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Factors Determining Self-Servicing Technology Adoption on Payment of Electricity Bills

R. Rajesh Kannan and S. Vasantha

Abstract Information Communication and Technology has developed to a vast extent and helps for better service quality. Self-service technologies assume significance as people start rapidly using this all over the country. Many transactions in real time are carried out by means of several self-service technologies. Using self-service technologies for the payment of electricity bills has become convenient, simple and easy to do even from remote places. Present day, people switch over to these technologies due to many benefits being accrued to users as whole rather than normal payments by depending on others. This paper highlights three important elements or factors such as personality traits, dominating factor and consumer satisfaction which drive consumer's technology adoption on payment of electricity bills through various viable online platforms to avoid standing in long crowded queue.

Keywords Consumer technology adoption · Electricity bill payments · Self-service technology

1 Introduction

Self-service technologies (SSTs) are application of scientific knowledge interfaces that allow end users to provide services that are apart from direct service [1]. Self-service systems are replacing many face-to-face service experiences in order to make service transactions more accurate, easier and quicker. Technology-oriented services (i.e., self-service technologies (SSTs)) are now being introduced by companies offering services to give customers convenience that helps to achieve higher turnover and contentment [2–4]. Generally, it is the customers' choice to make use of technological innovation. This process gets dominated by various consumer elements, namely character traits, social, economic and demographic factors, the attributes of the newly launched product, such as its comparative benefits and convolution and

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socioeconomic effects, such as opinion leaders. For the subject of revolutions related to technology, the process of adoption gets governed by many technologies that are associated with the newly launched product. Innovative technologies are all set to expressively mark the functions. Innovation's characteristics indicate a group of benefits that a product may offer to the consumers in payment of electricity bills with the use of SSTs. More specifically, latest technologies recommend four sorts of unique characteristics of innovation that are most likely to influence the process of adoption in payment of electricity bills.

1.1 Concept of Self-Service Technology

This technology helps the end users to avail services without meeting with the service provider. It is a big part of our lives, regardless of 6 or 60 years of age. The real thing behind this technology is that it is more advantageous to both buyer and seller. The consumers save their time in travel with a minimum cost, whereas the seller sells more in a reduced cost which in turn leads to increase the satisfaction and loyalty to the customers. In current times, self-service technologies remain inevitable, exclusively in customer service activities. The origin of smart phones, social media and the Internet of Things means that we get embraced by culture of accomplishment. We may have used self-service technology without getting to know about it. Below are some examples with regard to self-service technology:

- ATMs
- Technology-enabled services at petrol bunks
- Payment of electricity bills through various viable online platforms to avoid standing in long crowded queue.
- Services enabled by Internet
- Phone-enabled services.

Self-service technology has become very common and mostly used by sizeable amount of population in these days across the country. This study is restricted to Chennai City where people who make their electricity bill payment through various self-service technologies like Paytm, Google Pay, Net Banking, Debit Card, Jio Money, Mobile Pay and Mobile Banking and so on. But, these facilities are available only in major cities across India. But, people from village vicinities are not covered by such facilities. People who are tech savvy can handle self-service technology, but the same is not the case with the people who are not sound in technology. Some features in self-service technology are highly thorny and tricky. Some people hesitate to use self-service technology at the time of paying their electricity bills.

Even electricity boards in rural semi-urban areas are not covered by these facilities due to lack of Internet connection and poor network coverage. Transactions are often interrupted in the middle of the process. So, people find it difficult to complete the process till its end. Therefore, Internet services providers in India have to wake up to these issues and address the issues in the years to come and facilitate remotely living
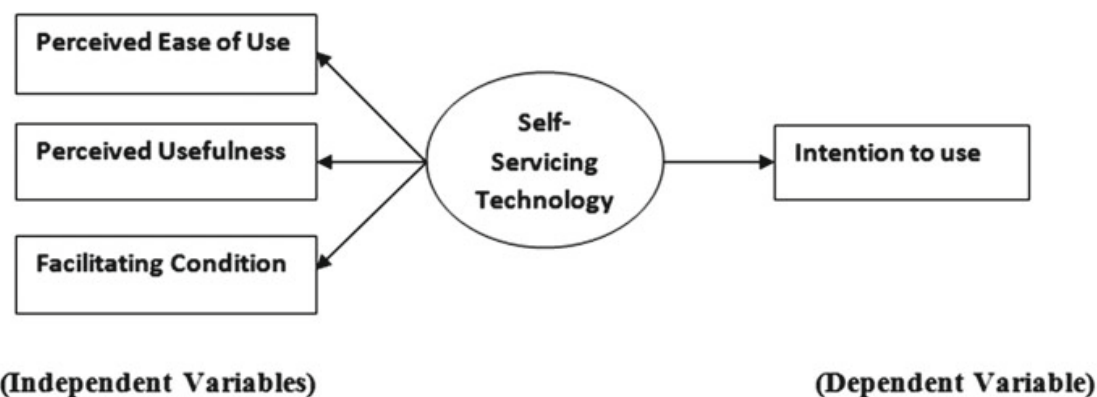
Fig. 1 Factors determining self-servicing technology adoption on payment of electricity bills

people by ensuring that they do get the facilities on par with the people of cities. Government of India has to launch fiber-enabled Internet connection and fiberless Internet connection facilities to interior areas where such facilities do not have. It is the costly affair and involves low income generation. That is why government at the center and state is not interested in this project, thus leaving people living there in lurch. Consumer satisfaction increases with continuous usage of self-service technologies. Many people have started becoming aware of this technology as it reduces their burden on paying not only electricity bills but also other payments as a whole.

Even Tamil Nadu Electricity Board (TNEB) has to come out with many more user-friendly self-service technologies in collaboration with leading software companies in India and abroad. So that, usage of self-service technologies will be used by almost all the people across Tamil Nadu in general and Chennai City in particular.

2 Proposed Conceptual Model

See Fig. 1.

3 Objectives of the Study

This research article is undertaken keeping in view the following objectives. They are listed below.

1. To examine the factors determining self-servicing technology adoption for payment of electricity bills
2. To analyze the effect of self-servicing technology factors on intention to adopt self-servicing technology for payment of electricity bill

4 Statement of the Problem

Customers are facing so many challenges for adopting self-servicing technology inspite of so many advantages present in the system. Several self-service machines depend primarily on optical wits of users, for example, screen displays or commands fed in the interface of the machine. People with visual impairment may not be able to touch the screen or see the display. People with dyslexia and having low literacy cannot figure out the content exhibited or the instructions of use displayed on the screen. People having issues like manual dexterity, such as missing appendages, hand shocks or issues regarding eye and action coordination may face difficulties to utilize such features as touch screens.

Aged population, people having eyesight difficulties or people who are slow in understanding the message may require more time to come to contact and may often get "timed out". People, who are handicapped, would have difficulty reaching close enough to access the controls of the interface to use the machines in case such controls are positioned at an inaccessible height. This may also be an issue for people of less height and children. Similarly, some people are not tech savy resulting in paying their EB through offline. Sometimes due to disruption in network service, transactions cannot be processed immediately. This will upset the users. Self-service technology is less effective for the people living in tribal areas or areas where there is no facility of Internet connection. So, this paper attempts to study the factors such as personality traits, dominating factor and consumer satisfaction which drive consumer's technology adoption on payment of electricity bills through SSTs.

5 Scope and Importance of Study

Researcher has indicated the significance and scope of self-service technology in this article. Self-service technologies play pivotal role in assisting the sizeable number of consumers. People irrespective of any level of education have started slowly learning self-service technology. The pattern used in SST is simple to operate and easy to understand. That is why, many online transactions are made easy. Nowadays, people like to use self-service technology due to which any number of transactions can be done within a stipulated period of time. Offline transactions are gaining less momentum, and self-service technologies reduce the processing time of transactions, minimize the risk of transactions and increase the morale among consumers. This article discusses how SST works and various factors that determine the payment of electricity bills through SST.

6   Review of Literature

6.1   Perceived Ease of Use

Mittal et al. [5] said that convenience or ease of use for a technology makes the adoption easier. However in addition to the ease of use, there are other factors such as gender, age, qualification and occupation which may impact adoption and usage of technology.

Zhu et al. [6] said that the managerial understanding of customer preference is very important for successful implementation. Also, providing informed choices creates a sense of control and makes a customer comfortable while using SST. **Weijters et al.** [7] in this paper explained that increasingly, retailers are moving to self-service technologies (SSTs) to increase efficiency and service quality while reducing costs. The authors present a process model in order to explain the meaning and results of self-servicing usage by end users in an in-store environment. The model was validated based on a combination of survey and observational data. Perceived utility is identified as main factors of customer attitude toward the SST. The actual use of technology was predicted by consumer attitude toward the SST. It examined the influence of the use of SST on the actual time spent in the shop by clients. The authors examine the effect of the use of SST on customers' perceptions of waiting time and, thus, on their level of satisfaction with the shopping experience. Finally, the moderating effects of age, training and gender are studied.

6.2   Perceived Usefulness

(Eriksson and Nilsson [8]**)** This research focuses on the ongoing use of self-service technology by consumers. As most research focuses on the adoption or acceptance of SST by consumers, this area is often overlooked. In contrast to the acquisition of new customers, continuous use is a cost-effective business practice to attract buyers. The researcher finds, based on a survey of 1831 Estonian Internet banking customers, that the continued usage of SST is positively influenced by the perceived utility of buyers. Continued SST use is also found to be negatively affected by multichannel satisfaction. As the results show, creators of SSTs and sellers using SSTs face two big problems. In the beginning when the buyer finds the SST useful, the continued use of the SST is carried out. Next, in the sense of all channels in the buyer–seller interface, SSTs need to be presented because the buyer cannot separate the service offering of an SST from other channels. If these strategic questions are taken into account, the advantages associated with using SSTs would increase.

(Oyedele and Simpson [9]**)** The paper (2007) seeks to analyze potential impacts on the decision to use SST in a shopping, library and hotel situation of the control locus, autonomy, self-efficacy, technology anxiety and time pressure. The essence of the analysis was empirical. Data for the study came from 187 college students

from four different departments in classes at a southern regional university. Overall, the results show that highly technophobic clients and those with a lasting mentality that all events in life are predestined are typically more likely than others to prefer checkout service employees rather than self-service checkout systems, depending on the situation, regardless of individual need for control and achievements.

6.3 Facilitating Conditions

(**Considine and Cormican** [10]) In this research article, it is said that self-service technologies (SST) have become omnipresent in modern life. Four measurements of the SSTQUAL quality scale were taken, namely (a) functionality, (b) security, (c) design and (d) customization, those elements were analyzed, and finally, the findings resulted that SST increases the customer satisfaction.

Sedighimanesh et al. [11] said that self-service technology was used as a platform to make the consumers feel happy. Large number of transactions was made through SST rather than other mode of platform. Many limitations were reduced to minimum and increased the confidence of the users.

Castro et al. [12] mention the importance of adequate measures to be put in by policy makers to encourage usage of SSTs. **Shahid Iqbal** [13] states the importance for service organizations to understand the consumer behavior, preferences and factors which may create satisfaction or dissatisfaction among consumers while implementing the SSTs. The firm should employ methods which provide greater autonomy to the consumers for making the choices. **Sovona** [14] said that consumers avoid usage of SSTs due to doubt and fear. The promotional campaign of an organization should target to remove this fear and promote comfort in minds of consumers. This can be done by enhancing both the knowledge for usage and of potential benefits.

6.4 Self-Servicing Technology Factors

(**Jayasimha and Nargundkar** [15]) In many sectors, the notion of full service is rapidly vanishing. Self-service either supported by technology or otherwise greatly alters the way most services are created and delivered. Although the Banking and Financial Service Industries (BFSI) continue to make substantial investments in technology, the use of technology-mediated self-service is also rapidly spreading to other sectors. Past studies have examined both active and passive SSTs as well as demand-based and supply-based problems in implementing SSTs. However, as SSTs extend to new services, to new cultural and organizational environments, further research is needed. This paper provides a number of research ideas on the basis of a critical literature review that can be empirically operationalized and assessed.

With the advancement of marketing [16, 17], for the perfect delivery of customer services, companies have variations of SST interfaces. For example, airline passengers can not only book tickets, but can also use the Internet and cell phones for payments by using online check-in. They will take printouts of their entry ticket at airport kiosks and receive the details regarding their journey to flew in air on their smart phones.

6.5 Intention to Use

(**Liébana-Cabanillas et al.** [18]) The present study develops a conceptual model in order to analyze the strategy to use mobile payment services in the emerging market. The study hypotheses were tested using structural equation modeling technology. The findings support the effect on the perceived usefulness of mobile payment services of innovation, stress and perceived ease of use. Subsequently, perceived utility, perceived happiness, perceived danger and perceived trust affect the intent of using mobile payment services. The results include options for companies to consolidate this technology-based payment service.

Magotra et al. [19] mention that the technology-specific attributes are as important as customer attributes. The kind and variety of functionalities a SST can perform help in early adoption and usage.

7 Research Methodology

The research design followed in the study is descriptive in nature. The study is based on both primary and secondary data. Purposive sampling technique has been adopted to choose 300 respondents. The structured questionnaire has been used to collect the primary data. The pilot study has been conducted with 60 respondents to test reliability of the questionnaire. The Cronbach alpha value of all the items is found to be greater than 0.76. The proposed conceptual model was tested with structural equation modeling (SEM).

From Table 1, it is clear that majority (54%) of the respondents come under the age group of 41–50 years and 2.7% (4) respondents belong to the category of above 50 years age group which shows that aged people are not interested in using SST. Regarding the occupation of the respondents, 58.7% of the respondents are employed and 6.7% of the respondents are doing their own business which implies that employed people are preferring the usage of SSTs as they are not able to devote their time for standing in queue. Among the respondents, 36% of them are undergraduates and 9.3% of them belong to the group of below 10th standard which implies that people who are having minimum educational knowledge only prefer SSTs. As far as the experience of the respondents, 41.3% belongs to 6–10 years and 2.7% belongs to 16–21 years.

Table 1 Demographic profile of the respondents

Age	Frequency	Percent
Below 20 years	22	7.3
21–30 years	76	25.3
31–40 years	86	28.7
41–50 years	108	**36.0**
Above 50 years	8	2.7
Occupation		
Student	26	8.7
Professionals	78	26.0
Own business	20	6.7
Employed in Pvt/public/MNC company	176	**58.7**
Education		
Below 10th STD	28	9.3
Higher secondary	64	21.3
Undergraduate	108	**36.0**
Others	72	24.0
Professional	28	9.3
Experience		
Below 1 year	24	8.0
1–5 years	10	3.3
6–10 years	124	**41.3**
11–15 years	106	35.3
16–21 years	8	2.7
Above 22 years	28	9.3
Total	**300**	**100.0**

Table 2 clearly depicts that 48.7% of the respondents use SSTs fortnightly and 8.7% of the respondents use SSTs monthly which implies that the frequency in usage of SSTs is slowly in an increasing trend among the respondents (Table 3).

Table 2 Frequency usage of self-servicing technology

Frequency of using self-servicing technology	Frequency	Percent
Daily	58	19.3
Weekly	30	10.0
Fortnightly	146	48.7
Monthly	26	8.7
Annually	40	13.3
Total	300	100.0

Table 3 Correlation analysis

	Perceived ease of use	Perceived usefulness	Facilitation condition	Intention to use
Perceived ease of use	1	0.797[**]	0.598[**]	0.437[**]
Perceived usefulness	0.797[**]	1	0.617[**]	0.300[**]
Facilitation condition	0.598[**]	0.617[**]	1	0.334[**]
Intention to use	0.437[**]	0.300[**]	0.334[**]	1

**Correlation is significant at the 0.01 level (2-tailed)

The correlation coefficient between perceived ease of use and perceived usefulness is 0.797, which indicates 79.7 percentage positive relationships between perceived ease of use and perceived usefulness are significant at 1% level. The correlation coefficient between perceived ease of use and facilitating condition is 0.598, which indicates 59.8 percentage positive relationships between perceived ease of use and facilitating condition are significant at 1% level. The correlation coefficient between perceived ease of use and intention to use is 0.437, which indicates 43.7 percentage positive relationships between perceived ease of use and intention to use are significant at 1% level. It can be inferred from the table that all the SST factors are positively correlated with each other. It is also inferred that perceived usefulness and perceived ease of use have high positive correlation of 79.7% and perceived usefulness and intention to use have low positive correlation of 33.4 at 1% significance level.

7.1 Hypothesis Framed

H_1: There is significant relationship between self-servicing technology factors and intention to use.

Sub-Hypothesis

H_a: Perceived ease of use influences self-servicing technology factors.

H_b: Perceived usefulness influences self-servicing technology factors.

H_c: Facilitating condition influences self-servicing technology factors.

Observed and endogenous variables: Perceived ease of use, perceived usefulness, facilitating condition, intention to use.

Unobserved and exogenous variables: $e1$–$e4$ and self-servicing technology factors.

Figure 2 displays the path analysis model for the research study, and it has been tested by using AMOS software to analyze the relationship between the variables used
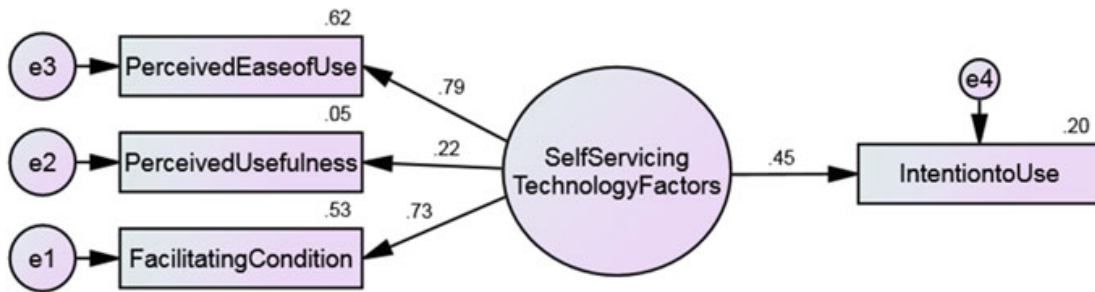
Fig. 2 Impact of self-serving technology factors on intention to use

in the study. The constructed model illustrated the path analysis to identify the model fit and to examine if there is any significant relationship between the study variables. The model has totally nine variables including observed, unobserved, endogenous and exogenous variables.

Table 4 highlights the cause and effect relationship between the self-servicing technology factors and intention to use. Self-servicing technology factors have positive influence on intention to use with an unstandardized coefficient value of 0.074. The estimated positive sign implies that such an effect is positive. There exists a positive relationship between self-servicing technology factors and intention to use. The unstandardized coefficient value is significant by 1% level of significance since the value of p is lesser than 0.05. Therefore, the hypothesis (H$_1$) "There is significant relationship between Self-servicing technology factors and Intention to use" is accepted.

Unstandardized coefficient of self-servicing technology factors on perceived ease of use is 0.975. Perceived ease of use has positive influence on self-servicing technology, holding other path variables as constant. Unstandardized coefficient value is significant by 1% level of significance since the value of p is lesser than 0.05. Therefore, sub-hypothesis (H$_a$) "Perceived Ease of Use influences Self-Servicing technology factors" is accepted.

Unstandardized coefficient of self-servicing technology factors on perceived usefulness is 0.208. Perceived usefulness has positive influence on self-servicing technology, holding other path variables as constant. Unstandardized coefficient value is significant by 1% level of significance since the value of p is lesser than 0.05. Therefore, sub-hypothesis (H$_b$) "Perceived usefulness influences Self-Servicing technology factors" is accepted.

Unstandardized coefficient of self-servicing technology factors on facilitating condition is 1.000. Facilitating condition has positive influence on self-servicing technology, holding other path variables as constant. Unstandardized coefficient value is significant by 1% level of significance since the value of p is lesser than 0.05. Therefore, sub-hypothesis (H$_c$) "Facilitating condition influences Self-Servicing technology factors" is accepted (Table 5).

Table 2 shows that the calculated value of chi-square/Df (CMIN/Df) is found to be 1.743 that is less than 5.00 which indicates the perfect fit model [20]. The value of goodness of fit index (GFI) 0.994 and adjusted good fit index 0.970 is higher

Table 4 Variables used in structural equation model

Independent variables		Dependent variables	Unstandardized coefficient	S.E	Standardized coefficient	t value	P-value	Result of hypothesis
Intention to use	←	Self-servicing technology factors	0.074	0.012	0.446	6.224	0.00	H_1 is supported
Perceived ease of use	←	Self-servicing technology factors	0.975	0.143	0.788	6.795	0.00	H_a is supported
Perceived ease of use	←	Self-Servicing technology factors	0.208	0.063	0.224	3.302	0.00	H_b is supported
Facilitating condition	←	Self-servicing technology factors	1		0.727		0.00	H_c is supported

Table 5 Model fit summary

Goodness of fit statistics	Value	Values of good fit
Chi-square value	3.485	–
Degrees of freedom	2	–
Chi-square/Df (CMIN/Df)	1.743	<5.00 [20]
Goodness of fit index (GFI)	0.994	>0.90 [21]
Root mean square error of approximation (RMSEA)	0.050	<0.08 (Hair et al. 2006)
Adjusted good of fit index (AGFI)	0.970	>0.90 [20]
Comparative fit index (CFI)	0.992	>0.90 [21]
Normed fit index (NFI)	0.981	>0.90 [21]

than 0.9 that indicates the model is said to be a good fit model as referred by the Hu and Bentler [21] and Hair et al. [20]. The value of normed fit index (NFI) 0.981 and comparative fit index (CFI) 0.992 and the value of root mean square error of approximation (RMSEA) 0.050 shows that the model is completely fit [20].

8 Conclusion

Self-service technology is a wonderful gift to the society at large across globe. This technology is gaining momentum as most people keep using it. People feel comfort as and when they pay electricity bills through various self-service technologies. Still some areas lag behind these technologies due to lack of initiatives by private sectors and government sector. Our honorable Prime Minister has taken various initiatives through various Bharat mission projects. People participated in the interview have expressed mixed responses with regard to self-service technologies. There are adverse responses put forth by some people during the interview. The suggestions to this effect have been advised by the researcher to overcome the difficulties faced by the consumers regarding usage of SSTs when it comes to pay electricity bills in Chennai City.

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