Metaverse for Marketing in the Public Sector: Implications on Citizen Relationship Management[*]

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Abstract

The purpose of this study is to explore how citizens perceive application of the metaverse platforms for city marketing and investigate factors that affect overall attitude for citizen relationship management in the public sector. In particular, this study investigates the following: i) how factors including perceived city brand value, public service, emotional value, experience, personalization, economic value, social value, and cultural value on overall attitude and ii) how overall attitude affects intention to use of metaverse for the public sector and citizen satisfaction. This study conducted an online survey with the assistance of a well-known research firm. This study applied factor, ANOVA, and regression analysis to test hypotheses. The results found that effects of perceived city brand value, emotional value, information, economic value, social value, and cultural value on overall attitude toward metaverse application for the public sector showed significance. The results provide managerial and policy implications for the public sector on how to apply metaverse to provide public services and enhance engagement with citizens. The results also provide implications which aspects should be considered to enhance citizen relationship management and to build the better city brand value by applying metaverse.

1. Introduction

How computer-mediated communication tools have been developed to connect people in our society? Digital communication relates to lower social connectedness overall (Nguyen et al., 2021), while how to improve interactivity has played a crucial role in the computer mediated environment. Nguyen et al. (2021) also addressed that people can draw on a variety of information and communication technologies to maintain social contact across distances when opportunities for in-person interactions are not possible. Neustaedter and Greenberg (2011) investigated an intimacy in long-distance relationships over video chat since the low cost and ubiquity of computer-mediated communication tools seemingly lessen the limitations of distance.

Ball (2022) addressed that the next iteration of the internet after the fixed line internet of the 1990s, the social net of

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the 2000s, and the mobile internet is the Metaverse. By applying social presence theory, Nguyen et al. (2021) examined that the degree of social presence is higher by applying better communication tools such as voice and video calls than email, text message, etc. Therefore, computer-mediated tools that enhance connectivity and social presence are required particularly in the era of the 4th industrial revolution. Suzuki et al. (2020), in the metaverse, mutual communication is possible just like that in the real world and avatars do everything on behalf of users. Anderson and Rainie (2022) addressed that proponents of extended reality and the development of more advanced and immersive online worlds say its rapid evolution is likely to benefit all aspects of society including education, health care, entertainment, the arts, social and civic life, etc.

How have the government and public sector applied digital communication tools to provide services and interact with citizens? Governments have applied Internet connected services for citizens, private and public sector, and government sectors in the digital governance environment. Fountain (2001) addressed that government officials, like all actors, should understand and use technology by highlighting the adoption of digital government. By explaining the virtual agency, Fountain (2001) also provided an example that a government can make information and service available to its citizens increasingly through the web including information regarding social security benefits, the ability to file and pay taxes online, etc. In the era of the digital evolution, Gayatri (2023) addressed that the government should adopt advanced services such as metaverse as the start of a new era of government services and build the citizen-centric metaverse, particularly using digital avatars. Gayatri (2023) also stressed that the Metaverse could be re-imagined as a vehicle of choice for delivery of services and applications to citizens by enabling communication and engagement between the government and its people. Lv et al. (2022) addressed that digital city management mode achieves accurate and efficient management of urban public utilities relying on modern information technology. Dwivedi et al. (2022) addressed that the metaverse covers a wide range of disciplines as it includes various concepts such as marketing, management, and strategy research.

While there are various studies in the field of city marketing strategies, previous researches rarely examined how application of advanced technology, particularly the adoption of the metaverse, affects development of the city image, perceived public service, economic value, social value, and relationship building with citizens. Based on the consideration, the purpose of this paper is to explore how citizens perceive application of the metaverse platforms for city management strategy and investigate factors that affect citizen satisfaction to foster relationship management in the public sector. In particular, this study examined factors including perceived city brand value, public service, emotional value, experience, personalization, interactivity, economic value, social value, and cultural value on overall attitude toward metaverse application in the public sector and how attitude affects intention to use metaverse for the public sector and citizen satisfaction. This study proposed perceived emotional and experience factors as those are crucial for experiential marketing, while customization, interactivity, social value, and public service are critical for citizen relationship management (CRM). Therefore, this study will investigate how application of digital technologies help provide better services, increase perceived city brand value, and improve relationships with citizens.

2. Literature Review

2.1. Origin and Definition of Metaverse

Zhang et al. (2022) stated that metaverse is a compound word combined with "meta-" (beyond; transcending) and "verse" (the root of "universe," cosmos; the whole world), which denotes a new virtual universe created beyond the real world. Stephenson (1992) first coined the term metaverse that describes humans with free access to a 3D space by reflecting the real world through digital avatars that interact with each other. According to Smart et al. (2007), the metaverse is a complex concept and the term has grown beyond Stephenson (1992)'s vision including aspects of the physical world objects, actors, interfaces, and networks that construct and interact with virtual environments. Davis et al. (2008) defined that metaverse are immersive three-dimensional virtual worlds in which people interact as avatars with each other and with software agents, using the metaphor of the real world but without its physical limitations.

According to Weinberger (2022), the metaverse is an interconnected web of ubiquitous virtual worlds partly overlapping with and enhancing the physical world and enables users represented by avatar to connect and interact with each other, to experience and consume user-generated content in an immersive, scalable, synchronous and persistent environment. Hennig-Thurau et al. (2022) defined that the metavese is a new computer-mediated environment in which people act and communicate with each other in real time via avatars in virtual worlds by gaining substantial attention and investigated the value of real-time multisensory social interactions in the virtual-reality metaverse. Hennig-Thurau and Ognibeni (2022) addressed that the true value of the metavese is its social dimension, "doing things together" with avatars in virtual,

360 degrees worlds and classified how companies can harvest its potentials to create social value in various contexts including at work (i.e., employee-employee relations), when consuming (i.e., consumer-consumer relations), and at the frontline (i.e., employee-customer relations). Suzuki (2020) addressed the concept of Society 5.0 that allows people to share a variety of information and knowledge and to produce new societal values via advanced technologies such as robotic and AI technologies. Anderson and Rainie (2022) expected the Metaverse in 2040 and highlighted that augmented- and mixed-reality enhancements will become more useful in people's daily lives.

2.2. Development of Metaverse

Allam et al. (2022) investigated that the concept of the Metaverse has been around for decades but has gained global attention with the rebranding of 'Meta.' According to Bibri and Allam (2022), recent advances in computing and immerse technologies have provided Meta (formerly Facebook) with the opportunity to leapfrog or expedite its way of thinking and devising a global computing platform called the "Metaverse". Smart et al. (2007) addressed that technologies will emerge contingent upon potential benefits, investments, and customer interest and will be subject to drawbacks and unintended consequences. Hazan et al. (2022) addressed that the metaverse, best characterized as an evolution of today's Internet, enables people to have virtual identities, presence, and agency including peer-to-peer interactions, transactions, user-generated content, and world-building.

By applying two critical uncertainties based on different function, types, or sets of technologies that includes the degree of augmentation (i.e., technologies that add new capabilities), simulation (i.e., technologies that model reality), intimate (i.e., technologies that focused inwardly), and external (i.e., technologies that focused outwardly), Smart et al. (2007) classified four scenarios that emphasized different functions, types, or sets of metaverse technologies as follows: i) virtual worlds that increasingly augment the economic and social life of physical world communities, ii) mirror worlds that are informationally-enhanced virtual models or reflections of the physical world, iii) augmented reality that enhances the external physical world for the individual, through the use of location-aware systems and interfaces, and iv) lifelogging that records and reports the intimate states and life histories of objects and users.

2.3. Applying Metaverse for Marketing in the Public Sector

According to Smyth (1994), city marketing or place marketing is the promotion of a city, or a district within it, with the aim of encouraging certain activities to take place there. Allam et al. (2022) addressed that the challenges and prospects of the metaverse varied including application in cities such as quality of life, urban social interaction, urban resource management and urban governance, etc. Among cities, the Seoul Metropolitan Government is the first local government in Korea to establish the metaverse platform which has emerged as a contactless communication channel in the post-pandemic era and provided a new concept of public service by using the platform in its administration (Seoul Metropolitan Government, 2021). The Seoul Metropolitan Government (SMG) launched the pilot of Metaverse Seoul, a government-run metaverse, in 2022 by delivering a virtual version of Seoul mayor's office (Weiss & Markowitz, 2022). According to Seoul Metropolitan Government (2021), the Seoul Metropolitan Government (SMG) is officially rolling out the first service phase of its virtual municipal world Metaverse Seoul, the first-ever platform of its kind in the entire world, after having successfully undergone a beta test of various administrative services such as economy, education, and tax affairs.

3. Hypotheses Development

3.1. Effects of Perceived City Brand Value on Overall Attitude

Kasapi and Cela (2017) addressed that place branding activities began mainly in the U.S. in the mid-to-late 1800s and is a wider umbrella of its tourism-related subarea, destination branding by demonstrating a long history in itself before it entered mainstream marketing. According to Anholt (2010), the term destination brand has been in use for at least a decade and is applied because the state or region is generally responsible for the overall place image. Anholt (2010) also addressed that place marketing is still seen fundamentally as a tool for selling the products and services and attractions of the place more effectively. According to a study by Anholt (2008), places must engage with the outside world in a clear, coordinated, and communicative way if they are to influence public opinion and the notion of brand image is critical and reputation understood as an external, even cultural phenomenon. Nurjaman (2022) examined the role of a digital marketing plan to promote a city brand containing a marketing guide and an elaboration of the digital system for mobile and online apps. This study posits that applications of advanced technology, particularly metaverse will help enhance perceived city brand value. Based on the consideration, this

study hypothesized the effect of perceived city brand value on overall attitude.

H1: Perceived city brand value affects overall attitude.

3.2. Effects of Perceived Public Service on Attitude

Chen et al. (2021) investigated that public sectors are utilizing AI-based self-service technology at an accelerating rate, given its purpose for improving work efficiency and user experience, reducing service costs, and relieving human workloads.   Chen et al. (2021) also addressed that with the rapid development of artificial intelligence (AI), smart self-service technologies that enable users to avail of services mostly independent of direct service employee involvement (Meuter et al., 2000) provide unprecedented opportunities for governments to improve public services and strengthen their interaction with citizens. Hartley (2023) addressed that the digital revolution has transformed policy practice, public service delivery, and the function of governments more generally and measured efficiency and effectiveness of public service as an important part of governance. This study posits that applications of advanced technology, particularly metaverse, will help enhance perceived public service by providing meaningful information such as job opportunities, city events and locations, and civil services. Based on the consideration, this study hypothesized the effect of perceived city brand value on overall attitude.

H2: Perceived city brand value affects overall attitude.

3.3. Effects of Perceived Emotional Value on Attitude

According to Baumeister and Leary (1995), belongingness appears to have multiple and strong effects on emotional patterns and on cognitive processes. By drawing upon the stimuli-organism-response framework (Mehrabian & Russell, 1974), Kim et al. (2021) examined effects of perceived enjoyment from the virtual reality experience on attitude and destination visit intention. Vergari et al. (2021) addressed that measuring emotions in Virtual Reality is particularly challenging. Based on the study of students' acceptance of an augmented reality teaching platform, Balog and Pribeanu (2010) addressed effects on perceived enjoyment and effects of perceived enjoyment on perceived usefulness and intention to use. Dwivedi et al. (2022) investigated that metaverse could enable marketers to transcend the boundary enabling brands to connect with consumers in many new ways including capturing emotions. Based on the consideration, this study hypothesized the effect of perceived emotional value on overall attitude.

H3: Perceived emotional value affects overall attitude.

3.4. Effects of Perceived Experience on Attitude

Application of metaverse in experiential marketing to foster attitudes toward the city. Vergari et al. (2021) addressed that user experience has become a vast topic with new challenges that keep coming on specific areas of interest and presence and immersion (Slater & Wilbur, 1997) are often used to describe virtual reality experiences. Jang and Kim (2023) investigated that metaverse refers to a space, where the real world is experienced or reproduced through various virtual spaces. Nagendran et al. (2022) explored that metaverse encompasses many aspects of our current future existence with the aim of enhancing our connectivity and the quality of shared experiences. Kim, So, Mihalik, and Lopes (2021) investigated possible actions from virtual reality that will contribute to an immersive experience in a service setting. According to Lombard and Jones (2007), telepresence is generally used to refer to the sense of 'being there' experienced by users of advanced media such as virtual reality, and the psychological state or subjective perception in which a person fails to accurately and completely acknowledge the role of technology in an experience. Nash et al. (2000) reviewed that previous studies performed to evaluate various aspects of human performance using virtual environment technology and addressed that a sense of presence is an important aspect of the virtual environment experience. Based on the consideration, this study hypothesized the effect of perceived experience on overall attitude.

H4: Perceived experience affects overall attitude.

3.5. Effects of Perceived Information on Attitude

Piro et al. (2014) addressed information centric services in smart city and examined how to formulate a pioneering proposal by drawing an advanced information centric platform for supporting the typical information and communication technology services of a smart cities. Edvinsson (2006) discussed that a knowledge city is purposely designed for encouraging and nourishing the collective knowledge, i.e. intellectual capital, as capabilities to shape efficient and sustainable actions of welfare over time. Albayati et al. (2023) investigated the success of metaverse adoption that involves extensive knowledge and information from different sources and perspectives. By applying metaverse for the public sector, this study proposed that citizens gain opportunities for diverse information services regarding the city. Based on the consideration, this study hypothesized the effect of perceived information on attitude.

H5: Perceived information affects overall attitude.

3.6. Effects of Perceived Personalization on Attitude

According to Zhou (2020), the virtual reality intervention includes main features such as enabling the users to control their avatar, personalizing the avatar to look the same as the user, and visualizing the positive consequences of exercising. Jang and Kim (2023) explored the impact and role of avatar customization that replace reality's existence in metaverse environments, cross boundaries between reality and virtual reality. Davis et al. (2009) explored that the role of avatars is to connect metaverse technology capabilities including communication, rendering, interaction, and team process and behaviors including coordination, trust, role clarity, and shared understanding and to provide outcomes including member support, perceived quality, self-image, cultural synchronicity, intent to immerse, etc. with capacity of personalization. Nagendran et al. (2022) investigated that using metaverse, people interact individually and manifests across the real and virtual worlds which leads us to avatars. Based on the consideration, this study hypothesized the effect of perceived personalized service on attitude.

H6: Perceived personalized service affects overall attitude.

3.7. Effects of Perceived Economic Value on Attitude

Dwivedi et al. (2022) addressed that the current metaverse consists of an economic system connected to the real world such as money from the real world and more real-world goods will be injected into the metaverse if a stable and sustainable economy is built. Tassy (2018) mentioned the attention economy from the contact economy where attention acts as the pricing factor in the economic system. Bartlett and Trifilova (2010) investigated that the focus on the use of information and communication technology (ICT) and innovation play a significant role and technology and innovation for economic growth policies. This study posits that using metaverse, citizens can save searching cost and time by obtaining useful information and receiving public services and help gain economic value from financial incentives known as extrinsic motivation (Bénabou & Tirole 2003; Frey & Oberholzer-Gee, 1997). Based on the consideration, this study hypothesized the effect of perceived economic value on attitude.

H7: Perceived economic value affects overall attitude.

3.8. Effects of Perceived Social Value on Attitude

Kawachi and Berkman (2001) also addressed that social ties play a beneficial role in the maintenance of psychological well-being by highlighting the pathways by

social networks and social supports. Vergari et al. (2021) addressed social acceptability (Distler et al., 2018) and included users perspectives of social environments and users' acceptance of virtual and augmented reality based products such as wearables, input modalities and gestures, etc. according to Biocca et al. (2003), theory of social presence could contribute to our understanding of social behavior in mediated environments and guide the design on new social environments and interfaces. Dwivedi et al. (2022) investigated that an important question about the value of the metaverse is whether there is new value for society in the metaverse environment using social life such as Second life, VRChat, Zepeto, etc. and the metaverse can help solve discrimination and social inequalities. Based on the consideration, this study hypothesized the effect of perceived social value on attitude.

H8: Perceived social value affects overall attitude.

3.9. Effects of Perceived Cultural Value on Attitude

Dwivedi et al. (2022) discussed culture is a social product that is formed over a long period of time with racial and regional characteristics and addressed application of metaverse including cultural studies. Yang and Wang (2023) investigated key technologies of metaverse applications and pioneered the exploration of virtuality-reality amalgamation by theorizing imitation, intensification, interaction, and integration taxonomy of metaverse tourism. By applying metaverse for the public sector, this study proposed that perceived cultural value for the city marketing will be enhanced. Therefore, application of metaverse will help increase competitiveness of culture and tourism. Based on the consideration, this study hypothesized the effect of perceived cultural value on attitude.

H9: Perceived cultural value affects overall attitude.

3.10. Effects on Intention to Use and Citizen Satisfaction

The theory of reasoned action (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) suggests that a person's behavior is determined by their intention to perform the behavior and the intention is a function of their attitude toward the behavior and subjective norms. Yang et al. (2022) investigated college students' intention to use metaverse technology for learning. According to Yi (1990), consumer satisfaction is a central concept in modern marketing thought and practice, as a result, overall quality of life is expected. According to Chatterjee et al. (2022), strategic public service impacts citizen satisfaction by applying AI enabled services. Based on the consideration, this study

hypothesized the effect of attitude on intention to use metaverse for the public service and citizen satisfaction.

H10: Overall attitude affects intention to use metaverse for the public service.

H11: Overall attitude affects citizen satisfaction.

4. Methodology

This study will conduct an online survey with the assistance of a well-known research agency. The questionnaire consists of major questions with warm up and demographic questions. Major questions include questionnaire items based on proposed factors that affect attitude, intention to use public service using metaverse, and citizen satisfaction. The study applies 5-point Likert scales for major questionnaire items. This study will apply stratified sampling by considering demographics. The survey will be collected in S. Korea and distributed to citizens regarding perceptions about application of metaverse platforms. 900 respondents answered the survey. The survey was distributed and collected from seven major metropolitan cities in S. Korea. The survey will be developed in English and translated to Korean. Back translation will be applied to check reliability of original and translated versions. The survey will be collected anonymously and voluntarily with agreement. The data will be stored confidentially and for the research purposes only. This study will apply factor analysis, ANOVA, and multiple regression analysis to test main hypotheses. This study will apply MANOVA and two-way ANOVA for additional effects such as generation differences. This study also conducted Cronbach alpha to check reliability. The results of Cronbach alpha include the following: 0.867 for city brand value, 0.850 for public service, 0.855 for emotional value, 0.839 for experience, 0.868 for information, 0.794 for personalization, 0.859 for economic value, 0.866 for social value, and 0.861 for cultural value. Table 1 summarized demographics of respondents.

Table 1: Demographics of Respondents

		#	%
Gender	Male	449	49.9
	Female	451	50.1
Age	20-24 years old	87	9.7
	25-29 years old	116	12.9
	30-34 years old	110	12.2
	3 5-39 years old	101	11.2
	40-44 years old	120	13.3
	45-49 years old	115	12.8
	50-54 years old	133	14.8
	55-59 years old	118	13.1
Education	Middle School	4	0.4
	High School	166	18.4
	In College	85	9.4
	Bachelor's Degree	573	63.7
	Graduate Degree	72	8.0
Job	Agriculture, Forestry, or Fisheries	2	0.2
	Self-Employed	67	7.4
	Blue-Collar	172	19.1
	White-Collar	400	44.4
	Student	66	7.3
	Housewife	113	12.6
	Not-Employed	77	8.6
	Others	3	0.3
Annual Income	Below 2,000,000 KRW	103	11.4
	Between 2,000,000-5,000,000 KRW	239	26.6
	Between 5,000,000-10,000,000 KRW	62	6.9
	Between 10,000,000-20,000,000 KRW	23	2.6
	Between 20,000,000-50,000,000 KRW	148	16.4
	Between 50,000,000-100,000,000 KRW	191	21.2
	Between 100,000,000-200,000,000 KRW	36	4.0
	More than 200,000,000 KRW	7	0.8
	Other	91	13.1
	TOTAL	900	100

5. Data Analysis

This study conducted factor analysis. Scale items were extracted by the constructs by applying factor analysis. Principal component analysis was applied as the method for extraction with maximum iterations for convergence and factors' eigenvalue was greater than 1 are extracted. VARIMAX with Kaiser Normalization was applied as the rotation method with maximum iterations for convergence. Table 2 summarized component matrix including factor loadings. Questionnaire items applied in this study as follows: i) for city brand value, items include whether use of metaverse help enhance the city brand value, help build up city as a brand, and help gain attention for citizens and tourists; ii) for public service, items include whether use of metaverse help get public services, help provide convenient

and friendly services, and help management of the city; iii) for emotional value, items include whether use of metaverse make feel fun and entertained, contents provided in the metaverse give pleasure, and products or services offered by the metaverse might be fun; iv) for experience, items include whether use of metaverse enriches experiences with reality, gives real life experiences, and gives a change to participate city related events; v) for information, items include whether information or contents available in the metaverse is useful and valuable; vi) for personalization, items include whether use of metaverse provides customized services based on preferences; vii) for economic value, items include whether using metaverse, citizens can save costs such as searching costs, transaction costs by getting diverse information; viii) for social value, items include whether using metaverse, citizens can communicate with city and other people, feel that they are person who follows recent trends in a society, and participate city events; and ix) for cultural value, items include whether use of metaverse help increase competitiveness of culture and tourism.

Table 2: Component Matrix for City Brand Value, Public Service, Emotional Value, Experience, Information, Personalization, Economic Value, Social Value, & Cultural Value

	Component								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
BV1	.91								
BV2	.90								
BV3	.87								
PS1		.88							
PS2		.88							
PS3		.87							
EM1			.79						
EM2			.78						
EM3			.75						
EX3				.89					
EX1				.87					
EX2				.85					
IF1					.89				
IF2					.89				
IF3					.88				
PN1						.91			
PN2						.90			
EV2							.89		
EV3							.88		
EV1							.87		
SV1								.88	
SV3								.87	
SV2								.85	
CV2									.89
CV1									.88
CV3									.88

*BV: City Brand Value; PS: Public Service; EM: Emotional Value;
EX: Experience; IF: Information; PN: Personalization;
EV: Economic Value' SV: Social Value; CV: Cultural Value

This study conducted multiple regression analysis to test hypotheses. Factor scores were used for regression analysis. This study applied perceived city brand value, public service, emotional value, experience, information, personalization, economic value, social value, and cultural value as independent variables and overall attitude as a dependent variable. The results of ANOVA showed that the overall model is significant with $F = 308.868$ at 0.01% and r-square = 0.757. As shown in Table 3, the results of this study found that the effects of city brand value, emotional value, information, economic value, social value, and cultural value on overall attitudes toward metaverse application for the public sector showed significance. Therefore, H1, 3, 5, 7, 8, and 9 were accepted. Among the significant results, the effect size was greater with cultural value on overall attitude than other effects followed by social value, city brand value, information, emotional value, and economic value. Overall, effect sizes were stronger with cultural and social values.

Table 3: Effects of Proposed Factors on Overall Attitude

Independent Variables => Dependent variable	Standardized Coefficient (t-value/sig)
City Brand Value => Overall Attitude	.118 (3.824***)
Public Service => Overall Attitude	.053 (1.461)
Emotional Value => Overall Attitude	.093 (2.663***)
Experience => Overall Attitude	.027 (.716)
Information => Overall Attitude	.103 (2.866***)
Personalization => Overall Attitude	.015 (.469)
Economic Value => Overall Attitude	.090 (2.878***)
Social Value => Overall Attitude	.237 (6.574***)
Cultural Value => Overall Attitude	.262 (7.953***)

*** $p < 0.01$ denotes statistical significance

This study also conducted regression analyses to test the effect of overall attitude on intention to use metaverse application for public sector and citizen satisfaction. The results of ANOVA showed that overall model is significant with $F = 1175.406$ at 0.01% and r-square = 0.567 for the effect of overall attitude on intention to use of metaverse application for public sector, while the results of ANOVA showed that overall model is significant with $F = 1947.766$ at 0.01% and r-square = 0.684 for the effect of overall attitude on citizen satisfaction. As shown in Table 4, the effect size of overall attitude on intention to use was 0.753 and the effect size of overall attitude on citizen satisfaction was 0.827. Hypotheses 10 and 11 were accepted.

Table 4: Effects on Intention & Citizen Satisfaction

Independent Variables => Dependent variable	Standardized Coefficient (t-value/sig)
Overall Attitude => Intention to Use	.753 (34.284***)
Overall Attitude => Citizen Satisfaction	.827 (44.134***)

*** *p* < 0.01 denotes statistical significance

6. Conclusion

The purpose of this study is to explore factors that affect overall attitudes toward metaverse application for the public sector and effects on intention to use and citizen satisfaction. By reviewing previous studies that highlights benefits of metaverse in the case of application in cities, this study proposed factors including perceived city brand value, public service, emotional value, experience, information, personalization, economic value, social value, and cultural value. The results of this study found that effects of perceived city brand value, emotional value, information, personalization, economic value, social value, and cultural value on overall attitude toward metaverse application for the public sector were significant, while effects of public service, experience, and personalization on overall attitude were not significant. Regarding effect size, this study found that effects of social and cultural value on overall attitude toward metaverse application for the public sector were stronger than effects of brand image, emotional value, information, personalization, and economic value on overall attitude.

The results of this study provide managerial and policy implications on the government and public sector on how to apply digital communication tools to provide public services and enhance engagement with citizens. By examining factors that affect overall attitude toward metaverse application for the public sector, the results of this study provide implications which aspects should be considered to foster citizen relationship management and to build the perceived image of the city by applying metaverse for city marketing. In particular, significant results of social value implied that application of metaverse for the public sector will help communicate with city and other people, make citizens feel that they are a person who follows recent trends in a society, and foster participation in city related events. Further, significant results of cultural value implied that application of metaverse for the public sector will help increase competitiveness of culture and tourism. Dwivedi et al. (2022) also stated that the metaverse is a world that transcends countries, borders, and gender and a new perspective beyond the existing humanistic approach is needed and addressed that the market of the metaverse will grow, and the market will help to construct a sustainable metaverse world. By investigating the application of digital communication tools and citizen relationship management in the public sector, the results of this study will also contribute which aspects should be more addressed academically for the marketing in the public sector.

This study has limitations and provides implications on future studies. The sample size will be increased in future study. Application of metaverse in other cities could be investigated. Future study might consider cross-cultural analysis. Application of metaverse in the private sector might be also examined in future studies.

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