Artificial Intelligence Application in City Marketing Strategies: Perspectives from Millennials and Generation Z

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Abstract

This study aims to explore driving factors of Artificial Intelligence application for city marketing strategy with perspectives of millennials and generation Z. This study proposed the following research questions: i) how perceived place branding factor, public service factor, affective factor, immersive experience factor, cognitive factor, cost benefit factor, social networking factor, and promotional value factor affect attitude toward AI application for city marketing; and ii) how attitude affect satisfaction and prospect toward AI application for city marketing? This study conducted an online survey with the assistance of a well-known research agency and applied factor and regression analysis to test hypotheses. The results found that effects of place branding, cognitive, social networking, and promotional value affect attitude significantly in the case of millennials, while effects of public service, affective, cost benefit, social networking, and promotional value affect attitude significantly in the case of generation Z. The results found that effects of attitude on satisfaction and prospect of AI showed significance. The results provide implications and different aspects for AI application of city marketing strategy with perspectives by generations, while millennials and generation Z perceived effects of promotional value as the most significant factor for AI application of city marketing strategy.

1. Introduction

The adoption of marketing strategies employed advanced technologies, including Artificial Intelligence (AI) Virtual Reality (VR), has rapidly transformed and influenced customer behavior. Cheng et al. (2022) highlighted that the evolution of advanced technologies has significantly impacted people's lives and molded the essence of liveliness. As per Chintalapati and Pandey (2022), the digital transformation catalyzed by AI has emerged as a critical factor influencing the next wave of disruptions in enterprise businesses. Verma et al. (2021) highlighted that the disruptive technologies, including the Internet of Things, big data analytics, block chain, and AI have transformed the operational landscape of businesses.

Specifically, AI in marketing has gained momentum due to its practical significance in both current and future business scenarios (Verma et al., 2021). Basha (2023) emphasized the elements that influence AI integration in marketing with the benefits and obstacles such as ethical considerations of AI integration in marketing. Jain and Aggarwal (2020) stated the term titled "Artificial Intelligence Marketing (AIM)" as an approach of optimally utilizing technology and customer data to enhance the customer's experience. Davenport et al.

(2020) investigated that AI is likely to substantially change both marketing strategies and customer behaviors.

How do millennials and generations perceive the application of AI and digital driven experiences that are applied for city marketing? Stone et al. (2020) addressed that the use of AI in marketing strategy has not been much discussed in the public domain, while it is expected that AI will be used in strategic decision-making. Stone et al. (2020) also investigated that the public sector is a very important marketing decision maker and must make decisions about making different services available to different citizens and identify the risks of not providing services to certain citizens. According to Serrat (2010), marketing must be seen to be an essential part of public sector management. Zenker and Braun (2017) researched that city branding has gained popularity as governance strategy, while the academic underpinning is still poor.

Previous studies in the field of city marketing often applied qualitative research, while quantitative research particularly, how citizens perceive AI application in city marketing was rarely investigated. Therefore, the purpose of this study is to examine which factors that affect citizens' perception on the application of AI for city marketing. In particular, this study investigates perception of millennials and generation Z and compares the effects of factors on attitude toward the AI application for city marketing. By classifying millennials and generation Z, this study proposed the following research questions:

i) How perceived place branding factor affects overall attitude toward application of AI for city marketing?
ii) How perceived public service factor affects overall attitude toward application of AI for city marketing?
iii) How perceived affective factor affects overall attitude toward application of AI for city marketing?
iv) How perceived immersive experience factor affects overall attitude toward application of AI for city marketing?
v) How perceived cognitive factor affects overall attitude toward application of AI for city marketing?
vi) How perceived cost benefit factor affects overall attitude toward application of AI for city marketing?
vii) How perceived social networking factor affects overall attitude toward application of AI for city marketing?
viii) How perceived promotional value factor affects overall attitude toward application of AI for city marketing?
ix) How does overall attitude affect satisfaction and prospects toward application of AI for city marketing?

By examining factors, the results of this study provide policy and managerial implications on which aspects of application of AI for city marketing need to be addressed for millennials and generation Z.

2. Literature Review

2.1. Application of Advanced Technology in Marketing

Verma et al. (2021) addressed that of all the disruptive technologies, artificial intelligence is the latest technological disruptor and holds immense potential for many fields such as manufacturing, pharmaceuticals, healthcare, agriculture, logistics, and digital marketing. Basha (2023) explored that one of the most significant applications of AI is in the field of marketing, which assists in enhancing performance. Davenport et al. (2020) investigated that AI appeared likely to influence marketing strategies, including business models, sales processes, and customer service options, as well as customer behaviors. Stone et al. (2020) addressed that the rise of AI in marketing is not taking place in isolation from the rapid, wider advance of marketing technology and this advance helps in the deployment of AI in marketing. Rusthollkarhu et al. (2022) addressed that AI-empowered tools enhance companies' diverse and crucial marketing management operations including forecasting and relationship management. Herath and Mittal (2022) explored that AI is applied as smart city solutions with various advantages to manage cities.

The concept of metaverse, the most recent application of advanced technology, is a mixed word from "meta" and "verse", introduced by Stephenson (1992) with the meaning, beyond the universe (Zhang et al., 2022). Prieto et al. (2022) addressed that metaverse a new paradigm by applying technologies such as augmented reality, mirror worlds, virtual worlds and lifelogging that are classified by Smart et al. (2007). Huynh-The et al. (2023) emphasized that the metaverse has been introduce as a shared virtual world by various emerging technologies, notably, artificial intelligence that underscores the significant important of enhancing immersive experience and enabling human-like intelligence of virtual agents. Cheng et al. (2022) investigated that in the virtual world, metaverse technologies drive the implementation of applications that also promote technology improvement and increase digitalization of the real world. Buhalis et al. (2023) addressed metaverse as the next disruptive technology by considering its impact in society and by highlighting immersive experiences in environments. Barrera and Shah (2023) examined that metaverse changes how consumers, brands, and firms transact and interact in an interconnected space of virtual realities. Brock and Kohli (2023) addressed the term called digital exploration services and found factors that affect critical to successful digital exploration including customer selectivity, close collaboration between IT providers and customers, strategic and systemic thinking, and open

innovation approach, etc. through in-depth interview. Ramadan (2023) investigated that the metaverse as a virtual parallel world digitally replicates people's lives and examined the potential strategic channel-based marketing routes in the presence of the metaverse.

2.2. Marketing in the Public Sector: City Marketing

Braun (2008) also stated that the term urban marketing is used to cover the marketing activities of cities, while sometimes it also refers to special marketing strategies of firms for certain cities. Hassan and Mahrous (2019) addressed nation branding as strategies that are gaining priority as an area of research because of increasing market complexity resulting from globalization forces, domestic, and international government policies, foreign exchange fluctuations and changes in the natural environment. According to Goovaerts et al. (2014), city marketing covers a broader range than place branding by attracting target groups and eventually focused marketing and selling, while place branding makes the city concerned a modern brand with a unique personality.

Osorio-Andrade et al. (2020) addressed that the concept of city marketing, city branding, or place marketing refers to the practice of recognizing, positioning, promoting, and selling cities, towns, regions, and countries to a specific market, by means of positive city image. Eshuis et al. (2018) stated that cities and regions in the case of western countries have often developed formal place marketing policies to improve their image and make their governance more marketing-led. Zenker and Braun (2017) developed a branding and communication strategy titled "The City Branded House Strategy" to deal with the complexity of city branding and to help city marketers and other urban policy-makers alike to manage city brands more effectively. Boisen et al. (2018) addressed promotion, marketing, and branding can support urban policies aimed at improving the place to the benefit of residents, businesses, and visitors. de Almeida (2023) analyzed that metaverse application in Seoul is strategic application of territorial-regional brand and city marketing with consideration of positioning as the first metaverse global city and strengthening the identity of territory. Wang and Medvegy (2022) investigated the application of metaverse concept as a new vitality and inevitable trend for smart cities. Cities applied metaverse with the purposes such as city promotion, value creation, and the growth of local economy. Among cities, Gwangju City claimed "AI Meta City" by providing new experiences to citizens and fostering economic value such as creating new concept jobs (Ministry of Land, Infrastructure and Transport, 2021).

3. Hypotheses Development

3.1. Effects of Place Branding Factor on Overall Attitude

Aitken and Campelo (2011) addressed that place branding is dependent on the relationships with community, people, landscape, companies, consumers and stakeholders. According to Acharya and Rahman (2016), places need marketing and branding strategies to obtain competitive advantage due to increasing competition among countries, cities, and regions. Feng et al. (2023) researched residents' participation in place branding processes by examining residents' construction of city brand identity and exertion of changes to a city brand. Zenker and Braun (2017) explored that city branding involves much more complexity than is commonly thought and outlines a strategy that enables urban policy makers, marketing researchers and marketers alike to better deal with city branding. Buhalis et al. (2023) addressed that metaverse empowers destination awareness, positioning, and branding and helps motivation to visit the place and change consumer behavior. This study highlights the potential transformation of place branding through the adoption of advanced technologies, such as the metaverse. Based on the consideration, this study hypothesized the effect of place branding factor on overall attitude in the cases of millennials and generation Z.

H1a: Place branding factor affects overall attitude in the case of millennials.
H1b: Place branding factor affects overall attitude in the case of generation Z.

3.2. Effects of Public Service Factor on Attitude

Berruhill et al. (2019) addressed that governments can use AI for better decision making, better communication with citizens and providing improved public services. Saha and Goyal (2021) developed a co-creation model for public service in the public management by suggesting building platforms for interaction and engagement. Gesk and Leyer (2022) investigated that AI solutions in public services are preferred and researched when and why AI is accepted and growing in the public service. Chatterjee et al. (2022) examined employment of AI enabled services by the government and researched how such services help enhance public value for citizens. Alruwaie et al. (2020) addressed the citizens' continuous use of e-Government services as a success factor related to the role of self-efficacy, expectations, and satisfaction by applying theories. This study hypothesized that by applying metaverse in the public services, overall attitude toward the public sector will be increased. This study also

hypothesized the effect of public service factor on overall attitude in the cases of millennials and generation Z.

H2a: Public service factor affects overall attitude in the case of millennials.

H2b: Public service factor affects overall attitude in the case of generation Z.

3.3. Effects of Affective Factor on Attitude

Kowalczuk et al. (2021) investigated consumer reactions to the Augmented Reality (AR) through the use of IKEA place app and demonstrated that behavioral responses, including reuse and purchase intention, are influenced by affective factors (such as immersion, enjoyment, product liking) and cognitive factors (such as media usefulness, choice confidence). Zhao et al. (2022) discussed that affective computing in computer science has led to the swift advancement of emotion AI and emphasized that emotions induce changes associated with feelings, pleasure, and other related aspects. Trandafilović et al. (2013) stated that emotions are conditions of an organism characterized by provoked or aroused states, accompanied by physiological changes and observable alternations in one's behavior, pointing towards emotional conditions or processes. Assunção et al. (2022) emphasized that in the development of AI, incorporating realistic attributes and fostering learning autonomy are crucial steps, particularly when addressing the integration of emotion. This study posited that the affection factor resulting from the application of the metaverse influences the overall attitude toward the public sector. This study also hypothesized the impact of affection factor on overall attitude in the cases of millennials and generation Z.

H3a: Affection factor affects overall attitude in the case of millennials.

H3b: Affection factor affects overall attitude in the case of generation Z.

3.4. Effects of Immersive Experience Factor on Attitude

According to Dwivedi et al., the technology to enable the creation of the metaverse is fast evolving with the use of VR headsets, haptic loves, AR, and extended reality, that enables users to fully experience the high levels of interaction and immersive experience which could transcend across platforms using avatars. Cheng et al. (2022) addressed that the convergence of different technologies that apply to metaverse such as extended reality, digital twins, etc. enhances the individual's immersive experience. D'Armenio (2022) investigated that the immersive media intends to address the degree of sensory involvement and raised the issue of how immersive media build perceptual experiences that

engage multiple senses. Prieto et al. (2022) addressed that the Internet has evolved with immersive and interactive environments and metaverse arises from the immersion of the virtual space particularly, multiplayer online role-playing games. Ramadan (2023) examined that the metaverse provides immersive opportunities to brands by integrating with current media and retail channels. Based on the consideration, this study hypothesized the impact of immersive experience on overall attitude in the cases of millennials and generation Z.

H4a: Immersive experience factor affects overall attitude in the case of millennials.

H4b: Immersive experience factor affects overall attitude in the case of generation Z.

3.5. Effects of Cognitive Factor on Attitude

Trandafilović et al. (2013) asserted that cognition, in alignment with cognitive theory, represents a learning process wherein individuals become aware of their internal and external reality, gaining a deeper understanding. Zhao et al. (2022) introduced the concept of cognitive AI, emphasizing its crucial role in engagement, decision-making, and other aspects that are intricately linked to the thought processes, reasoning, and decision-making capabilities of computers. By applying metaverse in the public sector, citizens will obtain cognitive information that also helps make decisions in their lives, this study hypothesized that cognitive factor affects overall attitude toward the public sector. This study also hypothesized the impact of cognitive factor on overall attitude in the cases of millennials and generation Z.

H5a: Cognition factor affects overall attitude in the case of millennials.

H5b: Cognition factor affects overall attitude in the case of generation Z.

3.6. Effects of Cost Benefit Factor on Attitude

Saha and Goyal (2021)'s proposed co-creation model for public service include the co-production benefits as a part of success factors. Dwivedi et al. (2022) explored that metaverse as a tool that solves tasks that could not easily be done in a real-world environment since it helps save cost. Rossi et al. (2022) investigated that use of AI is cost-effective as a decision-support system in many fields. By applying metaverse in the public sector, citizens will obtain benefits such as information by saving searching costs, therefore, this study hypothesized that cost benefit factor affects overall attitude toward public sector. This study also hypothesized the effect of cost benefit factor on attitude in the cases of millennials and generation Z.

H6a: Cost benefit factor affects overall attitude in the case of millennials.

H6b: Cost benefit factor affects overall attitude in the case of generation Z.

3.7. Effects of Social Networking Factor on Attitude

Dwivedi et al. (2022) addressed that the metaverse replaces virtual environments such as SNS that are familiar with and is useful for simulating social phenomena by stimulating social and other issues via increased interaction. Metaverse are likely subject to social influence since the spaces using metaverse are shared by many users (Hadi et al., 2023). In particular, the use of an avatar in the metaverse as a unique feature to connect people easily in a virtual space, helps enhance interaction with others. Hadi et al. (2023) also investigated that application of avatars and rich media such as AR and VR leverage brands to communicate with consumers. By applying a metaverse for the public sector, citizens will interact and communicate better, therefore, this study hypothesized that social networking factor affects overall attitude toward the public sector. This study also hypothesized the effect of social networking factor on attitude in the cases of millennials and generation Z.
H7a: Social networking factor affects overall attitude in the case of millennials.
H7b: Social networking factor affects overall attitude in the case of generation Z.

3.8. Effects of Promotion Factor on Attitude

Boisen et al. (2018) addressed that it is difficult to find clean definitions of place promotion, as most definitions of place promotion overlap extensively with place marketing and place branding, and therefore use similar terminology, albeit often with slightly different meanings. Goovaerts et al. (2014) researched that cities and towns carried out city marketing policy to attract new and existing target customers, while appropriate measurement of effectiveness and efficiency should be measured. Rahimah (2020) investigated that city branding required the program through comprehensive approaches including advertising, promotional campaigns, etc. Application of metaverse in the public sector will help promote the city as a brand, therefore, the effect of the promotional factor affects attitude toward the city. This study also hypothesized the effect of promotional factor on attitude in the cases of millennials and generation Z.
H8a: Promotion factor affects overall attitude in the case of millennials.
H8b: Promotion factor affects overall attitude in the case of generation Z.

3.9. Effects on Attitude, Satisfaction, and Prospect

According to Ajzen (1989), an attitude is an individual's disposition to respond favorably or unfavorably to an object, person, institution, or event, or to any other discriminable aspect of the individual's world. Ajzen and Fishbein (2000) investigated that people's attitudes follow spontaneously and consistently from beliefs accessible in memory and then guide corresponding behavior. Based on the consideration, this study hypothesized the effect of overall attitude on satisfaction and prospects toward the metaverse in the cases of millennials and generation Z.
H9a~b: Overall attitude affects satisfaction to the metaverse in cases of millennials and generation Z.
H10a~b: Overall attitude affects prospect toward the metaverse in cases of millennials and generation Z.

4. Methodology

This study conducted 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, attitude, satisfaction, and prospects toward the metaverse. The study applied 5-point Likert scales for major questionnaire items. This study applied stratified sampling by considering demographics. The survey will be collected in S. Korea and distributed to citizens regarding application of metaverse in the public sector. 534 respondents answered the survey including 330 millennials and 204 generation Z. The survey was distributed 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 also conducted Cronbach alpha to check reliability. The results of Cronbach alpha include the following: 0.874 for place branding factor, 0.846 for public service, 0.854 for affection factor, 0.851 for immersive experience, 0.876 for cognition factor, 0.849 for cost benefit factor, 0.873 for social networking factor, and 0.865 for promotional value factor in the case of millennials and 0.863 for place branding factor, 0.862 for public service, 0.855 for affection factor, 0.835 for immersive experience, 0.869 for cognition factor, 0.868 for cost benefit factor, 0.868 for social networking factor, and 0.887 for promotional value factor in the case of

generation Z. This study applied generation categories stated by Dries et al. (2008) that millennials are born early 1980 and mid-1990 and generation Z are born after mid-1990. Table 1 summarized demographics of respondents.

Table 1: Demographics of Respondents

		M (%)	Z (%)
Gender	Male	167 (50.6)	103 (50.5)
	Female	163 (49.4)	101 (49.5)
Age	20-24 years old	-	88 (43.1)
	25-29 years old	-	116 (56.9)
	30-34 years old	109 (33.0)	-
	35-39 years old	101 (30.6)	-
	40-44 years old	120 (36.4)	-
Education	Middle School	-	1 (0.5)
	High School	53 (16.0)	38 (18.6)
	In College	12 (3.6)	61 (30.1)
	Bachelor's Degree	239 (72.6)	97 (47.4)
	Graduate Degree	26 (7.8)	7 (3.4)
Job	Agriculture, Forestry, or Fisheries	-	2 (1.0)
	Self-Employed	15 (4.6)	12 (5.6)
	Sales/Service	30 (9.0)	20 (9.9)
	Blue-Collar	34 (10.3)	12 (5.9)
	White-Collar	188 (57.1)	64 (31.1)
	Student	3 (0.9)	64 (31.2)
	Housewife	27 (9.6)	2 (1.0)
	Not-Employed	27 (8.2)	28 (13.8)
	Others	1 (0.3)	1 (0.5)
Annual Income	Below 2,000,000 KRW	30.8 (9.1)	38 (17.3)
	Between 2,000,000-5,000,000 KRW	102 (30.8)	50 (24.5)
	Between 5,000,000-10,000,000 KRW	21 (6.4)	19 (9.5)
	Between 10,000,000-20,000,000 KRW	4 (1.2)	8 (3.7)
	Between 20,000,000-50,000,000 KRW	61 (18.4)	30 (14.5)
	Between 50,000,000-100,000,000 KRW	77 (23.3)	12 (5.9)
	Between 100,000,000-200,000,000 KRW	8 (2.4)	2 (1.0)
	More than 200,000,000 KRW	4 (1.2)	1 (0.5)
	Other	24 (7.2)	35 (17.3)
	TOTAL	330	204

* M: Millennials; Z: Generation Z

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 place branding factor, this study developed items including how application of the metaverse in the public sector help improve place branding, place image, and interests of residential area; ii) for public service factor, this study developed items including how application of the metaverse in the public sector help improve citizen services such as public service, job career counseling, public administration services, information sharing related to city, etc., therefore, such services help build comfort and familiarity of residential area; iii) for affection factor, this study developed items including how application of the metaverse in the public sector provides fun and enjoyable services and information delivers pleasures and excitement, iv) for immersive experience factor, this study developed items including how application of the metaverse in the public sector provides real life experiences and services for residential area and opportunities to participate in various events operated by residence such as city and province, v) for cognition factor, this study developed items including how application of the metaverse in the public sector provides useful information regarding the public service, residential area, etc.; vi) for cost benefit factor, this study developed items including how application of the metaverse in the public sector can help save searching costs for public services such as information searching cost, career counseling expenses, etc., vii) for social networking factor, this study developed items including how application of the metaverse in the public sector helps to communicate with the citizens, helps to build relationships between local governments and citizens, etc., and viii) for promotional value factor, this study developed items including how application of the metaverse in the public sector helps to improve cultural and destination tourism competitiveness and is helpful for marketing such as promotion of residential areas. Table 2~3 summarized component matrix in the case of millennials and generation Z.

Table 2: Component Matrix (Millennials)

	Component							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PB1	.91							
PB2	.89							
PB3	.88							
PS1		.89						
PS3		.87						
PS2		.87						
AF2			.89					
AF1			.88					
AF3			.86					
IE3				.90				
IE1				.88				
IE2				.86				
CO3					.90			
CO1					.89			
CO2					.88			
CB2						.90		
CB3						.88		
CB1						.85		
SN1							.88	
SN3							.87	
SN4							.86	
SN2							.80	
PV2								.89
PV3								.88
PV1								.88

*PB: Place Branding; PS: Public Service; AF: Affection; IE: Immersive Experience; CO: Cognition; CB: Cost Benefit; SN: Social Networking; PV: Promotional Value

Table 3: Component Matrix (Generation Z)

	Component							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PB1	.91							
PB2	.89							
PB3	.88							
PS1		.89						
PS3		.87						
PS2		.86						
AF2			.89					
AF1			.89					
AF3			.86					
IE3				.90				
IE1				.88				
IE2				.86				
CO3					.90			
CO1					.89			
CO2					.88			
CB2						.90		
CB3						.88		
CB1						.85		
SN1							.88	
SN3							.87	
SN4							.86	
SN2							.80	
PV2								.89
PV3								.88
PV1								.87

*PB: Place Branding; PS: Public Service; AF: Affection; IE: Immersive Experience; CO: Cognition; CB: Cost Benefit; SN: Social Networking; PV: Promotional Value

This study employed multiple regression analysis to test its hypotheses. Factor scores were utilized in the regression analysis. This study applied place branding, public service, affection, immersive experience, cognition, cost benefit, social networking, and promotional value factors as independent variables and overall attitude as a dependent variable. The results of ANOVA showed that the overall model shows significance with $F = 129.878$ at 0.01% and r-square = 0.803 in the case of millennials and $F = 73.588$ at 0.01% and r-square = 0.792 in the case of generation Z. As shown in Table 4, the results of this study found that the effects of place branding, cognition, social networking, and promotional value on overall attitudes showed significance in the case of millennials, while the effects of public service, affection, cost benefit, social networking, and promotional value on overall attitudes showed significance in the case of generation Z. Therefore, H1a, 5a, 7a, and 8a, were accepted in the case of millennials and H2b, 3b, 6b, 7b, and 8b were accepted in the case of generation Z. Therefore, social networking and promotional value factors were accepted in both cases of millennials and generation Z, while other effects on overall attitudes differ by millennials and generation Z. Among the significant results, the effect size was greater with promotional value factor followed by social networking factor, cognition factor, and place branding factor in the case of millennials. Among the significant results, the effect size was greater with the promotional value factor followed by social networking factor, affection factor, cost benefit factor, and public service factor in the case of generation Z. Overall, effect sizes were stronger with the promotional value and social networking factors in both cases of millennials and generation Z.

Table 4: Effects of Proposed Factors on Overall Attitude

Independent Variables => Dependent variable	Standardized Coefficient (t-value/sig)	Standardized Coefficient (t-value/sig)
	Millennials	Generation Z
Place Branding => Overall Attitude	.121(2.344***)	.014 (.228)
Public Service => Overall Attitude	.065(1.119)	.139 (1.976**)
Affection => Overall Attitude	.051(.930)	.208 (2.784***)
Immersive Experience => Overall Attitude	.047 (.774)	.074 (.921)
Cognition => Overall Attitude	.202 (3.461***)	.042 (.612)
Cost Benefit => Overall Attitude	.072 (1.414)	.166 (2.472**)
Social Networking => Overall Attitude	.207 (3.358***)	.217 (2.739***)
Promotional Value => Overall Attitude	.367 (7.356***)	.283 (3.987***)

*** $p < 0.01$; ** $p < 0.05$ denotes statistical significance

This study also employed regression analyses to test the effect of overall attitude on satisfaction and prospect of metaverse application in the public sector. The results of ANOVA showed that overall model is significant with $F = 803.025$ at 0.01% and r-square = 0.710 for the effect on satisfaction and $F = 905.924$ at 0.01% and r-square = 0.734 for the effect on prospect in the case of millennials, while overall model is significant with $F = 515.249$ at 0.01% and r-square = 0.718 for the effect on satisfaction and $F = 428.350$ at 0.01% and r-square = 0.680 in the case of generation Z. As shown in Table 5, the effect size of overall attitude on satisfaction was 0.843 in the case of millennials and 0.848 in the case of generation Z. Therefore, the effect size of attitude on satisfaction toward the metaverse application in the public sector in the case of millennials and generation Z were almost similar. Further, the results showed that the effect size of overall attitude on the prospect of metaverse application in the public sector was 0.857 in the case of millennials and 0.824 in the case of generation Z. Therefore, the effect size of attitude on prospect toward the metaverse application in the case of millennials was slightly greater than the effect size of attitude on prospect of metaverse in the public sector in the case of generation Z. Hypotheses 9a, 9b, 10a, and 10b were accepted.

Table 5: Effects on Satisfaction & Prospect

Independent Variables => Dependent variable	Standardized Coefficient (t-value/sig)	Standardized Coefficient (t-value/sig)
	Millennials	Generation Z
Overall Attitude => Satisfaction	.843 (28.338***)	.848 (22.699***)
Overall Attitude => Prospect	.857 (30.099***)	.824 (20.697***)

*** $p < 0.01$ denotes statistical significance

6. Conclusion

The aim of this study is to investigate the factors influencing overall attitudes toward metaverse application in the public sector and their impact on satisfaction and the prospects of metaverse application. This study classified millennials and generation Z and proposes a framework elucidating how factors such as place branding, public service, affection, immersive experience, cognition, social networking, and promotional value influence overall attitudes toward metaverse applications in the public sector. The findings of this study revealed that in the case of millennials, place branding, cognition, social networking, and promotional value significantly influenced overall attitudes. Meanwhile, in the case of generation Z, public service, affection, cost benefit, social networking, and promotional value demonstrated significance in shaping overall attitudes. Therefore, the

influence of social networking and promotional value on shaping overall attitudes proved to be significant in both cases of millennials and generation Z. With regard to effect size, this study discovered that in the case of millennials, the impact of promotional value on overall attitudes was higher, followed by the effects of social networking, cognition, and place branding. For generation Z, the effect size of promotional value on overall attitudes was found to be higher than the effects of other factors, with social networking, affection, cost benefit, and public service in order of impact. Hence, the effects sizes of promotional value and social networking on overall attitudes were found to be higher than the effects of other factors in both cases of millennials and generation Z.

The results suggest that millennials perceive place branding factors, such as how the application of the metaverse in the public sector contributes to improving place branding, place image, and interests of residential areas, significantly influencing overall attitude. The results suggest that millennials perceive the cognition factor, such as how the application of the metaverse in the public sector provides useful information regarding public service and residential areas, significantly influencing overall attitude. However, the effects of place branding and cognition did not demonstrate significance in the cases of generation Z. The results also suggest that generation Z perceives the public service factor, such as how the application of the metaverse in the public sector helps improve citizen services, including job career counseling, public administration services, and information sharing related to the city, significantly influencing overall attitude. Furthermore, the results suggest that generation Z perceives the affection factor, such as how the application of the metaverse in the public sector provides fun and enjoyable services and delivering information that brings pleasures and excitement, significantly influences overall attitude. The results also suggest that generation Z perceives how the application of the metaverse in the public sector can help save searching costs for public services, including information searching cost and career counseling expenses, significantly influencing overall attitude. However, the effect of public service, affection, and cost benefit factors did not demonstrate significance in the case of millennials. For both millennials and generation Z, the effect of the immersive experience factor does not demonstrate significance on the overall attitude toward the metaverse application in the public sector.

The results of this study offer managerial and policy implications for city marketing strategies, outlining how to effectively apply advanced technologies during the era of the 4th industrial revolution for citizen relationship management. Through an examining of significant factors in the case of millennials and generation Z, this study provides implications regarding the aspects of metaverse application in city marketing strategy that need to fostered

for each generation. In the case of millennials, the results of this study suggest that attention should be given to addressing the effects of place branding factor associated with residential areas and cognition factor associated with information related to residential areas. Additionally, efforts should be made to enhance the effects of the public service factor, affection, and cost-benefit factors by considering the perspectives of millennials. In the case of generation Z, the results of this study suggest that efforts should be directed towards addressing the effects of the public service factor associated with public service, job career counseling, and public administration services. Additionally, attention should be given to enhancing the effects of the affection factor associated with fun and enjoyable services, information that delivers pleasures and excitement, and cost counseling expenses. Meanwhile, improvements in the effects of place branding factor and the cognition factor should be considered by taking into account the perspectives of generation Z. The results of this study also suggest that the overall attitude formed by place branding, cognition, social networking, and promotional value factors significantly affects satisfaction and prospects toward the metaverse application in city marketing strategy for millennials. Similarly, the overall attitude formed by public service, affection, cost benefit, social networking, and promotional value factors significantly influences satisfaction and prospects in the case of generation Z. Furthermore, the results of this study suggest that the application of metaverse in city marketing strategy could be expanded to other cities as a means to build better relationships with citizens. In a previous study, Cho (2023) highlighted that the use of metaverse applications for marketing in the public sector has the potential to enhance the brand value of cities. This study has limitations and provides suggestions on future studies. The sample size will be increased in future study. Future study will also compare effects by other generations, such as generation X.

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