EXAMINING CONSUMER ATTITUDES AND INTENTIONS TOWARDS THE ADOPTION OF SELF-SERVICE FUEL STATIONS IN JOHANNESBURG, SOUTH AFRICA

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Abstract

The 21st century has brought about transformational and a rapid change in technological, political, and economic sectors in an effort to provide an improved customer service, self-service technologies (SST) were introduced in fuel stations globally. SST have redefined the nature of services and how service value is created. Self-service fuel stations (SSFS) first became popular in America around the 1930's. Developing countries such as South Africa have not implemented SST in fuel stations, embracing this service has been a challenge in the past. This study aimed to better understand consumer attitudes and intentions towards the adoption of self-service fuel stations in Johannesburg, South Africa. The study was quantitative in nature and adopted an online survey which was administered to 300 willing participants. The overall results show that motorists have a favourable attitude towards the adoption and implementation of SSFS in Johannesburg, South Africa. Motorists believe if they can observe a present relative advantage of the SST in fuel stations and in-turn perceive the technology as useful to them, then they are willing and intend to adopt SSFS. This study was an attempt to explore perspectives of Johannesburg motorists' attitudes and intentions towards the adoption of SSFS in the best way possible. A critical element of the research was provided to the fuel station owners and stakeholders to be able to come up with a structure that is solid and recognizable to bring forth the idea. As the current situation or status regarding SSFS is prohibited and no consumers are allowed to dispense fuel or diesel at the fuel station without the help of the petrol attendant. This research may enlighten by substantiating that the introduction of SSFS possibly will be achievable in Johannesburg grounded on the positive insights of motorists.

Keywords: Self-service, fuel stations, consumers, attitudes, adoption

INTRODUCTION

Over the past two decades, the introduction of self-service technologies (SST) has redefined the nature of service and how value is created (Abu-Shanab&Ghaleb, 2012). Services are increasingly being provided to customers through the use of SST. The adoption of SST is an emerging phenomenon in the service sector (Iqbal, Hassan &Habibah, 2018). These technologies have replaced the direct interaction between the buyer and the supplier of services, which allows buyers to utilize the service without the service provider (Meuter, Ostrom, Roundtree&Bitner, 2000). Li and Huang (2019) argue that the growth of SST in the

service industry is based on the premise that both service providers and customers benefit if SST are successful. Specifically, SST increase productivity, reduce costs while increasing customer experience and decreasing the waiting time (Meuter et al., 2000; Curran &Clark, 2003; Wang, 2012). As more service companies adopt the use of self-service technologies, it is important to understand how consumers feel towards this adaptation and how willing they are to the implementation of SST. Prior research on SST as far as consumer attitudes towards fuel stations was conducted by Uta, Chiliya, Chinomona and Chuchu (2016), the present study continues that discussion. According to Miller (2016) the fourth industrial revolution has brought about consumers who are constantly surrounded by digital domains, thus making them the perfect candidates for the adoption of SST. The petroleum industry has seen drastic improvements and upgrades over the years such as the service station framework, ownership, geographic and technological landscape (Matsho, 2010). Self-service fuel stations became popular firstly in America, as more Americans bought cars and travelled on the road. In the 1930s, there were more than 143 000 stations across the U.S (Simonovich, 2018). According to Jakle and Sculle (2002) there was a drastic change in the 1960's in the United States where the majority of the stations with SST pumps grew and became notorious and fashionable in the petroleum sector. Self-service fuel station technology has since become a debatable subject in many countries. New Jersey and Oregano were not in favour of the idea regardless of the legislation.

The rejection of self-service fuel stations (SSFS) was based on exposing unsafe situations to consumers through smoking while filling petrol which can ignite fire, petrol spillage and traffic congestion which might result in disservice. Researchers have noted that not all consumers in the 21st century may embrace SSFS (Meuter.et al., 2003; Reinders, Dabholkar&Frambach, 2008). There is no doubt that the 21st century will be characterised by chaotic, transformational, and rapid change regarding technological, political and economic transitions (Whetten& Cameron, 2011). In an effort to provide an improved customer service, developed countries have embraced and implemented self-service technologies at fuel stations (Crawford, 2010). Lee, Hsieh and Hsu(2011) point out that SST will be continued to be adopted by industries in order to obtain sustainable competitive advantage as well as increased convenience for the consumer. Although self-service fuel stations (SSFS) are growing more popular in most developed countries, it is still unclear whether SSFS can be adopted in emerging countries such as South Africa.

South Africa has not embraced SST the same way Europe and the United States have, and often choose traditional face-to-face contact as the preferred method of communication. Customers tend to embrace services that provide them with convenience (Mgxaji, Chinomona& Chuchu, 2016). Regardless of most of the country's retail influence coming from America, consumers are still a bit reluctant on the concept of SST (Erasmus, 2012), Regardless of the industry sector, 67% of South African consumers prefer taking matters into their own hands as they believe it saves them time and ensures convenience. According to Erasmus (2012), Total, the petroleum refining company, stated that there is a need for job creation in South Africa and thus was not willing to adopt the self-service technology in their fuel stations. This was because SST would limit employment opportunities.

Problem Statement

As stipulated in the introduction the fuel industry occupies a large section of the South African economy, therefore it is an area worth investigating. However, very little research has been conducted particularly focusing on motorist's attitudes and the exploration of the technology within fuel stations. Research has merely focused on service firms such as banks, hotels, fast-food restaurants, and supermarkets (Li & Huang, 2019).

THEORETICAL GROUNDING

Technology Acceptance Model

In exploring the attitudes affecting the adoption of self-service technologies, this study will use the technology acceptance model (TAM) by (Davis, 1989). Which has been used to study how individuals come to accept and use technology. Davis (1989) broke down the attitude construct into perceived ease of use and perceived usefulness. This model has been used in online shopping (Panchamia& Doctor, 2015), adoption of app-based taxi services (Roy, 2016) and online education (Cheng 2011). These examples mentioned have used this model when the technology is readily available to participants in the study (Leavell, 2019). However, with regards to self-service technologies in fuel stations, the technology is not readily available for participants. TAM is particularly relevant in this instance as it is the basis for the proposed model for the adoption of self-service fuel stations by motorists. In accordance with TAM, five main constructs exist and the most relevant in the adoption of self-service technologies are: Perceived Ease of Use (PEU), Perceived Usefulness (PU), attitude, behaviour intention and external variables (Tongnamtiang&Leelasantitham, 2019). PU indicates how the use of the technology will improve the consumer's performance and PEU represents the degree to which the technology seems to be free of effort (Mohammed, 2020).

The Diffusion of Innovation theory

Roger's (1995) theory is a social and psychological theory that aims to help predict how consumers decide to adopt an innovation by finding their adoption patterns and understanding its structure (Rogers & Shoemaker, 1993). This study will investigate the role of consumer's attitudes in the adoption of SST in South Africa using this as a grounding theory. The Diffusion of Innovation theory (DIT) has five innovation characteristics that are relevant to any adoption: (Complexity, Compatibility, Relative advantage, Observability, Trialability). Elements such as compatibility, relative advantage and observability are critical in determining levels at which SST are accepted by consumers.

The Unified Theory of Acceptance and Use of Technology (UTAUT)

This theory integrates eight models on the elements of technology acceptance behaviour intention. It combines the Theory of Planned Behaviour (TPB), the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), the motivational model, the combined TAM and TPB model, the model of Personal Computer (PC) utilization, The Diffusion of Innovation theory (DIT), Social Cognitive Theory (SCT) (Kijsanayotin,Pannarunothai&Speedie, 2009; VenkateshMorris, Davis & Davis, 2003). UTAUT has been used by a few studies to explore the adoption of SST as it has strong explanatory capabilities. Research on the acceptance of automated road transport systems (Madigan et al., 2016), and consumer's intentions and adoption of internet banking (Alalwan et al., 2018) was based on the UTAUT theory. The model has been modified within self-service technologies to allow for external constructs. There are four main constructs that are

proposed as key direct predictors of behaviour intentions: (performance expectancy, effort expectancy, social influences and facilitating conditions). External constructs are self-efficiency, innovativeness and trust and risk (Abu-Shanab, 2010). However, consumers are more aware of perceived risk which is an important variable that cannot be ignored (Tandon et al., 2018). In the context of self-service fuel stations, motorists' willingness and attitudes towards this technology will be affected by multiple psychological factors. This study will adopt two psychological factors in the UTAUT model (effort expectancy and behavioural intention) for understanding the consumers' attitude and willingness to use self-service fuel stations.

LITERATURE REVIEW

Attitude

The opinions, perspectives and feeling towards one thing, which may be positive or negative views that are not valid (Tongnamtiang&Leelasantitham, 2019). Attitude towards adoption of technology is associated with relative advantage and adoption intention of that technology (Venter de Villiers, Chuchu &Chavarika, 2020). Researchers, such as Hampshire (2017) and Wang (2012), have presented conceptual frameworks for investigating consumer attitudes towards technology adoption in the retail context. Attitude is seen to play an important role in the intention or acceptance of using self-service technologies. This is because the right customer attitudes are an imperative driver for financial performance any organisation (Mashele& Chuchu, 2018; Stank & Autry, 2011). This study therefore uses attitude to determine changes in motorists' behaviour to accept the use of self-service fuel stations.

Perceived Usefulness

Taken from TAM by Davis (1989). PU is the motorists' subjective probability that using self-service technologies in fuel stations will fill their tanks more efficiently and in a timely manner. Hyun-Joo& Lee (2013) suggested that PU is important in determining consumer's attitudes towards the use of self-service technologies (Tongnamtiang&Leelasantitham, 2019). PU is also important in changing the attitude towards using or accepting self-service technologies (Demoulin&Djelassi, 2016).

Perceived Ease of Use

Taken from TAM by Davis (1989) and UTAUT model (Venkatesh et al., 2003), PEOU refers to the degree to which prospective consumers expect service to be free of effort (Tongnamtiang&Leelasantitham, 2019). Perceived ease of use influences attitudes towards use of technology (Jaradat&Twaissi, 2010; Maziriri, Gapa& Chuchu, 2020). Kim (2016) and Fernandes andPedroso (2017) used this construct to determine how it plays an important role in changing attitudes towards accepting SST adoption. In investigating the attitudes towards motorists' intention to use SSFS, perceived ease of use will be added to the conceptual model.

Compatibility

Examines how the users' previous experience with similar technologies can affect the PU and PEOU (Min,So, &Jeong, 2019). Rogers (1995) defined compatibility as the extent to which a service is perceived as common with users' existing values, beliefs, habits, and past and present experiences. Research found that compatibility and the adoption of new technology have a positive relationship (Tung, Lee, Chen, & Hsu, 2009; Wu & Wang, 2005). With South

African consumers being more open to self-service technologies in retail and even banking services, the idea of South African motorists being more willing to adopt SSFS is present.
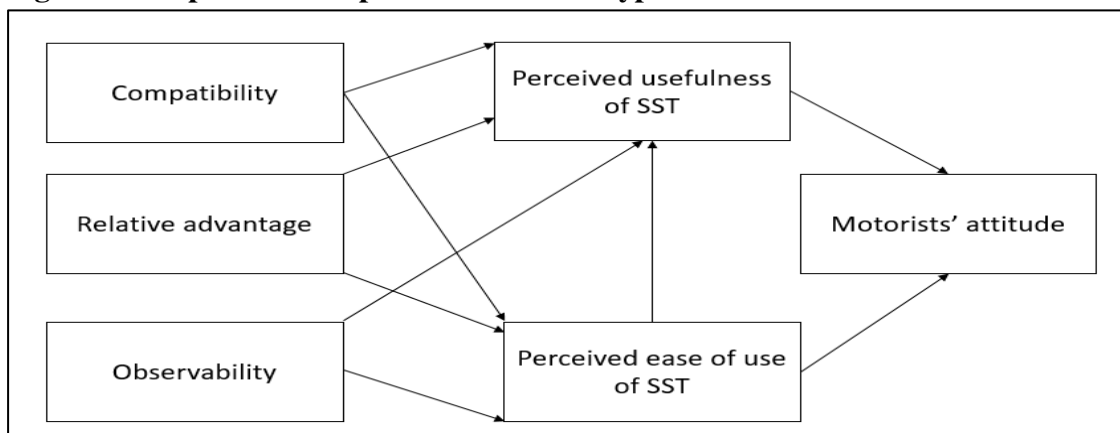
Relative Advantage

Taken from Rogers (1995) theory of Diffusion of Innovation. The perception of innovation is defined as the use of self-service technologies in fuel stations making motorists receive greater benefits than the usual method of petrol attendants filling their tanks. These benefits can be lower operating costs, reduced time of filling the tanks, and direct service which makes fast and easy to use. Many researchers in the retail context have identified the use of relative advantage as an important factor in describing attitudes of consumers towards the use of technology and innovation (Amaro& Duarte, 2015; Dash, Bhusan&Samal, 2014). Relative advantage is thus defined as the degree to which the use of SSFS provides a greater perceived benefit to motorists than the use of petrol attendants.

Observability

This is the extent to which an innovation is visible to the members of a social system and the benefits can be easily observed and communicated (Min et al., 2019; Rogers, 2003). Previous studies by Lee et al., (2011) integrating DIT with TAM, proposed that when employees can easily observe the system, it had a positive effect on PU and PEU. Research states that consumers are more likely to adopt new technologies when their benefits are visible to them (Park & Chen, 2007). Therefore, as SSFS are a new innovation in South Africa they could provide benefits to potential motorists prior to their actual use of the self-service fuel station. Observability, in this context, would be the information of the expected lowered costs of petrol and the new estimated service delivery time and efficiency. These observable features can be considered to positively affect PU and PEOU. Figure 1 presents the study's conceptual model.

Figure 1: Proposed Conceptual Model and Hypotheses Statements

Hypotheses Statements

H1: *Compatibility is related to perceived usefulness ofSST.*

H2: *Compatibility is related to perceived ease of use of SST.*

H3: *Relative advantage is related to perceived usefulness of SST.*

H4: *Relative advantage is related to perceived ease of use of SST.*

H5: *Observability is related to perceived usefulness of SST.*

H6:*Observability is related to perceived ease of use of SST.*

H7: *Perceived ease of use of SST is related to perceived usefulness of SST.*
H8: *Perceived usefulness of SST is related to motorists' attitude.*
H9: *Perceived ease of use of SST is related to motorists' attitude.*

The study proposed the abovementioned hypotheses which will be tested later in the research. The following section of the paper explores the study's research methodology.

RESEARCH METHODOLOGY
Research Design
The purpose of this investigation is to provide solutions to the problems posed in this study and to examine consequent data regarding these questions of the investigation in a method which explains both validity and reliability. Scientific research adopts qualitative and quantitative methodologies in conducting research (Creswell & Plano Clark, 2017).For the purpose of this study a quantitative approach due to its objective nature (Jamshed, 2014: MacKenzie, & Barker, 2013).

Target Population
Majority of fuel stations are located around city areas and a large percentage of the residents own motor vehicles, this research will then focus on the Johannesburg area, Gauteng. These are motorists who drive around Johannesburg and hold a valid driver's license for motorcycles, light passenger vehicles and large heavy motor-vehicles. The area chosen has a high threshold of motorists which consists of working and learning institutions. Furthermore, motorists have to be above the age of 18years as that is the minimum age to hold a licence in South Africa. The age range of 18 to 50 will be focused on in order to have a good representation of a diversified population.

Sampling
For the purpose of this study convenience and snowballing methods will be adopted as the members of the population meet criteria such as easy accessibility, geographical proximity and easily accessible (Leiner, 2014). Furthermore, it is attested that when using convenience sampling the researcher selects the elements because they are at "the right place at the right time. A sample above 300 participants was deemed suitable for purposes of the study.

RESULTS
This section provides an overview of the respondent profile, the model fit and hypotheses results.

Table 1: Sample Profile

Gender	Frequency
Male	122
Female	171
Preferred not to say	7
Total	**300**
Age	**Frequency**

18-25	91
26-35	97
36-45	75
46-50	33
Preferred not to say	4
Total	**300**
Financial Status	**Frequency**
Employed	196
Not Employed	96
Preferred not to say	8
Total	**300**
Customer Type	**Frequency**
Self-service	81
Non-self-service	219
Total	**300**

The table above presents the sample profile for the study. A total of 300 willing individuals participated in the study. The participants provided information on gender identity, age, financial status and their service preference. Notably, females were the largest group and in terms of age, participant aged young adults accounted for more than half of the sample. Most of the participants indicated that they were employed. However, some participants did not provide information on certain categories that they were not comfortable with. It is interesting to note that despite support for self-service technologies in the literature, this study clearly revealed that some customers remain highly sceptical towards this new approach to receiving services. The following table presents the findings from the hypotheses followed by a discussion.

Table 2: Hypotheses Results

Hypothesis		Estimate	P-value	Decision
C to PU	H1	0.326	***	Supported and significant
C to PEOU	H2	0.450	0.017	Supported and significant
RA to PU	H3	0.450	***	Supported and significant
RA to PEOU	H4	0.020	0.848	Suppoted and but not significant
OB to PU	H5	0.058	0.225	Supported but not significant
OB to PEOU	H6	0.462	***	Supported and significant
PEOU to PU	H7	0.001	0.991	Supported but not significant
PU to ATT	H8	0.628	***	Supported and significant
PEOU to ATT	H9	0.046	0.388	Supported and but not significant

Key: PU: Perceived usefulness of SST, ATT: Motorists' attitudes, PEOU: Perceived ease of use of SST, C: Compatibility, RA: Relative advantage, OB: Observability

P-value level of significance is less than 0.05

The table above, Table 2, presents findings from the hypotheses testing. The first hypotheses, H1 (compatibility and perceived usefulness) had an estimate of 0.326 and a p-value lower than 0.01 as indicated by ***. This result was both supported and significant suggesting that compatibility with SST led to motorists' view that this technology was actually useful therefore making them more likely to use them. H2 (compatibility and perceived ease of usefulness) this relationship was also supported and significant with an estimate of 0.450 and p-value of 0.017, this meant that perception of the usefulness of SST was linked to their potential ease of use. The third hypotheses, H3 (relative advantage and perceived usefulness), was supported having an estimate of 0.450 and significant at p<0.01 suggesting that perceived usefulness was based on the motorists' perception of SST providing advantages such as convenience to the user.

The fourth hypotheses, H4 (relative advantage and perceived ease of use), was supported having an estimate of 0.020 and was not significant at p<0.01 as it had a value of 0.848 suggesting that perceived ease of use had a relatively low advantage in the eyes of the motorists. However, they did acknowledge that an advantage was there, just not important enough to significantly influence their decision-making. H5 (observability and perceived ease of use), was supported having an estimate of 0.058 not significant at p<0.01 as it had a p-value 0.225suggesting that perceived ease of use of SSTwould be a possibility but not a major factor to the motorists'. The sixth hypotheses, H6 (observability and perceived ease of use), had an estimate of 0.462 and a p-value, lower than 0.01, which meant the relationship was both supported and significant. The motorists actually felt that this is something they envisioned doing one day. H7, (perceived ease of use and perceived usefulness) were supported and ironically had the weakest of all supported relationships. It is imperative to note that of all the relationships, this was the most insignificant with a p-value of 0.991. Possibly respondents felt there was not much to say about the relationship because they might have seen perceived ease of and perceived usefulness as the same thing. Another possibility was that maybe the relationship was vague for the participants. H8, was a very strong and significant relationship between perceived usefulness of SST and motorists' attitudes towards SST. This was very evident with an estimate of 0.628 which was the highest and a p-value lower than 0.01. It is important to note this was also the strongest of all relationships clearly showing that Johannesburg motorists were very willing to adopt SSTS.

Last, surprisingly the last hypothesis, H9 (perceived ease of use and attitudes) had a very weak relationship even though it was supported. This relationship had an estimate of 0.046 and a p-value of 0.388. This relationship was not significant, maybe it was that because motorists' felts perceived usefulness was all that mattered to them, making perceived ease of use irrelevant. It was therefore established that Johannesburg motorists are more likely to have a favourable attitude towards self-service fuel stations (SSFS) if they perceive the technology as useful to them. When motorists compare their compatibility of self-service technologies they use regularly, they have a favourable attitude to the intention to use self-service technology at fuel stations. Motorists' compatibility with self-service technology (SST) is supported by both the perceived usefulness and ease of use of SST which further indicates the positive influence these variables have on the attitude of the motorist.

The relative advantage of motorists positively influences the perceived usefulness of the motorists, and thus we can assume that if motorists see the relative advantage of SSFS they will have a more favourable attitude towards the intention to use SSFS. In conclusion, Johannesburg motorists will have a more favourable attitude with the intention to use SSFS in South Africa if they perceive the technology as useful to their routine at fuel stations. The perceived ease of use is not an important variable when it comes to the attitude of the motorists in this study. The next chapter will conclude on the research and provide the managerial implications, research findings, recommendations and the limitations and future studies.

CONCLUSIONS

The findings from the research demonstrate that there seems to be an overall agreement that SSFSs may perhaps be adopted by motorists in Johannesburg. This is quite evident as there is a positive attitude amongst motorists and their intention towards the adoption of the innovation. With the approved hypotheses, the results of the study conducted show us that Johannesburg motorists are more likely to have a favourable attitude towards self-service fuel stations (SSFS) if they perceive the technology as useful to their routine at fuel stations. The perceived ease of use is not an important variable when it comes to the attitude of the motorists in this study. The study makes it known that consumers are providing more and more of their own service. In the place of full service, the technical uprising of the past two decades has created widespread chances for networks to put systems in place that allow customers to provide their own service. These self-service technologies enable customers to perform entire services on their own without direct assistance from service providers. This is with the hope that conducting their own service is more useful to them than the help of service providers. It is important for fuel stations to begin looking at the implementation and feasibility of SSFS in South Africa. Motorists may be easily convinced of the service if it poses as an SST which will be useful to them and how they like to receive their service.

Recommendations

Consumers need to be aware that there is a benefit in implementing the SSFS in Johannesburg and that can be achieved by involving stakeholders. Through identifying operative methods of assisting to improve motorists' attitudes concerning the adoption of SSFS to warrant that these innovations may possibly be extensively recognized by the prospective market (Barnes, 2003). Also, it can be noted that the fuel prices in South Africa are constantly increasing which is putting more pressure on the consumers. It is imperative for leaders to recognize that as with the implementation of SSFS customers stand a good chance of paying less for the fuel and saving money. Henceforth, this may successively benefit service stations to develop more workable and help increase their profit-margins for owners as well and increase brand equity.In order to make the implementation of SSFS attractive to the motorists, owners need to consider training as a priority to ensure smooth transition. Elements such as value-proposition of convenience and service experience need to be leveraged on to ensure that the motorists' attitudes and intentions are positive towards the adaptation of SSFS.

Limitations and Suggestions for Further Research

Regardless that the largest percentage of the respondents seems to have a positive attitude towards the adoption of SSFS. It can also be noted that the research was piloted with a

sample of 300 respondents, which is not full representation of the South African population, the number was too little to some degree. Therefore, it was not appropriate to link the entire findings to be universal to the South African population. In addition, it was noted from the participant's results that the neutral choice on the Likert scale was often chosen, it can be suggested that the cause could stem from the fact that participants are lazy to engage and therefore end up just choosing neutral as an answer (Garland, 1991).While the research delivered abundant understanding keen on consumer's attitude and intention on adopting SSFS by Johannesburg motorists, the study failed to sufficiently delve on the standpoints of other participants. These include, but not limited to owners, board members who have the power in making decisions and are most advantageous in steward shipping the idea to the high power or decision makers.

Furthermore, the issue of customer dissatisfaction with SSFS was not fully addressed as there were not many questions relating to that, issues such failure of the technology during the initial encounter with the SSFT as well as what could occur later in the service delivery process. Despite the fact customers appreciate the convenience and easy access of SSFS it can be noted that every single advantage can be lost when SSFS fail, which may force consumers to return to more conventional service delivery options. Future studies can also pursue to reveal why some consumers are not interested in using SSFS, is it based on the fact that they prefer human intervention or the fact that they do not trust SSFS as a form of customer servicing? In addition, there can be more research focusing on the viability of adopting SSFS in Johannesburg by observing at the viewpoints of petrol attendants and the fuel stations owners as this perspective may yield different results and give further knowledge in the subject matter.

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