
CUSTOMER ACCEPTANCE OF SELF-SERVICE TECHNOLOGY AT FAST SERVICE RESTAURANTS IN TSHWANE

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ABSTRACT

Objective: Technological advances have prompted many businesses to introduce self-service technology (SST) to improve customer waiting times and reduce operational costs. This study aims to determine the factors linked to the acceptance of self-service technology by customers at fast-service restaurants. **Research Design & Methods:** This research uses a quantitative method by surveying 172 customers who had visited self-service restaurants within the preceding six months. The Unified Theory of acceptance and use of technology (UTAUT) was used to determine the factors linked to the acceptance of self-service technology at quick-service restaurants. The Statistical Package for Social Sciences was used for analysis. **Findings:** It was found that age and gender moderate the relationship between the construct: performance expectancy ratio and SST usage intention, effort expectancy and SST usage intention, social influence and usage intention and lastly, age moderates the relationship between facilitating conditions and SST usage behaviour. **Contribution & Value Added:** The design of future self-service technology at restaurants should be constructed in a manner that would appeal to customers of all ages and gender. An education drive should be prioritised to educate customers about the benefits of self-service while ensuring that they also understand that technology does not reduce employment but may be used to create employment in other forms. Future studies should also investigate whether technology education might have a moderating effect on technology.

Keywords: acceptance; businesses; intention; self-service; technology.

JEL codes: M100, O310, O320, O330

Article type: research paper

INTRODUCTION

Owing to the COVID-19 lockdown restrictions that were set by the South African government between 2020 and 2021, restaurants were not allowed to have customers walk in to purchase or collect their food. Still, orders were allowed to be delivered by the food outlets (Department of Co-operative Governance and Traditional Affairs, 2020). These measures forced companies to conduct business differently. Thus, even businesses that previously did not use self-service were now compelled to introduce SST ordering services. Customers were obliged to use these technologies even though some may not have ordinarily accepted them. Despite self-service technology offering convenience to customers, this type of technology is not always accepted by all, especially when people feel the technology is forced on them. This research will assist food services outlets in planning properly when contemplating the introduction of self-service technology to make informed decisions that cater to the needs of the customers and the business.

The South African fast service restaurant industry is growing tremendously and was valued at R300 billion in 2015 and the number of consumers was expected to be around 42 million by 2017/2018 (Marx-Pienaar et al., 2020). Owing to their affordability, fast service restaurants usually face the problem of long queues (Koh et al., 2014). It must be noted that long queues are common in the services industry such as restaurants, hotels, etc. especially during peak periods such as lunchtime in food outlets or check-in hours at the hotels, “where capacity is fixed as peak-time demand can exceed the available supply” (Kokkinou & Cranage, 2013). Ahn & Seo (2018) note that the introduction of technology in different businesses has become an integral part of innovation. Some have introduced technology in order to reduce waiting time as well as queues (W. Lee et al., 2012). Traditional service by an employee is steadily being enhanced or even replaced by self-service technologies (C. Wang et al., 2013). “Self-service technologies (SSTs) are defined as technological interfaces that enable customers to produce a service without direct employee involvement” (Fernandes & Pedroso, 2016).

Technological advances as well as exorbitant costs that come with paying employee salaries have, over the years, prompted businesses to look for alternatives, such as self-service technology (Dabholkar, 1996). For example, banks offer customers self-service options such as automated teller machines (ATMs), online as well as telephone banking (Blut et al., 2016). The use of self-service technology will keep increasing because it brings labour expenses down, as well as heightens satisfaction in customers (Strother et al., 2010). Extensive studies have been conducted in the field of SSTs, especially in the banking and airline industry, yet a choice to investigate the determinants of customer acceptance of self-service technology in fast service restaurants was chosen because studies as recent as the one in 2018 by Ahn & Seo (2018) state that there is a lack of similar studies in the food services industry.

The aim of this study was to investigate the factors linked to self-service technology acceptance at quick service restaurants in the city of Tshwane. The objectives of this study therefore were to investigate what determines acceptance of SSTs by customers; examine whether the decision to use the self-service kiosks at quick service restaurants is linked to age, gender or experience; examine whether the decision to use the self-service kiosks at quick service restaurants is linked to age, gender or experience; and determine whether UTAUT constructs such as performance expectancy, effort expectancy, social influence moderated by age, gender and experience will influence intention and use of technology. Small and medium enterprises (SME) that are strong assist a country in contributing to its gross domestic product (GDP) in that it fosters job creation and alleviates poverty while promoting entrepreneurial activity (Sitharam & Hoque, 2016). This research will assist food services outlets to plan properly when contemplating the introduction of self-service technology, to make informed decisions as a way of strengthening their businesses. Research still needs to be conducted to understand the determinants of acceptance from the customers to cater for the needs of the customers as well as the business. This research will be of value to other food services outlets when considering the introduction of these technologies to their businesses to contribute to their success. The body of knowledge in the field of self-service technology will also be enriched.

LITERATURE REVIEW

Overview of the Fast Service Industry in South Africa

Tourism has an important role to play in placing the South African economy on a sustainable inclusive growth trajectory (South Africa Department of Tourism, 2019). The tourism sector in South Africa contributed 2.8% to the gross domestic product (GDP) which is equivalent to R139 billion and this was expected to grow to R145.3 billion by 2019 Statistics South Africa (2019). The South African fast service restaurant industry which is a sub-sector of the food and beverages industry is growing tremendously and was valued at R300 billion in 2015 and the number of consumers was expected to be around 42 million by 2017/2018 (Marx-Pienaar et al., 2020). Fast Service Restaurants (QSR) allow for lower traditional services with reduced prices while ensuring speedy service and efficiency (Seo, 2020).

A notable change in eating habits have been seen over the past 40 years with more people consuming food prepared out of the home (Seguin et al., 2016). Most customers will visit a fast service restaurant at least once a week and, with lives getting busier, there is a growing fondness for cheap food with no waiting time (Marx-Pienaar et al., 2020). As a result of the need for cheap and quick food, Koh et al. (2014) highlight that fast service restaurants usually face the problem of long queues due to their affordability.

Self-Service Technology

“Self-service technologies (SSTs) are defined as technological interfaces that enable customers to produce a service without direct employee involvement” (Fernandes & Pedroso, 2016). Among others, SSTs include Internet-based solutions, automated phone systems such as telephone banking, automated teller machines (ATMs), self-scanning supermarket checkouts and self-service kiosks (SSKs) such as self-operated cash registers (Klier et al., 2016). In a restaurant setting, a self-service kiosk allows patrons to order food instead of having to interact with employees (Seo, 2020). The use of self-service technology dates back many centuries, in fact it was reported that the first self-service in the form of vending machines was invented by Hero in 219 BC, while in 1883, Percival Everitt invented the first coin operated vending machine (Segrave, 2002). Previously, convenience meant customers interacting with employees, but today convenience is all about a customer interacting with the technology and the surrounding environment (Collier et al., 2014). Another dimension regarding SST is that we have two types, namely private (those located in private homes away from public interactions) and public (located in high traffic areas where opportunities for interaction exist and can be viewed differently by users) SSTs (Collier et al., 2014). Self-service kiosks would be considered as public and differ slightly from online self-service in terms of acceptance (Seo, 2020). Over the past few years, SSTs have been introduced as a solution for meeting the need to increase the convenience in service while minimising costs (Collier et al., 2014).

The Benefits of SSTs

Introducing self-service technology brings many advantages to businesses as well as customers (H.-J. Lee et al., 2013) such as reducing costs and enhancing customer experience (Considine & Cormican, 2016; Feng et al., 2019). SSTs are a useful technique that a company can use to lower labour expenses (Abdelaziz et al., 2010; Liu et al., 2020), operational costs (Thusi & Maduku, 2011) space occupancy, waiting time as well as queues (Bulmer et al., 2018; W. Lee et al., 2012). Thusi & Maduku (2011) further state that companies introduce SSTs to improve efficiency as Feng et al. (2019) mentioned, to boost a company’s competitive advantage and to rise above fierce competition. According to W. Lee et al. (2012), airline industry clients would opt to use self-service check-in kiosks as a way of avoiding long queues and they are able to check in at a time that suits them. Self-services bring to customers, among others, benefits such as more privacy, more options of payment, convenience as well as entertainment (H.-J. Lee et al., 2013). In the food services industry, SST innovations allow customers to peruse menus, place or customise orders, request refills or make general interactions with the restaurants (Hanks et al., 2016). When a decision to use an SST result in a positive user experience and meet the expectations of the client about waiting times, there is a potential to influence customer store choice decisions and will thus also lead to clients’ future decisions to use the technology (Djelassi et al., 2018). Taillon & Huhmann (2019) concur with the statement as they mention that clients who rate the SST positively are loyal and will have repeat purchases from the marketer. Most users understand the benefits of SSTs and are even willing to use them provided the process had been clearly explained to them and adequate human assistance provided (Bulmer et al., 2018).

Why are SSTs rejected?

In a study by Bulmer et al. (2018) it was found that SSTs had the ability to both make shoppers feel competent while making others feel incompetent. Anxiety and fear that rise from dealing with the unknown has been noted by some scholars such as Bulmer et al. (2018) as a deterrent to using technological devices. Some clients in the airline industry reject the self-service technology due to their complicated designs and the customers being unfamiliar to the processes involved and are more at ease with the human service according to a service SITA, as quoted by W. Lee et al. (2012). In a

study by Collier et al. (2014), it was noted that the type of SST, be it private or public, had an effect towards anxiety; this meant that those who interacted with SSTs privately were less likely to experience anxiety than those using public ones. When SSTs are brought in with no introduction, warning or training, customers mostly felt uncomfortable with not knowing how to use the SSTs (Bulmer et al., 2018). Collier et al. (2014) further suggest that, with public SSTs' lack of control, it had a higher influence in anxiety and could lead to users avoiding SSTs while lack of control did not produce the same effect when using private SSTs.

Unified Theory of Acceptance and Use of Technology

The unified theory of acceptance and use of technology is a framework that was developed by Venkatesh et al. to predict the acceptance of technology in organisational environments (Chang, 2012). The UTAUT “explains that people engage themselves in technology system usage and form subsequent intentions and behaviour that is governed through four major constructs including (1) performance expectancy, (2) effort expectancy, (3) social influence, and (4) facilitating conditions” (Iqbal et al., 2018). UTAUT integrates elements in eight models of technology acceptance, i.e., Theory of Reasoned Action, Theory of Planned Behaviour, Innovations Diffusion Theory, Social Cognitive Theory, combined Technology Acceptance Model and Theory of Planned Behaviour as well as the model of personal computer utilisation (Boonsiritomachai & Pitchayadejanant, 2019). UTAUT postulates that individual differences influence the adoption of technology, which differences can be age, gender, etc. (A. M. Wang et al., 2016). Age, gender and experience are used as moderating variables for the acceptance of technology (Venkatesh et al., 2012). UTAUT has been noted to be a great model for this study based on its parsimonious structure (Lai, 2017; Prasanna & Huggins, 2016) and better explanatory ability (Venkatesh et al., 2003).

The Conceptual Model

The conceptual framework that guided this study was informed by the independent variables, moderating variables as well as dependent variables. The model relationships between the variables are depicted in Figure 1 below. According to the model used, the independent variables were performance expectancy, effort expectancy, social influence and facilitating conditions. The dependent variables: behavioural intention and usage behaviour, while the moderating variables were age, gender and experience. Performance expectancy moderated by age and gender was tested for its influence on behavioural intention. Effort expectancy moderated by age, gender and experience was also used to determine the intention behaviour. Age, gender, experience and voluntariness of use were tested to see whether they moderate the relationship between social influence and behaviour intention while testing facilitating conditions against usage behaviour.

Previous studies which used the UTAUT empirically analysed how the constructs of the model positively influence behavioural intention to accept and use technology. Based on the evidence gathered from the various scholars, the following hypotheses were formulated:

H1: Customers' Age moderates the relationship between:

H1a: Performance expectancy, SSTs usage intention and behaviour

H1b: Effort expectancy, SSTs usage intention and behaviour

H1c: Social influence, SSTs usage intention and behaviour

H1d: Facilitating conditions and SSTs usage behaviour.

H2: Customers' Gender moderates the relationship between:

H2a: Performance expectancy, SSTs usage intention and behaviour

H2b: Effort expectancy, SSTs usage intention and behaviour

H2c: Social influence, usage intention and behaviour.

H3: Customers' Experience moderates the relationship between:

H3a: Facilitating conditions and SSTs usage behaviour

H3b: Effort expectancy, SSTs usage intention and behaviour

H3c: Social influence, SSTs usage intention and behaviour.

H4: Customers' voluntariness of use moderates the relationship between social influence and SSTs usage behaviour.

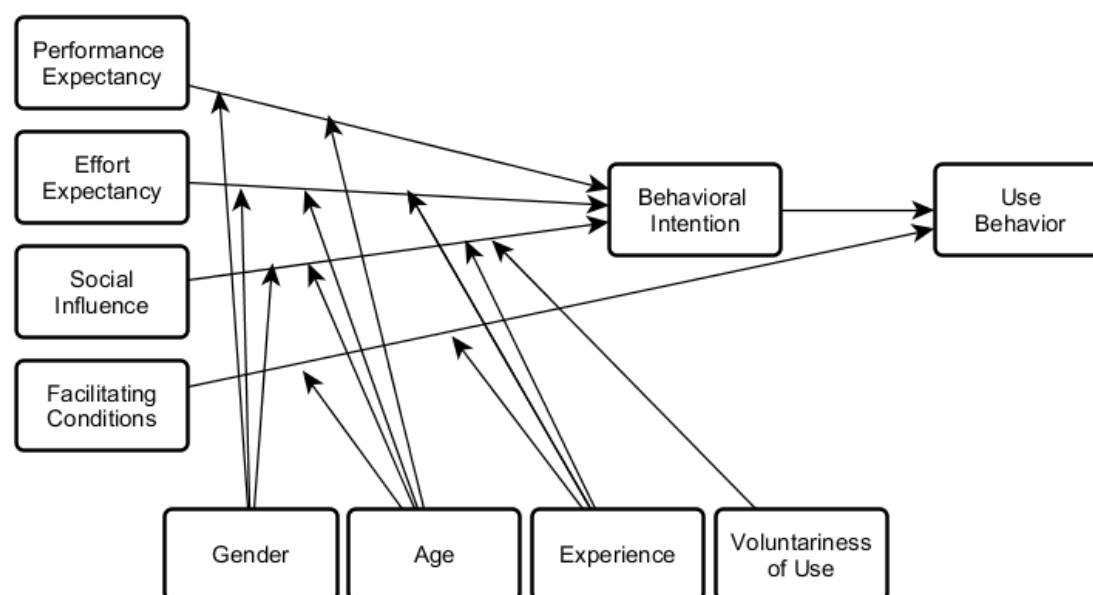


Figure 1. The Research Model

Source: Venkatesh et al. (2003)

METHODS

A quantitative research method was adopted to find whether a relationship exists between the variables in the UTAUT model and the intention, as well as actual use of self-service technologies in restaurants. The four constructs in the UTAUT model moderated by age, gender, experience, as well as voluntariness of use was examined to understand the influence, they have on customers' intention to use self-service technology at fast service restaurants. The population in this study were all customers residing in the city of Tshwane with 172 customers as the sample. The sampling technique used was non-probability through snowballing which was carried out based on initial informants who then referred others who had visited quick service restaurants within the six months of participation and were residing in the city of Tshwane, as this was the requirement for participation. The data collection method used a questionnaire. The collected data were captured on an Excel spreadsheet and were then transferred to the Statistical Package for the Social Sciences (SPSS). After capturing, SPSS software version 25 was used to analyse the data. Descriptive analyses of the data were performed, starting with the customer experiences of using technology followed by the model specific responses which were based on the model's constructs. The data were evaluated for frequencies under each variable to assess whether errors existed. Furthermore, to test the strength of the cause-and-effect relationships among variables, hierarchical moderated regression analysis was performed. The validity of this study was considered from the data collection process, through the analysis, hypothesis testing and presentation.

FINDINGS

Respondents' Profile

Table 1 below provides a detailed breakdown of the respondents' demographic profile; this includes gender, age, education level and employment status. From the gender perspective, there is no apparent gender bias since the percentages are quite similar. To ascertain whether respondents' age was a factor in determining growing enthusiasm by the respondents to adopt self-service technology at fast-service restaurants, the chi-square test was employed to check the relationship between the two variables (age and respondents' browsing of sites) using cross-tabulations (Field, 2009). The results ($X^2 = 98.974$; $p = 0.000$) showed that the older the respondents, the more the respondents understood the Internet and

applications such as self-service technology at fast-service restaurants. Furthermore, the respondents' occupation influenced their attitudes towards self-service technology at fast-service restaurants. Data confirmed that individuals who have better-paying jobs could afford credit card facilities and can easily embrace self-service technology facilities. Contrarily, the unemployed and other low earners find it difficult to embrace self-service technology at fast-service restaurants due to trust issues since they find it difficult to part ways with their little income.

Table 1. Demographic Background of Respondents

Demographic characteristics	Count	Percentage
<i>Gender</i>		
Male	69	40
Female	99	58
Other	4	2
<i>Age</i>		
18 to 25 years	62	36
26 to 35 years	66	38
36 to 45 years	21	12
46 to 55 years	12	7
56 to 65 years	6	4
66 years and Older	4	2
<i>Education Level</i>		
Grade 12 or Matric level or less	39	24
N6 Level Certificate	15	9
National Diploma	46	28
Bachelor's degree	40	24
Honours degree	20	12
Master degree	4	2
Other	2	1
<i>Employment Status</i>		
Employed (full-time)	81	47
Employed (part-time)	35	20
Pensioner/Retired	4	2
Self-employed (full-time)	11	7
Unemployed	41	24

Source: Authors, 2022

Respondents' Income per Annum

Most of the respondents (53%) had an annual R100,000 or less income. Respondents whose annual income was between R101,000 and R250,000 were about 24%. Respondents who earned an annual income between R251,000 and R400,000 constituted 14%, and respondents with an annual income between R401,000 and R600,000 were close to 9%. Only 1% of the surveyed sample had an annual income between R601,000 and R900,000. See Figure 2.

The data confirmed that individuals who have better-paying jobs with better annual income could afford credit card facilities and easily embrace self-service technology facilities. However, the unemployed and other low earners find it difficult to embrace self-service technology at fast-service restaurants facilities owing to trust issues since they find it difficult to spend their little income.

Technology Familiarity and Technology Usage Habits

This section provides empirical evidence on technology usage, specifically for surveyed customers in the Pretoria North area. Here, family is conceptualised as the participant's experience with available technology. In determining the extent to which the respondents use technology, their technology familiarity profiles and technology usage habits were established. The following factors are discussed in this section: (a) smartphone and computer usage, (b) consumers' online shopping and Internet banking, (c) web browsing familiarity, and (d) specifically self-service technology usage in quick-service restaurants. Most of the 172 valid responses showed that the respondents used smartphones. See Figure 3.

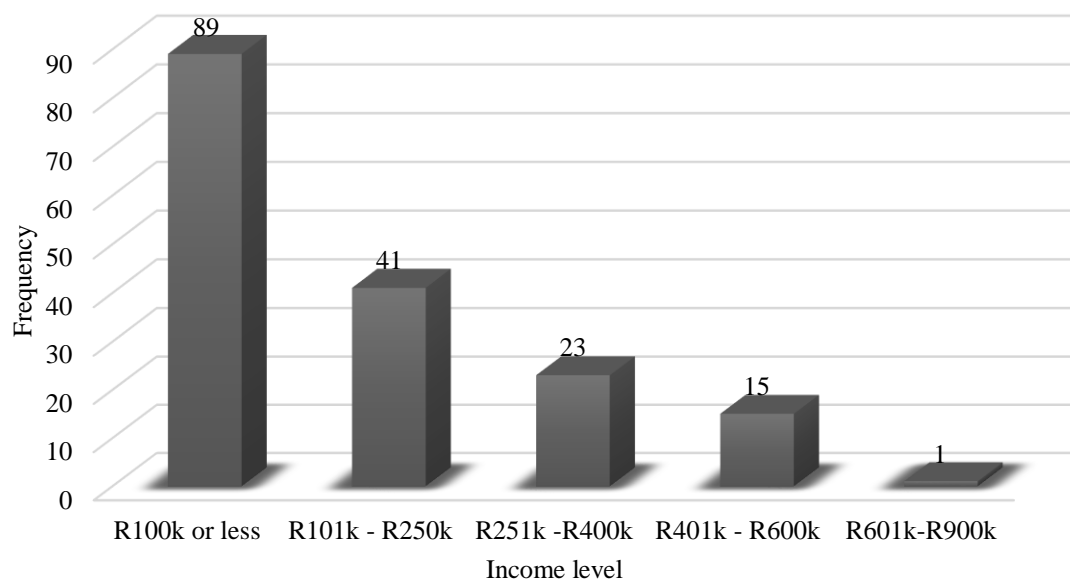


Figure 2. Respondents' Income per Annum

Source: Authors, 2022

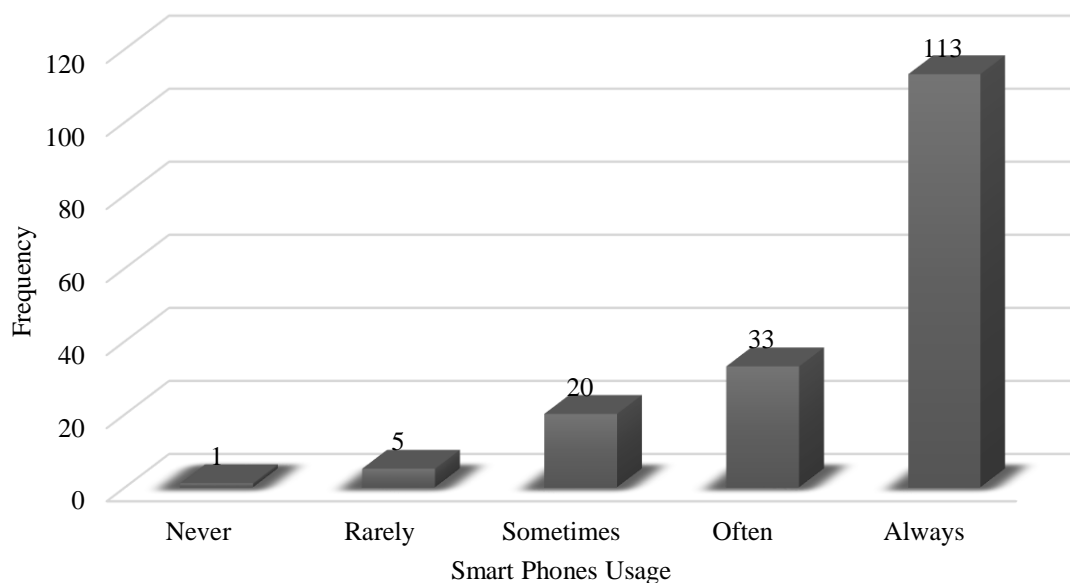


Figure 3. Smart Phone Usage

Source: Authors, 2022

Approximately 66% of the respondents always use their smartphones, 19% often use their smartphones, and 11% use their smartphones at certain times; 3% of the respondents rarely use smartphones, and only 1% have never used a smartphone. This distribution of respondents is common to the present-day consumers, both locally and abroad, owing to digitalisation in conducting business and final purchases (X. Wang et al., 2021). Baron & Kenny (1986) demonstrate that owing to the COVID-19 outbreak, most customers have learned to avoid social contact interactions and have rather opted for self-service technologies.

Following the smartphone usage results, it was important to determine the respondent's use of computers. This was determined by inquiring from the respondents whether they use laptops or desktops computers in accessing the Internet. Figure 4 displays the result.

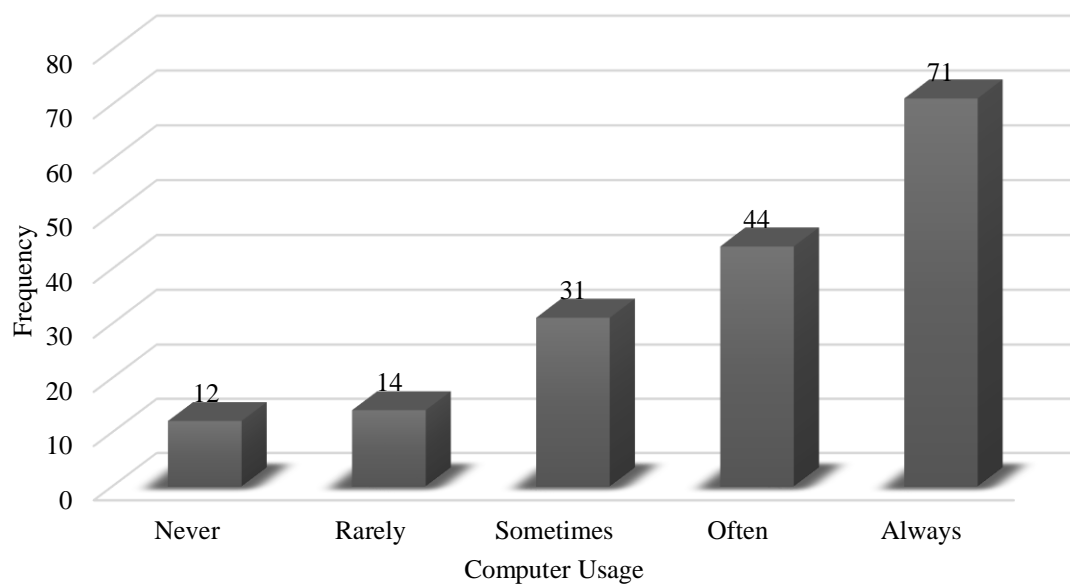


Figure 4. Computer Usage

Source: Authors, 2022

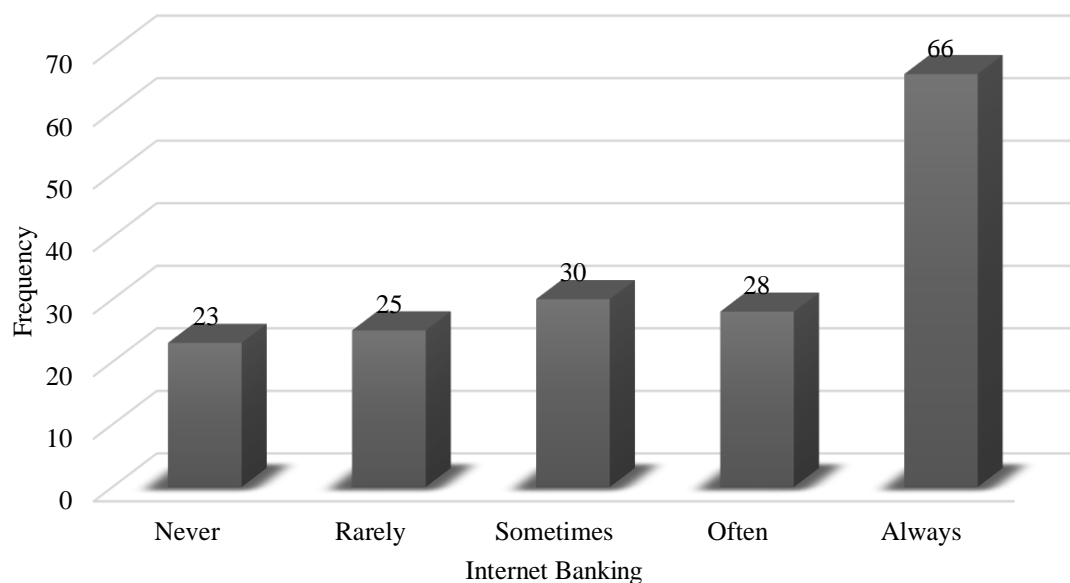


Figure 5. Internet Banking Usage

Source: Authors, 2022

The Figure 4 shows that 41.3% of the respondents indicated that they always use their computers and the Internet for information and product search. Approximately 25.6% revealed that they often use their computers, while 18% utilise the computer periodically. Furthermore, 8.1% of the respondents rarely use a computer, and 7% have never used a computer. The respondents' familiarity with internet banking results is presented in Figure 5.

Some 38.4% of the customers indicated that they are familiar with internet banking and always use its services. Approximately 16.3% of the surveyed customers often used internet banking, 17.4% indicated that they sometimes use internet banking, and 13.4% confirmed that they never use internet banking. Respondents were asked to indicate whether they perform online shopping transactions. Below are the distribution responses.

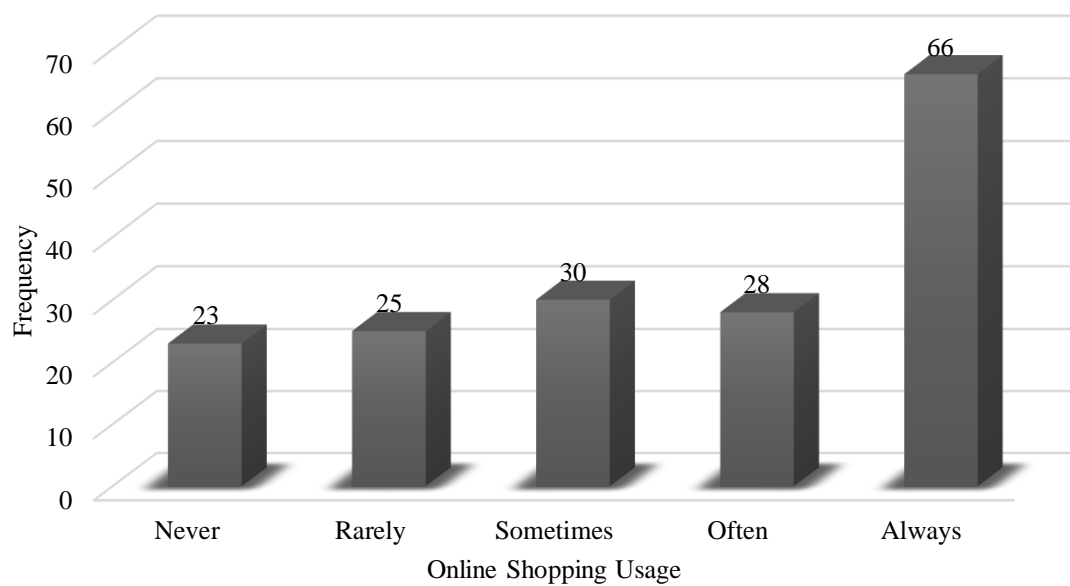


Figure 6. Online Shopping Usage

Source: Authors, 2022

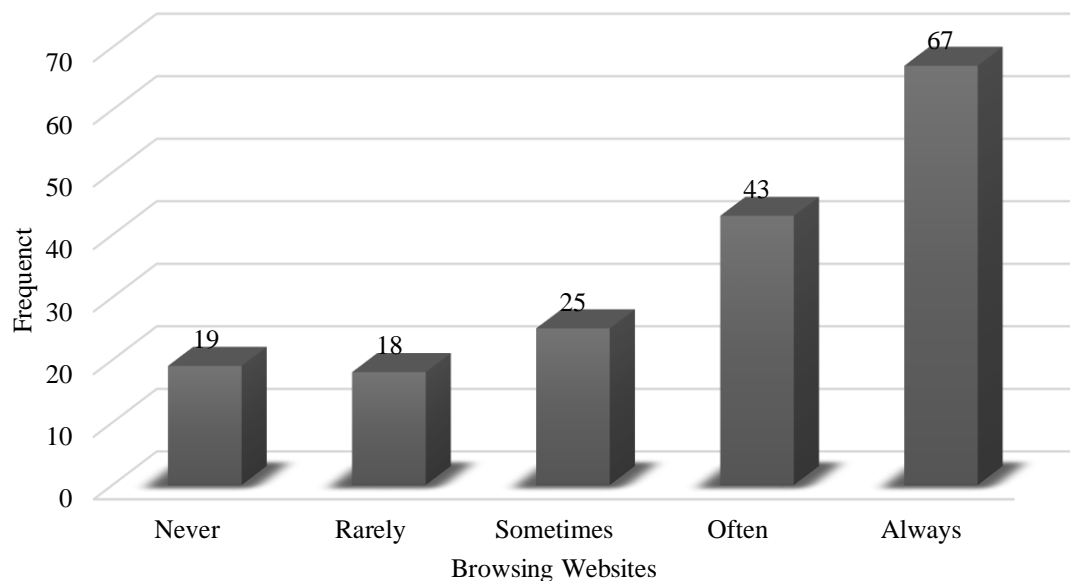


Figure 7. Website Browsing Statistics

Source: Authors, 2022

The Figure 6 shows that 29.7% of the respondents were not using online shopping, while those who always use online shopping recorded a percentage total of 23.8%. The results further reveal that a lower proportion of respondents (11%) often use online shopping, with 17.4% rarely using online shopping. These findings confirm that online commerce is growing in South Africa. The total lockdown of 2020 in South Africa was a catalyst in this process as people increasingly opted for online shopping instead of visiting crowded malls. This development points to an interesting shift in shopping behaviour which has accelerated the adoption of online shopping in South Africa.

The respondents were also probed on whether they browse websites on the Internet. This was to strengthen the data on them being internet-savvy. Some 39% of the respondents were always connecting and browsing websites on the Internet, while 25% indicated that they often browse some

websites. 10.5% of the respondents rarely connect and browse websites on the Internet, and 11% confirmed that they do not browse websites (see Figure 7).

Further, cross-tabulations between age and browsing of websites were done (see Table 2).

Table 2. Age*Browsing Websites with the Internet Cross Tabulation

		Browsing Websites					Total
		Never	Rarely	Sometimes	Often	Always	
Age	18-25	0	15	8	18	21	62
	26-35	5	2	11	15	33	66
	36-45	3	0	0	9	9	21
	46-55	3	0	5	0	4	12
	56-65	4	0	1	1	0	6
	Older than 66	4	0	0	0	0	4
Total		19	17	25	43	67	171

$X^2=98.974$; $p<0.000$

Source: Authors, 2022

The chi-square test was used in ascertaining the data in table 2. The test results ($X^2 = 98.974$; $p=0.000$) indicate that the older the respondents, the greater the understanding and browsing of important websites.

Hypothesis Testing

Moderator variables have been prominent in the marketing literature lately. The importance of predicting patrons' behaviour cannot be overemphasised (Baron & Kenny, 1986; McMullan, 2005). Modern-day marketing scholars have increasingly drifted towards this phenomenon, especially in its relation to the behavioural patterns of patrons who use innovative technology in commercial transactions (Khan et al., 2017; Slade et al., 2015). Moderating variables have been shown to contribute to a substantial amount of psychology and consumer behaviour research because relationships between variables become stronger when variables are involved (Islam et al., 2011; McGoldrick & Pieros, 1998; Venkatesh et al., 2003). To test the formulated hypotheses, hierarchical moderated regression analysis was utilised. This informed the researcher's choice to include a moderated model to strengthen the model's explanatory power. Below are the formulated hypotheses.

Hypothesis 1a: Age moderates Performance Expectancy (PE) and Behavioural Intention (BI)

Hypothesis 1b: Age moderates Effort Expectancy (EE) and Behavioural Intention (BI)

Hypothesis 1c: Age moderates Social Influence (SI) and Behavioural Intention (BI)

Hypothesis 1d: Age moderates Facilitating Conditions (FC) and Behavioural Intention (BI)

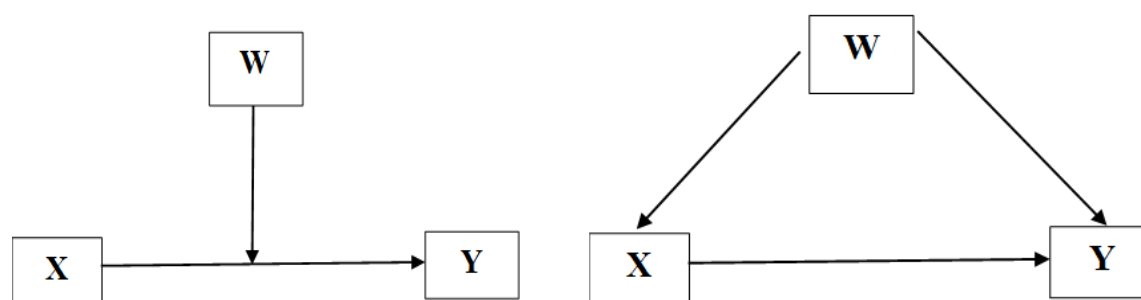


Figure 8. A Simple Moderation Model Depicted in the Form Model 1 (left) and Model 2 (right)

Source: Authors, 2022

Test of Moderation Effect of Age on the Relationship between SSTs' Acceptance Factors and Behavioural Intention

To successfully examine if the explanatory power of the relationship between SSTs' acceptance factors and behavioural intention is affected by the age of respondents, a moderated hierarchical regression analysis was carried out. Since SSTs' acceptance factors constitute four different constructs

- (performance expectancy, facilitating conditions, effort expectancy, social influence), the moderation effect of age on behavioural intention was analysed individually for each variable (see Table 3) to deduce some knowledgeable implications from the study.

Table 3. Moderation Test Results for Age on SSTs' Acceptance Variables and Behavioural Intention

Description of Test	Regression Model	Adjusted R^2R^2	β	F	df	p-value	Decision
Age moderates Performance Expectancy (PE) and Behavioural Intention (BI)	Model 1: Age, PE and BI	0.512		89.136	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, PE and BI	0.810	0.948	240.216	3	0.000	Moderation supported
Age moderates Effort Expectancy (EE) and Behavioural Intention (BI)	Model 1: Age, EE and BI	0.419		62.396	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, EE and BI	0.771	0.246	191.345	3	0.000	Moderation supported
Age moderates Social Influence (SI) and Behavioural Intention (BI)	Model 1: Age, SI and BI	0.158		16.399	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, SI and BI	0.838	0.540	927.181	3	0.000	Moderation supported
Age moderates Facilitating Conditions (FC) and Behavioural Intention (BI)	Model 1: Age, FC and BI	0.502		85.618	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, FC and BI	0.826	0.228	390.233	3	0.000	Moderation supported

Note: N = 172; Independent variables = Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions; Moderator variable = Age; Dependent variable = Behavioural Intention; $p < 0.05$.

*In the first step, the change statistics are not beneficial because Model 1 is compared to an empty model (i.e., no predictors); this translates the same R^2R^2 .

Source: Authors, 2022

Hypothesis 1a: Age moderates Performance Expectancy (PE) and Behavioural Intention (BI)

The results in Model 1 of the moderated hierarchical regression analysis, as depicted in Table 3, show that age and performance expectancy contributed significantly to the regression model, $F = 89.136$, $p < 0.05$ and was responsible for 51.2 per cent ($R^2 = 0.512$) of the difference in behavioural intention. These results are statistically significant and suitable for furthering the moderation analysis process (Hayes, 2017). Bringing in the interaction term (Age*Performance Expectation) on the second stage to regression Model 1 explained 81 per cent ($R^2 = 0.810$) of the variation in behavioural intentions resembling a significant change in R^2 , $F = 240.216$, $p < 0.05$. Moreover, as shown in Table 3, the standardised coefficient (beta) value for the interaction effect was positive ($\beta = 0.948$) and significant ($p < 0.05$). This supports Hypothesis H1a. These results show that age significantly moderated performance expectancy on behavioural intention.

Hypothesis 1b: Age moderates Effort Expectancy (EE) and Behavioural Intention (BI)

To evaluate the moderating role of age on the relationship between effort expectancy and behavioural intention, moderated hierarchical regression analysis was used. In Model 1 of the moderated regression model, sharing content and perceived verification explained a high level of variance in behavioural intention, $R^2 = 0.419$, $F = 62.396$, $p < 0.05$, as shown earlier in Table 3. In Model 2, the interaction term (Age*Effort Expectancy) was added to regression Model 1 and the effect was significant, $R^2 = 0.771$, $F = 191.345$, $\beta = 0.246$, $p < 0.05$. The moderation effect explains a positive change of the variance in the strength of behavioural intention, as calculated from the difference in R^2 for the model that includes the interaction term (Model 2, $R^2 = 0.771$) compared to the model that excludes it (Model 1, $R^2 = 0.410$). These results signal that age significantly moderates effort expectancy on behavioural intention and therefore permits the acceptance of hypothesis H1b.

Hypothesis 1c: Age moderates Social Influence (SI) and Behavioural Intention (BI)

A moderated hierarchical regression analysis was performed to test the hypothesis that age moderates the relationship between social influence and behavioural intention. The variables (age and social influence) in Model 1 of the moderated hierarchical regression accounted for significant variance in adoption $R^2 = 0.138$, $F = 16.399$, $p < 0.05$, as depicted in Table 3. Introducing the interaction term (Age*Social Influence) in Model 2 to regression Model 1 yielded an additional percentage variation in behavioural intention, and this change in R^2 was significant, $F = 927.181$, $p < 0.05$. Additionally, as highlighted in Table 3, the standardised coefficient (beta) value for the interaction effect was positive ($\beta = 0.540$) and significant ($p < 0.05$), and thus hypothesis H1c is supported. Therefore, a deduction can be made that age is a significant moderating effect on the variable social influence and consumers' behavioural intentions.

Hypothesis 1d: Age moderates Facilitating Conditions (FC) and Behavioural Intention (BI)

Age and its enabling conditions contributed significantly to the regression model, $F = 85.618$, $p < 0.05$ and accounted for 50.2 per cent ($R^2 = 0.502$) of the difference in behavioural intention, as per Model 1. Bringing the interaction term (Age*Facilitating Conditions) on the second stage to regression Model 1 explained 83 per cent ($R^2 = 0.826$) of the variation in behavioural intentions, resembling a significant change in R^2 , $F = 390.233$, $p < 0.05$. Moreover, as presented in Table 3, the standardised coefficient (beta) value for the interaction effect was positive ($\beta = 0.228$) and significant ($p < 0.05$), and thus Hypothesis H1d is supported. These indicate that age significantly moderated facilitating conditions on behavioural intention.

Test of Moderation Effect of Gender on the Relationship between SSTs' Acceptance Factors and Behavioural Intention

To successfully test whether the explanatory power of the relationship between SSTs' acceptance factors and behavioural intention is affected by the variable gender, a moderated hierarchical regression analysis was conducted, as depicted in Table 4.

Table 4. Moderation Test Results for Gender on SSTs' Acceptance Variables and BI

Description of Test	Regression Model	Adjusted R^2	β	F	df	p-value	Decision
Gender moderates Performance Expectancy (PE) and Behavioural Intention (BI)	Model 1: Gender, PE and BI	0.501		85.714	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, PE and BI	0.887	0.110	441.966	3	0.003	Moderation supported
Gender moderates Effort Expectancy (EE) and Behavioural Intention (BI)	Model 1: Gender, EE and BI	0.428		64.915	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, EE and BI	0.920	0.125	655.474	3	0.000	Moderation supported
Gender moderates Social Influence (SI) and Behavioural Intention (BI)	Model 1: Gender, SI and BI	0.143		14.996	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, SI and BI	0.897	0.040	481.615	3	0.000	Moderation supported

Note: N = 172; Independent variables = Performance Expectancy, Effort Expectancy and Social Influence; Moderator variable = Gender; Dependent variable = Behavioural Intention; $p < 0.05$.

*The change statistics are not beneficial for the first step because Model 1 is compared to an empty model (i.e., no predictors), which will be the same R^2 .

Source: Authors, 2022

Hypothesis 2a: Gender moderates Performance Expectancy (PE) and Behavioural Intention (BI)

In Model 1 (Table 4), the outcome indicates that gender and performance expectancy contributed significantly to the regression model, $F = 85.714$, $p < 0.05$ and was responsible for 50.1 per cent ($R^2 = 0.501$) of the model's explanatory power. Adding the interaction term (Gender*Performance Expectancy) on Model 2 to regression Model 1 yielded an additional 8.9 per cent ($\Delta R^2 = 0.889$) of the variation in consumers' behavioural intentions, and this change in R^2 was significant, $F = 441.966$,

$p < 0.05$. Additionally, as highlighted in Table 4, the standardised coefficient (beta) value for the interaction effect was positive ($\beta = 0.110$) and substantial ($p < 0.05$). Hence, hypothesis H2a is supported. Therefore, the deduction is that gender significantly moderates the relationship between consumers' performance expectancy and consumers' behavioural intention.

Hypothesis 2b: Gender moderates Effort Expectancy (EE) and Behavioural Intention (BI)

A moderated hierarchical regression analysis was performed to test the relationship between consumers' effort expectancy and how consumers' behavioural intention is moderated by gender. The variables (Gender, Behavioural Intention and Effort Expectancy) in Model 1 of the moderated hierarchical regression as depicted in Table 4 reported a significant variance in adoption $R^2 = 0.428$, $F = 64.915$, $p < 0.05$. Introducing the interaction term (Gender*Effort Expectancy) in Model 2 to regression Model 1 yielded an additional 9.2 per cent ($\Delta R^2 = 0.921$) of the variation in adoption, and this change in R^2 was significant, $F = 655.474$, $p < 0.05$. Additionally, as emphasised in Table 4, the standardised coefficient (beta) value for the interaction effect was positive ($\beta = 0.125$) and significant ($p < 0.05$), and hence hypothesis H2b is supported. It follows that a deduction is made that gender carries an important moderating effect on the relationship between consumers' effort expectancy and consumers' behavioural intention.

Hypothesis 2c: Gender moderates Social Influence (SI) and Behavioural Intention (BI)

In Model 1 of the moderated regression model, gender, behavioural intention, and social influence were responsible for a huge variance in behavioural intention, $R^2 = 0.143$, $F = 14.796$, $p < 0.05$, as shown earlier in Table 4. In Model 2, the interaction term (Gender*Social influence) was added to regression Model 1 and the effect was substantial, $R^2 = 0.897$, $F = 481.615$, $\beta = 0.040$, $p < 0.05$. The moderation effect explains about 9 per cent ($\Delta R^2 = 0.899$) of the variance in the strength of adoption, as calculated from the difference in R^2 for the model that includes the interaction term (Model 2, $R^2 = 0.897$) compared to the model that does not consider it (Model 1, $R^2 = 0.143$). These results reveal that gender significantly moderated sharing social influence on consumers' behavioural intention, so hypothesis H2c is accepted.

Test of Moderation Effect of Consumers' Experience on the Relationship between SSTs' Acceptance Factors and Behavioural Intention

To effectively assess whether the explanatory power of the relationship between SSTs' acceptance factors and behavioural intention is affected by the variable consumers' experience, a moderated hierarchical regression analysis was carried out (see Table 5).

Hypothesis 3a: Customers' experience moderates Facilitating Conditions (FC) and Behavioural Intention (BI)

Moderated hierarchical regression analysis was used to assess the moderating role of customers' experience on the relationship between facilitating conditions and behavioural intention. In Model 1 of the moderated regression model, customers' experience, behavioural intention and facilitating conditions explained a significant amount of variance in behavioural intention, $R^2 = 0.557$, $F = 105.808$, $p < 0.05$ as shown in Table 5. In Model 2, the interaction term (Customers' Experience*Facilitating Conditions) was added to regression Model 1 and the effect was prominent, $R^2 = 0.952$, $F = 1087.182$, $\beta = 0.066$, $p < 0.05$. The moderation effect explains about 4.3 per cent ($\Delta R^2 = 0.431$) of the variance in the strength of adoption, as calculated from the difference in R^2 for the model that includes the interaction term (Model 2, $R^2 = 0.952$) compared to the model that excludes it (Model 1, $R^2 = 0.557$). These results deduce that customers' experience essential moderated sharing facilitating conditions on consumers' behavioural intention and warrant the acceptance of hypothesis H3a.

Hypothesis 3b: Customers' experience moderates Effort Expectancy (EE) and Behavioural Intention (BI)

Statistically significant results are achieved from Model 1 and thus meet the moderation analysis requirements. In Table 5, Model 1 of the moderated hierarchical regression analysis, the results show

that consumers' experience and effort expectancy contributed significantly to the regression model, $F = 100.696$, $p < 0.05$ and reported for 54.1 per cent ($R^2 = 0.541$) of the explanatory power of the model. On Model 2 of the moderated hierarchical regression analysis, adding the interaction term (Customers' Experience*Effort Expectancy) failed to elicit a significant increase to the explanatory power of Model 2, $F = 1022.412$, $p > 0.05$. Moreover, as portrayed in Table 5, the standardised coefficient (beta) value for the moderation effect was very low and insignificant, $\beta = 0.003$, $p > 0.05$. Therefore, Hypothesis H3b is not supported. An inference may be made that customers' experience does not significantly moderate the relationship between effort expectancy and consumers' behavioural intention.

Table 5. Moderation Test Results for Gender on SSTs' Acceptance Variables and BI

Description of Test	Regression Model	Adjusted R^2	β	F	df	p-value	Decision
Customers' experience moderates Facilitating Conditions (FC) and Behavioural Intention (BI)	Model 1: Customers' experience, FC and BI	0.557		105.808	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, FC and BI	0.952	0.066	1087.182	3	0.007	Moderation supported
Customers' experience moderates Effort Expectancy (EE) and Behavioural Intention (BI)	Model 1: Customers' experience, EE and BI	0.541		100.696	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, EE and BI	0.948	0.003	1022.412	3	0.572	Moderation not supported
Customers' experience moderates Social Influence (SI) and Behavioural Intention (BI)	Model 1: Customers' experience, SI and BI	0.125		12.629	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, SI and BI	0.967	0.004	1601.299	3	0.163	Moderation not supported

Note: N = 172; Independent variables = Effort Expectancy, Social Influence and Facilitating Conditions; Moderator variable = Customers' experience; Dependent variable = Behavioural Intention; $p < 0.05$

*The change statistics are not beneficial for the first step because Model 1 is compared with an empty model (i.e., no predictors), which will be the same R^2 .

Source: Authors, 2022

Hypothesis 3c: Customers' Experience moderates Social Influence (SI) and Behavioural Intention (BI)

The results in Table 5 show that consumers' experience and social influence contributed significantly to the regression model, $F = 12.629$, $p < 0.05$ and accounted for 12.5 per cent ($R^2 = 0.125$) of the model's explanatory power. In Model 2 of the moderated hierarchical regression analysis, adding the interaction term (Customers' Experience*Social Influence) did not elicit a significant increase to the explanatory power of Model 2, $F = 1601.299$, $p > 0.05$. Moreover, as presented in Table 5, the standardised coefficient (beta) value for the moderation effect was very low and insignificant, $\beta = 0.004$, $p > 0.05$. Thus, Hypothesis H3c was not confirmed. An inference may be made that customers' experience does not significantly moderate the relationship between social influence and consumers' behavioural intention.

Test of Moderation Effect of Customers' Voluntariness of Use on the Relationship between Social Influence and Behavioural Intention

To successfully test whether the explanatory power of the relationship between social influence and behavioural intention is affected by the variable customers' voluntariness of use, a moderated hierarchical regression analysis was carried out (see Table 6). The following section outlines results of the tests for moderation effects of customers' voluntariness of use on the relationship between each antecedent of social influence and consumers' behavioural intention.

Hypothesis 4: Customers' voluntariness of use moderates the relationship between social influence and SSTs' usage behaviour.

Table 6 reveals that customers' voluntariness of use and social influence contributed significantly to the regression model, $F = 8.502$, $p < 0.05$ and is responsible for 9 per cent ($R^2 = 0.087$) of the model's explanatory power.

Table 6. Moderation test results for customers' voluntariness of use on Social Influence and Behavioural Intention

Description of Test	Regression Model	Adjusted R^2	β	F	df	p-value	Decision
Customers' Voluntariness of Use moderates Social Influence (SI) and Behavioural Intention (BI)	Model 1: Customers' experience, FC and BI	0.087		8.502	2	0.000	Proceed with moderation test
	Model 2: Interaction variable, FC and BI	0.949	0.001	988.288	3	0.415	Moderation not supported

Note: N = 172; Independent variables = Social Influence; Moderator variable = customers' voluntariness of use; Dependent variable = Behavioural Intention; $p < 0.05$

*The change statistics are not beneficial for the first step because Model 1 is compared with an empty model (i.e., no predictors), which will be the same as the R^2 .

Source: Authors, 2022

Adding the interaction term (Customers' Voluntariness of Use*Social Influence) on Model 2 of the moderated hierarchal regression analysis did not produce a significant increase in the explanatory power of Model 2, $F = 988.288$, $p > 0.05$. Furthermore, as depicted in Table 6, the standardised coefficient (beta) value for the moderation effect was very low and insignificant, $\beta = 0.001$, $p > 0.05$. The results do not support hypothesis H4, and an inference can be made that customers' voluntariness of use does not significantly moderate the relationship between social influence and consumers' behavioural intention.

Table 7. Summary of Hypotheses' Results

	Hypotheses	Findings	Result
H1: Customers' Age moderates the relationship between:	H1a: Performance expectancy, SSTs' usage intention and behaviour.	$\beta = 0.948$ $p < 0.05$	Supported
	H1b: Effort expectancy, SSTs' usage intention and behaviour.	$\beta = 0.246$ $p < 0.05$	Supported
	H1c: Social influence, SSTs' usage intention and behaviour.	$\beta = 0.540$ $p < 0.05$	Supported
	H1d: Facilitating conditions and SSTs' usage intention and behaviour.	$\beta = 0.228$ $p < 0.05$	Supported
H2: Customers' Gender moderates the relationship between:	H2a: Performance expectancy, SSTs' usage intention and behaviour.	$\beta = 0.110$ $p < 0.05$	Supported
	H2b: Effort expectancy, SSTs' usage intention and behaviour.	$\beta = 0.125$ $p < 0.05$	Supported
	H2c: Social influence, usage intention and behaviour.	$\beta = 0.040$ $p < 0.05$	Supported
H3: Customers' experience moderates the relationship between:	H3a: Facilitating conditions and SSTs' usage intention and behaviour.	$\beta = 0.066$ $p < 0.05$	Supported
	H3b: Effort expectancy, SSTs' usage intention and behaviour.	$\beta = 0.003$ $p > 0.05$	Rejected
	H3c: Social influence, SSTs' usage intention and behaviour.	$\beta = 0.004$ $p > 0.05$	Rejected
H4: Customers' voluntariness of use moderates the relationship between social influence and SSTs' usage behaviour.		$\beta = 0.001$ $p > 0.05$	Rejected

Source: Authors, 2022

Table 7 above summarises key findings from the study: a comparison is made between the hypotheses and findings and whether the hypotheses were supported or rejected. The results conclude that age posits a significant moderating effect on the relationship between performance expectancy and behavioural intention. The standardised β value was positive on H1a at $\beta = 0.948$ and significant ($p < 0.05$). The results for H1b were also significant $\beta = 0.246$, $p < 0.05$, signalling that age significantly moderates effort expectancy on behavioural intention and H1b is accepted. The standardised

coefficient (beta) value for the interaction effect was positive ($\beta=0.540$) and significant ($p<0.05$) on H1c. It follows that age posits a significant moderating effect on the variable social influence and consumers' behavioural intentions.

Gender posits a significant moderating effect on the relationship between consumers' performance expectancy and behavioural intention. Gender moderates the relationship between consumers' effort expectancy and behavioural intention. The beta value for the interaction effect was positive ($\beta=0.110$) and significant ($p<0.05$) for H2a. Hypotheses H2b can also be accepted, as the beta value for the interaction effect was positive $\beta=0.125$ and significant ($p<0.05$). H2c can be accepted with a beta value of $\beta=0.040$ and $p<0.05$. This signifies that gender moderates the relationship between social influence and behavioural intention.

Hypothesis H3a was supported with a β value of 0.066 and $p<0.05$. It may be posited that customers' experience moderates the relationship between facilitating conditions and customers' behavioural intention. H3b and H3c were rejected as the values were insignificant, with H3b $\beta=0.003$ and $p>0.05$, while H3c had low and insignificant $\beta=0.004$ and $p>0.05$ values. Customer experience does not have a significant relationship between effort expectancy and behavioural intention. Furthermore, customer experience does not have a significant relationship between social influence and customers' behavioural intention.

Hypothesis H4 is not being supported. The moderation effect's standardised coefficient (beta) value was very low and inconsequential for H4 with $\beta=0.001$, $p>0.05$. It may be concluded that customers' voluntariness does not significantly affect the relationship between social influence and consumers' behavioural intention.

DISCUSSION

According to the study's findings, gender moderates the following relationships: performance expectancy and SST behaviour intention; social influence and SST behaviour intention; and effort expectancy and SST usage behaviour intention. The relationship between facilitating conditions and usage behaviour, social influence and behaviour intention, effort expectancy and behaviour intention, and performance expectancy and SST behaviour intention was found to be moderated by age. It was discovered that the experience had only a moderating effect on the relationship between facilitating conditions and usage behaviour.

Unexpected findings revealed that there was no direct relationship between social influence and usage behaviour, contrary to previous research. This study adds to the Unified Theory of Acceptance and Use of Technology model by demonstrating that the moderating variable, voluntariness of use, has no moderating effect on technology use. Furthermore, experience has no moderating effect on effort expectancy and technology use; experience has no moderating effect on the relationship between effort expectancy and customer intention to use self-service technology at quick service restaurants. Furthermore, according to the findings of this study, age has a positive moderating effect on performance expectancy, effort expectancy, social influence, and facilitating conditions. The knowledge gained from this study's findings could be applied to the design of future self-service technology in restaurants to ensure that the features or design appeal to customers of all ages and genders, as gender was also found to significantly moderate the relationship between performance expectancy, effort expectancy, and social influence.

An education campaign should be prioritised to educate customers about the benefits of self-service while also ensuring that they understand that technology does not reduce employment but can be used to create other forms of employment; some of those who rejected technology stated that SSTs contribute to unemployment. Customers should have clear step-by-step instructions available at SSTs; for example, posters can be created. This can encourage using SSTs, resulting in businesses benefiting from these technologies. Customers' SST experience was found to have no moderating effect on the relationship between effort expectancy, the intention to use technology, and the relationship between social influence and usage behaviour. Restaurants that use SSTs or are considering introducing such

technology to their outlets should ensure that SSTs are designed in a way that would appeal to anyone, including novices.

CONCLUSION

Based on the findings of this study, the results suggest that gender moderates the following relationships: performance expectancy and SST behaviour intention; social influence and SST behaviour intention; as well as effort expectancy and SST usage behaviour intention. Age was found to moderate the relationship between facilitating conditions and usage behaviour, social influence and behaviour intention, effort expectancy and behaviour intention and lastly, performance expectancy and SST behaviour intention. Experience was found to only have a moderating effect on the relationship between facilitating conditions and usage behaviour. Unexpected findings were discovered in that voluntariness of use had no direct relationship between social influence and usage behaviour, which is contrary to previous research. This research contributes to the Unified Theory of Acceptance and use of the technology model in that the moderating variable, voluntariness of use, does not have a moderating effect on the use of technology. Furthermore, it should be noted that experience does not have a moderating effect on effort expectancy and the use of technology either; experience does not have a moderating effect on the relationship between effort expectancy and customer's intention to use self-service technology at fast service restaurants. From the findings of this study, it was noted that age contributes positively as a moderating effect on performance expectancy, effort expectancy, social influence, and facilitating conditions.

The knowledge about the findings of this study could be used in the design of future self-service technology at restaurants to ensure the features or design appeal to customers of all ages and gender, as gender was also found to significantly moderate the relationship between performance expectancy, effort expectancy, as well as social influence. An education drive should be prioritised to educate customers about the benefits of self-service while ensuring that they also understand that technology does not reduce employment but may be used to create employment in other forms; some of the respondents who rejected technology mentioned that SSTs contribute to unemployment. There should be clear step-by-step instructions available for customers at the SSTs; for example, posters can be created. This can encourage usage of SSTs which will in turn, see business benefiting from these technologies. As customers, SST experience was found not to have a moderating effect on the relationship between effort expectancy, the intention to use technology, and on the relationship between social influence and usage behaviour, restaurants that are using SSTs or contemplating the introduction of such technology in their outlets should ensure SSTs are designed in a way that would appeal to anyone, even to novices.

This research offers new insights into technology acceptance within the food services space; however, the study is not exempted from limitations of its own. This study was of an academic nature and as such, had to be completed within a specific period as prescribed by the academic institution. This meant the study could not be conducted over a longer period and as such, was limited to a cross-sectional time horizon. The issue of budget and time limits became a constraining factor where the research had to be conducted within the area of the city of Tshwane, focusing on the northern area only. While the sample was large enough to provide statistical conclusions, the results cannot be generalised. Future research should be conducted over a longer period to examine whether behavioural intention, as well as usage linked to technology can evolve over a longer period. Future studies should also investigate whether technology education might have a moderating effect on technology behavioural intentions and actual usage. This is coming from the discovery that was derived from this research in which other respondents felt threatened by technology. The notion that technology contributes to unemployment seems to contribute somewhat to technology rejection.

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