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Modelling the Factors Measuring Customer Service Excellence for Mobile Application Technology Usage in Abu Dhabi

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Abstract: In many areas of business, technological innovation is critical. The ability to use technology to transform organisations is now a requirement in all industries. Nonetheless, technological acceptance has a significant impact on overall corporate performance. Mobile applications are becoming more popular all over the world. As a result, the goal of this research is to look into the technology acceptance model in order to improve customer service in mobile applications. A questionnaire survey was used to collect data from mobile users in Abu Dhabi Municipality. The Partial Least Squares-Structural Equation Modelling (PLS-SEM) technique, aided by SmartPLS software, was used to analyse 396 completed questionnaire forms. The study's findings indicate that perceived usefulness, perceived ease of use, and attitude all have a significant impact on the intention to use technology. The role of intention to use as a moderator is also confirmed, as is the moderating effect of user experience. Furthermore, statistical evidence supports the role of user experience as a moderator in the customer satisfaction experience. The study's findings give marketing managers and academics a much stronger foundation for recommending CSE strategies. As a result, telecom operators must go above and beyond to improve PU, PEOU, and attitude, as well as develop strategies, in order to achieve a higher level of CSE.

Keywords: PLS-SEM, Abu Dhabi, Mobile technology, Customer Satisfaction Excellence

1. Introduction

In many business organizations, technological innovation is critical (Biekowska et al., 2019). According to Croteau and Bergeron (2001), strategic information systems and technology innovation management are inextricably linked to institutional performance. Furthermore, technology and innovation are realized through careful system implementation to maximize an organization's efforts in a transformation process toward performance excellence (Henderson & Venkatraman, 1999). When technology is embraced as a central component of organizational strategy, its ability to transform organizations is best realized (Biekowska et al., 2019). As a result, a critical link between proper technology deployment and organizational performance has been established (Croteau & Bergeron, 2001; Little, 2004). This connection can take many forms and is still required in today's organizations. The use of information management systems, for example, plays an essential role in shaping the business course in novel ways, as business planning is carried out more successfully and overall organizational competitiveness is significantly improved (Busch, 1999).

Aside from the valuable contribution of technological innovation to business performance, technology acceptance and actual adoption continue to be critical (Scherer et al., 2019; Raphaelian& Broadbent, 1999). One of the most

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significant challenges and causes of technology project failures worldwide is technology acceptance (Venkatesh & Davis, 2000; Legris et al., 2003). The acceptance challenge has received an internal acknowledgment within the firm, but external acknowledgment has also received (Pavlou, 2003; Venkatesh, 2000). Acceptance of technology is critical to global corporations' performance, productivity, efficiency, and overall operational excellence. As a result, technology is vital to international development and the advancements made by multinational corporations (Scherer et al., 2019). Compared to the industrial era, when machines were primitive and information communication technology was non-existent, technology now contributes more than 70% of overall work efficiency. Lack of technology acceptance by external stakeholders such as customers can be a significant impediment to organizational performance excellence, especially when it comes to customer service performance (Chisholm, 2014).

Mobile applications have received widespread attention among technological advancements and are rapidly becoming popular among all communities. One of the most elaborated outcomes of the use of mobile application technology in particular, is customer service excellence (Biekowska et al., 2019). As a result of the inherent benefits of technology adoption, businesses can now connect with customers and other stakeholders via various technology applications. From telegrams to telephones, email, and now mobile applications, businesses' methods of communicating with customers have evolved (Charland & Leroux, 2011). Mobile applications have been researched to provide the highest level of customer satisfaction while meeting customer needs most efficiently and effectively possible. There is also evidence that the adoption and use of such systems contribute significantly to the organization's overall excellence.

Even though acceptance has been deemed necessary, businesses must consider that user experience, attitude toward mobile application technology, and perceived usefulness of technology have all had significant effects on technology acceptance (Aswani et al., 2018; Scherer et al., 2019). Inability to address any of these issues poses a significant risk to technology adoption or endorsement, with ramifications for the desired outcomes of technology projects (Scherer et al., 2019; Biekowska et al., 2019). One fundamental area of technology acceptance that has piqued the interest of scholars in terms of the key facilitators of technology acceptance is the user experience of technology. Users' experiences are defined by their interactions with technology systems (Castaeda et al., 2007). The extent to which such experiences meet user expectations and complement the technology's usefulness is critical to its success (Gefen & Straub, 1997). As a result, the test for the overall contribution of user experience within the technology acceptance model is not novel. However, more research into user experiences is required to help engineer organisational interventions to drive user acceptance and improve overall organisational performance (Venkatesh & Davis, 2000, Castaeda et al. 2007).

The current study aims to critically examine one of the key challenges facing the Abu Dhabi Municipality (ADM) in the area of mobile technology user experience, which may be critical to the acceptance of the mobile application technology initially introduced to improve customer service excellence, using the case study research method in a mixed research approach. The study's goal is to critically examine the issue of technology acceptance among ADM customers and how it impedes the Municipality's quest for improved performance following the Abu Dhabi Vision 2030. This will help gain the knowledge needed to increase the acceptance of mobile application technology to improve the Municipality's overall customer service excellence.

2. Literature Review

2.1 The Need for Mobile Application Technology to Improve Customer Service Excellence

With the increased availability of smartphones, global entities' use of mobile technology has become a requirement rather than an option to serve their customers properly. For example, Google Play has received over 200 billion downloads from its over 3 million active applications over the last decade. These mobile applications improve mobile device functionality. Games, social networking, banking and finance, productivity, transportation, and various other business ventures are among the applications. Despite its size, the market for mobile applications is still considered to be in its infancy (Moreno-Munoz et al., 2016). Nevertheless, mobile applications are being used by businesses across industries to improve customer engagement and customer service excellence. According to Bowden (2008), Customer engagement refers to the measures implemented by the organization to make the customer feel like they are a part of the organization. They contend that call centers are insufficient and that clients require individualized services to ensure that their needs are prioritized to have satisfying experiences. Mobile applications help reduce customer engagement center costs. Still, they also help improve communication between parties, establish loyalty actions, and have a flexible adaptation strategy to accommodate constant changes in client requests (Moreno-Munoz et al., 2016).

It has been asserted that traditional modes of communication will be phased out in a few years. Letters and technology channels such as emails, like the telegram, will gradually lose relevance and be replaced by mobile applications, just as the telegram did (Moreno-Munoz et al., 2016). According to Hallmark Business Connections (2015), mobile applications such as Twitter, Facebook Messenger, and WhatsApp have proven effective communication methods in client conversation and participation. Many examples can be cited in this case; Virgin Mobile Live, American Express, L-Oreal Garnier Fructis, and others have demonstrated the importance of implementing mobile application technology with associated well-known benefits (Moreno-Munoz et al., 2016).

Moreno-Munoz et al. (2016) conducted a case study on a mobile application in the utility sector that provides an all-user-centered self-service solution, as shown in Figure 1.

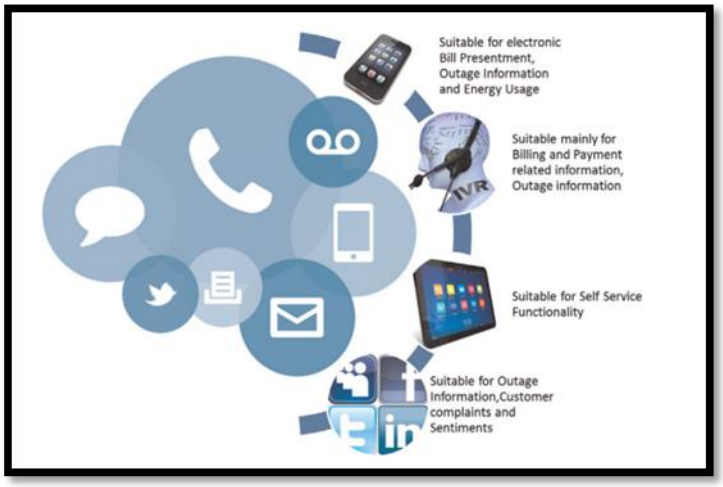

Fig. 1 - Strategy for Self-Service Multichannel through the mobile application
Source: Moreno-Munoz et al., 2016

As shown in Figure 1, the technology provides key channels for payment, service status information, usage status, requests, and other self-service functionality in the case of a utility organization. Aside from these functionalists, a business can look into the attitudes, motivations, and other associations that people have with service consumption. Other social networking sites, such as Facebook, Twitter, and Instagram, can also be accessed. Thanks to this collaboration, customers can share knowledge and easily integrate content flexibly and satisfyingly.

2.2 User Experience in Mobile Technology Acceptance

In a set of observations covering mobile application technology usage, Arhippainen and Tähti (2003) modeled user experience by assessing personal, social, cultural, contextual, and product factors. User beliefs are essential perceptions that influence IT usage (Castaneda et al. 2007). Furthermore, such perceptions change with time and experience. Many studies on new and existing IT users have concluded that user experience is critical and should be used to refine the overall level of technology acceptance in any given context (Venkatesh & Davis, 2000). In the context of online media and mobile application technology usage, user experience is regarded as one of the most important factors explaining an individual's behavior and contributing to the difference in technology acceptance.

In the Technology Acceptance Model (TAM), the moderating effect of user experience strengthens the relationship between perceived ease of use and behaviour, particularly for users with little to no experience (Arhippainen and Tähti 2003). However, the actual definition of user experience has frequently changed; users may apply alternative experiences gained from other technology, or they may simply be more knowledgeable about the technology of interest (Sun & Zhang, 2006). On the other hand, earlier tidies confirm that almost all constructs of the technology acceptance model respond to experience when it is introduced as a moderating factor (Sun & Zhang, 2006).

2.3 Mobile Application Technology and Customer Service Excellence in UAE Government entities

The importance of innovation in achieving excellence in public service delivery has been repeatedly emphasized (Agus et al., 2007; Chanana et al., 2016; Chiravuri& Abdul, 2016; Mohammad et al., 2011; EFQM, 2018). Governments must provide services in an accurate, timely, consistent, on-time, and secure manner, at any time and from any location. Furthermore, delivery options have expanded, focusing on cost reduction has been placed. For these reasons, technology reforms are common in countries worldwide, including the UAE (UAE). Leading with vision, inspiration, and integrity, adding value to customers, succeeding through people's talents, and sustaining outstanding results are all critical for success in the UAE (Thawani 2014).

In the UAE, policy interest in sector performance has grown steadily. Leadership, innovation, and cultural issues have been frequently discussed in the quest to implement these reforms. The government has not remained deafeningly silent on global trends in excellence and TQM principles. The UAE government, for example, adopted the Balanced Scorecard only a few days after it was introduced to the international private sector (Bovaird & Loffler, 2002). The government took additional steps to ensure public implementation of the balanced scorecard as early as the early 2000s.

Finally, the region's leadership has been observed to wield considerable power in the performance of government innovation and reform programs (Rahman & Said, 2015; Rahman et al., 2015).

The government has entrusted institutions and public entities with raising competencies for service delivery channels, providing customers with the opportunity to rate institutions and services received from government entities, and ensuring maximum engagement as part of the excellent programs that have resulted and continue to exist in the UAE. This is viewed as the ultimate function of customer satisfaction, which directs the country's excellence models toward value creation. In addition, many government and semi-government agencies in the region have implemented mobile applications to improve service performance.

2.4 Mobile Application User Experience in UAE Government Entities

Mobile application development in the UAE is part of the government's Smart Government or mGovernment initiatives, initially overseen by the Telecommunications Regulatory Authority (TRA) (Ahmad & Khalid 2017). According to the TRA, the overall mobile application experience is divided into four major stages. First, the customer is concerned with the type of service required and when, where, and how to obtain it at the stage of getting service information. The customer initiates contact with the entity to obtain the desired service through the service application. The third step is to interact with the service and pay for it. Finally, the customer has completed the service interaction and received the expected output.

3. Conceptual Framework

Figure 2 depicts the conceptual framework of the study. It is based on Lai (2017)'s technology acceptance model (TAM) and key items selected from EFQM (2013) and Suárez et al. (2017) on the customer results of the excellence model. With the outcome of customer service excellence, the technology acceptance model is at the heart of the model. The moderating role of user experience and user role is critical for the transition from perceived usefulness to intention to use mobile applications.

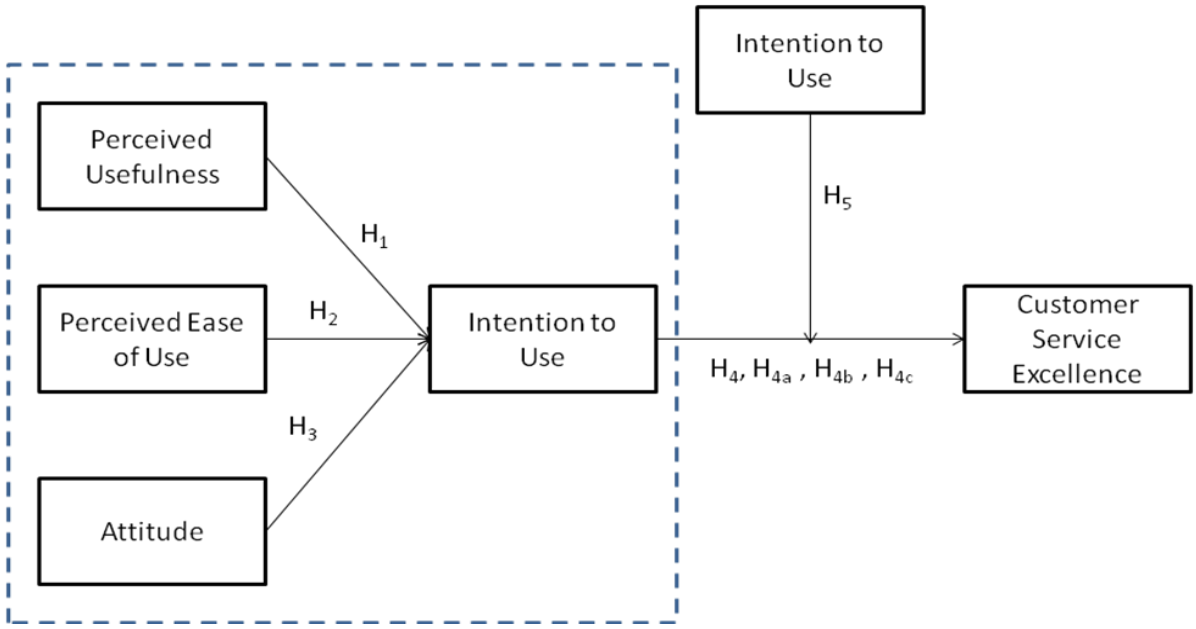

Fig. 2 - Conceptual Framework

The research hypotheses of the study are presented as follows:

H1: Perceived usefulness towards mobile application technology has a significant effect on the intention to use the technology.

H2: Perceived ease of use, towards mobile application technology has a significant effect on the intention to use the technology.

H3: Attitude towards mobile application technology has a significant effect on the intention to use the technology.

H4: Intention to use mobile application technology has a significant effect on customer service excellence of the organization.

H4a: Perceived usefulness mediate the relationship between Intention to use and customer service excellence.

H4b: Ease of use mediates the relationship between Intention to use and customer service excellence.

H4c: Attitude mediates the relationship between Intention to use and customer service excellence.

H5: User experience moderates the relationship between Intention to use and customer service excellence.

4. Research Methodology

For data collection in this study, a self-administered questionnaire was created. The questionnaire included 51 items designed to assess the relationship between independent variables, moderators, and the dependent variable. The measurement items were assessed using a 6-point Likert scale. The Likert scale is a unidimensional scale of measurement that ensures all items of measurement measure the same thing. It is one of the most popular scales of measurement used in survey research (Giudici, 2005; Oppenheim, 2000). The study selects the 6-Point Likert Scale because the responses obtained using this scale are not excessively skewed. In addition, the sensitivity of the responses is greater when compared to other scales such as the five-point Likert scale (Collis & Hussey, 2013; Natarajan, Balasubramanian, & Kasilingam, 2017). In addition, according to studies, they are mostly preferred by academics (Harris, Brookshire, & Chin, 2016).

This study used SPSS version 26 software to administer the collected data, which was then converted to CSV format and analyzed using SmartPLS 3.3.3 software to develop a structural model. SmartPLS is a second-generation multivariate PLS-SEM technique supporter. PLS-SEM was chosen as the primary data analysis technique in this study to test the hypotheses because it is the best technique for developing prediction models with small sample sizes and complex models. In addition, it is a variance-based approach that can aid in maximizing the model's variance explanation (Chin, 1998; Hair et al., 2016; Sang et al., 2010). The PLS-SEM technique is widely used in model development by researchers in various fields, such as Alshurideh et al. (2019), who used the PLS-SEM approach to investigate the factors influencing social network acceptance. Rahman et al. (2022) investigated the structural relationships between the causes and effects of changes in UAE projects. PLS-SEM was used by Almansoori et al. (2021) to model factors affecting PMO in the UAE. Khahro et al. (2021) created a structural model to evaluate green procurement in Pakistan. Memon and Rahman (2014), Rahme et al. (2013), Memon and Rahman (2013), and Memon et al. (2013) used PLS-SEM to investigate the factors that contribute to cost overruns in large and small Malaysian projects, as well as the effect of resources on the project budget. Jasimuddin et al. (2017) developed a model of the factors influencing digital technology acceptance in e-government services in the UAE. Al-Skaf et al. (2021) used the PLS-SEM approach to investigate the acceptance of social media sites.

5. Results and Discussion

5.1 Demographic Information of the Respondents

The targeted respondents were given a total of 537 questionnaire forms. As a result of this, 417 questionnaires were returned. Out of these, 396 were filled out by respondents, representing a 73.74 percent response rate, and were used for further analysis to achieve the study's goal. The characteristics of the respondents who filled out the questionnaire form were gathered and summarized in table 1.

Table 1: Characteristics of the respondents

Demographic Variable	Category	Frequency	% age
Gender	Male	300	75.8%
	Female	96	24.2%
Marital Status	Married	332	81.4%
	Single	64	17.4%
Age group	21-30	144	36.2%
	31-40	127	32.1%
	41-50	93	23.5%
	More than 50 Years	32	8.3%
Education	Diploma	6	1.5%
	Bachelors	261	65.9%
	Masters	125	31.6%
	PhD	4	1%

Table 1 shows that the majority of respondents, 75.8 percent, were males, with the remaining 24.2 percent being females. In contrast, 81.4 percent of respondents were married, while 18.6 percent were unmarried. The characteristics also shed light on the age group of the respondents. The majority of those who responded were under the age of thirty. On the other hand, 36.2 percent of respondents were between 21 and 30 years old, while 32.1 percent were between 31 and 40 years old. Furthermore, 23.5 percent of those polled are between 41 and 50. Finally, the remaining respondents

were over the age of 50. In terms of education, most respondents (64.9%) held a Bachelor's degree; 31.6 percent held a Masters Degree in a different discipline, 4 (1%) had a PhD, and only 1.5 percent held a diploma in other disciplines.

5.2 SEM-PLS Model

Hair et al. (2016) suggested assigning values to the questionnaire's attributes and grouping them. Therefore, the attributes were grouped and set values in this study. To identify the questions, different codes were used for coding. These codes were made up of alphanumeric characters. Table 2 shows the specifics of the coding and attributes.

Table 2: Data Coding

Constructs	Coding	Formation	Factors
Customer Service Excellence	CSE	Dependent Variable	CSE1 - This mobile app company provider is committed to provide services to its clients excellently. CSE2 - The services provided by this mobile app company provider are suitable and fulfilling the clients' needs. CSE3 - This mobile app company provider provides excellent services to its clients. CSE4 - This mobile app company provider solves their clients' complaints as soon as possible. CSE5 - This mobile app company provider has enough resources to provide excellent services. CSE6 - This mobile app company provider regularly improves their work processes in serving their clients. CSE7 - The service process provided in this mobile app company provider is not complicated. CSE8 - This mobile app company provider's staff play their roles accordingly. CSE9 - The staff of this mobile app company provider are capable of providing excellent services. CSE10 - The staff of this mobile app company provider are motivated and friendly to the clients
Intention to use	INU	Mediator	INU1 - I intend to use mobile app in the next few months. INU2 - I predict that I would use mobile app in the next few months. INU3 - I plan to use mobile app in the next few Months
User Experience	UE	Moderator	UE1 - The mobile app is focused on sensory appeal. UE2 - The mobile app tries to excite my senses. UE3 - The mobile app tries to be emotional. UE4 - The mobile app tries to be affective. UE5 - The mobile app tries to intrigue me. UE6 - The mobile app tries to stimulate my curiosity. UE7 - The mobile app causes me to think creatively. UE8 - The mobile app tries to make me think about my lifestyle. UE9 - The mobile app tries to remind me of the activities I can do. UE10 - The mobile app gets me to think about my behaviour. UE11 - The mobile app tries to make me think about bonds. UE12 - I can relate to other people through the mobile app. UE13 - The mobile app tries to get me to think about relationships. UE14 - It is easy and comfortable to use the mobile app. UE15 - The mobile app can transfer files simply and rapidly
Perceived Usefulness	PU	Independent Variable	PU1 - Using mobile app enhances my effectiveness. PU2 - Using mobile app makes it easier to do the tasks. PU3 - Using mobile app improves my performance. PU4 - Overall, I find the mobile app system useful. PU5 - The mobile app makes it easy for you to find the content you need. PU6 - The mobile app provides useful content. PU7 - The mobile app makes it easy for you to choose what you want to learn. PU8 - I believe mobile app can assist interaction to whom you want. PU9 - Overall, I find the mobile app system easy to use.

			PU10 - My interaction with the mobile app system is clear and understandable. PU11 - I find it easy to get the mobile app system to do what I want it to do. PU12 - Mobile app enables me to accomplish tasks more quickly
Perceived Ease of Use	PEOU	Independent Variable	PEOU1 - Learning to use the mobile app was easy for me. PEOU2 - I found it easy to get the mobile app to do what I want it to do to manage my tasks. PEOU3 - Using the mobile app was clear and understandable. PEOU4 - I found the mobile app to be flexible to use. PEOU5 - It was easy for me to become skilful at using the mobile app. PEOU6 - I found the mobile app to be easy to use
Attitude	ATT	Independent Variable	ATT1 - Using mobile app is good. ATT2 - My using mobile app is favourable. ATT3 - It is a positive influence for me to use mobile app. ATT4 - I think it is valuable to use mobile app. ATT5 - I think it is a trend to use mobile app

The model was created in the SmartPLS software based on the attributes and coding to assess the relationships between the constructs. Figure 3 depicts the PLS model.

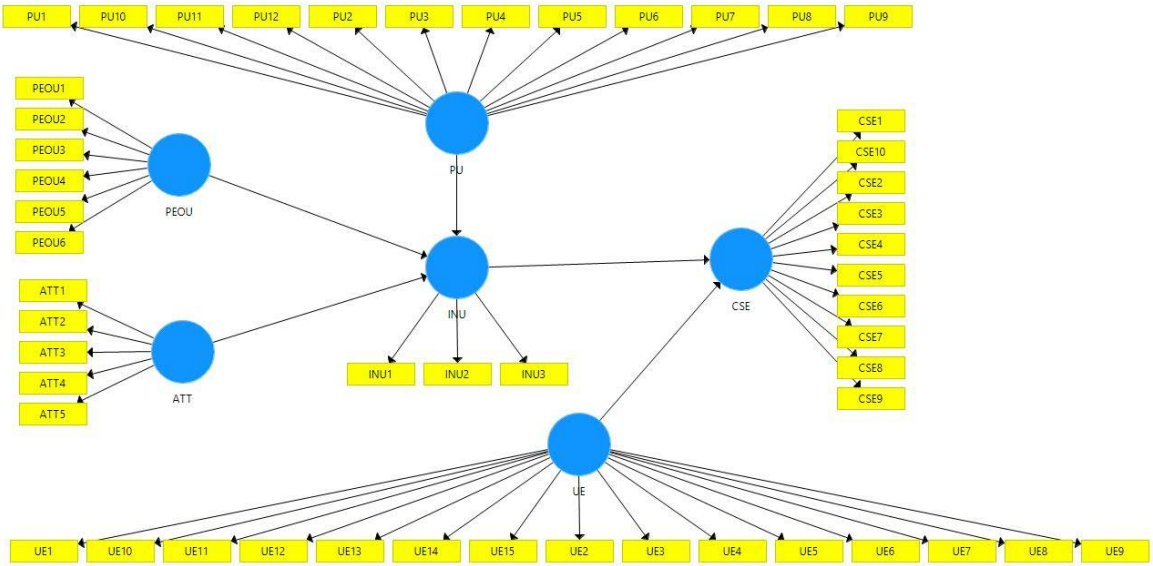

Fig. 3 - PLS Model

5.3 PLS-SEM Model Analysis: Convergent Validity and Reliability of Items

The outer model, also known as the measurement model, and the inner model, also known as the structural model, are both assessed in the PLS-SEM model evaluation (Henseler et al., 2009). The measurement model's content validity, discriminant validity, and convergent validity are all important in determining the internal consistency reliability (Hair et al. 2011). The variables' convergent validity and item reliability are confirmed, and the measurement model is evaluated. The item's loading value should be greater than 0.7, but items with loading values between 0.5 and 0.7 are acceptable if the Cronbach Alpha, Composite Reliability, and AVE values meet minimum thresholds (Hair et al. 2010). Validity is defined as criteria that accurately reflect the study's concept, such as the absence of any non-random or systematic errors (Hair et al., 2010). The construct validity is assessed using PLS-SEM in this study to ensure that the measurements are accurate. Construct validity refers to whether a set of measured items is reflected in the theoretical framework of a latent construct (Hair et al., 2010). Convergent and discriminant validity are two methods of determining construct validity. Convergent validity refers to how one measure positively correlates with other measures of the same structure (Hair et al., 2016). Convergent validity is determined by the indicator's outer loading and the average variance extracted (AVE). The AVE should be 0.50 or higher (Hair et al., 2016). Discriminant validity refers to how a construct is truly distinct from other constructs by being theoretically demonstrated to be so (Hair et al., 2016). To assess discriminant validity, the Fornell-Larcker criterion approach is implied.

The square root of the AVE values is compared to the correlation of the latent variable. Discriminant validity is achieved when the square root of each construct's AVE is greater than the correlation of other constructs (Hair et al.,

2016). On the other hand, the Fornell-Lacker criterion has been widely used to determine discriminant validity in general research. As a result, the HeterotraitMonotrait (HTMT) ratio of correlations, a new technique for determining discriminant validity, has emerged. The scholars concluded that the HTMT ratio is a superior criterion to other methods, such as the Fornell-Lacker criterion, according to Henseler, Ringle, and Sarstedt (2016). Cut-off values of 0.85 (Kline, 2011) and 0.90 (Gold et al., 2001) for the HTMT criterion are also suggested for establishing discriminant validity. The discriminant validity of the model was evaluated in the current study using a cut-off value of 0.90, such as the HTMT.90 criterion.

Reliability refers to the instrument's consistency and stability when evaluating a concept, and it aids in assessing a better measurement (Blumberg et al., 2014, Sekran and Bougie, 2016). Cronbach's alpha is the most widely used internal consistency reliability measure. The average of the intercorrelations between the items that measure the concept is calculated using the Cronbach's alpha. On the other hand, composite reliability is a metric that can withstand a variety of indicator variable outer loadings. The composite reliability scale runs from 0 to 1, with the higher the value, the more reliable the system is (Hair et al., 2016). Therefore, Cronbach's alpha and composite reliability values should be 0.7 or higher for any construct. Table 3 shows the results of the developed model's convergent validity and item reliability tests.

Table 3: Convergent validity and Item Reliability Parameters

Construct	Indicator ID	Loading	Alpha	rho_A	CR	AVE
Attitude (ATT)	ATT1	0.873	0.915	0.916	0.936	0.745
	ATT2	0.864				
	ATT3	0.88				
	ATT4	0.861				
	ATT5	0.839				
Perceived Ease Of Use (PEOU)	PEOU1	0.89	0.933	0.938	0.947	0.75
	PEOU2	0.886				
	PEOU3	0.881				
	PEOU4	0.889				
	PEOU5	0.801				
	PEOU6	0.845				
Perceived Usefulness (PU)	PU1	0.777	0.917	0.933	0.928	0.519
	PU2	0.751				
	PU3	0.791				
	PU4	0.713				
	PU5	0.708				
	PU6	0.736				
	PU7	0.719				
	PU8	0.718				
	PU9	0.647				
	PU10	0.737				
	PU11	0.711				
	PU12	0.621				
Intention to Use (INU)	INU1	0.931	0.914	0.917	0.946	0.853
	INU2	0.913				
	INU3	0.928				
User Experience (UE)	UE1	0.745	0.949	0.95	0.954	0.583
	UE2	0.765				
	UE3	0.768				
	UE4	0.74				

	UE5	0.743				
	UE6	0.76				
	UE7	0.76				
	UE8	0.784				
	UE9	0.794				
	UE10	0.77				
	UE11	0.779				
	UE12	0.767				
	UE13	0.781				
	UE14	0.773				
	UE15	0.718				
Customer Service Excellence (CSE)	CSE1	0.751	0.915	0.916	0.929	0.567
	CSE2	0.738				
	CSE3	0.753				
	CSE4	0.715				
	CSE5	0.793				
	CSE6	0.76				
	CSE7	0.79				
	CSE8	0.752				
	CSE9	0.739				
	CSE10	0.739				

Table 3 shows that all items have loading values greater than 0.7, except for PU12=0.621 and PU9=0.647. However, the Alpha, Rho A, and Composite Reliability values for all constructs are greater than 0.7, while the AVE value is greater than 0.5. This means that all of the constructs have achieved a high level of convergent validity. As a result, items PU12 and PU9 do not need to be dropped. The developed model is deemed suitable for further investigation. Figure 4 depicts a screenshot of the model obtained from the SmartPLS software.

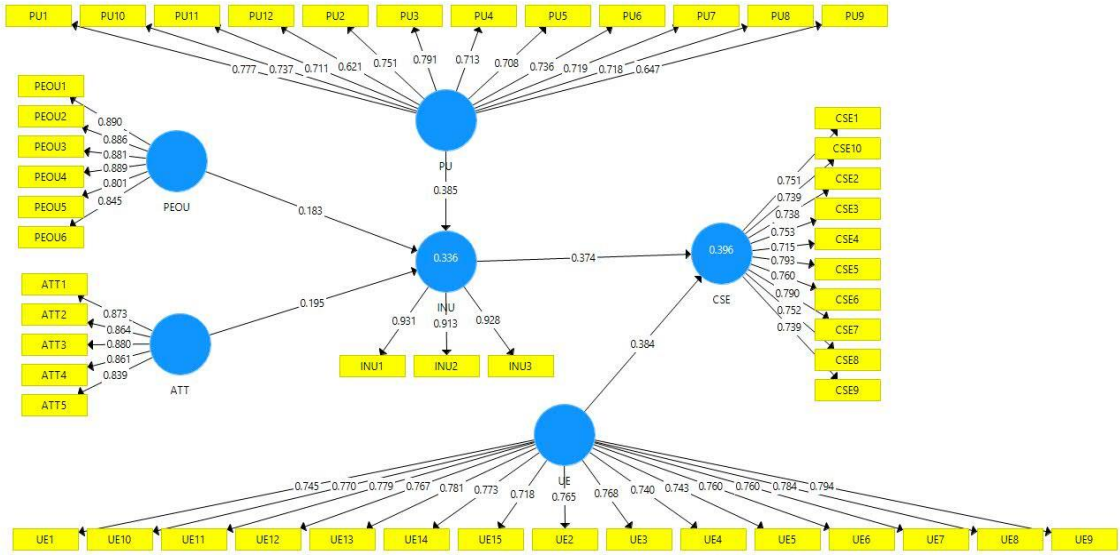

Fig. 4 - Final Model [measurement & structural]

5.4 Model's Analysis Results

The degree of variation among latent and remaining variables is called discriminant validity (Farrell and Rudd 2009). The AVE values were used in this study to predict discriminant validity, as recommended by Fornell and Larker (1981). The square root of AVE and the correlation between latent variables were calculated to determine discriminant

validity. Fornell and Larcker (1981) proposed that AVE values should not be less than 0.50. Furthermore, the square root values of AVE should be greater than the values of other variables (Henseler et al., 2009). Table 4 shows the discriminant validity results obtained from SmartPLS software for the developed model.

Table 4: Discriminant Validity - Fornell-Larcker Criteria

	ATT	CSE	INU	PEOU	PU	UE
ATT	**0.863**					
CSE	0.468	**0.753**				
INU	0.387	0.518	**0.924**			
PEOU	0.324	0.441	0.359	**0.866**		
PU	0.345	0.407	0.506	0.293	**0.721**	
UE	0.679	0.525	0.375	0.405	0.393	**0.763**

Table 4 shows that the square root of AVE is greater than the values of correlation among latent variables, confirming the sufficiency of discriminant validity. Furthermore, cross-loading of the indicators was evaluated, which is essentially a comparison of indicators loaded among each construct. According to Hair et al. (2013), discriminant validity is confirmed if the values of cross loading are greater than the values of other variables. The cross-loading results are shown in Table 5.

Table 5: Results of Cross Loading

	ATT	CSE	INU	PEOU	PU	UE
ATT1	**0.873**	0.364	0.357	0.268	0.31	0.594
ATT2	**0.864**	0.423	0.316	0.297	0.295	0.589
ATT3	**0.88**	0.439	0.322	0.293	0.274	0.613
ATT4	**0.861**	0.4	0.33	0.298	0.311	0.594
ATT5	**0.839**	0.396	0.342	0.245	0.298	0.541
CSE1	0.435	**0.751**	0.366	0.448	0.321	0.464
CSE10	0.331	**0.739**	0.345	0.357	0.297	0.403
CSE2	0.341	**0.738**	0.396	0.327	0.339	0.367
CSE3	0.381	**0.753**	0.368	0.424	0.325	0.397
CSE4	0.314	**0.715**	0.352	0.378	0.34	0.355
CSE5	0.375	**0.793**	0.42	0.28	0.316	0.428
CSE6	0.322	**0.76**	0.363	0.248	0.262	0.333
CSE7	0.377	**0.79**	0.403	0.297	0.27	0.404
CSE8	0.323	**0.752**	0.452	0.266	0.297	0.386
CSE9	0.313	**0.739**	0.426	0.298	0.299	0.398
INU1	0.405	0.5	**0.931**	0.341	0.479	0.386
INU2	0.324	0.461	**0.913**	0.29	0.443	0.328
INU3	0.341	0.474	**0.928**	0.361	0.479	0.323
PEOU1	0.275	0.376	0.308	**0.89**	0.257	0.375
PEOU2	0.284	0.387	0.326	**0.886**	0.262	0.371
PEOU3	0.279	0.396	0.336	**0.881**	0.233	0.353
PEOU4	0.297	0.4	0.331	**0.889**	0.267	0.328
PEOU5	0.291	0.336	0.254	**0.801**	0.21	0.302
PEOU6	0.26	0.389	0.298	**0.845**	0.29	0.372
PU1	0.209	0.293	0.352	0.182	**0.777**	0.261
PU10	0.307	0.299	0.356	0.236	**0.737**	0.299
PU11	0.313	0.29	0.357	0.231	**0.711**	0.329
PU12	0.134	0.225	0.23	0.123	**0.621**	0.149

PU2	0.218	0.307	0.331	0.159	**0.751**	0.25
PU3	0.24	0.296	0.338	0.193	**0.791**	0.258
PU4	0.17	0.233	0.258	0.16	**0.713**	0.236
PU5	0.179	0.296	0.299	0.154	**0.708**	0.247
PU6	0.176	0.228	0.276	0.14	**0.736**	0.209
PU7	0.337	0.388	0.586	0.283	**0.719**	0.369
PU8	0.332	0.326	0.386	0.303	**0.718**	0.39
PU9	0.218	0.225	0.356	0.245	**0.647**	0.253
UE1	0.72	0.309	0.271	0.258	0.3	**0.745**
UE10	0.437	0.417	0.29	0.363	0.343	**0.77**
UE11	0.43	0.412	0.332	0.319	0.353	**0.779**
UE12	0.436	0.43	0.29	0.285	0.3	**0.767**
UE13	0.441	0.423	0.322	0.387	0.308	**0.781**
UE14	0.42	0.408	0.259	0.335	0.251	**0.773**
UE15	0.385	0.4	0.255	0.312	0.249	**0.718**
UE2	0.705	0.371	0.258	0.286	0.297	**0.765**
UE3	0.709	0.404	0.271	0.282	0.295	**0.768**
UE4	0.688	0.39	0.263	0.268	0.338	**0.74**
UE5	0.716	0.436	0.321	0.283	0.354	**0.743**
UE6	0.443	0.426	0.297	0.26	0.299	**0.76**
UE7	0.398	0.375	0.268	0.301	0.25	**0.76**
UE8	0.424	0.401	0.285	0.331	0.25	**0.784**
UE9	0.476	0.369	0.296	0.355	0.298	**0.794**

Table 5 confirms the discriminant because the variables have a high loading in their variable compared to the other variables. The heterotrait-monotrait ratio correlational ratio (HTMT) test, which represents factor correlation estimation (Pittinio et al., 2018), was also evaluated. Gold et al. (2001) proposed that HTMT values must be less than 0.90 to meet discriminant validity. Table 6 displays the HTMT values for the developed model.

Table 6: Discriminant Validity by using HTMT

	ATT	**CSE**	**INU**	**PEOU**	**PU**	**UE**
ATT	-					
CSE	0.511	-				
INU	0.421	0.564	-			
PEOU	0.352	0.477	0.385	-		
PU	0.357	0.429	0.519	0.300	-	
UE	0.734	0.558	0.4	0.429	0.401	-

Table 6 shows that HTMT value of all the constructs is below 0.9, and hence the discriminant validity of the model is confirmed.

5.5 Model's Hypothesis Testing

As the measurement model has been successfully validated, the next step is to evaluate the structural model. According to Henseler et al. (2015), assessing path coefficient significance is an essential criterion for validating the structural path. With 389 cases, a standard bootstrapping procedure was used to assess the significance of path coefficients. First, 5000 subsamples were bootstrapped (Hair et al., 2016). Hair et al. (2013) pointed out that the hypothesis must have the same sign and significant values to be acceptable. For this, P-values and t-values for each relationship were calculated using bootstrapping and the path coefficient. The coefficient is considered significant if the t-value is greater than the critical value. For example, the acceptable value for the t-test for a two-tailed test is 1.96,

whereas, for a one-tailed test, the value must be 1.64 at a significance level of 0.05. (Hair et al., 2016). The results of the direct hypothesis are shown in Table 7.

Table 7: Direct Output

Hypothesis	Relationship	Beta	SE	t-value [t≥1.96]	Decision
H_1	PU -> INU	0.386	0.060	6.474	Supported
H_2	PEOU->INU	0.185	0.054	3.410	Supported
H_3	ATT -> INU	0.192	0.057	3.353	Supported
H_4	INU->CSE	0.422	0.058	7.277	Supported

Table 7 shows that perceived usefulness significantly affects intention to use, with t=6.474 and Beta=0.386 supporting H_1. Furthermore, with Beta= 0.185 and t=3.410, the relationship between perceived ease of use and intention to use supports H_2. Moreover, the results show that customer attitude significantly affects intention to use (Beta=0.192, t=3.353). As a result, H_3 is accepted. Likewise, H_4 of the current study is also accepted due to the direct relationship between intention to use and customer service excellence with Beta = 0.422 and t = 7.277. Aside from that, the significance of mediation relationships was evaluated. T-values were used to assess the mediating relationship, and standard errors were calculated for direct and indirect connections, as shown in Table 8..

Table 8: Mediating Output

Hypothesis	Relationship	Beta	SE	t-value [t≥1.96]	Decision
H_{4a}	PU->INU>CSE	0.163	0.033	4.997	Supported
H_{4b}	PEOU>INU>CSE	0.078	0.028	2.820	Supported
H_{4c}	ATT->INU>CSE	0.080	0.027	2.997	Supported

Table 8 shows that with Beta= 0.163, t=4.997, intention to use mediates significantly between perceived usefulness and customer satisfaction experience. As a result, 4a is supported. Furthermore, hypothesis 4b is supported, demonstrating that intention to use significantly mediates between perceived ease of use and customer service experience (Beta=0.078 and t=2.820). It is also clear that customer attitude and customer service excellence are mediated considerably by intention to use. As a result, hypothesis 4c's other mediating result is accepted. Because the variable is continuous, the product indicator approach was used in this study for moderating analysis (Rigdon, Schumacker, & Wothke, 1998). Researchers state that the outcome obtained by product term is superior or equal to the approach of group comparison, so this method is recommended (Henseler & Fassott, 2010). Moderators were also used in the developed model. As a result, the significance of the moderators' relationship was also evaluated, and the results are shown in table 9.

Table 9: Moderation Results

Hypothesis	Relationship	Beta	SE	t-value [t≥1.96]	Decision
H_5	UE*INU>CSE	0.107	0.043	2.506	Supported

According to table 9, the researcher uses the product indicator approach to investigate the moderating impact of user excellence on intention to use and customer service excellence. The above table show that the interaction term between INU and CSE has a significant impact (=0.107, t = 2.506). As a result, H4b is supported in this study.

5.6 Model's predicting power

It is critical to evaluate the power of a structural model, and researchers have used R^2, also known as the coefficient of determination of endogenous constructs, for this purpose (Henseler et al., 2009). The same author also stated that assessing the R^2 is critical for determining the significance of the path coefficients. For the value of R square, one or more variables can be used (Hair et al., 2010). For example, if the value of R square is 0.02, it is considered week, 0.13 is deemed to be moderate, and 0.26 is considered substantial (Cohen, 1988). R square has two values in the current study. As shown in table 10, one value is for intent to use, while the other is for customer service excellence.

Table 10: R^2 of Endogenous Latent Constructs

Construct	R Square	Result
Customer service excellence	0.396	Substantial
Intention to use	0.336	Substantial

Table 10 reveals that R^2 value of customer service excellence is 0.396, which is significant. In contrast, the R^2 value of intention to use is 0.336, which is also notable as per the defined criteria of Cohen (1988). The structural model obtained from the SmartPLS software is presented in Figure 3.

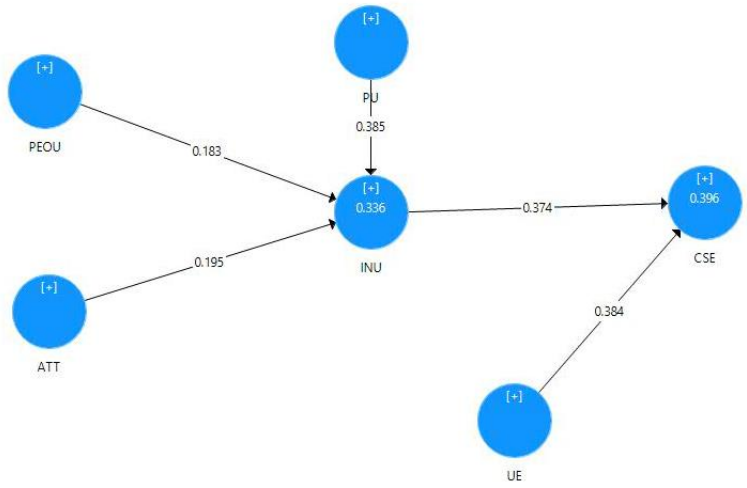

Fig. 5 - Structural Model

Observing path co-efficient values in Figure 5, it can be seen that Perceived Usefulness is reported as the most significant path toward the intention to use by the respondent. It has experienced the highest path co-efficient value of 0.385. This means that adopting any technology, the users consider the usefulness of the technology.

6. Conclusion

The current study has examined the complex relationship between various antecedents of CSE through the mediation of intention to use. Moreover, it focused on the most significant but least considered determinants of CSE like PU, PEOU, and customer attitude instead of their impact on CSE through the mediating role of intention to use the Telecom sector of in the Abu Dhabi. This study goal was attained by collecting the data with a questionnaire survey and analyzing it using the Structural equation modelling of partial least square (SEM-PLS) technique. A total of 396 questionnaire forms were collected in this study. Analysis of the data with SmartPLS showed that the developed model is satisfactory. The developed model has provided a comprehensive road map for increasing the CSE in the Abu Dhabi Telecom sector.

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