land

MDPI

Article

How to Encourage Public Engagement in Smart City Development—Learning from Saudi Arabia

Ibrahim Mutambik [1,*], Abdullah Almuqrin [1], Fawaz Alharbi [2] and Majed Abusharhah [3]

[1] Department of Information Science, College of Humanities and Social Sciences, King Saud University, Riyadh P.O. Box 11451, Saudi Arabia; aalmogren@ksu.edu.sa
[2] Department of Computer Science, Applied College, Imam Mohammed Ibn Saud Islamic University, Riyadh P.O. Box 11432, Saudi Arabia; fawsdalharbi@imamu.edu.sa
[3] Information Science Department, Imam Abdulrahman Bin Faisal University (IAU), Dammam P.O. Box 1982, Saudi Arabia; mmabusharhah@iau.edu.sa
* Correspondence: imutambik@ksu.edu.sa

Abstract: The concept of the smart city is well-established, and governments across the world are either planning, or already implementing, strategies to transform existing cities to smart status. However, governments cannot act alone. If the implementation of these smart city strategies are to be successful, public engagement is a key factor. This raises the question of how best to ensure public engagement. Currently, the various external factors that influence willingness to support, and actively participate in, the development of smart cities are not well-understood, as there are few studies which examine the issue. This is of significance across the globe, but is of particular significance in Saudi Arabia, which has announced an ambitious smart city development plan. The aim of this research is to explore this issue—that is, it seeks to identify the key variables that influence the intention to participate in smart city development, and explores how they ultimately affect engagement behaviours. To achieve this, the study used a quantitative methodology, based on data from residents of 10 Saudi cities, each of which is part of the Kingdom's 2030 smart city plan. The data were analysed, using structural equation modelling (SEM), in order to test the reliability and predictive value of a model which hypothesised a positive relationship between five external variables: information availability, perceived benefits, social norms, behaviour management, and social responsibility and engagement behaviour. The results showed that information availability has a direct and positive effect on an individual's engagement behaviour, while perceived benefits, responsibility and social norms have an indirect effect on engagement, by positively impacting the attitude of residents. Practical implications, based on these findings, are discussed. The study contributes important insights to the literature, as it is one of the few studies to explore such a model in the context of smart cities. It therefore acts as a useful foundation for further research. However, the focus on Saudi cities may be considered a limitation in terms of generalisability, and other external variables could usefully be explored in future research.

Keywords: smart city; smart government; urbanisation; engagement behaviour; citizenship

Citation: Mutambik, I.; Almuqrin, A.; Alharbi, F.; Abusharhah, M. How to Encourage Public Engagement in Smart City Development—Learning from Saudi Arabia. *Land* **2023**, *12*, 1851. https://doi.org/10.3390/land12101851

Academic Editor: Thomas Panagopoulos

Received: 16 August 2023
Revised: 25 September 2023
Accepted: 26 September 2023
Published: 28 September 2023

1. Introduction

Although the term 'smart city' was first used in the 1990s [1], the concept only began to be implemented on a wide scale in the mid-2000s [2], enabled by the increasing rate of development of advanced technologies such as AI (Artificial Intelligence), the IoT (Internet of Things), machine learning and Big Data. In recent years, the pace of smart city implementation has grown ever more rapidly, as the demands of global urbanisation have become increasingly urgent. This urgency is recognised by governments across the world. While, today, over 50% of the global population (approximately 4.4 billion people) live in cities, this trend is expected to continue, so that by 2050, over 70% of all people will live in an urban environment [3]. This trend will lead to many governmental and

societal challenges, most of which can be met through the implementation of smart city infrastructures. In fact, the potential of the smart city concept is so persuasive that the global smart cities market, valued at almost USD 400 billion in 2019, is expected to have a value of almost USD 1400 billion by 2030 [4].

However, if the potential of the smart city is to be realised, a number of technical, societal and governmental challenges need to be met. One of the most significant of these challenges is securing the participation of residents [5–7]. Not only do residents play a critical role in helping to make public institutions more transparent, accountable, and effective, but there is evidence that residents' engagement in governmental decision-making and initiatives can produce more positive and constructive citizen–state relations, improved public services and higher levels of public health and well-being [8]. These findings are supported by other studies, such as that by Nathansohn and Lahat [9], who argue that public participation is a key consideration in the development and implementation of smart and sustainable cities [10,11]. This means that gaining public support is an important element in the smart city strategy of any government. Although governments hold the leading role in the design and implementation of smart cities, residents also play a key part, and ensuring their support and enthusiasm for such projects is an essential component of the developmental process [11,12]. Ensuring this support is not a straightforward process, and can lead to the failure of a smart city initiative [13]. In fact, today, studies suggest that a lack of democratic process, leading to poor civic involvement, has resulted in significant discontent among residents and a reluctance to participate in, or support, many recent smart city initiatives [14]. Often, the fundamental reason for this lack of democratic process is the implementation of a top-down strategy, where leaders focus on technology platforms and self-interest, without recognising residents as legitimate and important stakeholders. Instead, what is required is a community-driven, bottom-up strategy where residents are seen as integral to the design and implementation process [15].

However, even though this need to involve residents is becoming more widely recognised and accepted, it remains unclear as to precisely what issues concern residents, and what factors are most important in securing their support. Until recently, little consideration has been given to how residents might be more meaningfully involved in the processes of governance around smart cities, and what encourages their involvement [16]. While this situation has begun to change, as an increasing number of studies have begun to focus on the role played by residents in smart city development, research which explores the factors that influence residents' willingness to participate in the development process remains relatively scarce [17]. As far as is known by the current researcher, there are no such studies which examine this issue within Saudi Arabia. This is significant, as Saudi has announced a major smart city strategy, which commits to the launch of 50 initiatives by 2030 [18].

This paper, therefore, constructs a research model designed to explore the following research question: RQ: What are the factors that influence the willingness of Saudi residents to participate in and support the development of smart cities?

To gain insights into these questions, we used the Citizenship Behavior Theory, which focuses on the role of attitudes and intentions in influencing behaviour. In this study, we apply the theory to all residents of Saudi (which includes foreigners as well as native citizens) to investigate the factors that influence behaviour concerning smart cities. In doing so, we developed a model that allows us to interpret these factors in the context of Saudi Arabia and other contexts.

2. Theoretical Framework and Hypotheses

2.1. The Role of Public Participation and the Theory of Citizenship Behaviour

Public participation is a process which provides private individuals with an opportunity to influence public decisions, and has long been a component of the democratic decision-making process [19]. Democratic decision-making, as opposed to bureaucratic/technocratic decision-making, assumes that all active stakeholders who are impacted by a given decision have a right to take part in the decision-making process. Public participa-

tion itself can either be 'direct' (i.e., through individual voting processes) or can be through third-party representation, and has a number of significant advantages. These include, according to Xiaomei [20], greater transparency of institutional decisions, more effective and relevant decision-making by government bodies, and higher levels of acceptance of resulting decisions.

Several studies have shown the importance of public participation in the context of urban planning [21], and it is a key consideration in the implementation of any city development strategy, as it can produce collaborative behaviours, as well as levels of individual and community empowerment, that have a positive effect on the sustainability and equity of outcomes [22–24]. However, the construction of a smart city is a particularly complex project, as it requires radical planning and redesign of infrastructure, with interconnected technologies at its core [25].

The aim of such a redesign is to use these underlying digital technologies to improve all areas of public life, including energy use, healthcare, transportation, education and public services, as well as to increase the transparency, efficiency and fairness of governance and other institutional mechanisms [26].

Given the critical nature of public participation in the construction of smart cities, governing bodies must conceive, and implement, strategies which create conditions under which public participation will flourish—i.e., to cultivate a political and social environment which not merely allows, but encourages, individuals, communities, organisations and institutions to share skills and knowledge [27,28]. Yet, despite the critical nature of this governmental responsibility, it remains unclear as to how this is best achieved. While previous studies have recognised the relevance and importance of public participation in the smart city development process, there is a scarcity of research on specific strategies that encourage publics to engage with the process. More research on this topic would usefully add to our knowledge.

Despite this lack of knowledge of specific strategies in a smart city context, there are useful findings from other areas of citizen behaviour theory. These findings strongly suggest that the sense of belonging and collaboration, inculcated by residents' attitude, can play a key role in gaining public support for, and engagement in, the development of smart cities [24,28,29]. This implies that a key condition for developing smart city engagement is to encourage the sense of citizenship attitude. A number of studies from the world of business, for example, have demonstrated the positive relationship between customer citizenship behaviour and company performance [23,30,31]. It is worth noting, however, that other research, such as that by Lepore, Testi and Pasher [22], have found that personal cost can have a significant negative impact on residents' behaviour and discourage individuals from engaging in supportive behaviour.

2.2. Information Availability and Data Accuracy

In this research, the term 'information availability' refers to the various types of evidence that are made available to residents regarding the development, implementation and benefits of smart cities. Previous studies have shown that there is a clear (and positive) association between the availability of evidence and an individual's behaviour. In a retail context, for example, behavioural models show that readily available information tends to stimulate the purchase process, while a lack of information can deter consumers from engaging in purchase-oriented behaviour [32]. Another study, in the context of e-waste recycling, has shown a similar result—that a lack of information concerning e-waste influences the readiness of households to recycle separate waste [33]—while research by Si et al. (2020) [34] echoed these conclusions in the field of (nuclear) energy acceptance. In fact, one relatively early metastudy [35] showed that this correlation of information availability and behaviour can be found across a wide range of contexts, from education to medical practice. However, it is important to note that not all research findings agree with these conclusions. Wang et al. [36], for example, found that information availability publicity has no significant influence on the rate of household waste separation.

Together, the above studies show that, while studies overall provide significant evidence for a positive association between information availability and behaviour—a result that may be intuitively expected—this association cannot be taken for granted in the field of smart cities, where research on information availability is extremely limited. It is therefore necessary to include this construct (information availability) in the model for this research, in order to examine its effect on residents' readiness to engage in the process of smart city development and construction.

Furthermore, while the relevance of information publicity is widely recognised, not all researchers agree on its contribution towards desired behaviour. Some researchers, such as Xiao et al. [37], have pointed out that that while behaviour may be stimulated by information availability, this information may be distorted, either deliberately or accidentally, and therefore contain bias. The accuracy of the data (information) provided is therefore also important, as well as its availability. In fact, research has shown that data accuracy can play an instrumental role in changing a person's behaviour [38], while Wang et al. [36] reported that data accuracy acts as a positive moderator of the relationship between information availability and a person's readiness to accept the validity of nuclear energy in an age of sustainability.

These studies, along with others, form the basis of the rationale behind this study, by helping to identify key factors which determine individual and collective behaviour. Based on this identification, a model was constructed which proposes how these factors are related. The validity of this model was explored by testing six key hypotheses.

3. The Research Hypotheses and Model

As discussed in the previous section, the theory of information behaviour describes how information availability has a significant effect on resident/individual behaviour. This is a result of the fact that humans tend to form a desire to satisfy various 'need states' that arise in the course of their daily lives, and the importance of that 'need state' drives the motivation to seek out information [39,40]. This can be illustrated by the case of an individual deciding whether or not to agree with nuclear energy. In deciding the issue, a person will look to satisfy the psychological 'need state' of gaining a benefit from this form of energy, and will seek out information that satisfies this need. If this exercise is successful, their perception of risk will recede, and their readiness to accept nuclear energy will increase [22,31,37]. On the other hand, a lack of available data is likely to increase their perception of danger, and nuclear energy will be rejected. Several studies, such as those by Muenratch et al. [41] as well as Chen and Cho [42], have confirmed this cause–effect process. This provides a clear analogy with the development of a smart city. In order to drive behaviours, information must be made available to help other residents weigh the risks against benefits, which will, in turn, influence their readiness to engage in the development phases of smart cities. This study therefore proposes the following hypotheses:

Hypothesis 1 (H1). *Information availability is positively associated with residents' attitude.*

Another important factor that can affect perceptions of attitude is perceived benefit. The positive effect of this (perceived benefit) on both affective and utilitarian attitudes and behaviours has been confirmed by many studies of consumer loyalty [43,44], while Martín et al. [45] found a strong positive causal association between those who gain economic benefits from tourism and their attitudes towards tourism development. This positive association seems to also occur in the context of smart cities, as studies such as Li et al. [46] and Huang et al. [30] found that the sense of gain felt by individuals, in residing in a smart city, strongly affected their sense of citizenship attitude and their readiness to participate in the development of the initiative. Another study, in Hong Kong, found that enthusiasm for the smart city concept associated positively with perceived smart city benefits, though the strength of the association was a function of education level and income [47], while research by Georgiadis et al. [48], concluded that inadequate dissemination by the government of

information about smart city benefits had led to low levels of support and cooperation from the Cypriot public. This paper therefore proposes the hypothesis:

Hypothesis 2 (H2). *Perceived benefit is positively associated with residents' attitude.*

Social norms are another important factor in the model used in this paper. These refer to the influences and pressures exerted by both individuals and groups, which shape attitudes and behaviours. The effect of social norms on individual behaviour and the resulting willingness (or lack of willingness) to support a particular idea or activity has been confirmed by studies in a wide range of contexts. In the context of vaccination and immunisation, for example, Oraby et al. [49] showed that social norms can depress vaccine uptake in some communities, while encouraging it in others, while several studies, for example, Reynolds [50] and McDonald and Crandall [51], found that people were more willing to make efforts to reduce household energy consumption if they were informed that others in their community were doing the same. In the field of sport, Dawson and Dobson [52] showed that social norms were a key factor in influencing the decisions of football referees, as fewer red and yellow cards were given to home teams in international matches. This paper therefore proposes the hypothesis:

Hypothesis 3 (H3). *Social norms are positively associated with residents' attitude.*

Behaviour management (the ability of individuals to manage and control their behaviour) also significantly affects a person's attitudes and behaviours in a particular context [53,54]. The ability to (self-)manage behaviour also has a considerable impact on self-efficacy [55], which affects the intention to participate in an activity. This effect has also been demonstrated in many other contexts, such as e-commerce [56,57]. This paper therefore proposes the hypothesis:

Hypothesis 4 (H4). *Behaviour (self-)management has a positive effect on residents' attitude.*

While the implementation of a smart city strategy places a burden of responsibility on the government and institutions, public participation is also required. This, as demonstrated by Mansoor and Wijaksana [58], can be significantly increased by encouraging a sense of responsibility within the public. This, in turn, can be generated by including communities and individuals in the planning and management of an initiative, so that they develop a sense of ownership [59–61]. A metastudy by Hines et al. [62], for instance, demonstrated that a strong sense of responsibility plays a crucial role in influencing individuals' environmental behaviours, and the findings of this research were echoed by Piyapong et al. [63]. In another study, conducted in Chile, Gonzalez and Lay [64] reported that inculcating a sense of responsibility in community members significantly improved involvement in the provision of social help. It is therefore proposed that:

Hypothesis 5 (H5). *Responsibility is positively associated with residents' attitude.*

There are many studies which have confirmed the effect of citizenship attitude on behaviour. These studies cover a wide range of social contexts, such as young people's willingness to participate in politics [65,66], to other areas, such as sustainable policy, online shopping and travel [67–70]. This paper therefore proposes the following hypothesis:

Hypothesis 6 (H6). *Residents' attitude has a positive effect on intention to participate.*

The research model, showing how the hypotheses above relate to the defined variables, is shown in Figure 1.

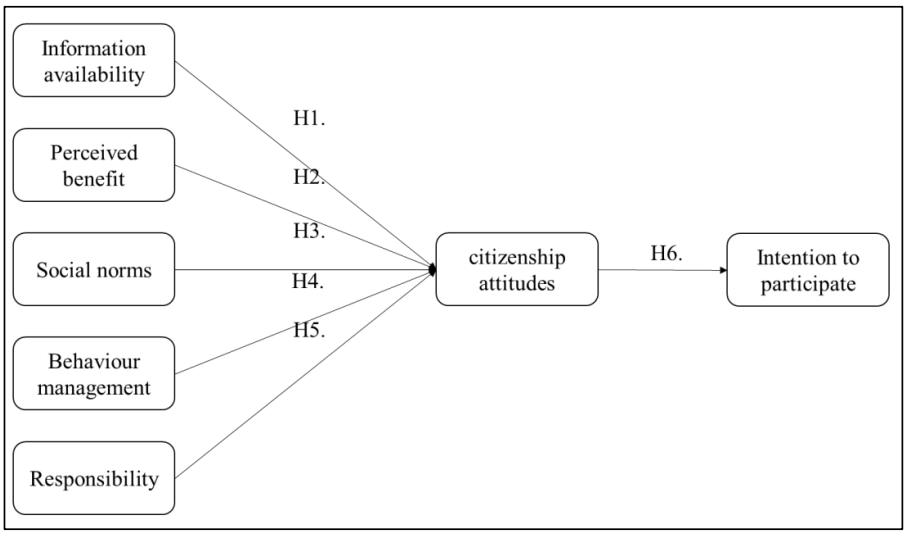

Figure 1. Research model, for residents' engagement in the development of smart cities.

4. Research Method

4.1. Sampling

The study used a cross-sectional sample, in terms of gender, age and employment status, to test the model. In order to obtain data, a number of steps were followed. The first of these steps was to identify Saudi cities which will become 'smart', according to the KSA 2030 strategy [71]. There are many such cities, but the country has plans to begin 10 immediately [71]. The next step was to approach the municipalities of these cities and seek their agreement to distribute the questionnaire to a random selection of residents within their jurisdiction. The selected residents were given a clear explanation of the purpose of the study.

A total of 2500 invitations were sent to individuals of different age groups, genders, nationalities and employment statuses. Over a period of six months, 1562 individuals responded, but only 1489 responses met the study's criteria for eligibility (fully completed questionnaires). A (retrospective) analysis of the sample shows that it is approximately representative of the Saudi population across all categories. A profile summary of the respondents can be found in Table 1.

Table 1. Summary of respondent demographics.

	Characteristic	Participants	%
Gender	Male	904	60
	Female	585	40
Employment status	Student	105	7
	Employed	964	65
	Self-employed	420	28
Age	18–24	416	28
	25–49	762	51
	50+	311	21
Nationality	Saudi	874	58
	Egypt	252	17
	India	83	6
	China	147	10
	France	53	4
	UK	50	3
	US	30	2

4.2. The Questionnaire Development

The questionnaire in the study was created using Google Forms and consisted of 22 items (Table 2), adapted from previously validated questionnaires to meet the current study aim, e.g., [48,72,73]. All items were based on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). In order to validate the accuracy and consistency of the items in the questionnaire, professionals competent in both languages translated them from English to Arabic, and then back into English (known as back-translation) [74,75].

Table 2. Constructs; items with factor loadings.

Construct	Item	Factor Loading
Intention to participate	I will gather information about smart city development through several channels	0.838
	I intend to engage with smart city development	0.865
	I will encourage family and friends to engage with smart city development plans	0.87
Perceived benefit	I believe that smart cities are a benefit to local residents	0.861
	I believe that a smart city creates job and work opportunities	0.859
	I believe that smart cities will improve the quality of life for people	0.94
Perceived behaviour management	I believe I could contribute to the development of a smart city	0.838
	I think I am relatively knowledgeable about the procedures for the construction of a smart city	0.853
	I consider that I am good at managing and controlling my behaviour	0.863
Information availability	I believe that information I hear about smart cities is accurate and reliable	0.868
	Information about the development of smart cities is easy to find and access	0.948
	Information about the development of smart cities is comprehensive and accurate	0.862
Resident attitudes	I will actively encourage friends and family to be involved in the development of a smart city	0.766
	I always provide positive feedback when I get good public service	0.867
	I will help in the development of a smart city in any way I can	0.871
	If am tolerant of mistakes in the provision of public services	0.865
Social norms	If those in my circle of friends and family engage in the development of a smart city, I will join them	0.903
	Most of my friends, family and colleagues will support me in my involvement with smart city development	0.84
	My ethical beliefs mean that I should engage with the development of a smart city	0.829
Responsibility	As I have a duty to participate in the development of a smart city, I am prepared to commit time and money	0.872
	My obligation to engage with the development of a smart city, means I am prepared to participate in related activities	0.904
	My obligation to participate in the development of a smart city, means that I will promote the idea and its benefits	0.858

To ensure clarity, a preliminary evaluation involving 43 experts in the field was conducted, yielding 39 responses. Based on the feedback received, certain modifications were made to the questionnaire. These revisions encompassed the following:

- Rephrasing some items to improve clarity;
- Reordering the items to improve flow;
- Adding specific instructions for participants on how to full the questionnaire.

The modified version of the questionnaire, based on the feedback from the pilot phase, was then used to collect data from the main study.

4.3. Ethics

All participants were informed, both on the initial invite and the website holding the questionnaire, that the study complied with all relevant ethical standards (approved by King Saud University's Research Ethics Committee, KSU-HE-12-242). Participants were also assured that all data collection and analysis were fully anonymised. No direct

incentives were offered to encourage participation, though a small donation to charity was offered for each complete response.

4.4. Analysis Procedure

The study used Partial least Squares Structural Equation Modelling (PLS-SEM) for analysis, for several reasons. Firstly, PLS-SEM is noted for its suitability for theory development [76–78], and is also the preferred approach when the structural model is relatively complex with several constructs and/or model relationships. Secondly, PLS-SEM is usually preferred (over CB-SEM) when the research is based on a relatively small sample size.

5. Results

5.1. Testing the Measurement Model

Factor analysis (FA) is utilized in this study to identify the underlying factors represented by a set of variables/items as well as to examine model fitness, convergent and discriminant validity. In order to use FA effectively, we first assessed the sampling adequacy for FA through the Kaiser–Meyer–Olkin (KMO) test, which resulted in a value of 0.874 (greater than the recommended value of 0.7) [79,80]. Secondly, we employed Bartlett's sphericity test to test the hypothesis that the correlation matrix is an identity matrix, where the value proved to be significant (p-value < 0.05). The results of the KMO and Bartlett's sphericity tests supported the use of AF in this study.

Regarding the goodness of fit indices for the model, all of the values were found to be within an acceptable range, meeting the criteria recommended by Hair et al. [81] and Hu and Bentler [82]. Table 3 below shows the goodness of fit indices for the structural model.

Table 3. Goodness of fit indices.

Fit Index	Results	Recommended Criteria
Absolute fit measures		
Chi-Square (χ2/DF)	2.32	<3.0
RMSEA	0.046	<0.05
GFI	0.973	>0.90
SRMR	0.928	>0.80
Parsimonious fit measures		
PNFI	0.691	>0.50
PGFI	0.611	>0.50
Incremental fit measures		
AGFI	0.928	>0.90
NFI	0.941	>0.90
IFI	0.921	>0.90
CFI	0.930	>0.90

Further, as shown in Table 1, the factor loadings for each item were all significant, ranging from 0.766 to 0.948. This indicates the convergent validity as each item was a good measure of its respective factor.

Additionally, CA was used in this study as a measure of internal consistency. As shown in Table 4, the calculated CA values for each construct ranged from 0.77 to 0.88, and CR was greater than 0.70, ranging from 0.80 to 0.86. These results indicate good internal consistency within each construct, suggesting that they effectively measured the same underlying construct [79,80].

Table 4. Correlations, CA, CR and AVE.

Factors	CA	CR	AVE	Correlations						
				1	2	3	4	5	6	7
1. Intention to participate	0.88	0.86	0.72	**0.85**						
2. Perceived benefit	0.86	0.84	0.70	0.58	**0.84**					
3. Perceived behaviour management	0.83	0.85	0.63	0.65	0.71	**0.79**				
4. Information availability	0.85	0.81	0.60	0.53	0.60	0.72	**0.77**			
5. Resident attitudes	0.87	0.80	0.62	0.56	0.60	0.61	0.50	**0.79**		
6. Social norms	0.86	0.83	0.67	0.51	0.66	0.63	0.54	0.51	**0.82**	
7. Responsibility	0.77	0.82	0.69	0.58	0.63	0.61	0.57	0.53	0.49	**0.83**

Note: Square root of AVE shown in bold as the diagonal.

Moreover, a discriminant validity test was conducted to ensure an adequate distinction between constructs and their metrics [81]. This test compares the square root of the average variance extracted (AVE) for each construct with its correlation value. The criterion is that the square root of AVE should be greater than the correlation value of 0.50 [81]. Once again, Table 4 demonstrates that the current study meets these necessary criteria.

Finally, multi-collinearity, which occurs when there is a high correlation among independent variables [78,80], was also examined. To assess this, the variance inflation factor (VIF) and tolerance values were checked showing that: the VIF value was less than three and the tolerance value was above two, meeting the criteria recommended by Hair et al. [76].

Based on the above results, the measurement model was found to be valid and reliable, with good model fitness, convergence and discriminant validity. This finding indicates that the scales employed in this study successfully assessed the fundamental factor of interest.

5.2. Common Method Variance and Bias

Common method variance (CMV) is a systematic error that may arise when data are gathered from a single source [78]. Since our data were collected from a single source, we conducted Harman's single factor test to examine the CMV. The results of this test indicated the absence of CMV. Additionally, common method bias (CMB) test, a form of CMV that can occur when the same response scale is utilized [76,78,83], was also measured. The outcomes of the common latent factor method demonstrated the absence of CMB. Consequently, our study was not affected by CMV or CMB, affirming the validity and reliability of our results.

5.3. Findings of the Research Hypotheses

Structural equation modelling (SEM) was employed to assess the psychometric properties of the measurement model and test the hypotheses. SEM is a statistical technique used to examine relationships among multiple variables. As shown in Figure 2, the analysis revealed that information availability, perceived benefit, social norms, perceived behaviour management and responsibility are all linked to residents' attitudes (explaining 54.6% of variance), thereby supporting hypotheses H1 to H5. Furthermore, the SEM analysis demonstrated a positive association between attitudes and intention to participate (explaining 66.3% of variance), thus supporting hypothesis H4. The *t*-values and standardized path coefficients of the model are presented in Table 5. All *t*-values are significant, indicating statistically significant relationships between the variables. The standardized path coefficients demonstrate the strength of these relationships. Furthermore, while the R2 values are not high (>0.7), neither are they low (<4), and the values are consistent with a reliable model, given the values of the other statistical variables [84]. In conclusion, the results of the SEM analysis strongly support the study's model.

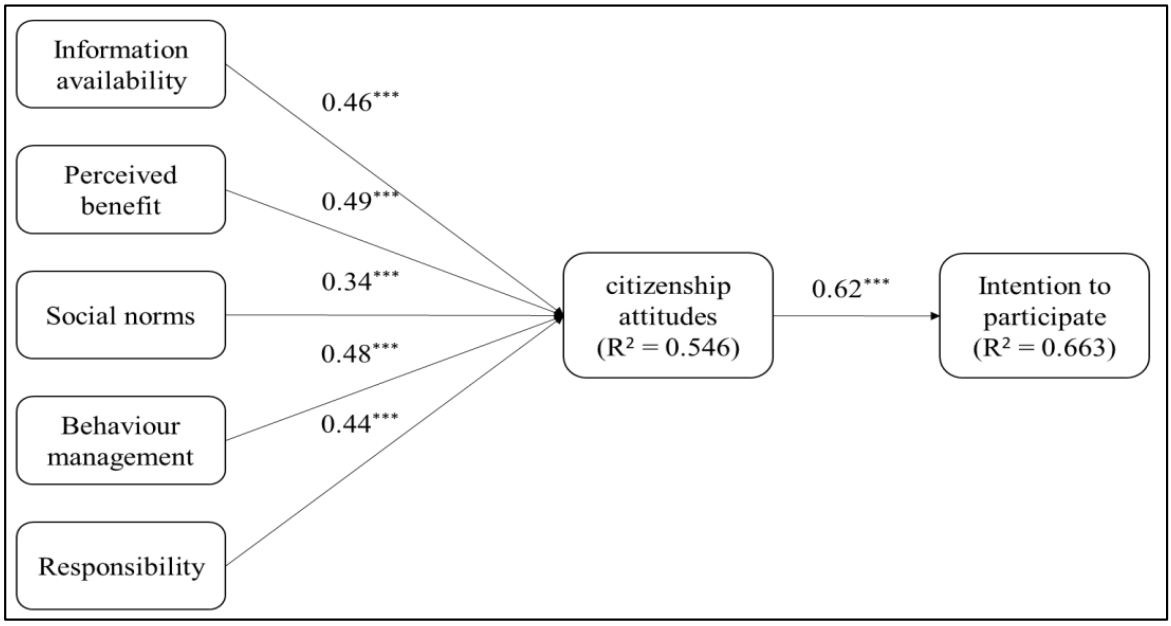

Figure 2. Research model (results of structural model evaluation using the whole sample). Note: ***: 0.001 significance.

Table 5. Path coefficients and *t*-values for full sample.

Hypothesis	Standardised Path Coefficient	*t*-Value	Support?
H1. Information availability is positively associated with residents' attitude.	0.46	5.61 ***	YES
H2. Perceived benefit is positively associated with residents' attitude.	0.49	5.42 ***	YES
H3. Social norms are positively associated with residents' attitude.	0.34	4.81 ***	YES
H4. Perceived behaviour management has a positive effect on residents' attitude.	0.48	5.35 ***	YES
H5. Responsibility is positively associated with residents' attitude.	0.44	5.31 ***	YES
H6. Residents' attitude has a positive effect on intention to participate.	0.62	6.11 ***	YES

Note: ***: 0.001 significance.

6. Discussion and Conclusions

This study has found a number of significant conclusions. As discussed above (Section 5.3), the SEM analysis of the data suggests that information availability influences an individual's attitude toward citizenship, and is positively associated with participation behaviour—specifically, the intention to engage. This is a result which supports the findings of Tang et al. [33] and Li et al. [85]. Furthermore, the analysis revealed that social norms play a vital role in shaping an individual's sense of belonging and are closely linked to their attitudes towards citizenship. In other words, the attitudes and values prevalent within both local communities and society at large significantly impact residents' willingness to participate in the advancement of smart city initiatives. Behaviour management was found to have a positive effect on residents' attitude, though factors that affect behaviour management that are not necessarily under an individual's control may affect their readiness to participate in defined activities [86,87]. If individuals consider that engaging in the development of a smart city is not a good use of their resources, or that the smart city will not deliver significant benefits, their readiness to engage will fall. On the other hand, if residents believe that such a city is beneficial, their readiness to engage with the development process rises [30,88].

According to the study, perceived benefits contribute significantly to citizenship attitude, as the digitally integrated infrastructure of smart cities can provide a wide range of improved public services, as well as new opportunities to both individuals and businesses [89–91]. Information impacts the perceptions and decisions of individuals, and

therefore their behaviours. Thus, it follows that residents' perceptions of smart city benefits have a positive effect on their readiness to support and engage in the development process.

The validity of the proposed model in this study, as demonstrated by the factor analysis, suggest that an individual's sense of responsibility is positively associated with residents' attitude, and therefore affects their intention to participate. Thus, activities which improve the public's sense of social responsibility should be at the core of governance strategy [73,92–94]. Lastly, the study confirmed the positive association between intention to participate (in smart city development) and engagement behaviour.

Another aim of the study was to establish the extent to which perceived information availability affects residents' intention to participate and engagement behaviours. The study's findings reveal a noteworthy correlation among the different factors influencing involvement in smart city development. When people feel that relevant information about smart cities is available and accessible, their enthusiasm for such initiatives, and their readiness to engage with them, increases. Currently, there are few studies which have explored the various factors which influence residents' engagement in the development of a smart city, so the conclusions of this research offer a number of meaningful contributions of practical value.

One of these contributions is that the research has built upon the current understanding of public participation in the specific context of smart cities. The study has achieved this by exploring the relationship between external variables such as information availability, social norms and behaviour management, and citizenship attitude. However, it should be noted that, while the study investigated the association between these external variables and intention to engage, it did not investigate the potential relationship between these variables and engagement behaviour—this may be significant [95–98]. Further research on this point would be useful.

Another important insight provided by the results of the study is that, if governments aim to encourage public participation in the development of smart cities, they need to integrate high levels of information availability into their implementation strategies. They should run awareness- and benefit-led information campaigns, aimed not only at city residents, but at surrounding areas, as well as visitors such as tourists. These campaigns should cover all aspects of a smart city, from planning and regulation, to the specific ways in which digital technology and information-sharing will be deployed to improve services and quality of life [99,100]. This approach can significantly reduce residents' reservations and increase their perception of benefits, thus increasing their intention to engage.

The analysis of the study data, which supports the model's validity, also demonstrated the importance of social responsibility in encouraging public participation. This (social responsibility) can be inculcated through the use of appropriate education programmes, and the provision of relevant advice and guidance concerning the processes and benefits of a smart city. This has been shown by other studies to be an effective approach to building public participation in the context of smart cities [46,101,102].

Lastly, it is also important to provide reassurance that the privacy and security of residents will be fully protected in the smart city environment, as this is a key area of uncertainty among many individuals [103,104]. By emphasising that participation can be undertaken without risk of compromising either individual or group safety and security [105–107], governments can significantly enhance readiness to engage in the development process.

7. Limitations and Future Research

While the model employed in this study explored the impact of some key external variables on public participation, there are also some other variables which were not included, but which could also have a significant effect. These variables include policy direction, governance models and legal implications. Future research could usefully integrate these factors into the theoretical model.

Another important factor that could be taken into account by future research is the technology-awareness of residents. As Michelotto and Joia [108] and Su and Fan [109]

pointed out, there is a 'virtuous circle' formed by smart cities and their residents, as the more they (smart cities) provide relevant, useful and trustable benefits, the more residents engage with the infrastructure, which, in turn helps to improve services, and so on. Thus, the greater the initial awareness and familiarity of technology, the more likely it is that this 'virtuous circle' will take root. Investigation of this effect on public participation would be an important contribution to the literature.

Another potential limitation of the study is the sampling. While cities (all planned as smart cities) in Saudi were used as sources of data, these cities may have significant demographic similarities and differences, in terms of education, resident nationality, age, etc., which may introduce a level of bias. Future research could investigate this possibility and/or use a larger city sample.

Furthermore, given the quantitative nature of the study's methodology, the results do not capture the nuances of individual experiences and perceptions. This could be important for understanding the reasons behind particular attitudes and behaviours, which would provide valuable insights that could contribute to policy and strategy formation. Future research could therefore benefit from employing a mixed-methods approach, which combines quantitative and qualitative methods. This may provide a more comprehensive understanding of the research topic.

Finally, this research has not yet investigated the impact of the relationship between the government and its residents on smart city development. However, as public trust in government intentions and strategies can influence resident engagement (both intention and behaviour), the government–resident relationship is an important consideration in smart city development. Therefore, this relationship should be further explored in future research.

Author Contributions: Conceptualization, I.M., A.A., F.A. and M.A.; methodology, I.M., A.A., F.A. and M.A.; validation, I.M., A.A., F.A. and M.A.; formal analysis, I.M., A.A., F.A. and M.A.; writing—original draft preparation, I.M., A.A., F.A. and M.A.; writing—review and editing, I.M., A.A., F.A. and M.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Deputyship for Research & Innovation, "Ministry of Education" in Saudi Arabia (IFKSUOR3-059-2).

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board (Human and Social Researches) of King Saud University.

Data Availability Statement: Data available on request due to restrictions of privacy.

Acknowledgments: The authors extend their appreciation to the Deputyship for Research & Innovation, "Ministry of Education" in Saudi Arabia for funding this research (IFKSUOR3-059-2).

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Yin, C.; Xiong, Z.; Chen, H.; Wang, J.; Cooper, D.; David, B. A literature survey on smart cities. *Sci. China Inf. Sci.* **2015**, *58*, 1–18. [CrossRef]
2. Anthopoulos, L.G. *Understanding Smart Cities: A Tool for Smart Government or an Industrial Trick*; Springer International Publishing: Cham, Switzerland, 2017; Volume 22. [CrossRef]
3. The World Bank. Urban Development. Available online: https://www.worldbank.org/en/topic/urbandevelopment/overview (accessed on 7 April 2023).
4. Next Move Strategy Consulting. Smart Cities Market by Functional Area. Available online: https://www.nextmsc.com/report/smart-cities-market (accessed on 7 April 2023).
5. Mora, L.; Deakin, M.; Reid, A. Strategic principles for smart city development: A multiple case study analysis of European best practices. *Technol. Forecast. Soc. Chang.* **2019**, *142*, 70–97. [CrossRef]
6. Mutambik, I. The Global Whitewashing of Smart Cities: Citizens' Perspectives. *Sustainability* **2023**, *15*, 8100. [CrossRef]
7. Almuqrin, A.; Mutambik, I.; Alomran, A.; Gauthier, J.; Abusharhah, M. Factors Influencing Public Trust in Open Government Data. *Sustainability* **2022**, *14*, 9765. [CrossRef]
8. The World Bank. Citizen Engagement. 2023. Available online: https://www.worldbank.org/en/topic/citizen-engagement (accessed on 7 April 2023).

9. Nathansohn, R.; Lahat, L. From urban vitality to urban vitalisation: Trust, distrust, and citizenship regimes in a Smart City initiative. *Cities* **2022**, *131*, 103969. [CrossRef]
10. Bashynska, I.; Dyskina, A. The overview-analytical document of the international experience of building smart city. *Bus. Theory Pract.* **2018**, *19*, 228–241. [CrossRef]
11. Dudek, M.; Bashynska, I.; Filyppova, S.; Yermak, S.; Cichoń, D. Methodology for assessment of inclusive social responsibility of the energy industry enterprises. *J. Clean. Prod.* **2023**, *394*, 136317. [CrossRef]
12. Hernàndez, C.A. The Role of Citizens in Smart Cities and Urban Infrastructures. In *Solving Urban Infrastructure Problems Using Smart City Technologies*; Elsevier: Amsterdam, The Netherlands, 2021; pp. 213–234. [CrossRef]
13. Sengupta, U.; Sengupta, U. Why government supported smart city initiatives fail: Examining community risk and benefit agreements as a missing link to accountability for equity-seeking groups. *Front. Sustain. Cities* **2022**, *4*, 960400. [CrossRef]
14. van Twist, A.; Ruijer, E.; Meijer, A. Smart cities & citizen discontent: A systematic review of the literature. *Gov. Inf. Q.* **2023**, *40*, 101799. [CrossRef]
15. Gartner. Gartner Says Citizen Engagement is Critical to the Success of Smart Cities. In Proceedings of the Gartner Symposium/Ltxpo, Dubai, United Arab Emirates, 5–7 March 2018.
16. Sweeting, D.; de Alba-Ulloa, J.; Pansera, M.; Marsh, A. Easier said than done? Involving citizens in the smart city. *Environ. Plan. C Politi. Space* **2022**, *40*, 1365–1381. [CrossRef]
17. Mutambik, I.; Lee, J.; Almuqrin, A.; Alkhanifer, A.; Baihan, M. Gulf Cooperation Council Countries and Urbanisation: Are Open Government Data Portals Helping? *Sustainability* **2023**, *15*, 12823. [CrossRef]
18. Asharq Al Awsat. Saudi Arabia Adopts Smart City Strategy. *Asharq Al Awsat*, 9 February 2022.
19. Quick, K.S.; Bryson, J.M. Public Participation. In *Handbook on Theories of Governance*; Edward Elgar Publishing: Cheltenham, UK, 2022. [CrossRef]
20. Xiaomei, S. Environmental Initiatives and Citizen Participation in the Local Government in China. *High. Educ. Orient. Stud.* **2023**, *3*, 9–16. [CrossRef]
21. Foroughi, M.; de Andrade, B.; Roders, A.P.; Wang, T. Public participation and consensus-building in urban planning from the lens of heritage planning: A systematic literature review. *Cities* **2023**, *135*, 104235. [CrossRef]
22. Lepore, D.; Testi, N.; Pasher, E. Building Inclusive Smart Cities through Innovation Intermediaries. *Sustainability* **2023**, *15*, 4024. [CrossRef]
23. Ruijer, E.; Van Twist, A.; Haaker, T.; Tartarin, T.; Schuurman, N.; Melenhorst, M.; Meijer, A. Smart Governance Toolbox: A Systematic Literature Review. *Smart Cities* **2023**, *6*, 878–896. [CrossRef]
24. Appio, F.P.; Lima, M.; Paroutis, S. Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges. *Technol. Forecast. Soc. Chang.* **2019**, *142*, 1–14. [CrossRef]
25. Dameri, R.P. Smart City Definition, Goals and Performance. In *Smart City Implementation*; Springer: Cham, Switzerland, 2017; pp. 1–22. [CrossRef]
26. Ben Letaifa, S. How to strategize smart cities: Revealing the SMART model. *J. Bus. Res.* **2015**, *68*, 1414–1419. [CrossRef]
27. Yigitcanlar, T.; Kamruzzaman, M.; Foth, M.; Sabatini-Marques, J.; Da-Costa, E.; Ioppolo, G. Can cities become smart without being sustainable? A systematic review of the literature. *Sustain. Cities Soc.* **2019**, *45*, 348–365. [CrossRef]
28. Ahad, M.A.; Paiva, S.; Tripathi, G.; Feroz, N. Enabling technologies and sustainable smart cities. *Sustain. Cities Soc.* **2020**, *61*, 102301. [CrossRef]
29. Jiang, H.; Jiang, P.; Wang, D.; Wu, J. Can smart city construction facilitate green total factor productivity? A quasi-natural experiment based on China's pilot smart city. *Sustain. Cities Soc.* **2021**, *69*, 102809. [CrossRef]
30. Huang, G.; Li, D.; Ng, S.T.; Wang, L.; Wang, T. A methodology for assessing supply-demand matching of smart government services from citizens' perspective: A case study in Nanjing, China. *Habitat Int.* **2023**, *138*, 102880. [CrossRef]
31. Ben Rjab, A.; Mellouli, S.; Corbett, J. Barriers to artificial intelligence adoption in smart cities: A systematic literature review and research agenda. *Gov. Inf. Q.* **2023**, *40*, 101814. [CrossRef]
32. Fletcher, K.-A.; Gbadamosi, A. Examining social media live stream's influence on the consumer decision-making: A thematic analysis. *Electron. Commer. Res.* **2022**. [CrossRef]
33. Tang, D.; Cai, X.; Nketiah, E.; Adjei, M.; Adu-Gyamfi, G.; Obuobi, B. Separate your waste: A comprehensive conceptual framework investigating residents' intention to adopt household waste separation. *Sustain. Prod. Consum.* **2023**, *39*, 216–229. [CrossRef]
34. Si, H.; Su, Y.; Wu, G.; Li, W.; Cheng, L. Can government regulation, carbon-emission reduction certification and information publicity promote carpooling behavior? *Transp. Res. Part D Transp. Environ.* **2022**, *109*, 103384. [CrossRef]
35. Wilson, T. Exploring models of information behaviour: The 'uncertainty' project. *Inf. Process. Manag.* **1999**, *35*, 839–849. [CrossRef]
36. Wang, S.; Wang, J.; Zhao, S.; Yang, S. Information publicity and resident's waste separation behavior: An empirical study based on the norm activation model. *Waste Manag.* **2019**, *87*, 33–42. [CrossRef]
37. Xiao, L.; Zhang, G.; Zhu, Y.; Lin, T. Promoting public participation in household waste management: A survey based method and case study in Xiamen city, China. *J. Clean. Prod.* **2017**, *144*, 313–322. [CrossRef]
38. Ajzen, I. *Attitudes, Personality and Behaviour*; Open University Press: Maidenhead, UK, 2005.
39. Cibangu, S.K. The origins and informed uses of the terms phenomenography and phenomenology. *J. Doc.* **2023**, *79*, 641–669. [CrossRef]

40. Mutambik, I.; Nikiforova, A.; Almuqrin, A.; Liu, Y.D.; Floos, A.Y.M.; Omar, T. Benefits of Open Government Data Initiatives in Saudi Arabia and Barriers to Their Implementation. *J. Glob. Inf. Manag.* **2021**, *29*, 1–22. [CrossRef]
41. Muenratch, P.; Nguyen, T.P.L.; Shrestha, S.; Chatterjee, J.S.; Virdis, S.G. Governance and policy responses to anthropogenic and climate pressures on groundwater resources in the Greater Mekong Subregion urbanizing cities. *Groundw. Sustain. Dev.* **2022**, *18*, 100791. [CrossRef]
42. Chen, W.Y.; Cho, F.H.T. Understanding China's transition to environmental information transparency: Citizens' protest attitudes and choice behaviours. *J. Environ. Policy Plan.* **2021**, *23*, 275–301. [CrossRef]
43. Kang, M.; Shin, D.-H. The effect of customers' perceived benefits on virtual brand community loyalty. *Online Inf. Rev.* **2016**, *40*, 298–315. [CrossRef]
44. Liu, M.T.; Chu, R.; Wong, I.A.; Zúñiga, M.A.; Meng, Y.; Pang, C. Exploring the relationship among affective loyalty, perceived benefits, attitude, and intention to use co-branded products. *Asia Pac. J. Mark. Logist.* **2012**, *24*, 561–582. [CrossRef]
45. Martín Martín, J.M.; Guaita Martínez, J.M.; Salinas Fernández, J.A. An Analysis of the Factors behind the Citizen's Attitude of Rejection towards Tourism in a Context of Overtourism and Economic Dependence on This Activity. *Sustainability* **2018**, *10*, 2851. [CrossRef]
46. Li, D.; Wang, W.; Huang, G.; Zhou, S.; Zhu, S.; Feng, H. How to Enhance Citizens' Sense of Gain in Smart Cities? A SWOT-AHP-TOWS Approach. *Soc. Indic. Res.* **2023**, *165*, 787–820. [CrossRef] [PubMed]
47. Mutambik, I.; Lee, J.; Almuqrin, A.; Zhang, J.Z. Transitioning to Smart Cities in Gulf Cooperation Council Countries: The Role of Leadership and Organisational Culture. *Sustainability* **2023**, *15*, 10490. [CrossRef]
48. Georgiadis, A.; Christodoulou, P.; Zinonos, Z. Citizens' Perception of Smart Cities: A Case Study. *Appl. Sci.* **2021**, *11*, 2517. [CrossRef]
49. Oraby, T.; Thampi, V.; Bauch, C.T. The influence of social norms on the dynamics of vaccinating behaviour for paediatric infectious diseases. *Proc. R. Soc. B Biol. Sci.* **2014**, *281*, 20133172. [CrossRef]
50. Reynolds, K.J. Social norms and how they impact behaviour. *Nat. Hum. Behav.* **2018**, *3*, 14–15. [CrossRef]
51. McDonald, R.I.; Crandall, C.S. Social norms and social influence. *Curr. Opin. Behav. Sci.* **2015**, *3*, 147–151. [CrossRef]
52. Dawson, P.; Dobson, S. The influence of social pressure and nationality on individual decisions: Evidence from the behaviour of referees. *J. Econ. Psychol.* **2010**, *31*, 181–191. [CrossRef]
53. Ajzen, I. The Theory of Planned Behavior. *Organ. Behav. Hum. Decis. Process.* **1991**, *50*, 179–211. [CrossRef]
54. Liu, Y.; Sheng, H.; Mundorf, N.; Redding, C.; Ye, Y. Integrating Norm Activation Model and Theory of Planned Behavior to Understand Sustainable Transport Behavior: Evidence from China. *Int. J. Environ. Res. Public Health* **2017**, *14*, 1593. [CrossRef] [PubMed]
55. Terry, D.J.; O'Leary, J.E. The theory of planned behaviour: The effects of perceived behavioural control and self-efficacy. *Br. J. Soc. Psychol.* **1995**, *34*, 199–220. [CrossRef] [PubMed]
56. Oliver, M.O.; Jestratijevic, I.; Uanhoro, J.; Knight, D.K. Investigation of a Consumer's Purchase Intentions and Behaviors towards Environmentally Friendly Grocery Packaging. *Sustainability* **2023**, *15*, 8789. [CrossRef]
57. Mustafa, S.; Zhang, W.; Sohail, M.T.; Rana, S.; Long, Y. A moderated mediation model to predict the adoption intention of renewable wind energy in developing countries. *PLoS ONE* **2023**, *18*, e0281963. [CrossRef]
58. Mansoor, M.; Wijaksana, T.I. Predictors of pro-environmental behavior: Moderating role of knowledge sharing and mediatory role of perceived environmental responsibility. *J. Environ. Plan. Manag.* **2023**, *66*, 1089–1107. [CrossRef]
59. Espinet, M.; Llerena, G.; dos Santos, L.M.F.; de Robles, S.L.R.; Massip, M. Co-operatives for learning in higher education: Experiences of undergraduate students from environmental sciences. *Teach. High. Educ.* **2023**, *28*, 1005–1023. [CrossRef]
60. Muir, A.; Duncan, A.; Almack, K.; Boucher, N.; Dunlop, E.; Febria, C.; Ives, J.; Lauzon, R.; Lickers, H.; Mattes, W.; et al. Sharing across the space: Introduction to a special issue on bridging Indigenous and non-Indigenous knowledge systems. *J. Great Lakes Res.* **2023**, *49*, S1–S11. [CrossRef]
61. Mutambik, I.; Almuqrin, A.; Lee, J.; Zhang, J.Z.; Alomran, A.; Omar, T.; Floos, A.; Homadi, A. Usability of the G7 Open Government Data Portals and Lessons Learned. *Sustainability* **2021**, *13*, 13740. [CrossRef]
62. Hines, J.M.; Hungerford, H.R.; Tomera, A.N. Analysis and Synthesis of Research on Responsible Environmental Behavior: A Meta-Analysis. *J. Environ. Educ.* **1987**, *18*, 1–8. [CrossRef]
63. Piyapong, J.; Thidarat, B.; Jaruwan, C.; Siriphan, N.; Passanan, A. Enhancing citizens' sense of personal responsibility and risk perception for promoting public participation in sustainable groundwater resource management in Rayong Groundwater Basin, Thailand. *Groundw. Sustain. Dev.* **2019**, *9*, 100252. [CrossRef]
64. González, R.; Lay, S. Sense of Responsibility and Empathy: Bridging the Gap between Attributions and Helping Behaviours. In *Intergroup Helping*; Springer International Publishing: Cham, Switzerland, 2017; pp. 331–347. [CrossRef]
65. Yabanci, B. Work for the Nation, Obey the State, Praise the Ummah: Turkey's Government-oriented Youth Organizations in Cultivating a New Nation. *Ethnopolitics* **2021**, *20*, 467–499. [CrossRef]
66. Zagidullin, M.; Aziz, N.; Kozhakhmet, S. Government policies and attitudes to social media use among users in Turkey: The role of awareness of policies, political involvement, online trust, and party identification. *Technol. Soc.* **2021**, *67*, 101708. [CrossRef]
67. Ward, M.R. Will Online Shopping Compete More with Traditional Retailing or Catalog Shopping? *NETNOMICS* **2001**, *3*, 103–117. [CrossRef]
68. Durukal, E. *Customer Online Shopping Experience*; IGI Global: Hershey, PA, USA, 2022; pp. 60–77. [CrossRef]

69. Oliveira, T.; Araujo, B.; Tam, C. Why do people share their travel experiences on social media? *Tour. Manag.* **2020**, *78*, 104041. [CrossRef]
70. Merton, R.K.; Barber, E. *The Travels and Adventures of Serendipity: A Study in Sociological Semantics and the Sociology of Science*; Princeton University Press: Princeton, NJ, USA, 2004.
71. Allied Market Research. Saudi Arabia Smart Cities Market. Available online: https://www.alliedmarketresearch.com/saudi-arabia-smart-cities-market-A10247 (accessed on 7 April 2023).
72. Chen, Z.; Chan, I.C.C. Smart cities and quality of life: A quantitative analysis of citizens' support for smart city development. *Inf. Technol. People* **2023**, *36*, 263–285. [CrossRef]
73. Sun, Y.; Hu, Y.; Zhang, H.; Chen, H.; Wang, F.-Y. A Parallel Emission Regulatory Framework for Intelligent Transportation Systems and Smart Cities. *IEEE Trans. Intell. Veh.* **2023**, *8*, 1017–1020. [CrossRef]
74. Creswell, J.W.; Clark, V.L.P. *Designing and Conducting Mixed Methods Research*; SAGE: London, UK, 2011.
75. Collis, J.; Hussey, R. *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*; Palgrave Macmillan: Basingstoke, UK, 2003.
76. Hair, J.F.; Ringle, C.M.; Sarstedt, M. PLS-SEM: Indeed a Silver Bullet. *J. Mark. Theory Pract.* **2011**, *19*, 139–152. [CrossRef]
77. Rigdon, E.E.; Sarstedt, M.; Ringle, C.M. On Comparing Results from CB-SEM and PLS-SEM: Five Perspectives and Five Recommendations. *Mark. ZFP* **2017**, *39*, 4–16. [CrossRef]
78. Hair, J.F., Jr.; Matthews, L.M.; Matthews, R.L.; Sarstedt, M. PLS-SEM or CB-SEM: Updated guidelines on which method to use. *Int. J. Multivar. Data Anal.* **2017**, *1*, 107. [CrossRef]
79. Bagozzi, R.P.; Yi, Y. On the evaluation of structural equation models. *J. Acad. Mark. Sci.* **1988**, *16*, 74–94. [CrossRef]
80. Field, A.P. *Discovering Statistics Using IBM SPSS Statistics: And Sex and Drugs and Rock "n" Roll*; Sage: Los Angeles, CA, USA, 2013.
81. Hair, J.F.; Howard, M.C.; Nitzl, C. Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *J. Bus. Res.* **2020**, *109*, 101–110. [CrossRef]
82. Hu, L.T.; Bentler, P.M. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Model.* **1999**, *6*, 1–55. [CrossRef]
83. Kalidien, S.; van Witzenburg, R.; Choenni, S. *Developing, Implementing, and Evaluating a Web Interface in the Field of E-Government*; IGI Global: Hershey, PA, USA, 2014; pp. 60–70. [CrossRef]
84. Ozili, P.K. The Acceptable R-Square in Empirical Modelling for Social Science Research. *SSRN Electron. J.* **2022**, 1–9. [CrossRef]
85. Li, Y.; Bhutto, M.Y.; Sun, C.; Mehdi, S.M. Do information publicity and moral norms trigger waste-sorting intention among households? A sequential mediation analysis. *Front. Psychol.* **2023**, *14*, 1193411. [CrossRef]
86. Zhang, B.; Lai, K.-H.; Wang, B.; Wang, Z. From intention to action: How do personal attitudes, facilities accessibility, and government stimulus matter for household waste sorting? *J. Environ. Manag.* **2019**, *233*, 447–458. [CrossRef]
87. Le-Anh, T.; Nguyen, M.D.; Nguyen, T.T.; Duong, K.T. Energy saving intention and behavior under behavioral reasoning perspectives. *Energy Effic.* **2023**, *16*, 8. [CrossRef]
88. Mutambik, I.; Almuqrin, A.; Lee, J.; Gauthier, J.; Homadi, A. Open Government Data in Gulf Cooperation Council Countries: An Analysis of Progress. *Sustainability* **2022**, *14*, 7200. [CrossRef]
89. Hichri, S.M.; Jamoussi, H.B.O.; Keraani, W. The Data–Driven Smart Region, Innovation and Sustainability. In *Knowledge Management for Regional Policymaking*; Springer International Publishing: Cham, Switzerland, 2022; pp. 191–221. [CrossRef]
90. Costales, E. Identifying sources of innovation: Building a conceptual framework of the Smart City through a social innovation perspective. *Cities* **2022**, *120*, 103459. [CrossRef]
91. Oh, D.-S.; Phillips, F.Y.; Mohan, A.V. *Smart City 2.0*; World Scientific: Singapore, 2023; Volume 8. [CrossRef]
92. Kummitha, R.K.R. Smart cities and entrepreneurship: An agenda for future research. *Technol. Forecast. Soc. Chang.* **2019**, *149*, 119763. [CrossRef]
93. Fontaine, P.; Minner, S.; Schiffer, M. Smart and sustainable city logistics: Design, consolidation, and regulation. *Eur. J. Oper. Res.* **2023**, *307*, 1071–1084. [CrossRef]
94. Vardopoulos, I.; Papoui-Evangelou, M.; Nosova, B.; Salvati, L. Smart 'Tourist Cities' Revisited: Culture-Led Urban Sustainability and the Global Real Estate Market. *Sustainability* **2023**, *15*, 4313. [CrossRef]
95. Sujood; Bano, N.; Siddiqui, S. Consumers' intention towards the use of smart technologies in tourism and hospitality (T&H) industry: A deeper insight into the integration of TAM, TPB and trust. *J. Hosp. Tour. Insights* **2022**. [CrossRef]
96. Zhang, W.; Liu, L. How consumers' adopting intentions towards eco-friendly smart home services are shaped? An extended technology acceptance model. *Ann. Reg. Sci.* **2022**, *68*, 307–330. [CrossRef]
97. Cui, Q.; Wei, R.; Huang, R.; Hu, X.; Wang, G. The Effect of Perceived Risk on Public Participation Intention in Smart City Development: Evidence from China. *Land* **2022**, *11*, 1604. [CrossRef]
98. Zhang, W.; Liu, L. Unearthing consumers' intention to adopt eco-friendly smart home services: An extended version of the theory of planned behavior model. *J. Environ. Plan. Manag.* **2022**, *65*, 216–239. [CrossRef]
99. Thakur, N.; Han, C.Y. Indoor Localization for Personalized Ambient Assisted Living of Multiple Users in Multi-Floor Smart Environments. *Big Data Cogn. Comput.* **2021**, *5*, 42. [CrossRef]
100. Wu, D.; Xie, Y.; Lyu, S. Disentangling the complex impacts of urban digital transformation and environmental pollution: Evidence from smart city pilots in China. *Sustain. Cities Soc.* **2023**, *88*, 104266. [CrossRef]

101. Principale, S.; Cosentino, A.; Lombardi, R.; Rocchi, A. Public administration in smart city: A bibliometric analysis. *J. Public Aff.* **2023**, *23*, e2863. [CrossRef]
102. Shekarappa, G.S.; Badi, M.; Raj, S.; Mahapatra, S. An Overview of Smart City Planning—The Future Technology. In *Artificial Intelligence and Machine Learning in Smart City Planning*; Elsevier: Amsterdam, The Netherlands, 2023; pp. 319–335. [CrossRef]
103. Visvizi, A. Computers and human behavior in the smart city: Issues, topics, and new research directions. *Comput. Hum. Behav.* **2023**, *140*, 107596. [CrossRef]
104. Gupta, S.; Zeballos, J.C.; Castro, G.d.R.; Tomičić, A.; Morales, S.A.; Mahfouz, M.; Osemwegie, I.; Sessi, V.P.C.; Schmitz, M.; Mahmoud, N.; et al. Operationalizing Digitainability: Encouraging Mindfulness to Harness the Power of Digitalization for Sustainable Development. *Sustainability* **2023**, *15*, 6844. [CrossRef]
105. Hartley, K. Public Perceptions About Smart Cities: Governance and Quality-of-Life in Hong Kong. *Soc. Indic. Res.* **2023**, *166*, 731–753. [CrossRef]
106. Maltezos, E.; Karagiannidis, L.; Dadoukis, A.; Petousakis, K.; Misichroni, F.; Ouzounoglou, E.; Gounaridis, L.; Gounaridis, D.; Kouloumentas, C.; Amditis, A. Public Safety in Smart Cities under the Edge Computing Concept. In Proceedings of the 2021 IEEE International Mediterranean Conference on Communications and Networking (MeditCom), Athens, Greece, 7–10 September 2021; pp. 88–93. [CrossRef]
107. Mutambik, I.; Almuqrin, A.; Liu, Y.D.; Halboob, W.; Alakeel, A.; Derhab, A. Increasing Continuous Engagement with Open Government Data. *J. Glob. Inf. Manag.* **2023**, *31*, 1–21. [CrossRef]
108. Michelotto, F.; Joia, L.A. Unveiling the Smart City Concept: Perspectives from an Emerging Market via the Social Representation Theory. *Sustainability* **2023**, *15*, 8155. [CrossRef]
109. Su, Y.; Fan, D. Smart cities and sustainable development. *Reg. Stud.* **2023**, *57*, 722–738. [CrossRef]