



Smart City Marketing Strategy: Transformative Endeavor

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Abstract

Purpose: The purpose of this study is to investigate impact of smart city awareness on citizen satisfaction and to measure various factors influencing smart city competitiveness that were rarely addressed in previous studies. For the impacts on the competitiveness of smart cities, this study explored the effects of data-driven service, economic impact, social trust through sharing, environmental protection, and sustainable growth. **Research design, data and methodology:** To collect data, this study employed an online survey conducted by a reputable research organization. Data analysis involved the use of factor analysis, ANOVA, and regression analysis. **Results:** This study identified key aspects important for enhancing citizen satisfaction. Furthermore, this research unveiled the significant impacts of data-driven service, economic impact, social trust through sharing, environmental protection, and sustainable growth on the competitiveness of smart cities. **Conclusions:** The results yield valuable managerial and policy implications. The study suggests that enhancing citizen satisfaction through improved awareness of the smart city is crucial for effective city marketing management. Additionally, the results highlight special aspects necessary to improve smart city competitiveness, including the implementation of promotional policies supported by the government, promoting global competitiveness for domestic companies, and fostering citizen participation for effective city marketing management.

Keywords : Smart City, City Marketing Strategy, Awareness, Competitiveness

JEL Classification Code: M30, M20, M10, M15

1. Introduction

The creation of a smart city involves implementation of advanced technologies and data-driven solutions to enhance the efficiency, sustainability, and the overall quality of urban life. Developing a smart city is a visionary and transformative endeavor that harnesses cutting-edge technologies to optimize various aspects of urban living. The ultimate goal of creating a smart city is to foster a connected and responsive urban environment, where

technology empowers communities, minimizes environmental impact, and ensures a higher standard of living for all residents. Herrschel (2013) discussed that the concept of ‘smartness,’ as central feature, extends beyond the implicit meaning associated with smart growth. The notion has gained increasing prominence, advocating for innovativeness, participation, and coordination in various contexts (Herrschel, 2013).

Ekman et al. (2019) explored the rise of new actors and their pivotal roles in shaping the transformation of smart

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cities. Hoffman (2020) delved into the growing interest in smart cities, exploring the convergence of information and communication technology, urban planning, economy development, health, and various other domains with the realm of smart city research and practice. Kozlowski and Suwar (2021) pointed out that the concept of the smart city is gaining prominence in discussions around sustainable development, while there remains a degree of misunderstanding regarding the precise definition and characteristics of smart cities. Nam and Pardo (2011) argued that cities are acknowledged to achieve enhanced operational efficiency and address concerns for an improved quality of life by implementing innovative urban development strategies

Vijaygopal et al. (2022) emphasized the global prevalence of smart city areas and initiatives. Despite this, Vijaygopal et al. (2022) identified a notable research gap, particularly in understanding the decision-making processes involved in initiating, marketing, and branding of smart city projects.

This study asserts that formulating a robust smart city marketing strategy necessitates a holistic approach, taking into account multiple facets such as economic impact, environmental sustainability, and enhanced public services. This ensures effective communication of the myriad benefits and distinctive features inherent in the concept of a smart city. This study further emphasizes that a successful smart city marketing strategy should encompass citizen engagement, business attraction, and tourism promotion through the application of technology-driven services, sustainable practices, and advancements across various sectors. This study investigates the effects of proposed factors on competitiveness of smart cities by applying quantitative methods, which have been lacking in previous studies. To enhance citizen engagement, a smart city must formulate strategies to actively involve citizens through the utilization of social media, community events, and online platforms. This approach seeks to engage citizens in the development and promotion of the city, fostering a collaborative and participatory environment. A successful smart city marketing strategy should place a strong emphasis on leveraging data-driven insights in decision-making processes. This involves showcasing how the city utilizes data analytics to enhance public services, improve efficiency, and make informed decisions, ultimately contributing to a more intelligent and responsive urban environment.

The purpose of this study is twofold. Firstly, it aims to explore citizens' awareness of the smart city. To achieve this, the study poses research questions addressing the impact of citizens' awareness of the smart city, their understanding of its meaning, their perception of the importance of smart city utilization, and their consideration of additional promotional

information related to the smart city on satisfaction with the smart city. Second, this study delves into the factors influencing the competitiveness of the smart city. Specifically, the following research questions were formulated: i) How do data-driven services impact the competitiveness of the smart city? ii) How does economic impact influence the competitiveness of the smart city? iii) How does social trust through sharing affect the competitiveness of the smart city? iv) How does environmental protection shape the competitiveness of the smart city? and v) How does sustainable growth influence the competitiveness of the smart city?

2. Literature Review

2.1. Marketing Strategy for Cities

Osorio-Andrade et al. (2020) defined city marketing as the practice of promotion and selling cities, towns or regions to a specific target market. Deffner and Liouris (2005) highlighted that marketing techniques are frequently employed to contribute to the transformation of a city into a post-industrial center focusing on tourism, culture, and redevelopment. Vanolo (2018) emphasized that brands exert a profound influence on our daily lives, shaping our social relations, contributing to the construction of our identities, and influencing our sense of being either 'in place' or 'out of place' in the city. The terms such as city marketing, place marketing, place branding is often used interchangeably. Lucarelli (2018) delved into the constitution of place branding as a hybrid form of urban policy, providing a distinct perspective on place branding. Boisen et al. (2018) asserted that concerning cities, the fundamental assumption is that promotion, marketing, and/or branding can bolster urban policies directed at enhancing the locale for the advantage of residents, businesses, and visitors. Boisen et al. (2018) also highlighted that place marketing primarily revolves around refining the place to effectively manage supply and demand. Vallaster et al. (2018) conducted an investigation into the interplay between urban policies and grassroots city brand development. Vallaster et al. (2018) also formulated propositions regarding the co-creation and co-destruction of city brands.

Ferrer (2017) discussed how new technologies provide cities with opportunity to embark on a more sustainable path by actively involving and engaging citizens. Hoffman (2020) addressed that during the 1990s, 'smart' became popular in technology marketing, with products like smart boards, smart phones, and smart cars. Therefore, smart city eventually became a popular term in the 2010s with marketing winds behind it (Hoffman, 2020). Hammons and Myers (2019) highlighted that there has been a

predominant focus on digitizing existing processes and optimizing services for more efficient management. Chan et al. (2019) offered implications suggesting that the identified smartness factors constitute crucial dimensions of urban smartness, highlighting them as priority areas for continued development, innovation, and marketing within the tourism industries and other enterprises. The perspective views a mature urban destination as incorporating the branding of a proposed smart district as a strategic element in overall urban development (Chan et al., 2019). Vanolo (2018) pointed out that in this context, residents, including marginalized individuals who often reside outside the optimistic promotional representations of the city, should have a voice. This involves the implementation of promotional measures as well as other strategies aimed at enhancing the product-market combinations (Boisen et al., 2018).

2.2. Smart City Marketing Strategy

By incorporating various aspects into the smart city marketing strategy, cities build capability to create a comprehensive and effective plan to by promoting unique features and benefits. Maček et al. (2019) underscored the significance of fostering an open innovation spirit and reconsidering marketing strategies in the context of an emerging smart city. In the work of Vangelov (2022), it is noted that over the years, numerous definitions of a smart city have emerged, with many of them substituting the term 'smart' for alternatives like 'intelligent' or 'digital'. Nursanty (2019) highlighted that the 'smartness' of a city is evaluated based on its abilities to successfully develop branding rooted in its unique realities. Yigitcanlar and Kamruzzaman (2018) addressed that adopting appropriate strategic planning, development, and management practices is a coherent vision for the future of urban ecosystems in our smart cities. Yigitcanlar and Lee (2014) addressed ubiquitous-eco-city to provide a high quality of life and place to residents, workers, and visitors with low-to-no negative impacts on the natural environment with support from the state-of-the-art technologies in their planning, development, and management. Bakici et al. (2013) analyzed how Barcelona effectively implemented the smart city strategy, serving as a model for the world. Furthermore, Bakici et al. (2013) discussed the application of smart districts, living labs, initiatives, e-services, infrastructures, and open data in the context of Barcelona's smart city initiatives. Huertas et al. (2021) discussed how smart cities and smart tourism destinations seamlessly integrate technological infrastructures and end-user devices, aiming to enhance and provide more satisfying experiences. Simultaneously, the city should be capable of attracting both visitors and fostering a sense of appeal within its own

community (Nursanty, 2019). Christofi et al. (2021) highlighted that smart cities are now integral to global competition. The adoption of international marketing strategies is identified as a pivotal factor in their development, serving to the gap between policymakers, city authorities, and the needs of citizens (Christofi et al., 2021). Furthermore, these strategies provide essential tools for cities to compete effectively on both national and international fronts (Christofi et al., 2021).

Nam and Pardo (2011) underscored the strategic directions of smart city by emphasizing three pivotal components: technological factors involving integration, human factors centered on learning, and institutional factors focusing on governance. Kozłowski and Suwar (2021) further elaborated that the smart city concept is intricately connected to a technological orientation, involving the application of advanced technological infrastructure, particularly information and communication technology. Additionally, it encompasses a human orientation, influenced by key factors such as education, learning, and the knowledge of populace, as well as an institutional dimension (Kozłowski & Suwar, 2021). In their study, Maček et al. (2019) underscored that the drive to transform cities into smart entities stems from challenges associated with rapid urbanization, often leading to a decline in the quality of life within large agglomerations. Ekman et al. (2019) highlighted that the evolution towards smart cities receives gains momentum through the integration of digital innovations introduced by market actors. These actors leverage smart services with the aim of enhancing the quality of life for citizens (Ekman et al., 2019). Lee (2020) emphasized that a smart city is expected to embody not only technical aspects but also the social characteristics of the city. Lee's (2020) study also delves into the role of a smart growth plan in improving the living conditions of the citizens. The proliferation of smart initiatives has become commonplace in various countries, notably in the USA and Europe, over the last decade (Hollands, 2014). Oke et al. (2022) explored smart city theories and models, delving into the concept's relationship with environmental and energy factors, as well as its implications and considerations regarding conceptual integration across human, technological, and institutional domains. Liu and Wu (2023) highlighted that theoretical frameworks of smart cities primarily emphasize the digital transformation of urban areas, the adoption of next-generation information technologies, and the overall intelligence of cities, often overlooking the fundamental role and value of cities, which revolves around the central position of people and their pursuit of happiness. Furthermore, Sessa (2022) emphasized that a smart city can be regarded as both a theoretical construct and an ideal model, enhancing collective logic and serving a proactive role in the exploration of innovative

solutions aimed at streamlining daily routines. The concepts explored in this study, such as smart city awareness, understanding the meaning of smart cities, the importance of utilization, citizen satisfaction, and competitiveness, are substantiated by theories pertaining to smart cities.

3. Hypotheses Development

3.1. Citizen Satisfaction toward Smart City

McKenna (2020) investigated the construct of awareness in relation to the key smart city characteristics, including adaptability, complexity, innovation, and readiness. This exploration focused on smart city implementations in contemporary urban environments (McKenna, 2020). Mańka-Szulik et al. (2023) explored residents' perceptions of the smart city concept and determined the degree of identification with implemented solutions as elements of a smart city system. In their study, Szulik et al. (2023) found that only 18% of those surveyed respondents indicated that education and communication activities are a challenge in the process of spreading public awareness of smart growth. Kamnunansilpa et al. (2020) examined the level of awareness and knowledge of smart cities by emphasizing consideration of smart city planning dimensions, including social, political, planning and functional need variables. Novita and Suryani (2019) noted that the public is aware of the importance of implementing a smart city, yet their knowledge remains limited to programs related to the smart city. Alakavuk et al. (2023) emphasized that the awareness, knowledge, and participation of city residents regarding sustainable and smart cities will play a significant role in the city's journey towards sustainability and smart development. Further, Alakavuk et al. (2023) highlighted that increasing society's awareness of sustainability changes attitude and habits, ultimately contributing to making the city's structure more sustainable and smarter. Zhu and Alamsyah (2022) analyzed that IT artifacts of smart city apps, including addressability, sensibility, communicability, and associability, play a crucial role in citizen empowerment. Zhu and Alamsyah (2022) also addressed that empowered citizens, in turn, are associated with enhanced satisfaction. Building upon these considerations, the present study hypothesizes that citizens' awareness of the smart city, their understanding of its meaning, their perception of the importance of smart city utilization, and their consideration of additional promotional information related to the smart city on satisfaction with the smart city influence the citizen satisfaction.

H1: Smart city awareness has a significant impact on citizen satisfaction

H2: Understanding meaning of smart city has a significant impact on citizen satisfaction

H3: Smart city importance of utilization has a significant impact on citizen satisfaction

H4: Necessity of information regarding the smart city has a significant impact on citizen satisfaction

3.2. Smart City Competitiveness

This study considered competitiveness of the smart city by considering driving forces such as government-supported promotional policies that encourage the growth of businesses and technology innovation, city's global competitiveness by emphasizing collaborations and partnership, attracting global enterprises, a system of support from central ministries, continuing cooperation between the government and local governments, strengthen technology and enhance international competitiveness of domestic companies, participation in civic groups. This study also highlights regulatory improvements that support the development of a smart city to foster the smart city competitiveness. Hollands (2014) discussed that entire cities, grounded in smart principles, are presently being built by giant corporate information technology (IT), engineers and building firms. Herrschel (2013) focused on smart city regionalism, a concept derived from the principles of smart growth and new regionalism. Herrschel (2013) also highlighted that one of the pivotal characteristics of 'smartness' is a strong inclination toward the regional scale, serving as a mediating platform between the bridges local and international considerations, particularly in the realms of 'competitiveness' and 'sustainability' policies. Malik et al. (2022) suggested conducting research on topics that should be investigated to identify the drivers for cities' growth, resilience, and sustainability.

3.2.1. Retaining Specifications

This study emphasizes the significance of data-driven services that prioritize the utilization of data-driven insights in decision-making processes. It highlights how the city leverages data analytics to enhance public services, improve efficiency, and make informed decisions. Furthermore, the implementation of smart governance and digital services not only enhances citizen engagement but also facilitates seamless interactions between residents and local authorities. Malik et al. (2022) explored that smart services, including demand and innovation-driven service development, constitute an essential part of the broad concept of smart city. Key components of a smart city encompass intelligent infrastructure, responsive public services, and sustainable

urban planning. For example, smart transportation systems facilitated by real-time monitoring and adaptive traffic management, play a crucial role in alleviating traffic congestion. Energy-efficient initiatives, including smart grids and the integration of renewable energy sources, significantly contribute to environmental sustainability. Muschkiet et al. (2022) addressed that smart cities face challenges making data valuable for the design of such data-driven services. Building upon these considerations, the present study hypothesizes that data-driven service influences the smart city competitiveness.

H5: Data-driven service has a significant impact on the smart city competitiveness

3.2.2. Effects of Economic Impact on Smart City Competitiveness

This study underscores the importance of outlining the economic benefits and opportunities for businesses to enhance the competitiveness of a smart city. Economic impact emphasizes the role of smart cities in fostering innovation, supporting local businesses, and attracting investments. Caragliu et al. (2023) investigated the impact of the adoption of smart city strategies on urban economic outcomes in the planning and managing modern cities. Padchenko (2023) analyzed stakeholders' visions to develop the definition of smart cities and classified their social and economic effects as a basis for further advanced study in this direction. In particular, Padchenko (2023) highlighted that positive economic impacts include increased investments, intensified economic growth, enhanced competitiveness of the municipality, and the development of a higher skills economy, among other benefits. Chen and Cheng (2022) assessed the economic impact of smart city investment and identified its diverse effects on the local economy during both the construction and operational phases. Building upon these considerations, the present study hypothesizes that the economic impact influences the smart city competitiveness.

H6: The economic impact has a significant impact on the smart city competitiveness.

3.2.3. Effects of Social Trust through Sharing Opportunity Smart City Competitiveness

This study asserts that social trust and inclusivity play a significant role in a smart city competitiveness. Initiatives to enhance social trust and inclusivity involve encouraging community collaboration, promoting information sharing, and implementing technology-services that benefit all citizens. Novita and Suryani (2019) explored the concept that a smart city is constructed to create values that are useful for the community. Novita and Suryani (2019) also employed indicators such as the influence of others, socialization, and

promotional activities to measure public perception of smart city programs. Furthermore, Novita and Suryani (2019) addressed that smart city definitions encompass various aspects from those focusing on technical elements, such as the importance of technologies, to those emphasizing social aspects, like enabling citizens and communities to act smarter. Patel and Doshi (2019) also addressed that the concept of smart city is adapting to the most powerful economic and social forces of our time to meet the needs of the places where most of us live and work. Building upon these considerations, the present study hypothesizes that social trust through sharing influences the smart city competitiveness.

H7: Social trust through sharing has a significant impact on the smart city competitiveness.

3.2.4. Effects of Environmental Protection on Smart City Competitiveness

The ultimate goal of creating a Smart City is to cultivate a connected and responsive urban environment, where technology empowers communities, minimizes environmental impact, and ensures a higher standard of living for all residents. This study suggests that a smart city strategy should encompass effective communication of the city's commitment to environmental protection and sustainability. It involves showcasing initiatives such as eco-friendly energy sources, waste reduction programs, and the implementation of green infrastructure. Lee (2020) also emphasized that this holistic approach aims to enhance the living environment of citizens by embracing diverse viewpoints throughout the city. Hollands (2014) examined how cities positioned as both economic growth hubs and centers of environmental concerns, are being developed as smart cities to address numerous urban challenges. The smart city concept holds the promise of fostering prosperity and promoting healthy lifestyles for all residents (Hollands, 2014). Building upon these considerations, the present study hypothesizes that environmental protection influences the smart city competitiveness.

H8: Environmental protection has a significant impact on the smart city competitiveness.

3.2.5. Effects of Sustainable Growth on Smart City Competitiveness

Trindade et al. (2017) addressed that over the past decade, smart urban technologies, as part of the smart and sustainable city agenda, have begun to blanket our cities with the aim of forming the backbone of a large and intelligent infrastructure. Alakavuk et al. (2023) explored the issues of sustainable and smart city studies, which are often addressed by local governments, business circles, and the academic

community in the context of city and neighborhood developments. Yigitcanlar et al. (2019) addressed that despite sustainability being often claimed as a desired outcome of smart city initiatives, there is little evidence of how sustainability outcomes are incorporated or achieved within these initiatives. Furthermore, Yigitcanlar et al. (2019) addressed the question of whether cities can become smart without actually being sustainable by examining sustainable outcomes, such as smart city policies, smart city practices, and smart city notions. In another study, Yigitcanlar and Kamruzzaman (2018) highlighted the importance of prospective investigation to accurately scrutinize the outcomes of existing smart city projects. Yigitcanlar and Kamruzzaman (2018) also emphasized the necessity of developing smart city agendas that deliver sustainable outcomes. Building upon these considerations, the present study hypothesizes that sustainable growth influences the smart city competitiveness.

H9: Sustainable growth has a significant impact on the smart city competitiveness.

4. Methodology

This study conducted an online survey in collaboration with a reputable survey agency. The survey began with introductory questions to assess participant awareness, followed by inquiries about key variables under consideration, and concluded with demographic information. First, for smart city awareness, this study incorporates questionnaire items related to citizens’ awareness of the smart city, their understanding of its meaning, their perception of the importance of smart city utilization, and their consideration of additional promotional information related to the smart city. Furthermore, the variables explored in this study for smart city competitiveness encompass data-driven service, economic impact, social trust through sharing, environmental protection, and sustainable growth, and overall competitiveness of the smart cities. The research utilizes 5-point Likert scales to assess the major proposed items, ranging from 1 (strongly disagree) to 5 (strongly agree). This study collected a total of three hundred eighty-five responses. The survey employed stratified sampling, considering factors such as age, gender, education, and income. For smart city awareness, ANOVA and multiple regression analysis were employed. Additionally, for smart city competitiveness, factor analysis, ANOVA, and multiple regression analysis were utilized to examine the proposed hypotheses in this study. Reliability was assessed using Cronbach’s alpha, with the results summarized as follows: 0.782 for data-driven service, 0.729 for economic impact, 0.792 for social trust through sharing, 0.760 for

environmental protection, 0.850 for sustainable growth, and 0.757 for overall competitiveness of smart cities.

Table 1: Demographics of Respondents

Category	Constructs	Respondents # (%)
Gender	Male	189 (49.1)
	Female	196 (50.9)
Age	20-24 years old	34 (8.8)
	25-29 years old	52 (13.5)
	30-34 years old	50 (13.0)
	35-39 years old	31 (8.1)
	40-44 years old	44 (11.4)
	45-49 years old	43 (11.2)
	50-54 years old	30 (7.8)
	55-59 years old	28 (7.3)
	60-64 years old	23 (6.0)
	Elder than 65 years old	20 (6.5)
Education	Middle School	3 (0.8)
	High School	85 (22.1)
	In College	41 (10.6)
	Bachelor’s Degree	218 (56.6)
	Graduate Degree	32 (8.3)
Annual Income	Below 10,000,000 KRW	103 (26.8)
	Between 10,000,000-20,000,000 KRW	13 (3.4)
	Between 20,000,000-30,000,000 KRW	59 (15.3)
	Between 30,000,000-40,000,000 KRW	78 (20.3)
	Between 40,000,000-50,000,000 KRW	51 (13.2)
	Between 50,000,000-60,000,000 KRW	27 (7.0)
	Between 60,000,000-70,000,000 KRW	18 (4.7)
	More than 70,000,000 KRW	36 (9.4)
	TOTAL	385

5. Data Analysis

In this study, the frequency of citizens’ awareness of the smart city, their understanding of its meaning, their perception of the importance of smart city utilization, and their consideration of additional promotional information was initially presented (Table 2).

Table 2: Smart City Awareness, Meaning, Importance of Utilization, and Necessity of Information This

	Str Dis	Dis	Ag	Str Ag
Smart City Awareness	6.8	13.2	27.0	4.7
Understanding Meaning of Smart City	4.9	11.4	33.5	6.0

Smart City Importance of Utilization	0.3	3.6	47.3	17.9
Necessity of Information	0.5	2.1	46.8	27.5

* Str Dis: Strongly Disagree; Dis: Disagree;
Ag: Agree; Str Ag: Strongly Agree

Additionally, this study assessed the extent of citizen awareness regarding the smart city and its influence on satisfaction level. The independent variables considered encompass citizens' awareness of the smart city, their understanding of its meaning, their perception of the importance of smart city utilization, and their consideration of additional promotional information related to the smart city. Furthermore, this study includes citizen satisfaction with the smart city as the dependent variable. In this study, a multiple regression analysis was employed to examine the impact of smart city awareness on satisfaction. The ANOVA results indicated the overall model's significance, with an F value of 67.132 at the 0.01% significance level and an R-square of 0.405. Furthermore, the results of multiple regression indicated the acceptance of Hypotheses H1, H2, H3, and H4 were accepted. Among the factors examined, the impact of smart city awareness on citizen satisfaction was found to be higher than other effects, followed by the influence of understanding the meaning of a smart city, the importance of smart city utilization, and the perceived necessity for more information about the smart city.

Table 3: Effects of Proposed Factors on Citizen Satisfaction

Independent Variables => Dependent variable	Standardized Coefficient (t-value/sig)
Smart City Awareness => Citizen Satisfaction	.419 (7.511***)
Understanding Meaning of Smart City => Citizen Satisfaction	.156 (2.730***)
Smart City Importance of Utilization => Citizen Satisfaction	.128 (2.516**)
Necessity of Information => Citizen Satisfaction	.082 (1.765*)

Secondly, this study measured various factors influencing smart city competitiveness. Factor analysis was utilized, and scale items were extracted through principal component analysis. The extraction method employed maximum iterations for convergence, and factors with eigenvalues exceeding 1 were retained. For rotation, VARIMAX with Kaiser Normalization was applied, incorporating maximum iterations for convergence. Table 4 presents a succinct overview of the component matrix, including factor loadings. In this study, the questionnaire items applied as follows: i) for the data-driven service factor, the survey encompassed questions related to the utilization of technology and data-driven analytics for enhancing public services to citizen and establishing an efficient system for the smart city through innovative public service

approaches; ii) for economic impact, the questionnaire items in this study encompassed aspects such as the potential for companies engaged smart city development to enhance their international competitiveness through the creation of new technologies, the utilization of expertise in constructing and operating urban smart cities to contribute to the national economy, and development of specialized products associated with Korean smart city; iii) for social trust through sharing, the questionnaire items in this study comprised inquiries about communication opportunities facilitated by the use of public data, the sharing of social information, and the establishment of social trust through the implementation of technology-driven services; iv) for environmental protection, the questionnaire items in this study addressed the role of smart cities in reducing environmental pollution, providing opportunities for environmental protection as a positive a step, and contributing to the creation of a more sustainable city through utilization of eco-friendly energy sources such as solar and wind power; v) for the sustainable growth factor, the questionnaire items in this study explored the contributions of the smart city to economic and social growth, its positive impacts on social interaction among citizens, and its overall sustainability in terms of both the city and environment; and vi) for smart city competitiveness, the questionnaire items in this study encompassed aspects such as the establishment of a smart city through central government support, including improvements in unnecessary regulations, sustained collaboration between the government and local authorities, the enhancement of technology, and the promotion of global competitiveness for domestic companies, and fostering citizen participation.

Table 4: Component Matrix for Data-driven Service, Economic Impact, Social Trust through Sharing, Environmental Protection, Sustainable Growth, and Smart City Competitiveness

Variables	Component					
	1	2	3	4	5	6
Data-driven Service2	.89					
Data-driven Service3	.83					
Data-driven Service1	.81					
Economic Impact2		.84				
Economic Impact3		.80				
Economic Impact1		.79				
Social Trust through Sharing1			.86			
Social Trust through Sharing2			.84			
Social Trust through Sharing 3			.82			
Environmental Protection3				.85		

Environmental Protection1				.82	
Environmental Protection 2				.79	
Sustainable Growth3				.79	
Sustainable Growth1				.78	
Sustainable Growth2				.77	
Smart City Competitiveness2					.83
Smart City Competitiveness1					.80
Smart City Competitiveness4					.78

In this study, we employed multiple regression analysis to examine hypotheses, incorporating factor scores as variables. The independent variables included data-driven service, economic impact, social trust through sharing, environmental protection, and sustainable growth. The dependent variable assessed in this study was smart city competitiveness. The ANOVA results highlighted the significance of the overall model, revealing an F value of 195.633 at the 0.01% significance level. The corresponding R-square was 0.713, with an adjusted R-square of 0.709. In Table 5, this study demonstrates that the effects of data-driven service, economic impact, social trust through sharing, and sustainable growth on smart city competitiveness were found to be statistically significant at the 1% level of significance. Additionally, the impact of environmental protection on smart city competitiveness was observed to be significant statistically significant at the 10% level. As a result, Hypotheses H5, H6, H7, H8, and H9 were all accepted. Notably, the study determined the highest effect size in the influence of data-driven service on smart city competitiveness. Subsequently, the effects of economic impact, social trust through sharing, sustainable growth, and environmental protection on the smart city competitiveness were also identified, in descending order of influence.

Table 5: Effects of Proposed Factors on Competitiveness

Independent Variables => Dependent variable	Standardized Coefficient (t-value/sig)
Data-Driven Service => Competitiveness	.297 (6.172***)
Economic Impact => Competitiveness	.278 (5.827***)
Social Trust through Sharing => Competitiveness	.179 (4.132***)
Environmental Protection => Competitiveness	.073 (1.783*)
Sustainable Growth => Competitiveness	.133 (3.155***)

6. Conclusion

The purpose of this study is to investigate the factors

influencing smart city competitiveness. Prior to that, this study examined how citizen awareness of smart cities affects citizen satisfaction. In assessing smart city awareness, factors included citizens' awareness of the smart city, their understanding of its meaning, their perception of the importance of smart city utilization, and their consideration of additional promotional information related to the smart city. For smart city competitiveness, this study considered factors such as data-driven service, economic impact, social trust through sharing, environmental protection, and sustainable growth. The results of multiple regression analysis for smart city awareness indicated that citizens' awareness of the smart city, their understanding of its meaning, their perception of the importance of smart city utilization, and their consideration of additional promotional information related to the smart city significantly influence citizen satisfaction. Among the factors considered, the impact of awareness of the smart city on citizen satisfaction demonstrated a higher effect, followed by the influence of understanding the meaning of a smart city, the importance of smart city utilization, and the perceived necessity for more information about the smart city. In terms of smart city competitiveness, the results of multiple regression analysis indicated that data-driven service, economic impact, social trust through sharing, environmental protection, and sustainable growth all exhibited significance on the competitiveness of the smart city. Among the factors, this study found that the effect size of data-driven service on the competitiveness of the smart city was higher than other effects, followed by economic impact, social trust through sharing, sustainable growth, and environmental protection.

The results suggest that as the citizen awareness level and perceived importance of the smart city increase, citizen satisfaction also increases. Similarly, a better understanding of the meaning of the smart city better is associated with increased citizen satisfaction. Furthermore, the necessity to promote the smart city by delivering information also contributes to higher levels of citizen satisfaction. Furthermore, how citizens perceive public service through data analysis significantly affects the competitiveness of the smart city. Therefore, enhancing public service approaches, utilizing technology and data-driven analytics, will contribute to the improvement of the smart city competitiveness. The impact of economic impact on the competitiveness of the smart city suggested the role of companies engaged in smart city development. This involves enhancing their international competitiveness through the creation of new technologies, the utilization of expertise in constructing and operating urban smart cities to contribute to the national economy, and recognizing the importance to developing specialized products associated with the Korean smart city. The impact of social trust through sharing on competitiveness of the smart city

emphasizes the significance of communication opportunities facilitated by the use of public data, the sharing of social information, and the establishment of social trust through the implementation of technology-driven services. The impact of environmental protection on the competitiveness of the smart city highlighted the crucial role of smart cities in reducing environmental pollution, providing opportunities for environmental protection as a positive step, and contributing to the creation of a more sustainable city through utilization of eco-friendly energy sources. Furthermore, the impact of sustainable growth on the competitiveness of the smart city implies the need to address the contributions of the smart city to economic and social growth, its positive impacts on social interaction among citizens, and its overall sustainability in terms of both the city and environment.

The results provide managerial and policy implications. Firstly, the study suggested that to enhance citizen satisfaction, it is essential to increase smart city awareness through promotional efforts, which are also crucial for city marketing management. Additionally, the results indicate the special aspects that are necessary to improve smart city competitiveness. The results suggest the need for promotional policies supported by the central government and regulatory interventions, including improvements in unnecessary regulations. Furthermore, to enhance smart city competitiveness, this study implies the importance of sustained collaboration between the government and local authorities. Promoting global competitiveness for domestic companies and fostering citizen participation are crucial elements in building smart city competitiveness and effective city marketing management.

This study has limitations and suggests future studies. While this study presents valuable insights, it is essential to acknowledge its limitations and suggest potential avenues for future research. The limitations of this study encompass the sample size and the location of data collection. The relatively small sample size may impact the generalizability of findings, and the specific location of data collection could influence the study's applicability to broader contexts. Future research could address these limitations by considering larger and more diverse samples or expanding the study to different geographic locations.

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