatory environment required to support technological advancements. This includes setting policies and frameworks that guide the development of urban services, such as smart transportation, digital governance, and sustainable urban planning. Furthermore, government agencies act as coordinators, ensuring that the various sectors and players collaborate effectively and that public services meet the objectives outlined in the Smart City agenda. The private sector, on the other hand, contributes significantly by providing innovative technological solutions and financing. Companies in the telecommunications, energy, and technology sectors often have the expertise and resources to develop and deploy advanced systems that are essential for the functioning of a Smart City. For instance, telecommunications companies

provide the connectivity required for IoT devices to function, while energy companies may implement smart grids to manage and distribute energy more efficiently.

Academia and research institutions also have a vital role to play. Their involvement ensures that the Smart City projects are backed by evidence-based research and best practices. Universities and think tanks can offer valuable insights into urban planning, technology deployment, and the socio-economic impacts of digital transformation. Moreover, academia can foster innovation by developing new tools, applications, and models that can be incorporated into the Smart City framework. They can also provide essential training and capacity-building programs to equip individuals with the necessary skills to work in the Smart City ecosystem.

Citizen participation is crucial in ensuring the inclusivity and success of Smart City projects. Engaging citizens in the planning and implementation process allows the authorities to tailor projects to the specific needs of the community, address concerns, and ensure that the technologies adopted are accessible to everyone. Citizens can provide feedback through surveys, public consultations, and forums, allowing them to voice their opinions on issues such as data privacy, digital governance, and the sustainability of urban services.

Moreover, citizens' active involvement can help reduce the digital divide, ensuring that vulnerable groups, such as the elderly and those in low-income areas, are not left behind in the digital transformation process. Public outreach initiatives that promote digital literacy and inclusion are also necessary to ensure that all segments of the population can benefit from the Smart City development.

In the case of Bangkok, the government has made efforts to ensure broad stakeholder engagement through various platforms. Public consultations and surveys are regularly conducted to involve citizens in the planning phase of the Smart City initiative, while partnerships with private companies and academic institutions help bring innovative solutions to the table. For example, collaborations with tech companies like Microsoft and Huawei are aimed at developing solutions to improve the city's transportation systems and enhance the delivery of public services. By fostering collaboration and ensuring that all stakeholders have a voice, Smart City projects can be developed in a more transparent, inclusive, and efficient manner. This participatory approach can also help overcome challenges such as resistance to change, data privacy concerns, and the fear of technology-driven job displacement, which are common barriers in the adoption of Smart City initiatives.

Discussion

The development of Smart Cities, particularly in cities like Bangkok, presents both significant opportunities and challenges in modernizing urban spaces with the integration of advanced technologies. International standards for Smart Cities emphasize the use of technologies such as the Internet of Things (IoT), artificial intelligence (AI), and big data to improve urban functions like transportation, energy management, and public services. However, implementing these technologies in Bangkok requires adaptation to the local context. While global frameworks set guidelines, adapting them to the unique

urban structure and social context of Bangkok can be difficult [14]. One of the major challenges is the integration of Smart City technologies into existing infrastructure. In Bangkok, the complexity of updating aging infrastructure while ensuring that new technologies are both efficient and inclusive presents a significant obstacle. Integrating new technologies into outdated systems requires considerable investment and careful planning, as these older infrastructures were not originally designed to accommodate modern technological innovations [15].

Furthermore, the digital divide remains a critical issue in Bangkok, as not all residents have equal access to the necessary technology or the digital skills required to fully participate in the benefits of Smart Cities [16]. This inequality can exacerbate social disparities, leading to a divide where only certain segments of the population benefit from digital innovations while others remain excluded. Such exclusion can perpetuate existing social inequalities, leaving disadvantaged groups behind and preventing them from fully enjoying the advantages that a Smart City promises. This growing digital gap could further reinforce social divides, with the vulnerable population lacking the resources or skills to engage with new smart services [17].

Moreover, the involvement of various stakeholders government agencies, private sector entities, and civil society is crucial for the successful development of Smart Cities. Active collaboration among these groups is necessary to overcome challenges related to governance, policy, and the actual implementation of technologies. Public participation through consultations and feedback mechanisms also plays a vital role in ensuring that the development of Smart Cities meets citizens' needs and expectations. Effective communication channels between government entities and the public can ensure that Smart City projects address the diverse needs of the community while fostering a sense of ownership and trust among residents.

In addition to these challenges, revitalizing older urban areas while developing new urban spaces presents another key challenge. Urban revitalization efforts must incorporate Smart City technologies without compromising the social and historical value of existing communities. The integration of modern technologies should not displace the cultural heritage or the social fabric that makes these neighborhoods unique. A balanced approach is necessary to preserve the identity of old neighborhoods while facilitating their modernization.

Efforts should be directed towards finding solutions to these complex issues by exploring inclusive development models, strategies for adapting technologies to existing infrastructures, and governance reforms that promote both technological progress and social equity. These actions will be crucial in ensuring that Smart City projects in Bangkok not only modernize the city but also improve the quality of life for all residents in an equitable, sustainable, and socially responsible way. Addressing the challenges of infrastructure integration, technological accessibility, stakeholder engagement, and the preservation of cultural identity will be key to making Smart Cities truly inclusive and beneficial for everyone.

The development of Smart Cities presents both opportunities and challenges, as evidenced in cities such as Singapore, Barcelona, and Amsterdam, which have faced complex issues and successfully addressed them through innovative strategies. Singapore's Smart Nation Initiative, for example, leverages advanced technologies like the Internet of Things (IoT), artificial intelligence (AI), and big data to enhance urban functions such as transportation, healthcare, and energy management. The key challenge in Singapore has been the integration of these technologies into an already dense urban environment while maintaining sustainability. To ensure that technological advances benefit all residents, the government has focused on inclusivity, promoting digital literacy and access to technology for underserved communities, thus reducing the digital divide. Barcelona's Smart City model also addresses similar challenges by incorporating smart technologies into urban services, such as waste management, air quality monitoring, and water conservation.

Moreover, the city's use of platforms like Decidim Barcelona ensures public participation, giving residents a voice in decision-making processes, which strengthens the alignment of technological solutions with community needs. In Amsterdam, the Smart City strategy successfully integrates smart grids for energy management into the city's existing infrastructure, overcoming the challenge of modernizing outdated systems. The city also fosters collaboration between public and private sectors, enhancing transparency through open data platforms, thus promoting social equity alongside technological progress. These examples demonstrate how cities can navigate the complexities of Smart City development by adopting inclusive, adaptive, and transparent strategies that prioritize both technological innovation and social inclusion. In all these cases, the integration of Smart City technologies into existing infrastructure has been key to addressing urban challenges and creating sustainable, equitable environments.

By studying the approaches taken by cities like Singapore, Amsterdam, and Barcelona, Bangkok can learn valuable lessons on how to address the complex issues surrounding Smart City development. For instance, Singapore's Smart Nation Initiative emphasizes inclusivity by providing digital literacy programs to marginalized communities, which could be replicated in Bangkok to ensure that all residents, regardless of their socio-economic status, benefit from the city's digital transformation. Similarly, Amsterdam's smart grids for energy management and its emphasis on public-private sector collaboration could inspire Bangkok to focus on energy sustainability through innovative smart infrastructure solutions, such as smart meters and grids that optimize energy consumption. Furthermore, Barcelona's approach to participatory governance through platforms like Decidim Barcelona allows citizens to actively engage in decision-making processes, ensuring that the Smart City model meets the needs of its residents. Bangkok could introduce similar platforms for public consultation and feedback to ensure that the development of the Smart City aligns with citizens' needs and expectations, fostering a sense of community and engagement in the city's transformation.

Despite the potential benefits of adopting such models, it is important to acknowledge the specific challenges that Bangkok faces. One significant barrier is the existing infrastructure, which may not be as advanced or as adaptable as those in Singapore, Amsterdam, or Barcelona. In this regard, Bangkok could learn from their experiences by focusing on gradual improvements and making strategic investments to upgrade infrastructure incrementally. This would involve a careful assessment of existing infrastructure and identifying areas that require modernization to accommodate new technologies. Instead of attempting a rapid overhaul, a phased approach would allow for more manageable upgrades, minimizing disruption to daily life and ensuring that the transition to a Smart City is smooth and sustainable. For example, focusing on high-priority areas like transportation, energy management, and public safety could provide tangible benefits in the short term, while longer-term projects like the full integration of IoT devices and AI systems could be rolled out progressively.

Additionally, addressing the digital divide is a crucial component for ensuring that the benefits of Smart City technologies are equitably distributed. Bangkok must ensure that all its residents, particularly those in marginalized areas, have equal access to technology and the digital skills necessary to participate in and benefit from the digital transformation. This can be achieved through initiatives such as providing affordable internet access, community-based digital literacy programs, and building public access points in underserved areas. Moreover, partnerships between the government, private sector, and civil society could help develop solutions that cater to the needs of the most vulnerable populations, ensuring that no one is left behind in the transition to a Smart City.

The experiences of cities like Singapore, Amsterdam, and Barcelona highlight the importance of inclusive policies and collaborative efforts in creating a successful Smart City. A Smart City is not just about implementing advanced technologies but about ensuring that these innovations benefit all citizens, regardless of their socio-economic status. By fostering strong collaboration between government agencies, private companies, and civil society, Bangkok can create a supportive ecosystem where technology and social inclusion go hand in hand. Through these efforts, Bangkok can build a Smart City that not only integrates cutting-edge technologies but also promotes fairness, sustainability, and the well-being of all its residents. While Bangkok can certainly benefit from the strategies and methods implemented by Singapore, Amsterdam, and Barcelona, it will need to adapt these approaches to its own unique challenges and context. By focusing on inclusivity, sustainability, and citizen engagement, Bangkok can move closer to realizing its Smart City vision, addressing both technological and social challenges in the process.

CONCLUSION

Fundamental Finding : This study concludes that while advanced technologies such as IoT, AI, and big data are critical to the development of Smart Cities, their successful implementation in Bangkok depends on inclusive, context-sensitive strategies

that integrate technological innovation with social equity and environmental sustainability. **Implication :** The findings underscore the necessity of a multi-stakeholder governance approach—encompassing public-private collaboration and active community participation—to ensure that Smart City initiatives are not only technologically advanced but also socially responsible and equitably beneficial. **Limitation :** However, the study is limited by its focus on a comparative analysis of only three benchmark cities—Singapore, Barcelona, and Amsterdam—potentially overlooking other innovative urban models relevant to Bangkok's unique socio-political landscape. **Future Research :** Further studies should expand the comparative scope to include a broader array of global and regional urban centers and should explore dynamic governance models that can adapt to the rapidly evolving digital ecosystem while ensuring inclusive access and participatory urban development.

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