

Article

How E-Government Can Help Societies during a Crisis: Implications of UTAUT Model in Lebanon

Bassel El Hajj ¹, Georgiana Karadas ¹  and Pouya Zargar ^{2,*} 

¹ Department of Business Administration, Faculty of Economics and Administrative Sciences, Cyprus International University, Mersin 10, Lefkosa 99010, Turkey

² Department of Business Management, Faculty of Business and Economics, Girne American University, Mersin 10, Girne 99300, Turkey

* Correspondence: p.zargar@hotmail.com

Abstract: Introduction: Information and communication technology (ICT) usage has grown rapidly, with a significant rise following the occurrence of the COVID-19 pandemic. This study assesses the relationships among task–technology fit, sense of virtual community, and the continuous intention to use electronic government services (e-government). Methods: Through quantitative approach using surveys, a total of 390 data was obtained from registered citizens in Tripoli municipality during the pandemic. The data were analyzed using partial least square-structural equation modeling (PLS-SEM). Results: The mediating role of the unified theory of acceptance and use of technology (UTAUT) model was observed, which shows that task–technology fit, sense of virtual community, and the consideration of society and its development are essential factors for citizens to use ICTs. Systems should entail features that meet the needs of citizens, community-building elements, and satisfactory performance. The importance of e-government ICTs in community development, particularly in a fragile state such as Tripoli, Lebanon, is the highlight of the current results. This can be beneficial for governmental authorities in the region of the Middle East, helping them to increase communication effectiveness by implementing appropriate digital means for the public during a crisis. Community development is a highly effective aspect that governments can implement in their digital services to provide opportunities for learning, awareness, and social progress to the public.

Keywords: continuous intention to use; community development; task–technology fit; sense of virtual community; UTAUT; COVID-19; e-government



check for updates

Citation: El Hajj, B.; Karadas, G.; Zargar, P. How E-Government Can Help Societies during a Crisis: Implications of UTAUT Model in Lebanon. *Sustainability* **2023**, *15*, 5368. <https://doi.org/10.3390/su15065368>

Academic Editors: Kyle Maurice Woosnam, Viviana Langher and Manuela Tomai

Received: 6 January 2023

Revised: 6 March 2023

Accepted: 15 March 2023

Published: 17 March 2023



Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The scale of advancements in information and communication technology (hereafter ICT) in recent years has led to a comprehensive impact on human life (e.g., public services, health, education, and other domains) [1–3]. Accordingly, the usage and acceptance of ICTs have risen across the globe due to their effectiveness and provision of numerous solutions. Operations have shifted from their traditional form as new digital technologies aim to enhance quality of life by tackling existing problems via new methods and approaches [4,5]. For governments, ICTs enable information sharing and increase the quality of public services to citizens. Through a sense of virtual community, increased acceptance of new technologies, and the extent to which the technology is deemed ‘fit’ to perform tasks by users (i.e., citizens) [6–8], this research argues that governments can significantly improve their relationship with people. Subsequently, this can enhance the wellbeing of their citizens via community-building and provide other social and economic benefits. Sustainable Development Goals (SDGs) 3, 4, 8, 9, and 11 are linked to this context, encompassing wellbeing, education, economic growth, innovation, infrastructure, and sustainable communities. Hence, the importance of e-participation during a crisis is the focus of this study as it is a primordial tool for managing information and public services

by governments. Urgent responses, communicating policies, and including the public are among the key aspects that ICTs provide for improving government–citizen relationships [1,9,10] and crisis management. As the COVID-19 pandemic forced citizens to remain at home, and the government to monitor and analyze the spread of the disease, the usage and acceptance of e-services increased. Thus, this study aims to investigate the perception of citizens regarding e-government services during the pandemic and consideration of the continued usage of such ICTs. Current results can aid local governments in increasing the overall quality of public services via digital means. The overarching result is advancements in the local communities that can have long effects in terms of safety, education, and development. The intention to use the e-government services in a continuous manner is linked to various psychological and social elements such as trust in government, task–technology fit, social media, risk management, health-related risks, and motivational factors [4,5,7,9]. This study argues that community-building and social aspects inherent in the acceptance of technologies are key to obtaining the aforementioned social development.

In this study, the continuous usage of ICT is assessed among citizens as a means for effective communication with government and increased engagement in the public scene and social inclusion [2,11–14]. This research aims to highlight the important elements that can lead to continuous usage of governmental ICTs that meet the needs of communities during times of uncertainty and establish resilience for facing future crises. Furthermore, e-participation is used as the concept of using ICTs [15] with high engagement of citizens in governmental decision-making, communication, and policymaking as well as public services via e-government platforms [10]. E-participation in this context shows the participation of citizens in e-government ICTs and, specifically, those developed and/or modified during the pandemic. As a result, the current findings can provide a better understanding on community development through the usage of ICTs. The proposed model in this study includes task–technology fit, addressing the importance of meeting the needs of users (i.e., citizens) [16,17]. For ICTs to be continuously used, it is imperative that features that are desired by users are designed in the system.

Additionally, sense of virtual community is examined as it encompasses affective attachment in a community-based manner when using ICTs [18,19]. Unified theory of acceptance and use of technology (UAUT) is included in this research as it incorporates various aspects that can influence an individuals' usage of ICTs [20,21]. The feeling of being a member of a group and/or having sense of belonging (e.g., citizens) benefits society in terms of its development while establishing viable networks among citizens on a city-wide scale. Arguably, effective governmental strategies are required to ensure citizens use e-government services in a continuous manner. It can be argued that by taking task–technology fit, sense of virtual community, and elements of UTAUT into account, governments can achieve a continuous usage of their digital services. This can benefit the government and citizens alike in community-building, social development, and information/policy communication.

The role of ICTs has been reported as critical in terms of human and social development as it provides virtual environments of learning and social elements (i.e., sense of virtual community). The current research emphasizes the community aspect based on the context of Lebanon and Tripoli city, specifically. In this respect, the continuous usage of ICTs is contextualized as outcomes of adequate features which are implemented in the formal networks/platforms to meet the needs of the society, while providing valid information, learning, and educational opportunities, and including community-building features. The conduct of this study is driven by various scholars addressing its importance and call for empirical evidence among both earlier [22–25] and recent studies (during and after the pandemic) [16,17,26–28]. This study aims to contribute to the current understanding of continuous intention to use ICTs in the e-government domain during the pandemic. Therefore, the specific criteria that are used in this study address citizens who have used such services through e-participation.

The current research is also driven by gaps in the existing literature on the subject, such as the following:

(a) Scarcity of studies pertaining to government–citizen relationships in the context of ICT [29];

(b) Lack of empirical evidence in terms of ICT continuous usage and sense of virtual community in the Middle East [30,31], and particularly Lebanon;

(c) Limited number of studies that address the perception of citizens towards governmental services during the global pandemic of COVID-19 [32]. Importantly, numerous studies have stated that there is a need for further investigation into this subject, especially with the advancements in the realm of technology and upon the occurrence of the global pandemic [11,15,33–36].

In this respect, the effect of task–technology fit and sense of virtual community on continuous usage of ICTs are examined. This study further examines the mediating role of the UTAUT model which, according to several scholars, has a valid implication in the current context as it addresses acceptance and the usage of technology entailing user experience and social elements [3,7,37,38]. The noted gaps are used to provide a better understanding on the subject and contribute to the literature of ICT, psychology, and UTAUT in the public domain. Accordingly, this research pioneers a string of research among Arab countries that address and examine task–technology fit (TTF) [35,39], sense of virtual community (SVC) [40,41], UTAUT [11], and continuous intention to use (CIU) [12,38] which can aid the government in enhancing its relationship with citizens. Importantly, this can reveal the role of e-government services such as ICTs to social development [26–28] in a fragile state that has been disrupted by conflict, instability, and other social and economic challenges in the past decade [42,43]. Similar studies in the literature can be found [3,7,25,40]; however, the specific factors included in the research and the public scope of the current research distinguishes its context. Moreover, empirical evidence from the Middle Eastern region is relatively scarce, which further justifies the conduct of this study.

Based on what was noted, the research asks whether TTF and SVC can improve CIU among Lebanese citizens? Is there a mediating effect posed by UTAUT on TTF and SVC’s relationship with CIU? How can e-government help society during uncertain times as well as in a continued manner for social development? The results of this research can be beneficial for scholars as they the borders of theories used in this research as well as their application in Lebanon as a geographical context. Furthermore, the proposed model and theoretical premise of this study can be used as a pathway for future analyses of the country and the region of Middle East by extension. Similarly, practitioners in regional governments can benefit as the influential elements that lead to continued usage of ICTs are highlighted. The sections that follow provide information on the theoretical framework, hypothesis development, and methodology used in the research, which are followed by data analyses, discussion, and conclusions. The limitations and recommendations for future studies are highlighted in the final sections.

2. Theoretical Framework

This section provides data regarding the linkage that persists among the included variables of the study while highlighting the theoretical framework that shaped its foundation. In this respect, CIU enables the measurement of the level of usage of ICTs by individuals in a consistent manner that does not end after the crisis and persists in their routine behavior [3,11,44]. The effect of UTAUT model in this context is vivid as it entails social influences, effort, and performance expectancy [45], defining the extent to which an individual continuously uses a certain technology. An extensive number of studies have examined the applicability and appropriateness of this model in various contexts and settings [4,46–48].

Within the same context, task–technology fit (hereafter TTF) is influential as it pertains to the adoption of technology by individuals with regards to the extent of ‘fit’ perceived and the features and characteristics that are required for conducting a task [4,48]. In other

words, the extent to which a user perceives that a technology is fit for achieving goals is referred to as TTF, which has an un-negligible impact on CIU [3]. It is more likely that CIU occurs when the ICTs fit the needs of users [4]. TTF model encompasses *quality, authorization, compatibility, easiness, and production timeliness* factors within the concept of accepting and adopting technologies [7,49–51]. The proposed theoretical model of this research illustrates the factors under examination (see Figure 1). It can be argued that through a technology that takes aspects into consideration, society can benefit, with more vivid outcomes during a crisis (i.e., COVID-19 pandemic). As an overarching result, the current study can contribute to the understanding of ICTs and community development during uncertain times, including and not limited to the policies, information regarding safety, updates, and awareness among citizens.

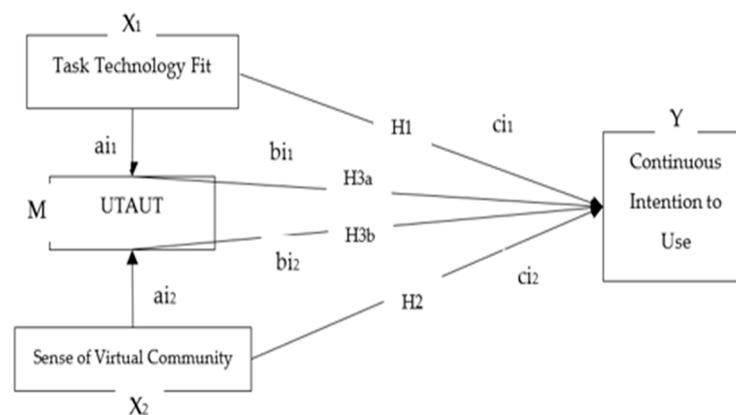


Figure 1. Research model. $X_1 = \text{TTF}$; $X_2 = \text{SVC}$; $Y = \text{CIU}$; $M = \text{UTAUT}$; Indirect effect of X_1 on Y through $M_{i1} = a_{11}b_{11}$; Indirect effect of X_2 on Y through $M_{i2} = a_{12}b_{12}$; Direct effect of X_1 and X_2 on $Y = c'$; Where a_{i1} is X_1 to M ; a_{i2} is X_2 to M ; b_i is M to Y ; and c_{i1} is X_1 to Y and c_{i2} is X_2 to Y ; $Y = M_{i1} + X_1 + M_{i2} + X_2 + c'$.

Linked to the premise of the UTAUT model, the perception of users can be affected by performance of the ICT, which is under the influence of TTF [3,52]. The theory of reasoned action (TRA) includes subjective norms, attitudes, and behavioral intentions that are linked to adoption of ICTs when benefits to users are focused [53]. Scholars have examined similar contexts using TRA, implying its adequacy for the current research [54–56]. However, the majority of studies tend to investigate other sectors (e.g., education and healthcare). While the perception of citizens on e-government services have been examined by scholars in different regions and areas [57,58], the Lebanese context remains scarce in the extant literature. Similarly, the technology acceptance model [18,59] included ease of use, social influences, cognitive processes, and perceived usefulness regarding the adoption of ICTs [60,61].

The UTAUT model is a comprehensive framework that includes performance expectancy (extent of usefulness of the technology), effort expectancy (ease of use), social influence (subjective norm that is linked to beliefs of individuals regarding the usage of a technology by others), and facilitating conditions that are supportive and complementary services that are used to enhance acceptance and adoption of the technology (i.e., government ICTs) of users [20,21]. Due to the comprehensiveness of UTAUT model and its adequacy in the current research context, this theory is used to address CIU among Lebanese citizens with regard to e-government services during the pandemic. Hence, this theoretical setting is deployed for shaping the hypotheses of this research that are described in the following sections.

3. Hypothesis Development

3.1. Task–Technology Fit

In Tripoli, Lebanon, where internet infrastructures are mediocre and expensive [62,63], TTF can be helpful for government as aspects to consider in the digital domain. The citizens

should find e-government services fitting their needs in an easy way to continue using these e-services. TTF entails *quality, authorization, compatibility, easiness, and production timeliness* [49] that have influence on CIU in online settings and, particularly, during a crisis (i.e., COVID-19 pandemic) [18,61]. *Quality* refers to details and its recency and accuracy, which is highly important in the case of crises [64]. *Authorization* can be described as the level of access for users in a platform that provides necessities to public in the current context [65]. *Compatibility* addresses the consistency of the digital system (i.e., e-government services), which can be device compatibility and consolidation of data across different platforms [66]. *Easiness* explains the level of training or familiarity needed for users when interacting with an online platform that provides public services. This can also include availability of training and/or tutorials on the platform that enable appropriate usage by citizens.

Production timeliness pertains to daily functions in a timely manner that provide recent information (e.g., policies, risk factors, and government initiatives) to the public [51,67]. This requires IT teams to maintain a high level of punctuality, consistency, and the previously noted dimensions. Therefore, TTF can be a determinant of CIU as it can increase or decrease satisfaction of users with regards to the noted dimensions. This connects the interests of users and the 'fitness' of the task performed by the platform [34,48]. Researchers argue that users will only adopt ICT when it fits their tasks at hand and improves their performance [4,18,61]. This entails the social development aspect [26–28] which can be derived from appropriate ICTs (i.e., e-government services) which can provide platforms that are required by citizens generally, and particularly during times of crises (i.e., the global pandemic). Following what was mentioned, a hypothesis has emerged:

Hypothesis 1. *TTF can positively impact CIU among citizens who use governmental ICTs during a crisis.*

3.2. Sense of Virtual Community

Sense of virtual community (SVC) is an essential element that influences CIU among users. This factor pertains to the degree of affective attachment to the community through using ICTs [40]. In this sense, connectedness and sense of interdependency among the people using ICTs can be expressed, which encompasses *membership* (belongingness), *influence* (sense of creating change in community), and *immersion* (strong attachments and addiction) [68,69]. As individuals perceive a higher rate of SVC, it is more likely that they will continue to use ICTs and exhibit higher participation in communities [11]. This behavior can be more explicit among individuals who are more active in civic engagement and social groups [11]. The current study incorporates community development as an ultimate outcome of establishing ICTs for citizens and a source of updated, reliable, and legitimate information, which can create a sense of community among different members in a city-wide scale. Arguably, this can have positive outcomes for citizens regarding safety measures, learning opportunities (i.e., online platforms and their content), policies, and awareness regarding events or incidents (i.e., the disease) and improve the communication between the government and its citizens. E-government platforms can become a major source of sustainable development in the city and across the nation.

Membership is highly influential on the intention to use technologies among virtual communities. Similarly, citizens who share interests are more prone to engage in e-participation based on interactions within the community and their influence. Lastly, immersion explains attachment and the level at which citizens use a governmental ICT during the pandemic. An example can be health and policy-related platforms, where information is constantly updated and various resources are provided to increase awareness, which can increase the engagement of users through immersion [19,70]. Through e-participation, an individual can contribute to their communities, which positively influences continuous usage of e-government services [54]. This concept is embedded within the premises of UTAUT as it relates to facilitating conditions which can positively influence CIU [11].

Moreover, SVC is linked to the social influence dimension of UTAUT as it addresses the sense of community and social elements that can impact CIU among users. In accord with what was noted above, the following hypotheses is developed:

Hypothesis 2. *SVC has a positive impact on users' CIU in the context of Lebanese governmental ICTs during the pandemic.*

3.3. Mediating Role of UTAUT

The UTAUT model is linked to all variables of the study and thus its role as a mediating element is assessed. In this respect, TTF lays a positive impact on the performance expectancy of citizens as they perceive a higher level of fit that reflects usefulness and effectiveness [3]. The correlation between the UTAUT model and TTF has been reported by several studies in the extant literature, which provide support for the theoretical model of current study [3,6,48]. As SVC addresses emotional belongingness and attachment to a specific virtual community, ICTs deployed by the government during the pandemic can be a suitable platform for enhancing the civic engagement and e-participation of citizens through social interactions as a form of social development, especially considering the effects of the pandemic on the society (e.g., lack of physical interactions, restrictions of mobility, and similar constraints). This study focuses on the mediating effect of UTAUT between SVC and CIU in the context of digital governmental services, especially during a crisis. The attachment to social community can have a positive effect on the individual belief that others should use the system that falls within the boundaries of the UTAUT model [11,12,71].

This research investigates the mediating effect of UTAUT based on its positive linkage with TTF and SVC while showing a positive relationship with continuous intention to use e-government services (i.e., those offered by the local municipality during crisis). The comprehensiveness of the UTAUT model provides a premise for this study that incorporates the scope of government–citizen relationship in the Lebanese context. The effects of UTAUT on CIU has been noted in the literature [11,39,72]. This shows that UTAUT incorporates aspects that cover both the social/customer view (i.e., social influence, performance expectancy) and the technical view (i.e., effort expectancy and facilitating conditions). The UTAUT model is a solid framework that encompasses various aspects surrounding the usage of ICTs by individuals. The current research focuses on the continuous usage of ICTs by citizens during the pandemic. In this context, the UTAUT model can appropriately address both TTF and SVC and their subsequent effect on CIU. While the specific model of this research has not been examined in prior studies, researchers examining similar contexts have confirmed the appropriateness of UTAUT in understanding intentions to use (i.e., continuous) ICTs. Similar results can be observed in various countries and domains [19,73–75].

In the context of Lebanon, this study argues that social influence and expectation of ICT performance in the e-government domain is compared with modern outlets by citizens. This, however, is limited by the facilities that are hindered due to economic and other governance challenges. While the platforms under examination in this research were relatively easy to navigate, it is expected that e-government services can provide a decent and adequate service to citizens. For the fragile state of Lebanon dealing with several crises, ICTs can be essential tools for the government to improve its relationship with citizens and establish long-term plans for enhancing communities. The UTAUT model bridges the concepts used in the proposed model of this research (see Figure 1). The current model benefits from the premises of the UTAUT model to establish a theoretical framework that better explains the relationship among SVC, TTF, and CIU. Building on the previously noted arguments, the current research aims to provide a better understanding on the mediating role of UTAUT on CIU among Lebanese citizens.

In the light of the aforementioned arguments, theoretical context, and aforementioned aims, the current research proposes the following hypotheses:

Hypothesis 3a. *UTAUT has a mediating role between TTF and CIU.*

Hypothesis 3b. *UTAUT has a mediating role between SVC and CIU.*

4. Methodology

4.1. Sampling and Data Procedures

The current study uses a quantitative approach through a self-administered survey that addresses the perception of citizens regarding governmental ICTs during the pandemic based on the included factors in the proposed research model (Figure 1). This is in line with prior studies that examined municipalities or other governmental services and their linkage with citizens. There is no official population consensus for Tripoli, Lebanon. Comparing online and scholarly resources, the city has an estimated population of 1 million [76–78]. The sample size for this research was calculated as 336 using G*power software with statistical power of 85%, effect size of 0.01 m, and the number of arrows towards CIU = 4 [79]. Accordingly, sample size above 336 is regarded as adequate for the current study. A pilot test of the Arabic questionnaire was conducted by sending the questionnaire's link to 30 participants (public citizen, municipality officers, and NGOs volunteers) to ensure both the validity and understandability of the questions. The pilot test data were excluded from the final analysis (no changes were deemed necessary on the survey). The ICTs that were found to be established and/or developed during the pandemic were noted to be two governmental media platforms and a municipality-specific platform integrated with other municipalities, where recent information on the disease, policies, initiatives, and risk management were provided to citizens. These platforms also included forums, Q&A sections, and online automated search functions linked to other governmental sources (e.g., ministries, insurance, banking, and finance). In addition, the noted platforms provided direct call options to emergency systems specific to the pandemic. This was further combined with blog posts and social proofs of the initiatives undertaken by the regional government.

The procedure for obtaining data was initiated by contacting the municipality of Tripoli, informing the relevant authority regarding the context and aims of the research. Using the official database, it was established that only Tripoli citizens are included, and that targeted individuals are registered and have made contacts with the municipality during the pandemic. Through simple random sampling [80], 500 random contacts were drawn from the database. Via SMS (online or direct), a total of 500 citizens were contacted, informed about the research, and were asked to participate in the study based on their availability, willingness, and the aforementioned criteria. Upon confirmation of participation, a written consent form alongside the link to survey was sent to each respondent via email, where participants signed and returned the forms. These forms were then collected by the authorities in the municipality to comply with anonymity, confidentiality, and permissions to access the dataset. The original questionnaire was developed in English, translated into Arabic using a professional translator, and translated back into English by a second translator to ensure the accuracy of terms and reducing common method bias [81]. A total of 403 surveys were completed, from which 390 were qualified for the final analysis (eliminated data were based on incomplete responses). Due to the sensitivity of information, security, and privacy concerns, no data that had any identifiers remaining were kept and the original data were returned to the authorities after extracting the necessary information. Participants were given full anonymity and the data collection process was conducted under the supervision of a municipality representative. As various sectarian groups shape the society in Lebanon, establishing trustworthy networks becomes essential, especially in the public sector. Hence, the first author used various personal and professional networks as a local to engage with authorities and gain the trust of participants regarding privacy and ethical means. Such delicate matters can be the reason behind the scarcity of literature in the Middle East region and Lebanon in particular. Having a local as the first researcher improved the process of data collection as participants were provided with relevant infor-

mation in their own language and dialect. Hence, establishing a better understanding of the context of the study.

4.2. Measurements

Task–technology fit (TTF) was measured based on its dimensions (i.e., quality, authorization, compatibility, easiness, and production timeliness) using available scales in the literature [39,48]. Each dimension comprised 2 items. Sense of virtual community (SVC) was measured through three factors (immersion, influence, and membership) with 9 items [11,40]. Continuous intention to use (CIU) was measured with three items derived from the extant literature [11,54]. The UTAUT model and its dimensions (performance expectancy, social influence, facilitating conditions, and effort expectancy) were measured based on relevant scales in the literature [34,54,82–84]. Finally, the survey included the demographic factors (age, gender, and level of education) as control variables [46,54]. All variables were measured using the seven-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree. A copy of the survey can be found in the appendix section (see Appendix A).

5. Results

The current research uses Smart-PLS software and partial-least squares-structural equation modeling (PLS-SEM) technique to test the above-mentioned hypotheses. This technique is deemed appropriate for the current research as it includes latent variables, has a relatively small sample size, and does not concern normality of distribution [79].

To reduce the extent of bias and increase the willingness of the participants, no personal or sensitive information was obtained from respondents. The majority of participants were between the ages of 40 to 55 (40.5%), followed by 26 to 39 (30.8%), and others were below 25 (16.4%) and above 56 (12.3%). The sample was composed of 225 men and 165 women. It was noted that 42.3% of participants held a bachelor's degree, which formed the majority. This was followed by master degree holders (27.7%), high school or diploma holders (16.4%), and those at doctorate or post-doctorate level with 11.0% and 2.6%, respectively.

5.1. Measurement Model Assessment

The proposed model has been measured with results presented in Table 1. These results show that outer loadings are within the acceptable threshold (above 0.710) [85], and Rho A, internal consistency (α), composite reliability (CR), and convergent validity (CV) are statistically satisfactory as they are above 0.7 [86,87]. Similarly, Table 2 presents VIF values that are within the acceptable threshold ($VIF < 3$), stating that there are no multicollinearity issues [85,88,89]. Lastly, average variance extracted (AVE) states convergent validity (above 0.5) and the heterotrait–monotrait (HTMT) ratio (Table 3) exhibits acceptable discriminant validity (below 0.85), implying that the measurement model is a good fit [79,90].

5.2. Structural Model Assessment

The structural model of the research and its hypotheses have been found to be a good fit as (1) indices exhibit satisfactory values for normal fit index ($NFI = 0.911$), and standardized root mean square residual ($SRMR = 0.021$) [90]; (2) no multicollinearity issue was found (Table 2—VIF below 3) [85]; and (3) R-square (predictive power) and Q-square (predictive relevance) have been found statistically acceptable [91]. The decisions on structural model testing are provided in Table 4 which shows acceptance of the research hypotheses. As can be observed from Table 3, all hypotheses of the research are supported; TTF has a significantly positive impact on CIU ($\beta = 0.307$) supporting the first hypothesis, similar to SVC ($\beta = 0.321$), which supports second hypothesis. Furthermore, the mediating effect of UTAUT is supported in the results ($\beta = 0.279$) which shows support for the third hypothesis, and the SVC–CIU relationship ($\beta = 0.241$) leads to acceptance of fourth hypothesis. These findings suggest that citizens are more likely to continue their usage of ICTs provided by the Lebanese government during the pandemic when the notion of SVC and TTF are the

focus. Furthermore, the mediating role of UTAUT provides a better explanation on the aforementioned relationships.

Table 1. Measurement model assessment.

Construct	Dimensions	Indicator	Outer Loadings	α	Rho A	CR	AVE	
TTF	Quality	QL1	0.741	0.751	0.758	0.761	0.615	
		QL2	0.825					
	Authorization	AUT1	0.833	0.792	0.787	0.808	0.678	
		AUT2	0.814					
	Compatibility	CPT1	0.825	0.743	0.754	0.757	0.610	
		CPT2	0.735					
	Easiness	EAS1	0.810	0.736	0.742	0.748	0.598	
		EAS2	0.806					
	Production timeliness	PTL1	0.823	0.808	0.821	0.823	0.699	
		PTL2	0.849					
	SVC	Immersion	IMR1	0.851	0.877	0.881	0.883	0.715
			IMR2	0.837				
IMR3			0.849					
Influence		INF1	0.807	0.809	0.814	0.816	0.596	
		INF2	0.752					
		INF3	0.756					
Membership		MMP1	0.766	0.835	0.837	0.837	0.631	
		MMP2	0.798					
		MMP3	0.818					
UTAUT		Performance expectancy	PE1	0.803	0.861	0.872	0.874	0.698
			PE2	0.841				
			PE3	0.862				
	Social influence	SI1	0.870	0.834	0.846	0.848	0.652	
		SI2	0.822					
		SI3	0.724					
	Facilitating conditions	FC1	0.808	0.837	0.855	0.857	0.667	
		FC2	0.843					
		FC3	0.799					
Effort expectancy	EE1	0.747	0.849	0.857	0.857	0.668		
	EE2	0.861						
	EE3	0.839						
CIU	-	CIU1	0.767	0.792	0.805	0.810	0.586	
		CIU2	0.798					
		CIU3	0.731					

Table 2. Assessment of reflective-formative constructs.

Construct	Items	Convergent Validity	Weights	VIF	t-Statistics
TTF	Quality	0.727	0.386	1.889	4.488
	Authorization		0.379	1.801	4.251
	Compatibility		0.524	2.305	5.863
	Easiness		0.408	2.377	5.282
	Production timeliness		0.459	1.846	5.607
SVC	Immersion	0.719	0.427	1.946	5.359
	Influence		0.416	2.034	5.461
	Membership		0.459	1.958	5.329
UTAUT	Performance Expectancy	0.758	0.383	1.807	3.404
	Social Influence		0.422	2.229	4.617
	Facilitating Conditions		0.469	2.118	5.176
	Effort Expectancy		0.427	2.099	4.949

Table 3. Heterotrait–monotrait ratio.

	QL	AUT	CPT	EAS	PTL	IMR	INF	MMP	PE	SI	FC	EE
QL												
AUT	0.722											
CPT	0.481	0.509										
EAS	0.722	0.613	0.776									
PTL	0.586	0.725	0.639	0.757								
IMR	0.725	0.478	0.681	0.705	0.822							
INF	0.710	0.718	0.721	0.730	0.744	0.801						
MMP	0.623	0.601	0.727	0.664	0.707	0.711	0.722					
PE	0.676	0.639	0.702	0.724	0.701	0.667	0.706	0.762				
SI	0.670	0.491	0.787	0.599	0.507	0.629	0.606	0.705	0.712			
FC	0.579	0.641	0.667	0.713	0.649	0.726	0.697	0.593	0.708	0.711		
EE	0.632	0.728	0.764	0.565	0.603	0.618	0.594	0.644	0.589	0.720	0.746	
CIU	0.597	0.609	0.646	0.599	0.697	0.678	0.711	0.649	0.723	0.737	0.743	0.765

Table 4. Hypothesis testing.

Effects	Relations	β	t-Statistics	f^2	Decision
Direct					
H1	TTF \rightarrow CIU	0.307	4.387 ***	0.133	Supported
H2	SVC \rightarrow CIU	0.321	4.556 **	0.126	Supported
Mediation					
H3	TTF \rightarrow UTAUT \rightarrow CIU	0.279	3.704 **	0.049	Supported
H4	SVC \rightarrow UTAUT \rightarrow CIU	0.241	3.648 *	0.044	Supported
Control Variables					
	Gender \rightarrow CIU	0.122	2.224 *		
	Age \rightarrow CIU	0.131	2.130 *		
	Education \rightarrow CIU	0.120	2.264 *		

$$R^2_{CIU} = 0.43 / Q^2_{CIU} = 0.23$$

$$R^2_{UTAUT} = 0.65 / Q^2_{UTAUT} = 0.45$$

$$SRMR: 0.021; NFI: 0.911$$

* 0.05, ** 0.01, *** 0.001.

6. Discussions

In the light of current results, online services that are currently nascent can be effective tools for improving government–citizen relationships, especially during a crisis (i.e., COVID-19 pandemic). While the surge in usage of technology was noted in the aftermath of the pandemic, governments (particularly in Lebanon) faced challenges regarding the communication of information, and social development issues. The results show that e-government services can be deployed as means for improving participation and relationships and establishing virtual communities in the society when interactions and transportations are limited (due to curfews). Citizens who are more engaged and continue their engagement when e-government services can facilitate their needs and enhance their sense of community. E-platforms and social media are powerful tools for the government to increase civic participation and deliver essential services and information to citizens during a crisis. This can improve community-building at the city-wide scale based on the current findings. The regional government in Lebanon was found to be limited in terms of resources (e.g., funds) and equipment (e.g., access to modern technology) during the conduct of this research. This shows the inherent challenges faced by the municipality in terms of digital communication with citizens. Nevertheless, the government can strategize and implement ICTs with a focus on community development and increased access to reliable and comprehensive features that meet their needs during and after a crisis. Hence, features and functions that meet citizens' needs and focus on social aspects are imperative for CIU among citizens. As the results show, quality, authorization, compatibility, easiness, and production timeliness can effectively direct citizens towards continued usage of e-government services [11,39]. This can be beneficial for authorities as they can implement systems that encompass the noted elements to improve experiences of users and encourage reuse.

Furthermore, immersion, influence, and membership are key elements that encourage continuous usage of ICTs during a pandemic as these elements reflect virtual communities and shared interests among citizens [71,72]. For community development, this can be highly effective as ICTs can include employment, insurance, education, and other services that can benefit the society. Similarly, various groups in the society can be connected through virtual communities, which increases social interactions, engagement, and participation in the public sphere. Dimensions of UTAUT model (performance expectancy, social influence, facilitating conditions, and effort expectancy) were found to be significantly influential on CIU among Lebanese citizens, which show a consensus with previous findings in the extant literature and contribute to its applicability and geographical borders [15,34,54,83]. Expectations (performance and effort), as well as social influence and facilitating conditions are vital elements for ICTs to bear fruit and prove their adequacy for citizens. These findings show the complexity and importance of considering various aspects for governmental ICTs to aid the society as a whole through community-building and the improvement of wellbeing (e.g., provision of reliable information during the pandemic), education (e.g., learning opportunities), sustainable community (i.e., digitalization), and modern and innovative infrastructures (i.e., e-government ICTs).

For effective communication between government and its citizens, e-services are highly important, and their efficiency determines the extent to which citizens will use ICTs during a crisis, and in a continuous manner [19,70]. Users (i.e., citizens) should find the e-services offered by the government beneficent, effective, and that the e-service fits the task they want to achieve. This indicates that when users feel an emotional connection when using the e-platform, they will continue to use it for a long term and are more involved in the social work. This involvement can create a positive impact in the local society and help municipalities and other governmental departments to better serve their citizens [33,39,84]. If the e-government services are considered useful for citizens, an improvement in their interaction with the government sector can be obtained. ICTs and their features (useful practices, applications, or online procedures) are tools for providing beneficial information, awareness, and opportunities (e.g., avoiding risks of a crisis) to citizens, which can be perceived as a social development and improvement due to the noted interactions and

opportunities for different activities and features. As a result, citizens are more likely to continue using the online service.

7. Conclusions

Pertaining to the aims of the current research, it is important to note that ICTs can be used as highly effective tools for community development due to their flexibility, which allows inclusion of numerous features. The aforementioned discussions show that the government can have an effective role in terms of fostering belongingness to the community by using ICTs to communicate with its citizens. This can improve government–citizen relationship, while providing all communities (especially minorities) with various opportunities to progress. The high accessibility, ease of use, and consideration of unique elements of each community is highly important, particularly in the case of Lebanon due to its numerous sectarian groups. Considering restrictions (curfew) and the lack of social interactions, such services can be highly influential for health-related issues where the government can understand changes, needs, and awareness among communities. Results of this research show that fit features and social consideration are key aspects; high performance in these domains can further encourage usage of e-government ICTs. This can be highly beneficial for community-building, education, introduction of IT to various groups in society, and preparing citizens for future crises. The evidence in this research shows that ICTs in the Middle East can be used in a continuous manner if governments emphasize improving the society and enhancing technological systems for the benefit of citizens. In this region, the government–citizen relationship is complicated, and ICTs can be tools for progress due to the social values they offer [11,15,30].

It is also noteworthy that the attainment of SDGs is depicted as the overarching outcome of the results as the government can use ICTs to achieve a number of goals, namely, *SDG 3 wellbeing* (risk and disaster management during crises); *SDG 4 education* (training, awareness, workshops, and industry channels); *SDG 8 economic growth* (through development of new systems, educating the public, and creating opportunities); *SDG 9 infrastructure* (via developments in the IT sector and deployment of innovative ICTs); and *SDG 11 sustainable community* (energy, waste, and material consumption, and digitalization of public services to meet the needs of citizens).

7.1. Theoretical Implications

The current research contributes to a better understanding of the UTAUT model among Arab countries and, particularly, the Lebanese context. The perception of citizens in this context is found similar to other cultures and settings, which implies that the quality and efficiency of e-government services is vital for the continuous usage of such platforms. Hence, this research implies that by focusing on social elements (i.e., SVC) and technical aspects (i.e., TTF) [4] within the premises of UTAUT, governments can achieve a higher rate of civic participation, enhance communication, and deliver policies and information to citizens in an adequate manner [3,11,44]. As mentioned in the theoretical setting section, UTAUT pertains to TTF and SVC as it includes both technical and social aspects; thus, the current findings imply its adequacy and appropriateness in the context of Lebanon and the perception of its citizens towards digital services provided by the government during the pandemic. The current findings can further be linked to the theory of reasoned action, where governmental ICTs provide vivid benefits to citizens through influencing subjective norms, attitudes, and behavioral intentions [18,54,58,60,61]. This is of importance for society as a form of developmental pathway [26–28]. As individuals perceive a higher rate of efficiency and benefits that can be achieved by using e-government services, it can be expected that CIU will increase among citizens.

7.2. Practical Implications

The current findings can be beneficial for authorities and decision-makers in the Lebanese government and Tripoli, especially. In this respect, user friendly e-services that

do not require training or tech savviness can be a great tool for increasing civic participation. E-services should help citizens to achieve their goals, especially during crises and uncertain times. For instance, adequate information regarding policies and the conditions of the society, which become more vital during crises, should be constantly updated across governmental platforms to provide integrated and immersive knowledge to citizens. These platforms should function well, have clear guidelines, and be accessible to the nation so that their effectiveness is perceived by citizens. In addition, citizens should feel part of the social community using municipalities' e-services, where they express feelings, share, and invite others to be engaged in a virtual community. The feeling of a sense of community and belonging to social groups boosts their continuous intention to use e-services in the long term, and encourages cooperation between the government and citizens, which can be a success factor for e-government duties. E-government services should also facilitate usage and interactions in the platform to positively impact the perception of users and increase engagement. This can have desired outcomes as it clarifies governmental actions, provides additional information and support, and increases trust towards the ICT. This research recommends the government implement efficient e-government services for citizen's satisfaction, particularly during crises, as it can impact the overall wellbeing of citizens both physically and psychologically. Furthermore, the educational aspects of such platforms can be made the focus so that citizens are provided with various opportunities that enable personal and/or professional development while clearly delivering governmental policies and updates regarding various initiatives in the society. This can help develop the society while protecting it from threats such as the global pandemic. In this respect, governments can have a major role in terms of social development through ICTs as resilient systems can be used after crises through increased features, legitimacy, and content.

8. Limitations

There are several constraining factors that hindered the process of the current research in terms of its conduct. For example, data were only gathered from one city (Tripoli), which may not be an accurate representation of Lebanese people in general. The municipality of Tripoli is not fully equipped with various e-services; thus, it uses social media platforms as complementary tools for communication with citizens. Hence, the platform which citizens engaged with during the pandemic was limited in terms of its function. Similarly, data were collected in a cross-sectional manner, which can lower the generalizability of findings. Furthermore, this approach limits the analysis of behavior over time as data pertaining to research factors are collected in one session. This study is also limited by a contextual factor that is the scarcity of studies examining the Arab world and Lebanon, specifically. The current analysis does not include cultural aspects that can be highly influential in this context. Moreover, in-depth data were not obtained as quantitative measures do not provide string data that can thoroughly analyze the experiences of individuals. Lastly, factors such as, cost, infrastructure, trust towards the government, and individual traits were beyond the scope of current study, thus limiting its theoretical and contextual framework. It should also be noted that most participants were educated, which might have skewed the results.

9. Recommendations for Future Studies

In accord with the aforementioned limitations, there are a number of pathways that scholars can follow to provide a better understanding of the current subject and develop the results of this study and thus address its shortcomings. In this respect, obtaining longitudinal data is highly recommended as it can provide a deeper comprehension on changes in the behavior and usage of ICTs by citizens at different times. Undertaking a qualitative approach can also be useful as it can gather in-depth data from practitioners (e.g., decision-makers in the government) regarding the challenges and different strategies that are deployed for enhancing users' experience and encouraging the continuous usage of governmental e-services. Cultural aspects and characteristics can be examined in neighboring countries and other developing nations to yield comparative results. This can be

combined with the inclusion of other theories that encompass social and cultural elements. Similarly, risk management, civic participation, demographic characteristics, and different platforms such as social media platforms can be examined to further develop the boundaries of this research and expand the literature on the subject. The human (personal and/or group), economic, and cultural influences of ICTs can be examined to further provide a deeper understanding of their social and psychological effects.

Author Contributions: Conceptualization, G.K.; methodology, P.Z.; validation, G.K.; formal analysis, P.Z.; investigation, B.E.H.; resources, B.E.H.; data curation, B.E.H.; writing—original draft preparation, B.E.H.; review and editing, P.Z.; supervision, G.K. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from the respondents of the survey.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

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

Appendix A. Survey (Factor Items)

TTF	Task–Technology Fit
Quality	<ol style="list-style-type: none"> 1. The data is current and fits the needs of current situation. 2. The detail of information is appropriate for the tasks.
Authorization	<ol style="list-style-type: none"> 1. Authorization is not difficult. 2. There are different authorization levels depending on data usage.
Compatibility	<ol style="list-style-type: none"> 1. The data is hard to consolidate/compare or use in different sources 2. Inconsistency can be seen in data from different sources.
Easiness	<ol style="list-style-type: none"> 1. It is easy to learn how to work with the systems. 2. It does not need much training to be familiar with all options.
Production timeliness	<ol style="list-style-type: none"> 1. Updates and reports are routine and follow schedules. 2. Regular activities (e.g., daily updates) are scheduled on the system.
SVC	Sense of Virtual Community
Immersion	<ol style="list-style-type: none"> 1. I spend much time online with my e-participation community. 2. I spend more time than expected with my e-participation community. 3. I've spent more time with my e-participation community during the pandemic.
Influence	<ol style="list-style-type: none"> 1. I am known in my e-participation community. 2. I feel I have control in the e-participation community. 3. Other members review my activities on e-participation.
Membership	<ol style="list-style-type: none"> 1. I feel belongingness to my e-participation community. 2. I feel other members in e-participation community are my friends 3. I like other members in e-participation community.
UTAUT	Unified Theory of Acceptance and Use of Technology
Performance expectancy	<ol style="list-style-type: none"> 1. E-government services are useful for my life. 2. E-government services provide results that meet my needs. 3. E-government services will benefit me in the future.
Social influence	<ol style="list-style-type: none"> 1. People who influence me think it is important to use e-government. 2. People whose opinions I value think it is necessary to use e-government. 3. People who are important to me prefer me to use e-government.
Facilitating conditions	<ol style="list-style-type: none"> 1. There is infrastructure for digital governmental services. 2. Using e-government is facilitated by instructions. 3. There is technical assistant available to use e-government.
Effort expectancy	<ol style="list-style-type: none"> 1. I think it is easy to use e-government services. 2. I can learn all features and settings of e-government by myself. 3. I think I will be able to use e-government fluently.

Continuous Intention to Use (ICTs)	
CIU	1. I plan to use e-government services in my day. 2. I think I will use e-government services in the future. 3. I intend to use e-government services routinely.

References

- Vanderose, B.; Snoeck, M.; Clarinval, A.; Simonofski, A. The impact of user participation methods on e-government projects: The case of La Louvière, Belgium. *Media Commun.* **2018**, *6*, 175–186.
- Akinuwa, B.A.; Uzoka, F.M.E.; Fashoto, S.G.; Mbunge, E.; Odumabo, A.; Amusa, O.O.; Okpeku, M.; Owolabi, O. A modified UTAUT model for the acceptance and use of digital technology for tackling COVID-19. *Sustain. Oper. Comput.* **2022**, *3*, 118–135. [[CrossRef](#)]
- Wan, L.; Xie, S.; Shu, A. Toward an Understanding of University Students' Continued Intention to Use MOOCs: When UTAUT Model Meets TTF Model. *SAGE Open* **2020**, *10*, 215824402094185. [[CrossRef](#)]
- Ha, Q.A.; Chen, J.V.; Nguyen, T.H.T. Continuance use of enterprise social network sites as knowledge sharing platform: Perspectives of tasks-technology fit and expectation disconfirmation theory. *Int. J. Knowl. Manag. Stud.* **2021**, *12*, 429–451. [[CrossRef](#)]
- Al-Maatouk, Q.; Othman, M.S.; Aldraiweesh, A.; Alturki, U.; Al-Rahmi, W.M.; Aljeraiwi, A.A. Task-technology fit and technology acceptance model application to structure and evaluate the adoption of social media in academia. *IEEE Access* **2020**, *8*, 78427–78440. [[CrossRef](#)]
- Dang, Y.M.; Zhang, Y.G.; Brown, S.A.; Chen, H. Examining the impacts of mental workload and task-technology fit on user acceptance of the social media search system. *Inf. Syst. Front.* **2020**, *22*, 697–718. [[CrossRef](#)]
- Li, Y.; Zhao, M. A study on the influencing factors of continued intention to use MOOCs: UTAUT model and CCC moderating effect. *Front. Psychol.* **2021**, *12*, 3039. [[CrossRef](#)]
- Azizan, S.; Lee, A.; Crosling, G.; Atherton, G.; Arulanandam, B.; Lee, C.; Rahim, R.A. Online Learning and COVID-19 in Higher Education: The Value of IT Models in Assessing Students' Satisfaction. *Int. J. Emerg. Technol. Learn.* **2022**, *17*, 245–278. [[CrossRef](#)]
- Awa, H.A.R.T.; Kalu, U. Studying Enterprise Systems' Acceptance Using Integrated Unified Theory of Acceptance and Use of Technology (UTAUT). *J. Sustain. Sci. Manag.* **2020**, *15*, 98–126. [[CrossRef](#)]
- Alkhalidi, A.N. A model of the major factors affecting user's intention to use m-government services in Saudi Arabia: From user's perspective. *J. Glob. Bus. Technol.* **2018**, *14*, 68–81.
- Naranjo-Zolotov, M.; Oliveira, T.; Casteleyn, S.; Irani, Z. Continuous usage of e-participation: The role of the sense of virtual community. *Gov. Inf. Q.* **2019**, *36*, 536–545. [[CrossRef](#)]
- Naranjo-Zolotov, M.; Oliveira, T.; Casteleyn, S. Citizens' intention to use and recommend e-participation: Drawing upon UTAUT and citizen empowerment. *Inf. Technol. People* **2018**, *32*, 364–386. [[CrossRef](#)]
- Rahi, S.; Khan, M.M.; Alghizzawi, M. Extension of technology continuance theory (TCT) with task technology fit (TTF) in the context of Internet banking user continuance intention. *Int. J. Qual. Reliab. Manag.* **2020**, *38*, 986–1004. [[CrossRef](#)]
- Alyoussef, I.Y. E-Learning acceptance: The role of task-technology fit as sustainability in higher education. *Sustainability* **2021**, *13*, 6450. [[CrossRef](#)]
- Le Blanc, D. *E-Participation: A Quick Overview of Recent Qualitative Trends*; United Nations, Department of Economics and Social Affairs: New York, NY, USA, 2020; Volume 163.
- Payne, M. *The Origins of Social Work: Continuity and Change*; Bloomsbury Publishing: London, UK, 2020.
- Caena, F.; Redecker, C. Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators (Digcompedu). *Eur. J. Educ.* **2019**, *54*, 356–369. [[CrossRef](#)]
- Mensah, I.K. Impact of government capacity and E-government performance on the adoption of E-Government services. *Int. J. Public Adm.* **2019**, *43*, 303–311. [[CrossRef](#)]
- Kim, I.; Kim, J.J. Emotional attachment, age and online travel community behaviour: The role of parasocial interaction. *Curr. Issues Tour.* **2021**, *24*, 3466–3488. [[CrossRef](#)]
- Dwivedi, Y.K.; Rana, N.P.; Jeyaraj, A.; Clement, M.; Williams, M.D. Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Inf. Syst. Front.* **2019**, *21*, 719–734. [[CrossRef](#)]
- Zhou, L.L.; Owusu-Marfo, J.; Asante Antwi, H.; Antwi, M.O.; Kachie, A.D.T.; Ampon-Wireko, S. Assessment of the social influence and facilitating conditions that support nurses' adoption of hospital electronic information management systems (HEIMS) in Ghana using the unified theory of acceptance and use of technology (UTAUT) model. *BMC Med. Inform. Decis. Mak.* **2019**, *19*, 230. [[CrossRef](#)] [[PubMed](#)]
- Assar, S.; El Amrani, R.; Watson, R.T. ICT and education: A critical role in human and social development. *Inf. Technol. Dev.* **2010**, *16*, 151–158.
- Palvia, P.; Baqir, N.; Nemati, H. ICT for socio-economic development: A citizens' perspective. *Inf. Manag.* **2018**, *55*, 160–176. [[CrossRef](#)]
- Sinko, M.; Lehtinen, E. *The Challenges of ICT*; Atena: Jyväskylä, Finland, 1999.
- Gallardo-Montes, C.D.P.; Caurcel-Cara, M.J.; Crisol-Moya, E.; Peregrina-Nievas, P. ICT Training Perception of Professionals in Functional Diversity in Granada. *Int. J. Environ. Res. Public Health* **2023**, *20*, 2064. [[CrossRef](#)] [[PubMed](#)]

26. Rahiem, M.D. Technological barriers and challenges in the use of ICT during the COVID-19 emergency remote learning. *Univers. J. Educ. Res.* **2020**, *8*, 6124–6133. [[CrossRef](#)]
27. Choi, K.; Wang, Y.; Sparks, B. Travel app users' continued use intentions: It's a matter of value and trust. *J. Travel Tour. Mark.* **2019**, *36*, 131–143. [[CrossRef](#)]
28. Roztocki, N.; Soja, P.; Weistroffer, H.R. The role of information and communication technologies in socioeconomic development: Towards a multi-dimensional framework. *Inf. Technol. Dev.* **2019**, *25*, 171–183. [[CrossRef](#)]
29. Mahmood, M.; Weerakkody, V.; Chen, W. The role of information and communications technology in the transformation of government and citizen trust. *Int. Rev. Adm. Sci.* **2020**, *86*, 708–728. [[CrossRef](#)]
30. Al-Adwan, A.S.; Yaseen, H.; Alsoud, A.; Abousweilem, F.; Al-Rahmi, W.M. Novel extension of the UTAUT model to understand continued usage intention of learning management systems: The role of learning tradition. *Educ. Inf. Technol.* **2022**, *27*, 3567–3593. [[CrossRef](#)]
31. Zafar, M.W.; Zaidi, S.A.H.; Mansoor, S.; Sinha, A.; Qin, Q. ICT and education as determinants of environmental quality: The role of financial development in selected Asian countries. *Technol. Forecast. Soc. Chang.* **2022**, *177*, 121547. [[CrossRef](#)]
32. Abdul-Wakeel Karakara, A.; Osabuohien, E.S. Threshold effects of ICT access and usage in Burkinabe and Ghanaian households. *Inf. Technol. Dev.* **2022**, *28*, 511–531. [[CrossRef](#)]
33. Razak, F.Z.B.A.; Kasim, N.M.B.; Harun, S.A.B. Relationship between Service Quality and e-Government Acceptance: The Role of Gender as a Moderator. *Glob. Bus. Manag. Res.* **2018**, *10*, 859–865.
34. Isaac, O.; Abdullah, Z.; Aldholay, A.H.; Abdulbaqi Ameen, A. Antecedents and outcomes of internet usage within organisations in Yemen: An extension of the Unified Theory of Acceptance and Use of Technology (UTAUT) model. *Asia. Pac. Manag. Rev.* **2019**, *24*, 335–354. [[CrossRef](#)]
35. Onorati, T.; Díaz, P.; Carrion, B. From social networks to emergency operation centers: A semantic visualization approach. *Future Gener. Comput. Syst.* **2019**, *95*, 829–840. [[CrossRef](#)]
36. Przeybilovicz, E.; Cunha, M.A.; Meirelles, F.D.S. The use of information and communication technology to characterize municipalities: Who they are and what they need to develop e-government and smart city initiatives. *Rev. Adm. Pública* **2018**, *52*, 630–649. [[CrossRef](#)]
37. Jain, R.; Garg, N.; Khera, S.N. Adoption of AI-Enabled Tools in Social Development Organizations in India: An Extension of UTAUT Model. *Front. Psychol.* **2022**, *13*, 893691. [[CrossRef](#)] [[PubMed](#)]
38. Nunes, A.; Limpo, T.; Castro, S.L. Acceptance of mobile health applications: Examining key determinants and moderators. *Front. Psychol.* **2019**, *10*, 2791. [[CrossRef](#)]
39. Li, Y.; Yang, S.; Zhang, S.; Zhang, W. Mobile social media use intention in emergencies among Gen Y in China: An integrative framework of gratifications, task-technology fit, and media dependency. *Telemat. Inform.* **2019**, *42*, 101244. [[CrossRef](#)]
40. Brunzini, A.; Caragiuli, M.; Massera, C.; Mandolini, M. Healthy Ageing: A Decision-Support Algorithm for the Patient-Specific Assignment of ICT Devices and Services. *Sensors* **2023**, *23*, 1836. [[CrossRef](#)] [[PubMed](#)]
41. Sharabati, A.A.A.; Al-Haddad, S.; Al-Khasawneh, M.; Nababteh, N.; Mohammad, M.; Ghoush, Q.A. The Impact of TikTok User Satisfaction on Continuous Intention to Use the Application. *J. Open Innov. Technol. Mark. Complex.* **2022**, *8*, 125. [[CrossRef](#)]
42. Iliș, M.; Iliș, D.; Josan, I.; Iliș, A.; Iliș, G. The Gateway of Maramureș Land. Geostrategical Implications in Space and Time, in *Annales*. In *Annals for Istrian and Mediteranian Studies, Series Historia et Sociologia*; Založba Annales: Koper, Slovenia, 2010; Volume 20, pp. 469–480.
43. Baumann, H. The causes, nature, and effect of the current crisis of Lebanese capitalism. *Natl. Ethn. Politics* **2019**, *25*, 61–77. [[CrossRef](#)]
44. Peñarroja, V.; Sánchez, J.; Gamero, N.; Orengo, V.; Zornoza, A.M. The influence of organisational facilitating conditions and technology acceptance factors on the effectiveness of virtual communities of practice. *Behav. Inf. Technol.* **2019**, *38*, 845–857. [[CrossRef](#)]
45. Venkatesh, V.; Zhang, X. Unified theory of acceptance and use of technology: US vs. China. *J. Glob. Inf. Technol. Manag.* **2010**, *13*, 5–27. [[CrossRef](#)]
46. Venkatesh, V.; Thong, J.Y.; Xu, X. Unified theory of acceptance and use of technology: A synthesis and the road ahead. *J. Assoc. Inf. Syst.* **2016**, *17*, 328–376. [[CrossRef](#)]
47. Wu, B.; Chen, X. Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model. *Comput. Hum. Behav.* **2017**, *67*, 221–232. [[CrossRef](#)]
48. Zhou, T.; Lu, Y.; Wang, B. Integrating TTF and UTAUT to explain mobile banking user adoption. *Comput. Hum. Behav.* **2010**, *26*, 760–767. [[CrossRef](#)]
49. Goodhue, D.L.; Thompson, R.L. Task-technology fit and individual performance. *MIS Q.* **1995**, *19*, 213–236. [[CrossRef](#)]
50. Zhang, X.; Jiang, S.; Ordóñez de Pablos, P.; Lytras, M.D.; Sun, Y. How virtual reality affects perceived learning effectiveness: A task-technology fit perspective. *Behav. Inf. Technol.* **2017**, *36*, 548–556. [[CrossRef](#)]
51. Chauhan, S.; Goyal, S.; Bhardwaj, A.K.; Sergi, B.S. Examining continuance intention in business schools with digital classroom methods during COVID-19: A comparative study of India and Italy. *Behav. Inf. Technol.* **2021**, *19*, 1–24. [[CrossRef](#)]
52. Cheng, Y.M. How does task-technology fit influence cloud-based e-learning continuance and impact? *Educ. Train.* **2019**, *61*, 480–499. [[CrossRef](#)]
53. Fishbein, M. A theory of reasoned action: Some applications and implications. *Neb. Symp. Motiv.* **1979**, *27*, 65–116.

54. Zolotov, M.J.N. Determinants of Information and Communication Technologies for the Online Citizen Participation Adoption in Urban Contexts. Ph.D. Thesis, Universidade NOVA de Lisboa, Lisbon, Portugal, 2018.
55. Mishra, D.; Akman, I.; Mishra, A. Theory of reasoned action application for green information technology acceptance. *Comput. Hum. Behav.* **2014**, *36*, 29–40. [[CrossRef](#)]
56. Buabeng-Andoh, C. Predicting students' intention to adopt mobile learning: A combination of theory of reasoned action and technology acceptance model. *J. Res. Innov. Teach. Learn.* **2018**, *11*, 178–191. [[CrossRef](#)]
57. Oni, A.A.; Oni, S.; Mbarika, V.; Ayo, C.K. Empirical study of user acceptance of online political participation: Integrating Civic Voluntarism Model and Theory of Reasoned Action. *Gov. Inf. Q.* **2017**, *34*, 317–328. [[CrossRef](#)]
58. Alryalat, M.A.A.; Rana, N.P.; Dwivedi, Y.K. Citizen's adoption of an E-Government system: Validating the extended theory of reasoned action (TRA). In *Open Government: Concepts, Methodologies, Tools, and Applications*; IGI Global: Hershey, PA, USA, 2020; pp. 651–674.
59. Sulistyowati, W.A.; Alrajawy, I.; Yulianto, A.; Isaac, O.; Ameen, A. Factors contributing to e-government adoption in Indonesia—An extended of technology acceptance model with trust: A conceptual framework. In *Intelligent Computing and Innovation on Data Science*; Springer: Singapore, 2020; pp. 651–658.
60. Mensah, I.K. Citizens' Readiness to adopt and use e-government services in the city of Harbin, China. *Int. J. Public Adm.* **2018**, *41*, 297–307. [[CrossRef](#)]
61. Chen, L.; Aklirikou, A.K. Determinants of E-government adoption: Testing the mediating effects of perceived usefulness and perceived ease of use. *Int. J. Public Adm.* **2020**, *43*, 850–865. [[CrossRef](#)]
62. Honein-AbouHaidar, G.N.; Antoun, J.; Badr, K.; Hlais, S.; Nazaretian, H. Users' acceptance of electronic patient portals in Lebanon. *BMC Med. Inform. Decis. Mak.* **2020**, *20*, 31. [[CrossRef](#)]
63. Nouredine, O.H.; ZeinEddine, R.B. Social media and its impression on consumers behavior during their decision-making process. *Am. Acad. Sci. Res. J. Eng. Technol. Sci.* **2018**, *41*, 76–84.
64. Al-Emran, M. Evaluating the use of smartwatches for learning purposes through the integration of the technology acceptance model and task-technology fit. *Int. J. Hum.-Comput. Interact.* **2021**, *37*, 1874–1882. [[CrossRef](#)]
65. Sharif, S.P.; Naghavi, N. Online financial trading among young adults: Integrating the theory of planned behavior, technology acceptance model, and theory of flow. *Int. J. Hum.-Comput. Interact.* **2021**, *37*, 949–962. [[CrossRef](#)]
66. Kimiagari, S.; Baei, F. Promoting e-banking actual usage: Mix of technology acceptance model and technology-organisation-environment framework. *Enterp. Inf. Syst.* **2022**, *16*, 1894356. [[CrossRef](#)]
67. Tavitiyaman, P.; So, C.Y.A.; Chan, O.L.K.; Wong, C.K.C. How Task Technology Fits with Employee Engagement, Organizational Support, and Business Outcomes: Hotel Executives' Perspective. *J. China Tour. Res.* **2022**, *18*, 1212–1238. [[CrossRef](#)]
68. Xiang, Y.; Chae, S.W. Influence of perceived interactivity on continuous use intentions on the danmaku video sharing platform: Belongingness perspective. *Int. J. Hum.-Comput. Interact.* **2022**, *38*, 573–593. [[CrossRef](#)]
69. Hiebert, A.; Kortess-Miller, K. Finding home in online community: Exploring TikTok as a support for gender and sexual minority youth throughout COVID-19. *J. LGBT Youth* **2021**, 1–18. [[CrossRef](#)]
70. O'Connell, M.E.; Haase, K.R.; Grewal, K.S.; Panyavin, I.; Kortzman, A.; Flath, M.E.; Cammer, A.; Cosco, T.D.; Peacock, S. Overcoming barriers for older adults to maintain virtual community and social connections during the COVID-19 pandemic. *Clin. Gerontol.* **2022**, *45*, 159–171. [[CrossRef](#)]
71. Joa, C.Y.; Magsamen-Conrad, K. Social influence and UTAUT in predicting digital immigrants' technology use. *Behav. Inf. Technol.* **2022**, *41*, 1620–1638. [[CrossRef](#)]
72. Khan, I.U.; Hameed, Z.; Khan, S.N.; Khan, S.U.; Khan, M.T. Exploring the effects of culture on acceptance of online banking: A comparative study of Pakistan and Turkey by using the extended UTAUT model. *J. Internet Commer.* **2022**, *21*, 183–216. [[CrossRef](#)]
73. Al-Sharafi, M.A.; Al-Emran, M.; Arpaci, I.; Marques, G.; Namoun, A.; Iahad, N.A. Examining the impact of psychological, social, and quality factors on the continuous intention to use virtual meeting platforms during and beyond COVID-19 pandemic: A hybrid SEM-ANN approach. *Int. J. Hum.-Comput. Interact.* **2022**, 1–13. [[CrossRef](#)]
74. Hsu, C.W.; Peng, C.C. What drives older adults' use of mobile registration apps in Taiwan? An investigation using the extended UTAUT model. *Inform. Health Soc. Care* **2021**, *47*, 258–273. [[CrossRef](#)]
75. Mishra, A.; Baker-Eveleth, L.; Gala, P.; Stachofsky, J. Factors influencing actual usage of fitness tracking devices: Empirical evidence from the UTAUT model. *Health Mark. Q.* **2021**, 1–20. [[CrossRef](#)]
76. Tadmouri, R.; Sief, H. Sustainability Management of Solid Waste in Tripoli Lebanon Landfill. In *MATEC Web of Conferences*; EDP Sciences: Les Ulis, France, 2019; Volume 281, p. 03003.
77. Khoder, G.; Mina, S.; Mahmoud, I.; Muhammad, J.S.; Harati, R.; Burucoa, C. Helicobacter pylori Infection in Tripoli, North Lebanon: Assessment and risk factors. *Biology* **2021**, *10*, 599. [[CrossRef](#)]
78. Population of Cities in Lebanon 2023. Available online: <https://worldpopulationreview.com/countries/cities/lebanon> (accessed on 3 January 2023).
79. Hair, J.F., Jr.; Sarstedt, M.; Ringle, C.M.; Gudergan, S.P. *Advanced Issues in Partial Least Squares Structural Equation Modeling*; Sage Publications: Thousand Oaks, CA, USA, 2017.
80. Chaudhuri, A.; Mukerjee, R. *Randomized Response: Theory and Techniques*; Routledge: Oxfordshire, UK, 2020.
81. Podsakoff, P.M.; MacKenzie, S.B.; Podsakoff, N.P. Sources of method bias in social science research and recommendations on how to control it. *Annu. Rev. Psychol.* **2012**, *63*, 539–569. [[CrossRef](#)]

82. Wang, H.; Tao, D.; Yu, N.; Qu, X. Understanding consumer acceptance of healthcare wearable devices: An integrated model of UTAUT and TTF. *Int. J. Med. Inform.* **2020**, *139*, 104156. [[CrossRef](#)]
83. Alyoussef, I.Y. Massive open online course (MOOCs) acceptance: The role of task-technology fit (TTF) for higher education sustainability. *Sustainability* **2021**, *13*, 7374. [[CrossRef](#)]
84. Lin, X.; Wu, R.; Lim, Y.T.; Han, J.; Chen, S.C. Understanding the sustainable usage intention of mobile payment technology in Korea: Cross-countries comparison of Chinese and Korean users. *Sustainability* **2019**, *11*, 5532. [[CrossRef](#)]
85. Hair, J.F., Jr.; Sarstedt, M.; Hopkins, L.; Kuppelwieser, V.G. Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *Eur. Bus. Rev.* **2014**, *26*, 106–121. [[CrossRef](#)]
86. Dijkstra, T.K.; Henseler, J. Consistent partial least squares path modeling. *MIS Q.* **2015**, *39*, 297–316. [[CrossRef](#)]
87. Jöreskog, K.G. Simultaneous factor analysis in several populations. *Psychometrika* **1971**, *36*, 409–426. [[CrossRef](#)]
88. Ramayah, T.J.F.H.; Cheah, J.; Chuah, F.; Ting, H.; Memon, M.A. Partial least squares structural equation modeling (PLS-SEM) using smartPLS 3.0. In *An Updated Guide and Practical Guide to Statistical Analysis*; Pearson: Kuala Lumpur, Malaysia, 2018.
89. Sarstedt, M.; Hair, J.F., Jr.; Cheah, J.H.; Becker, J.M.; Ringle, C.M. How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australas. Mark. J.* **2019**, *27*, 197–211. [[CrossRef](#)]
90. Henseler, J.; Ringle, C.M.; Sarstedt, M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J. Acad. Mark. Sci.* **2015**, *43*, 115–135. [[CrossRef](#)]
91. Henseler, J.; Ringle, C.M.; Sinkovics, R.R. The use of partial least squares path modeling in international marketing. In *New Challenges to International Marketing*; Emerald Group Publishing Limited: Bingley, UK, 2009.

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.