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Designing A User-Centred Model to Amplify Satisfaction in Utilizing Online Government Information

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Abstract: With the increasing reliance on digital platforms for accessing government services and information, user satisfaction becomes a crucial factor in ensuring effective service delivery and citizen engagement. Thus, this study explores into the development of a user-centred model aimed at enhancing user satisfaction in the utilization of online government information. The proposed model integrates Privacy; Safety; Service quality; Time; and Awareness with Satisfaction to create a model that aligns with citizens' needs and preferences. The data collection process targeted respondents among citizens of the United Arab Emirates (UAE) for the questionnaire survey. The respondents were selected using a convenience sampling technique, allowing for the collection of samples conveniently located around a specific area or accessible through internet services. A total of 396 participants took part in the survey and the collected data was used to develop the model using SmartPLS software. The developed model was analysed and the results reveal that the path from Privacy to Satisfaction holds significant influence, as indicated by a T statistic of 3.755 and a p-value of 0.000. Similarly, the paths from Safety and Service Quality to Satisfaction are also significant, with T statistics of 2.363 and 4.580, respectively, and corresponding p-values of 0.009 and 0.000. However, the paths from Awareness and Time to Satisfaction are found to be not significant, with T statistics of 1.162 and 0.935, and p-values of 0.123 and 0.175, respectively. By prioritizing user satisfaction, this research contributes to the advancement of digital government initiatives and citizen-centric service delivery paradigms.

Keywords: User-centred model, online government information

1. Introduction

Government online information plays a crucial role as a primary agent for delivering essential policies and critical information from the government to its citizens. The implementation of online government information is vital for the smooth functioning of a country's administrative system, particularly in developed nations. Failure to encourage widespread use of government information online could prove to be a liability for the nation itself. In the current era, often referred to as the Information Age, we witness a historic shift characterized by the rapid transition from traditional industries to digital technologies, marking the 21st century. In this context, the most challenging task is to ensure that government information online is accessible and inclusive to all generations. These generations can be broadly classified into three categories: digital natives, digital immigrants, and digital novices.

To enhance government information online, it is crucial to consider the usage patterns of users from different generations. Synchronizing the platform with the specific issues faced by users is key to improving user response. However, there has been limited research focused on capturing and analysing the usage patterns for each generation

individually. Most studies tend to address user response enhancement in a general sense (Ball et al., 2017) without specifically accounting for generational differences. In order to boost user satisfaction with government online information, it is essential to identify and address the unique usage patterns and challenges faced by users from different generations. By implementing strategies to enhance satisfaction and loyalty among diverse user groups, we can create a more effective learning process for all generations, leading to promising prospects for the future.

In the era of globalization, each generation plays a crucial role in developing their nation, contributing significantly to the government's efforts for a positive future. This includes digital natives, the young people who will be the country's future prospects, digital intermediates, the adults currently leading the nation, and digital immigrants, the elder generation considered the brain of the country. However, some countries fail to bridge the digital divide, which refers to the gap in opportunities between those with internet access and those without it. The lack of access to the internet prevents individuals from benefiting from e-government services (Ball et al., 2017). This digital divide affects various generations differently, with digital natives, digital immigrants, and intermediates facing specific challenges in using government information online, such as privacy and safety concerns, lack of efficiency, information scarcity, low-quality service, high costs, low demand, trust issues, time constraints, difficulty in memorability, user-unfriendliness, low participation in information and communication technology (ICT), and lack of awareness. These issues contribute to the low usage of government information online.

While many consider the digital divide a threat to the country due to unsynchronized government website or portal targets, studying usage patterns for different generations presents an opportunity to enhance user satisfaction and loyalty positively. However, to date, there has been no specific study on a framework or model for enhancing loyalty and satisfaction among different generations using government information online. Consequently, government sectors often lack initiatives to design inclusive interfaces or change the delivery methods that cater to all generations due to a lack of knowledge in this area.

This study aims to analyse the usage patterns of different generations in utilizing government information online to enhance user satisfaction and loyalty. The research will serve as a reference for researchers, government sectors, and designers involved in the development of government information online. This study could propel the United Arab Emirates to become a leading country in the world by effectively utilizing the Internet of Things (IoT) in government sectors. The proposed model will not only cater to the young generation but will be inclusive to citizens of all ages worldwide

2. Usage Patterns of Government Online Information

The usage patterns of government online information refer to the various ways in which individuals' access and interact with government-related data, services, and resources through online platforms. These patterns encompass a wide range of behaviors, preferences, and habits exhibited by users while navigating government websites, portals, and digital platforms. Understanding these usage patterns is crucial for governments to optimize their online services, enhance user satisfaction, and tailor information dissemination strategies to meet the needs of different user groups. Analysing usage patterns can also reveal insights into the effectiveness of government information online and identify areas for improvement to create a more efficient and user-friendly digital environment.

Usage patterns of government online information encompass several aspects, including the frequency of visits, the duration of sessions, the specific services accessed, and the devices used for access (e.g., desktop, mobile, or tablet). Some users may visit government websites regularly to stay informed about policies and regulations, while others may utilize these platforms for specific tasks, such as paying taxes or applying for permits. The preferences and behaviours of different generations, such as digital natives, digital intermediates, and digital immigrants, can significantly influence usage patterns. Understanding these generational differences is essential for creating inclusive and user-centric online experiences.

Analysing user interactions with government information online can also reveal popular search queries, frequently accessed content, and areas where users encounter difficulties. This data-driven approach allows governments to optimize website design, navigation, and content organization, enhancing user satisfaction and facilitating efficient information retrieval. Furthermore, identifying patterns of user engagement and drop-offs in specific services can help governments identify bottlenecks or areas of improvement, streamlining the user journey and promoting more effective use of online resources. Regularly monitoring usage patterns and gathering user feedback is crucial for continuously improving government online information services and meeting citizens' evolving needs in the digital age.

2.1 Awareness

Both the young people and responsible government authorities should strive to educate the generation of digital immigrants about the significance of ICT, especially the importance of government information online. This is essential for fostering and maintaining social interactions among older individuals, which we consider a crucial aspect in enhancing e-government services for senior citizens. Currently, digital immigrants do not extensively utilize government information online due to their lack of awareness regarding its importance. By raising awareness and promoting

understanding, we can encourage greater participation and engagement among older individuals in utilizing e-government services, leading to a more inclusive and efficient digital landscape.

2.2 Privacy

In some government websites, a significant number of them lack a privacy policy, which raises concerns about user data protection. It is argued that there is no valid justification for not having such a policy since many e-government sites already have one in place. There should be no reason not to adopt a standardized content for all government websites. For those websites that do have a privacy policy, there is a lack of consistency between different councils. The location of the privacy policy on the site and the names used to represent it vary, making it challenging for users to locate and understand the policies. Furthermore, some of the existing privacy policies are found to be inadequate, unclear, and lacking crucial technical information that would be essential for ensuring user security on the website. Improving the quality and accessibility of privacy policies across government websites is crucial to ensure transparency and protect users' data and privacy effectively.

2.3 Safety

Concerns about privacy and safety are prevalent among individuals from the digital natives' generation when using government online information. This is due to the widespread online surveillance carried out by some governments, which restricts private web browsing for their citizens. For instance, in the UK, the Investigatory Powers Act grants legal authorization to government authorities for spying on the browsing and internet activities of British citizens. Although the government requires a warrant to directly breach online privacy in case of suspected criminal involvement, the Act mandates internet service companies to collect and retain customer metadata for twelve months.

This stored metadata can be obtained in bulk by government authorities with a warrant, aiming to combat terrorism and prevent organized crime. To address these concerns, the government needs to reassure citizens by demonstrating that the collected data will solely be used for countermeasures against negative activities. Clear communication and transparency from the government will be essential to build trust and alleviate the anxieties of the digital natives' generation regarding their online privacy and security.

2.4 Time

Digital intermediates are one of the most significant user groups of government information online compared to other generations. This is primarily because they are actively engaged in governance or frequently utilize related government online services. Given their busy schedules, one of the major challenges they face when using government information online is time constraints. Some government websites or portals may have longer loading times compared to other websites, which can hinder their efficiency.

To address this issue, it is crucial to monitor and address loading time discrepancies frequently. Ensuring that e-government services run smoothly and efficiently will lead to enhanced user satisfaction for digital intermediates, who heavily rely on these services for their various responsibilities and tasks. By optimizing the performance of government websites, we can cater to the needs of digital intermediates and make their experience with government information online more seamless and productive.

2.5 Service Quality

Government online services face several challenges related to service quality, impacting user satisfaction. These challenges include accessibility and inclusivity, technical issues, data privacy and security concerns, information accuracy, and interoperability difficulties. Additionally, digital literacy among citizens, multi-language support, user helpdesk services, bureaucratic red tape, and the need for continual improvement pose significant hurdles. Overcoming these challenges necessitates government investment in technology, user training, cybersecurity measures, and ongoing evaluation and enhancement of online services to meet user needs effectively.

Furthermore, building user trust and confidence through transparent data handling practices and effective communication is crucial for successful government online services. Implementing user-friendly interfaces and simplifying complex processes can enhance accessibility and encourage wider adoption. Governments should prioritize addressing these challenges to create efficient and inclusive online platforms that cater to citizens' diverse needs and promote a positive user experience.

2.6 Satisfaction and Loyalty Enhancement Toward Government Online Information

In the present day, the focus should be on enhancing user loyalty and satisfaction when using government online information. This approach is essential to establish a reliable and trustworthy system for accessing online government information. Key attributes that contribute to user satisfaction and loyalty include happiness, comfortability, and

manageability while using government information online. User satisfaction plays a critical role in determining the success or failure of e-Government projects, as it directly impacts the continued use of online government services. As e-government planners and practitioners seek to improve citizen satisfaction, they often assess technical dimensions such as system quality, information quality, and service quality.

User loyalty, on the other hand, stems from the strength of the relationship between an individual's attitude and their repeated patronage. It is built on trust and the belief that promises will be kept, encouraging people to use the services repeatedly. Scholars emphasize the importance of user loyalty in the adoption and use of e-government services. Enhancing user loyalty and satisfaction is a complex process but is vital for the success of government services. Therefore, researchers must delve into the root causes of why some individuals are still not loyal to and satisfied with government information online. This investigation is crucial to ensure that the developed systems are accurate, consistent, and comprehensive, thereby promoting greater trust and engagement among users.

3. Methodology

The data collection process targeted respondents among citizens of the United Arab Emirates (UAE) for the questionnaire survey. The respondents were selected using a convenience sampling technique, allowing for the collection of samples conveniently located around a specific area or accessible through internet services. A total of 396 participants took part in the survey. Based on background analysis, the gender distribution indicated 51 percent female and 49 percent male respondents. The participants were categorized into three age groups: "Below 30 years old," "31 years to 50 years old," and "Above 50 years old." The largest percentage, 38 percent, fell within the "31 years to 51 years old" category, followed by 15 percent in the "Below 30 years old" group, and 9.0 percent in the "Above 51 years old" group. Moreover, respondents were asked to indicate their educational levels across six categories: Bachelor, Master, and Doctorate. The findings showed that 58.5 percent of respondents had a bachelor's qualification, 22 percent held a master's degree, and 19.5 percent possessed a doctorate qualification.

The data collected served as the foundation for building the model within the SmartPLS Software utilising the PLS-SEM (Partial Least Squares Structural Equation Modelling) technique. The first phase included the visual depiction of the model, followed by the input of obtained data into the software. Following that, the model's measurement component was meticulously evaluated in order to achieve alignment with defined fitness criteria. Only after this level of alignment was achieved was the evaluation extended to the structural component of the model, measuring its adherence to fitness standards once more. This review included not just the general structure of the model, but also hypothesis testing to determine the statistical significance of the relationships inside the model. This rigorous procedure confirmed the robustness and validity of the results.

4. Modelling

In a Partial Least Squares Structural Equation Modelling (PLS-SEM) model, the causal relationship refers to the connections between latent constructs within the theoretical framework. These relationships depict how one construct influences or predicts another. Path coefficients, often represented as standardized coefficients, quantitatively illustrate the strength and direction of these causal connections. Positive coefficients suggest a direct positive influence, while negative coefficients indicate a negative influence. The magnitude of the coefficients demonstrates the extent of the impact. Causal relationships are inferred based on the theoretical underpinnings of the model and empirical evidence gathered from data. They guide the formulation of hypotheses and provide insights into how variables interact within the model. The PLS-SEM model allows researchers to uncover both direct and indirect relationships, facilitating a comprehensive understanding of complex systems. Overall, the causal relationships form the backbone of the model, enabling researchers to analyse, validate, and interpret the interdependencies between constructs and their effects on the studied phenomenon.

Thus, a conceptual framework for this study involves the integration of various key factors, including Privacy, Safety, Service quality, Time, and Awareness, with the central construct of Satisfaction. This model has been designed to closely align with the needs and preferences of citizens. By incorporating these factors, the model seeks to capture the intricate relationships and influences that contribute to individuals' overall satisfaction. The integration of these constructs allows for a comprehensive understanding of the multifaceted dynamics that impact citizens' experiences with the subject matter. Through this holistic approach, the proposed model aims to provide valuable insights into how these interconnected elements collectively shape citizens' perceptions and attitudes, ultimately contributing to their overall satisfaction level.

4.1 Consistency Reliability

The initial aspect under evaluation was internal consistency, with Cronbach's alpha being the widely employed assessment tool. In the context of this study, a Cronbach's alpha equal to or exceeding 0.6 (as stipulated by Hair et al., 2014) was considered acceptable. The second examination involved composite reliability, where constructs with a Composite Reliability (CR) value of 0.6 or higher were retained for further analysis. These two tests collectively contribute insights into the study's internal consistency reliability. As demonstrated in Table 1, all latent constructs demonstrated compliance with the criteria across these three assessments.

Table 1 - Reliability of constructs

Constructs	Cronbach's Alpha	rho_A	Composite Reliability	(AVE)
AWARENESS	0.832	0.908	0.889	0.678
PRIVACY	0.916	0.918	0.941	0.800
SAFETY	0.803	0.832	0.870	0.630
SATISFACTION	0.882	0.895	0.918	0.737
SERVICE QUALITY	0.593	0.796	0.774	0.535
TIME	0.550	0.820	0.737	0.521

Table 1 summarizes reliability and validity assessments for different constructs. Internal consistency was measured through Cronbach's Alpha and Rho_A, with constructs like Privacy demonstrating high consistency (Alpha: 0.916, Rho_A: 0.918). Composite Reliability (CR) was evaluated, indicating strong reliability for constructs like Satisfaction (CR: 0.918). Additionally, Average Variance Extracted (AVE) values were calculated, with Privacy and Satisfaction showing high convergent validity (AVE: 0.800 and 0.737 respectively).

4.2 Convergent Validity

The second assessment criterion focused on convergent reliability. Convergent reliability, as outlined by Petter et al. (2007), gauges the extent to which indicators collectively measure a construct. To establish convergent validity, the study examined the Average Variance Extracted (AVE), considering values above 0.5 as acceptable according to Hair et al. (2014). Additionally, the analysis involved assessing outer loadings of factors, retaining items with outer loadings between 0.45 and 0.95 for further examination. As depicted in Table 2, 23 out of the original 30 items possessed loadings surpassing the recommended threshold of 0.708, and thus were automatically retained. Conversely, items with loadings below 0.4 were excluded for not meeting the criterion (Hair et al., 2014). In this instance, no items were removed based on this criterion. Furthermore, items with loadings ranging from 0.4 to 0.7 necessitated an evaluation of their impact on the construct's Average Variance Extracted (AVE) and Composite Reliability if removed.

After the initial run of PLS Algorithm on the model, it was found that two items which are SEQ 4 and TIME 4 have to be deleted due to their outer loading values falling below the designated threshold of 0.5 (Hair et. al, 2014). Following the elimination of these items, the algorithms were re-run. The subsequent results demonstrated that the constructs' Average Variance Extracted (AVE), composite reliability, and Cronbach's alpha exceeded the prescribed thresholds. This outcome signified the suitability of retaining the remaining items for subsequent analysis. Table 2 below shows the clear picture of the convergent validity after the deletion of items mentioned.

Table 2 - Convergent validity results

Latent Variables / constructs	Indicator	Indicator Loadings	Cronbach Alpha	Composite Reliability	AVE
Privacy	PRIV1	0.861	0.916	0.941	0.800
	PRIV2	0.899			
	PRIV3	0.927			
	PRIV4	0.888			
Safety	SAF1	0.635	0.803	0.870	0.630
	SAF2	0.852			
	SAF3	0.803			
	SAF4	0.862			
Service quality	SEQ1	0.850	0.801	0.882	0.714
	SEQ2	0.819			
	SEQ3	0.866			
Time	TIME1	0.867	0.782	0.869	0.690
	TIME2	0.863			
	TIME3	0.757			
Awareness	AWARE1	0.503	0.832	0.889	0.678
	AWARE2	0.911			
	AWARE3	0.902			
	AWARE4	0.903			
Satisfaction	SATIS1	0.860	0.882	0.918	0.737
	SATIS2	0.887			
	SATIS3	0.834			

Latent Variables / constructs	Indicator	Indicator Loadings	Cronbach Alpha	Composite Reliability	AVE
	SATIS4	**0.852**			

4.3 Discriminant Validity

Discriminant validity pertains to how well a construct empirically captures distinct attributes from other constructs (Hair et al., 2013). To evaluate discriminant validity, HTMT.85 (Kline, 2011), HTMT.90 (Gold et al., 2001), and HTMT inference (Henseler et al., 2015) were employed. While the Fornell-Larker criteria (1981) was previously the go-to test, current research has shown hesitance toward its utilization. Henseler, Ringle, and Sarstedt (2015) introduced the HTMT ratio of correlations, showcasing improved performance through simulations of diverse loading patterns and sample sizes. Their findings revealed HTMT specificity and sensitivity rates between 97% and 99%, no cross-loading issues (0.00%), and a Fornell-Larker benchmark of 20.82%. In this study, discriminant validity was assessed through HTMT.85, HTMT.90, and HTMT.95. Discriminant Validity results are as in Table 3.

Table 3 - Discriminant validity using (Fornell-Lacker Criterion)

Constructs	AWARENESS	PRIVACY	SAFETY	SATISFACTION	SERVICE QUALITY	TIME
AWARENESS	0.823					
PRIVACY	0.700	0.894				
SAFETY	0.584	0.856	0.793			
SATISFACTION	0.724	0.692	0.606	0.859		
SERVICE QUALITY	0.718	0.559	0.657	0.741	0.845	
TIME	0.847	0.568	0.608	0.695	0.881	0.831

Table 3 above presents the results of the Fornell-Lacker criteria, used to evaluate discriminant validity. The displayed values in the table demonstrate the establishment of discriminant validity for the constructs. The test's prescribed thresholds are 0.85 (Kline, 2011) and 0.90 (Gold et al., 2001), indicating that constructs below 0.90 confirm discriminant validity. Another approach to establish discriminant validity was through Henseler et al.'s (2015) test using HTMT inference with a bootstrapping technique, as detailed in Table 4. The results reveal that all constructs possess discriminant validity; the confidence intervals indicate no zeroes between the intervals, satisfying the condition of $-1 < HTMT < +1$. As such, it can be concluded that all constructs successfully meet the acceptable threshold for discriminant validity.

4.4 Collinearity Assessment

Collinearity among constructs occurs when two or more exogenous variables measure the same underlying concept, leading to redundancy if both constructs are used simultaneously. To address this issue, one construct is usually eliminated from the model. In this study, Table 4 presents collinearity results obtained from the Smart-PLS 3.0 output, showcasing the collinearity values for all items through the variance inflation factor (VIF). The VIF values consistently remain below the threshold values of 5 (Hair et al., 2014) and 3.3 (Diamantopoulos and Siguaw, 2006), as per the result. Consequently, it can be concluded that collinearity has not reached a critical level in any of the formative constructs, ensuring it is not a concern for estimating the PLS path model. This indicates that the constructs are not strongly correlated, and therefore, all constructs were retained for further analysis.

Table 4 - Summary of collinearity analysis (VIF)

VIF Value	
Variables	User Satisfaction
AWARENESS_	1.440
PRIVACY	1.019
SAFETY	1.584
SATISFACTION	1.976
SERVICE QUALITY	1.015
TIME	1.609

Table 4 displays the VIF values, which indicate the tolerance levels between each exogenous variable (rows) and endogenous variables (column) within the model. Notably, the VIF values reflect the level of tolerance between exogenous variables (rows) and endogenous variables (table column) as presented in the table. Among these, service quality exhibits a low tolerance level of 1.015, and privacy registers 1.019. Conversely, satisfaction records the highest

tolerance level at 1.986. Notably, all tolerance values remain within an acceptable range, confirming the absence of problematic multicollinearity within the model.

4.5 Path Coefficients

The evaluation involved analyzing the path coefficients, which illustrate the anticipated connections between the constructs. These standardized values range from -1 to +1, with estimates closer to +1 indicating robust positive relationships, and values closer to -1 signifying strong negative relationships. A value near zero suggests a weak relationship, either positively or negatively. Significance assessment of the path coefficients was conducted using bootstrapping. Figure 1 presents the path coefficients and coefficient of determination results, as reported by Smart-PLS 3.0.
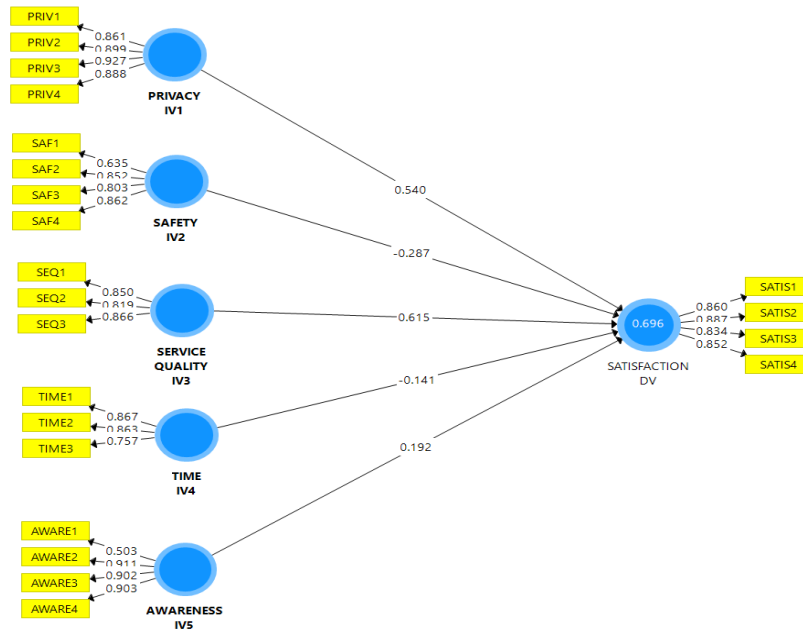

Fig 1 - Path coefficients and coefficient of determination

4.6 Hypothesis Testing

To substantiate the proposed hypotheses and validate the structural model, the assessment focused on path coefficients between latent variables. As per established guidelines, a path coefficient value of at least 0.1 is considered necessary to indicate a meaningful impact within the model (Hair et al., 2011; Wetzels et al., 2009). In this study, the verification of hypotheses was accomplished by examining the statistical significance of path coefficients using t-values and confidence intervals, employing a bootstrapping resampling method with 5000 samples (Hair et al., 2014). Bootstrapping, as described by Chin (1998), is a non-parametric technique used to gauge the precision of PLS estimates. The results are presented in Table 5.

Table 5 - Summary of hypotheses testing results

Relationships	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Significant
AWARENESS -> SATISFACTION	0.192	0.204	0.165	1.162	0.123	Not Significant
PRIVACY -> SATISFACTION	0.540	0.516	0.144	3.755	0.000	Significant
SAFETY -> SATISFACTION	-0.287	-0.267	0.122	2.363	0.009	Significant
SERVICE QUALITY-> SATISFACTION	0.615	0.605	0.134	4.580	0.000	Significant
TIME -> SATISFACTION	-0.141	-0.139	0.151	0.935	0.175	Not Significant

Table 5 presents an analysis of hypothesis testing of the model. It shows the original sample values, sample means, and standard deviations for each path. The T statistics are computed by comparing the original sample values to the standard deviations. P-values indicate the level of significance for each path's impact on satisfaction. The results reveal that the path from Privacy to Satisfaction holds significant influence, as indicated by a T statistic of 3.755 and a p-value of 0.000. Similarly, the paths from Safety and Service Quality to Satisfaction are also significant, with T statistics of 2.363 and 4.580, respectively, and corresponding p-values of 0.009 and 0.000. However, the paths from Awareness and Time to Satisfaction are found to be not significant, with T statistics of 1.162 and 0.935, and p-values of 0.123 and 0.175, respectively.

5. Conclusion

This study explores into the development of a user-centred model aimed at enhancing user satisfaction in the utilization of online government information. The proposed model integrates Privacy; Safety; Service quality; Time; and Awareness with Satisfaction to create a model that aligns with citizens' needs and preferences. The data collection process targeted respondents among citizens of the United Arab Emirates (UAE) for the questionnaire survey. The respondents were selected using a convenience sampling technique, allowing for the collection of samples conveniently located around a specific area or accessible through internet services. A total of 396 participants took part in the survey and the collected data was used to develop the model using SmartPLS software. The developed model was analysed and the results reveal that the path from Privacy to Satisfaction holds significant influence, as indicated by a T statistic of 3.755 and a p-value of 0.000. Similarly, the paths from Safety and Service Quality to Satisfaction are also significant, with T statistics of 2.363 and 4.580, respectively, and corresponding p-values of 0.009 and 0.000. However, the paths from Awareness and Time to Satisfaction are found to be not significant, with T statistics of 1.162 and 0.935, and p-values of 0.123 and 0.175, respectively. By prioritizing user satisfaction, this research contributes to the advancement of digital government initiatives and citizen-centric service delivery paradigms.

Acknowledgement

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