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The Future of Self-Service Technologies: Understanding User Intentions in Guyana

Dave Sarran[1]

[1]Department of Computer Science, Faculty of Natural Sciences, University of Guyana, Turkeyen, Georgetown, Guyana

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ABSTRACT

Self-service technologies (SSTs) are playing a crucial role in the advancement of both developed and developing economies. These technologies, including automated teller machines (ATMs) and self-service kiosks, offer organizations more accessibility and efficiency. However, the successful implementation and deployment of SSTs, particularly in developing countries, is a complex and demanding task. Understanding the determinants of their adoption is therefore crucial. This study examines the determinants of citizens' willingness to utilize self-service technology, focusing specifically on self-service kiosks in Guyana. This study develops a conceptual model extending TAM with three additional predictor variables: Resistance to Change, Technology Anxiety, and User Interface. The data were collected through an online survey from 350 Guyanese citizens, and Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed for testing and validating the model. The findings indicate that Resistance to Change, Technology Anxiety, and User Interface have significant impacts on Perceived Ease of Use. Additionally, Technology Anxiety was identified as a predictor of Resistance to Change. Perceived Ease of Use was a significant predictor of Perceived Usefulness, and Perceived Usefulness and Perceived Ease of Use were significant predictors of Attitude Toward Use. Finally, Attitude Toward Use was a predictor of intention to use self-service kiosks. By providing insights into the determinants of citizens' uptake of self-service technology in Guyana, the current study provides valuable suggestions for practitioners on how to design and implement successful public self-service systems.

Corresponding Author:

Dave Sarran,
Department of Computer Science, Faculty of Natural Sciences, University of Guyana, Turkeyen, Georgetown, Guyana
Email: dave.sarran@uog.edu.gy

1. INTRODUCTION

Self-service describes circumstances where a patron of an enterprise performs a service entirely on their own, without assistance from the staff of an organisational entity [1]. Self-service technologies (SSTs) refer to technological platforms which allow customers to interact with and consume the services of an enterprise without the assistance of service staff of same. Several industries including but not limited to banking, hospitality, travel, finance, and retailing have begun to incorporate self-service technologies into their settings. With the tremendous growth of SSTs today, a plethora of self-services are being encountered by customers. These include automatic hotel check-in and check-out, self-check-in at airports, banking via the Internet and Automated Teller Machines (ATMs), bill payment at kiosks and self-checkout kiosks in supermarkets and stores [2][3]. Today, with the arrival of these self-service technologies, many face-to-face service transactions are being replaced with more accuracy, convenience and efficiency gains for the consumers of the services.

Today, self-service technologies can help organisations enhance their competitive strength [1][4][5][6] by minimizing costs and providing more efficient customized services [7][8][9]. Like companies, consumers can also obtain benefits from SSTs, including the handling of service demand fluctuation, reduction in time waiting to conduct transactions and more consistent and efficient service without human employee contact [8][9]. While SSTs can provide benefits to companies and

consumers alike, there is a great challenge of overcoming the resistance to SSTs adoption in handling transactions between service providers and consumers [4][10]. This may be due to the shifting existing habits and traditional service patterns of consumers [11][12].

The problem of long queues for customers to conduct transactions is a common one. Research shows that many customers dislike waiting in service lines [13]. Customers tend to get dissatisfied with a service when they have to wait excessively long periods of time in queues. When customers are compelled to wait for services, they develop negative attitudes towards both the service and organization. This is because most consumers consider time to be a valuable resource.[14]. Long queues often mean that the demand for service has surpassed its supply.

As the population increases worldwide, people are finding it difficult to transact their businesses in a timely manner. For a long time, several types of organisations have been associated with long queues and time-consuming processes. Numerous government agencies across the world have already incorporated SSTs into their business processes in an effort to handle customer demand for their services. However, before SSTs can be successfully implemented in organisations, an understanding of customers' adoption behaviour and their intention to use SSTs is required.

This research aimed to investigate factors that are associated with Guyanese citizens' intention to use self-service technologies. Given the plethora of self-service technologies that are in existence, the research will be focused specifically on self-service kiosks (SSKs) within Guyana. This research draws inspiration from previously implemented self-service kiosks in developed countries, extending a conceptual model based on the well-known Technology Acceptance Model [15].

2. RESEARCH METHOD

2.1 Research Model

The Technology Acceptance Model has been utilized in many contexts and fields, investigating users' intention to use information systems, including but not limited to e-learning [16], healthcare [17], biometrics [18] and online games [19]. It is worth mentioning that the majority of the developments, modifications, and expansions to the TAM were done in major well-known developed/developing countries, particularly in Asia, Europe, and North America [22][23]. TAM suggests that perceived usefulness (PU) and perceived ease of use (PEOU) jointly predict the attitude toward using (ATU) new technology while intention to use (ITU) determines the actual use of new technology [24]. While TAM suggests relationships among its core constructs, the literature shows that there are many precursors to TAM's constructs of perceived ease of use and perceived usefulness [20][21].

Figure 1 represents the research model of this study. It is a reduction of the original TAM since it omits the construct named actual usage. In this study and similar to other studies in the past [25][26], user adoption was explored by intention to use the technology rather than actual usage of same. The rationale for this decision was based on the circumstance that self-service kiosks for motor vehicle licensing and registration services do not presently exist in Guyana. Furthermore, this study extends TAM to include external variables that may impact perceived usefulness (PU) and perceived ease of use (PEOU). The study also examines the impact of external variables on PEOU and PU and suggests three additional predictor variables that may impact PEOU and PU namely User Interface (UI), Technology Anxiety (TA), and Resistance to Change (RTC).

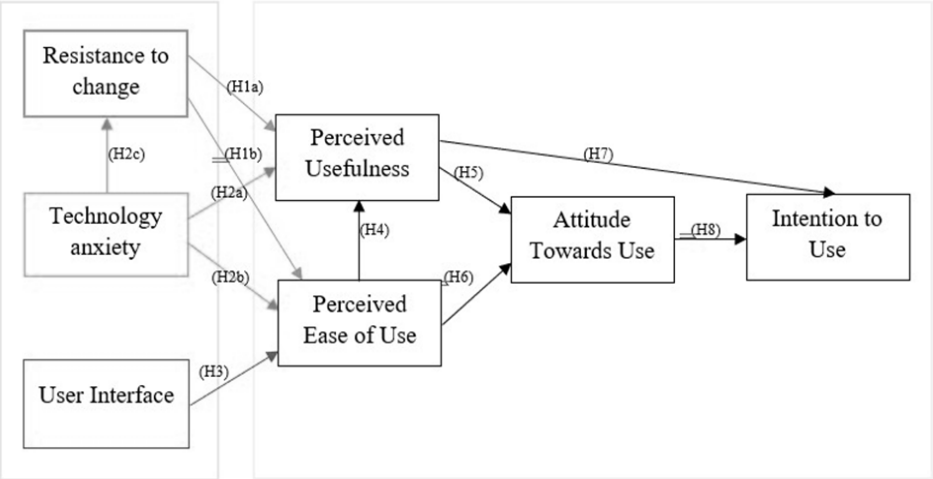

Figure 1. Conceptual Model of the study

2.1.1 Resistance to Change (RTC)

In the context of technology adoption, resistance to change refers to the passive or active reluctance of individuals to adopt, accept and utilize new technologies [27]. There is extensive literature examining the association between technology anxiety and resistance to change [28][29], The literature demonstrates that the uncertainty of technology can act as a trigger for technology anxiety which can in turn cause resistance among individuals to adopt same [30]. Users' sensitivity and high levels of resistance to using new technology may affect their evaluation regarding the usefulness of the technology [28]. In this regard, the following hypotheses are proposed:

H1a: *RTC is negatively associated with PU as it relates to customers in Guyana using self-service kiosks.*
H1b: *RTC is negatively associated with PEOU as it relates to customers in Guyana using self-service kiosks.*

2.1.2 Technology Anxiety (TA)

With the evolution of new technologies, it is essential to explore the aptitude and willingness of customers to use these new technologies. Technology anxiety is the apprehension people feel when considering the use of technological tools [12]. This anxiety manifests in various forms including persons' avoidance of and development of fears during the usage of technologies [31]. The research demonstrates that computer anxiety is an important factor to consider in technology adoption and how it affects PU and PEOU needs to be understood [32]. In this regard, the following hypotheses are proposed:

H2a: *TA is negatively associated with PU as it relates to customers in Guyana using self-service kiosks.*
H2b: *TA is negatively associated with PEOU as it relates to customers in Guyana using self-service kiosks.*
H2c: *TA is positively associated with RTC as it relates to customers in Guyana using self-service kiosks*

2.1.3 User Interface (UI)

The ability of a technological platform to attract people and encourage interaction is tied to its user interface [33]. Through the user interface, people develop user experiences which shape their interest in continuing to use the platform [34]. The literature shows that the user interface of a system allows a person to exercise his or her influence over a system [35]. It is established that the feature set available on the user interface is linked to the attractiveness of the platform [35]. Given this, the following hypothesis is proposed:

H3: *UI has a significant direct effect on the PEOU as it relates to customers in Guyana using self-service kiosks.*

2.1.4 Perceived Usefulness (PU) and Perceived Ease of Use (PEoU)

In the context of technology adoption, perceived usefulness refers to the belief of an individual that a technology will help him or her perform a job better. The literature supports that there is an association between perceived usefulness and usage behaviour towards technology [24]. More specifically, the higher the level of perceived usefulness of a system by an individual, the better the performance of the individual during use of the system. However, while an individual might perceive a system to be useful, he or she may still perceive a system to be challenging to use. The extent to which an individual feels that a system would be effortless to use is known as perceived ease of use [25]. The literature shows that perceived ease of use can be considered an important determinant of technology usage behaviour [24][36]. In this regard, the following hypotheses are proposed:

H4: *PEOU will positively influence PU as it relates to customers in Guyana using self-service kiosks.*
H5: *PU will positively influence customers' attitudes towards using self-service kiosks.*
H6: *PEOU will positively influence customers' attitudes towards using self-service kiosks.*
H7: *PU will positively influence customers' intention to use self-service kiosks.*

2.1.5 Attitude Towards Use (ATU)

In the context of technology adoption, attitude towards use refers to an individual's predisposition towards adopting and using a technological system [37]. It is theorized that a strong relationship exists between user beliefs and attitudes [37]. As a person forms beliefs about a system, he or she will acquire an attitude toward that system. The literature demonstrates that if the goal is to model the determinants of the usage behaviour of a system, then one should assess an individual's attitude toward the use of the system and not his or her attitude toward the system itself [39]. In light of this, the following hypothesis is proposed:

H8: *Attitude towards using SSTs will positively influence customers' intention to use self-service kiosks.*

2.1.6 Behavioural Intention to Use (ITU)

The literature demonstrates that behavioural intention of an individual to use a system is influenced by their attitude toward the use of the system [25]. If the attitude towards the use of a system is positive, then the users will develop an intention

to act consistently. The literature further demonstrates a positive relationship between an individual's perceived usefulness of a system to their intention to use the system [25].

2.2 Data Collection

This study utilized the Structural Equation Modeling (SEM) technique to evaluate the study's hypotheses. A quantitative approach for data collection was adopted. An online survey instrument was designed and disseminated via Google Forms to Guyanese citizens over the age of 20 or older residing in various districts of Guyana. The convenience sampling method was used to collect data from the respondents in the study. This technique allowed for the recruitment of participants from the target population who were easy to access.

Respondents were provided with a link to the questionnaire that could only be used once. A total of 350 valid responses were obtained over a three-month period. However, since self-service kiosks have not been implemented in Guyana, the participants were provided with links to videos of the capabilities of *self-service kiosks* before they completed the questionnaire. To guarantee the content validity of the survey instrument, measurement scales were derived from the original TAM [24] and other literature [38[39]. Some modifications to the measurement items were done to fit the context of users' intention to use self-service technology (SST) in Guyana. The questions were designed using a 5-point Likert scale with a score of 1 indicating "strongly disagree" and 5 indicating "strongly agree".

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2.3 Data Analysis

This study utilized Partial Least Squares Structural Equation Modelling (PLS-SEM) to evaluate the relationships between variables in the conceptual model. The variables were Intention to Use (ITU), Perceived Ease of Use (PEOU), Resistance to change (RTC), Technology Anxiety (TA), User Interface (UI), Perceived Usefulness (PU) and Attitude toward Use (ATU). A two-step method using SmartPLS software was used to analyse the data collected. The first step involved testing the reliability and validity of the measurement model, and the second step involved validating the structural model by evaluating the hypotheses.

3. RESULTS & DISCUSSION

3.1. Demograpihcs

Table 1 presents the demographic attributes of the participants in the study. A total of 298 participants took part in the study. Males represented 53.3% of the sample and females, 46.7%. The majority of participants (67.4%) were between 30 to 39 years while 26.1% were between 20 to 29 years. In terms of experience with technology, the majority of participants (58.7%) claimed to be intermediate users of technology.

Table 1. Participants' Demographic Information

Items	Frequency	Percentage
Gender		
Male	159	53.3
Female	139	46.7
Age		
20 – 29	78	26.1
30 – 39	201	67.4
40 – 49	13	4.3
50 – 59	0	0
60 & above	6	2.2
Technology Experience		
None	3	1.1
Beginner	22	7.6
Intermediate	176	58.7
Advance	97	32.6

3.2. Measurement Model Analysis

Validity refers to the extent to which a measurement instrument assesses and measures what it is intended to measure so that meaningful generalizations from data can be made [24]. This study utilizes factor analysis to assess the convergent

validity of twenty-nine (29) items of the survey instrument. Convergent validity assesses and determines whether the measurement items of a construct are converging together toward a single variable [44]. The literature suggests that 0.5 is valid for each item's factor loadings [41][45].

3.2.1 Factor Loadings

Table 2 displays the factors loadings of the measurement items for the seven factors of the research model. The results show that all factor loadings in this study were above 0.5, suggesting satisfactory convergent validity. In addition to examining convergent validity, the discriminant validity was also checked by the use of the Heterotrait-Monotrait ratio (HTMT). The HTMT criterion measures the average correlations of the indicators across constructs [46]. The acceptable level of discriminant validity is less than the value of 0.90 [46]. The HTMT values for this study are presented in Table 5 and indicate that discriminant validity for constructs was established.

Table 2. Factor Loading Scores

Construct	Measurement Items	Factor Loadings
Resistance to change	RTC1	0.718
	RTC2	0.709
	RTC3	0.629
	RTC4	0.566
	RTC5	0.547
Technology Anxiety	TA1	0.676
	TA2	0.917
	TA3	0.508
	TA4	0.547
User Interface	UI1	0.811
	UI2	0.817
	UI3	0.807
	UI4	0.797
Perceived Usefulness	PU1	0.935
	PU2	0.741
	PU3	0.775
	PU4	0.628
	PU5	0.872
	PU6	0.853
Perceived Ease of Use	PEOU1	0.77
	PEOU2	1.047
	PEOU3	0.88
	PEOU4	0.971
	PEOU5	0.718
Attitude towards use	ATU1	0.799
	ATU2	0.944
	ATU3	0.882
Behavioural Intention to Use Technology	ITU1	0.994
	ITU2	0.976

3.2.2 Reliability Analysis

The reliability of the variables in the model was evaluated by Cronbach Alpha values of same. Cronbach Alpha assesses the internal consistency of test items and measures how closely they are related as a group [40]. The literature suggests that Cronbach's Alpha value of 0.7 is acceptable [41]. In this study, the Cronbach Alpha values for all factors of the model were above 0.7, ranging from 0.773 to 0.953 and demonstrating satisfactory internal consistency (See Table 3). Further, all of the constructs obtained Composite Reliability (CR) scores that were higher than the recommended value of 0.700 [45]. The CR scores of constructs in this study ranged from 0.772 to 0.946.

Table 3. Construct Reliability Analysis

Construct	Cronbach's Alpha	Composite Reliability (CR)
Resistance to change	0.773	0.772
Technology Anxiety	0.793	0.766
User Interface	0.883	0.883
Perceived Ease of Use	0.918	0.917
Perceived Usefulness	0.905	0.909
Attitude towards use	0.985	0.985
Behavioural Intention to Use Technology	0.953	0.946

3.2.3 Convergent Validity Analysis

The convergent validity was further assessed using the Average Variance Extracted (AVE) of each variable of the model. In this regard, convergent validity was deemed acceptable since the AVE values of all but two constructs of the model were over 0.50 [45] (see Table 4). The literature suggests that if the AVE of a construct is less than 0.5, but the composite reliability of the same construct is greater than 0.6, then the convergent validity of the construct can be deemed acceptable [42]. Thus, in summary, all constructs of the model demonstrated good reliability and validity], and as such, were included in further analyses.

Table 4. Construct Convergent Validity Analysis

Constructs	Average Variance Extracted (AVE)
Resistance to change	0.406
Technology Anxiety	0.464
User Interface	0.653
Perceived Usefulness	0.651
Perceived Ease of Use	0.771
Attitude towards use	0.971
Behavioural Intention to Use Technology	0.782

3.2.4 Discriminant Validity Analysis

In addition to examining convergent validity, the discriminant validity was also checked by the use of the Heterotrait-Monotrait ratio (HTMT). The HTMT criterion measures the average correlations of the indicators across constructs [46]. The acceptable level of discriminant validity is less than the value of 0.90 [46]. The HTMT values for this study are presented in Table 5 and indicate that discriminant validity for constructs was established.

Table 5. Heterotrait-Monotrait Scores

Construct	RTC	TA	UI	PU	PEOU	ATU	ITU
RTC	0.637						
TA	0.719	0.701					
UI	0.519	0.551	0.681				
PU	0.478	0.498	0.528	0.881			
PEOU	0.188	0.34	0.585	0.865	0.696		
ATU	0.349	0.363	0.433	0.68	0.826	0.746	
ITU	0.332	0.349	0.333	0.48	0.655	0.556	0.86

3.3 Structural Model Analysis

3.3.1 Model Fit - Predictive Relevance & Capability (R^2 & Q^2)

The goodness of the model is determined by the strength of each structural path. The strength of each path is determined by the R^2 value of the dependent variable of the model [47]. The literature suggests that this value should be greater than or equal to 0.1 [48]. Table V shows that all R^2 values in this study were over the value of 0.1, hence establishing the predictive capability of the model.

Furthermore, Q^2 values were calculated to determine the predictive relevance of the endogenous variables [49]. A Q^2 greater than 0 implies that the model has predictive relevance, whereas a Q^2 less than 0 suggests the lack of same [50]. Therefore, based on the results in Table V, it can be established that there is significance in the prediction of the constructs in this study given the positive Q^2 values.

Table 6. Explanatory Power and Predictive Relevance

Construct	R-Squared (> 0.1)	Q-Squared (>0)
Resistance to change	0.518	0.151
Perceived Usefulness	0.663	0.362
Perceived Ease of Use	0.895	0.569
Attitude towards use	0.727	0.522
Behavioural Intention to Use Technology	0.744	0.648

3.3.1 Hypothess Test Results

Table 7 and Figure 2 present the results of the assessments of the study's hypotheses. Overall, eight out of eleven hypotheses were supported by the data collected (see Table VI). The results revealed that Resistance to Change has an insignificant impact on Perceived Usefulness ($\beta = -0.601$, $t = 0.95$, $p = 0.343$), hence H1a was not supported. However, it was found that Resistance to Change significantly affects Perceived Ease of Use ($\beta = 0.559$, $t = 3.713$, $p < 0.001$), thereby supporting hypothesis H1b.

The results of the study showed that Technology Anxiety has an insignificant impact on Perceived Usefulness ($\beta = 0.394$, $t = 0.557$, $p = 0.578$).Thus, the hypothesis H2a was not supported. However, Technology Anxiety was found to have a substantial influence on Perceived Ease of Use ($\beta = -0.444$, $t = 2.512$, $p < 0.05$). In this regard, hypothesis H2b was supported. It was also found that Technology Anxiety has a significant effect on Resistance to Change ($\beta = 0.719$, $t = 10.227$, $p < 0.001$), thereby supporting hypothesis H2c. The research findings revealed that User Interface significantly affects Perceived Ease of Use ($\beta = 0.824$, $t = 5.211$, $p < 0.001$) thereby supporting hypothesis H3.

Perceived Ease of Use was also found to have a substantial influence on Perceived Usefulness ($\beta = 0.857$, $t = 2.213$, $p < 0.05$), thus supporting hypothesis H4. The results of the study showed that both Perceived Usefulness ($\beta = 0.598$, $t = 3.842$, $p < 0.001$) and Perceived Ease of Use ($\beta = 0.316$, $t = 2.478$, $p < 0.05$) have a significant impact on Attitude towards Use, thereby supporting hypotheses H5 and H6. However, Perceived Usefulness was found to have an insignificant impact on the Intention to Use self-service kiosks ($\beta = -0.163$, $t = 0.485$, $p = 0.628$), thereby rejecting hypothesis H7. Lastly, the results of the study showed that Attitude towards Use has a substantial influence on the Intention to Use self-service kiosks ($\beta = 0.992$, $t = 3.108$, $p < 0.01$). Therefore, hypothesis H8 was supported.

Table 7. Path Analysis Results

Hypotheses	Paths	Path Coefficient	t-value	Supported /Not Supported
H1a	RTC → PU	-0.601	0.95	Not Supported (p > .05)
H1b	RTC → PEOU	0.559	3.713	Supported (p < .001)
H2a	TA → PU	0.394	0.557	Not Supported (p > .05)
H2b	TA → PEOU	-0.444	2.512	Supported (p < .05)
H2c	TA → RTC	0.719	10.227	Supported (p < .001)
H3	UI → PEOU	0.824	5.211	Supported (p < .001)
H4	PEOU → PU	0.857	2.213	Supported (p < .05)
H5	PU → ATU	0.598	3.842	Supported (p < .001)
H6	PEOU → ATU	0.316	2.478	Supported (p < .05)
H7	PU → ITU	-0.163	0.485	Not Supported (p > .05)
H8	ATU → ITU	0.992	3.108	Supported (p < .01)

3.4 Discussion

This study utilized an extended Technology Acceptance Model and focused on the intention to use instead of actual use to explore customers' intention to use self-service technology (SST) in Guyana. Overall, eight out of eleven hypotheses were supported. The study hypothesized a negative relationship between RTC and PU as it relates to customers using self-service technologies. However, the relationship was not found. This aligns with past literature that demonstrates that participants' lack of experience with the use of technologies such as SSTs in their daily lives could make it difficult for them to fathom how such technologies could change the way they operate [39]. The study also hypothesized a negative relationship between RTC and PEOU. However, the results supported that RTC was negatively associated with PEOU. This finding aligns with past literature that shows user resistance comes about from limited measures that might be in place to improve the ease of use of the technical aspects of technology in organizations or social settings [53]. Therefore, resistance to change is a useful factor to consider when seeking to improve perceived ease of use.

The study hypothesized three relationships that involved Technology Anxiety. Firstly, the study hypothesized a negative association between Technology Anxiety (TA) and Perceived Usefulness. The results of the study rejected the hypothesis. Reference [39] supports this finding and explains that persons who value the functionality and utility of technological innovations are less likely to poorly perceive the usefulness of the technological innovation. Secondly, similar to research findings in the past, this study supports a negative association between Technology Anxiety and Perceived Ease of Use [39][28]. The literature shows that the unfamiliarity with technological devices and solutions causes anxiousness to develop within the minds of persons which in turn negatively affects persons' perception of perceived ease of use [39]. Thirdly, the study hypothesized that TA is positively associated with RTC as it relates to customers in Guyana using self-service kiosks. This hypothesis was supported and aligns with past research in the field [28]. Reference [28] explains that technological anxiety can activate the inhibitors such as resistance to change.

The study hypothesized a positive relationship between the user interface (UI) and PEOU to utilize self-service kiosks. The results showed that UI has a substantial influence on perceived ease of use of technology. This finding is supported by the results of past studies [33][54]. The literature suggests that since the user interface allows for interactivity on a technological platform, the variable serves as a precursor to perceived ease of use [35][55].

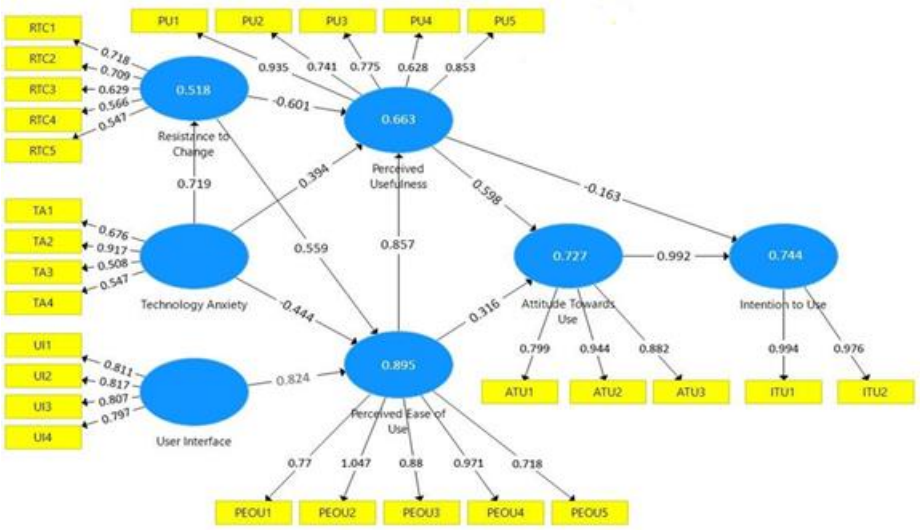

Figure 2. Structural Model Results

Regarding the core constructs of TAM namely perceived ease of use and perceived usefulness, the results demonstrated that perceived ease of use had a substantial influence on perceived usefulness. This finding is consistent with prior related research [35]. The results also showed that both perceived usefulness and perceived ease of use substantially impacted attitudes toward use. This finding was consistent with past research in the field [56][57][58][59]. However, the results of the study showed that perceived usefulness had no direct significant influence on the intention to use self-service kiosks.

This finding is contrary to some studies in the past [60]. Such studies explain that if users consider a technology to be useful in improving their interaction with an entity, they will be more likely to develop intentions to use the technology.

Lastly, and as predicted by the original TAM assertions, this study showed that attitude towards use has a significant impact on the intention to use self-service kiosks. This finding was heavily supported by past research [24][38][56]. Thus, when a consumer has a significant attitude toward online shopping, this will influence consumer adoption behaviour.

4. CONCLUSION

This study extended the Technology Acceptance Model to assess the factors impacting citizens' intention to use self-service technology, specifically self-service kiosks in Guyana. The study established relationships between constructs in the model. Firstly, resistance to change, technology anxiety and user interface were found to be significant predictors of perceived ease of use. Secondly, technology anxiety was found to be a significant predictor of Resistance to Change. Thirdly, perceived ease of use was found to significantly impact perceived usefulness. Fourthly, perceived usefulness and perceived ease of use were found to strongly influence attitudes toward use. Lastly, attitude towards use was found to be a significant predictor of intention to use self-service kiosks. In summary, this study confirms the applicability of TAM to the third-world context, specifically the country of Guyana and establishes a basis for further research within the field of self-service technology adoption.

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