

THAILAND VEHICLE ANNUAL TAX SERVICE EFFICIENCY MODEL

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Abstract

The Thailand 4.0 Policy results in Thai public and private work agencies applying digital technology to adjust their work and services in many dimensions. In addition, the worldwide pandemic of Covid-19 results in reduction of face-to-face contact between people in order to reduce the close contact among people, which is the main way of self-protection. Consequently, self-service has become more important and necessary. The objectives of this research are (1) to study the levels of self-service technology, e-service quality, technology acceptance, service innovation, and efficiency of vehicle annual tax service of Thailand; (2) to study the influences of self-service technology, e-service quality, technology acceptance, and service innovation on efficiency of vehicle annual tax service of Thailand; and (3) to create Thailand vehicle annual tax service efficiency model. This research was a mix-method research involving quantitative and qualitative research methodologies. In the quantitative study, the research sample consisted of 340 owners of cars that paid annual tax throughout Thailand obtained by multi-stage sampling. The sample size was determined based on the criterion of 20 times of observable variables. A questionnaire was used as the data collecting instrument. Research data were analyzed with structural equation modeling. In the qualitative study, the researcher conducted in-depth interviews of 15 experts on Thailand vehicle annual tax service efficiency. The research findings are as follows: (1) the self-service technology, e-service quality, technology acceptance, service innovation, and efficiency of vehicle annual tax service of Thailand are rated to be at the high level; (2) the self-service technology, e-service quality, technology acceptance, and service innovation have influences on efficiency of vehicle annual tax service of Thailand by 83 percent, which is statistically significant at the .05 level; and (3) the Thailand vehicle annual tax service efficiency model developed by the researcher is called VTSE Model (V = Vehicle Registration Information; T = Tax Issuing System; S = Service Innovation; E = Efficiency of Public Service). In addition, findings from qualitative research are as follows: In increasing the efficiency of vehicle annual tax service of Thailand, in addition to the study of self-service technology and service innovation, there should be additional study on the innovation process that focuses on the process, set of activities, the changes of operational set, and the output of innovation. This is because the main component of the efficiency of vehicle annual tax service is the receiving of a vehicle tax sign showing vehicle tax payment to be used as the evidence in case the police want to check. Furthermore, the developed model of Thailand vehicle annual tax service efficiency can also be applied to increase the efficiency of checking of the police.

Keywords: Self-Service Technology/ E-Service Quality / Technology Acceptance / Model and Service Innovation

1. Introduction

The Thailand 4.0 policy has significant importance (Raob, Hasan, & Jeha, 2021) which aims to increase research and development (R&D) expenditure to 4% of gross-domestic product (GDP), increase economic growth rate to full capacity rate of 5-6% within 5 years, and increase national income per capita from 5,470 USD in 2014 to 15,000 USD by 2032. This policy results in Thai public and private work agencies applying digital technology to adjust their work and services in many dimensions. In addition, the worldwide pandemic of Covid-19 results in

reduction of face-to-face contact between people in order to reduce the close contact among people, which is the main way of self-protection. Consequently most of the organizations started online operations and provided several online services to promote business activities in the COVID-19 (Prasetyo et al., 2021; Yustina, Syafii, & Vebrianto, 2020). Similarly the tax collection department of Thailand also started various online operations and developed various applications to collect tax. In Covid-19 the reduction in physical contact decreased the efficiency of tax collection services, therefore, the tax department introduced different ways such as online transaction system to promote tax collection and to reduce the loss in tax collection. In this way vehicle annual text services also improved and shifted to the online system. The e-services provided by the tax collection department to the general public for the payment of vehicle tax. This system of tax collection reduced the effect of Covid-19 on vehicle tax collection and increases the efficiency.

However, to improve the efficiency of the system, it is important to address various factors which has influence on online tax collection system (Anggraeni & Daito, 2022). Although the applications introduced by the tax department are working effectively, however, it is needed to promote the efficiency in this system. The inefficient services may lead to the decrease in overall amount of tax collection and it may decrease the satisfaction level of general public. This is the important system which provide the general public for the tax payment of vehicles but the inefficient system may lead to the negative role in tax collection. Therefore the promotion of efficiency in tax collection system particularly in online system to collect vehicle taxes is most important. This system is developed on initial level to address the issue of COVID-19 and perform effectively. It is realized that online tax payment system is one of the effective way to collect tax (Akram, Malik, Shareef, & Goraya, 2019; Do, Mac, Van Tran, & Nguyen, 2022) which has several benefits for the tax departments as well as for the general public. Therefore, the improvement in the efficiency is required to sustain this system for long term basis. In this way, the current study is an attempt to highlight the efficiency of online vehicle tax collection with the help of different factors.

According to the current study, there are several issues related to the efficiency of vehicle online tax system. First e-service quality (Wilis & Nurwulandari, 2020; Zhou et al., 2019) is needed to promote with the help of better applications as well as online system. There are number of service innovation issues because the system is initially developed to handle the issue in the Covid-19, therefore, this system is working at a basic level. It is needed to promote with the help of better innovation to facilitate the general public while tax payment system. Service innovation in any organization has central importance to satisfy the customers (Mahmoud, Al-Mkhadmeh, & Alananzeh, 2021; Taimenas, Pellokila, Rihi, & Day, 2019), therefore, an online tax system service innovation also has major importance. Additionally, another important problem is technology acceptance by the users. It is quite difficult to increase the level of awareness among the people related to the new technology and its benefits. The technology acceptance among the people is at basic level and people are facing the problem while paying the tax online. Therefore, the awareness among the people related to the new technology must be introduced by the departments. Hence this study proposed that the service quality, service innovation and technology acceptance is important to promote efficiency in

vehicle online tax payment system. This study proposed that it can be managed with the help of self-service technology. The introduction of self-service technology has the potential to promote efficiency in the system. Consequently, self-service has become more important and necessary. Thus, the objectives of the study are as follows; the objectives of this research are (1) to study the levels of self-service technology, e-service quality, technology acceptance, service innovation, and efficiency of vehicle annual tax service of Thailand; (2) to study the influences of self-service technology, e-service quality, technology acceptance, and service innovation on efficiency of vehicle annual tax service of Thailand; and (3) to create Thailand vehicle annual tax service efficiency model.

2. Literature Review

2.1 Efficiency

Efficiency is the ability to avoid wasting materials, energy, efforts, money, and time in doing something or in producing a desired result. In a more general sense, it is the ability to do things well, successfully, and without waste. Similarly, deficiency is also required among the organizations related to the public organizations as well as private organizations having business motives are not for profit motives. Whatever the organization the efficiency is an important element which has major importance to achieve various operations smoothly. Similarly, the efficiency is also important among the various public institutions (Hyun Soo, Hyeon Joo, Dong Hyun, & Eun Hyun, 2021; Martínez-Campillo & Fernández-Santos, 2020). Particularly the efficiency in various operations is required among the tax collection institutions in Thailand. The tax collection institutions are the most significant institutions in any nations because it generates a lot of revenue for the nation (Learn, 2009). The efficient services of these institutions cause to increase the level of tax collection; however, the inefficient services may lead to the decrease in tax collection which has negative effect on the economy. Therefore, it is most important to promote efficiency in different services of tax collection department in Thailand. The tax collection department has started rendering the services with the help of online system and this institution made possible the collection of text through online system. The efficiency of this system is required to achieve a certain level which is lacking by these institutions. These institutions have developed the vehicle annual tax system through online services. Although this system is working for the people to pay tax of vehicles, but it is important to increase efficiency in tax collection. Therefore, this study is an attempt to highlight the efficiency of the online system for vehicle annual tax collection system with the help of different elements which may have influence to increase efficiency.

2.2 Self-Service Technology

Self-service technologies (SSTs) are technological interfaces permitting customers to avail services independent of participation of different employees directly (De Leon, Atienza, & Susilo, 2020). These technologies are substituting numerous face-to-face service connections with the purpose to make various service transactions more precise, convenient as well as faster. Self-service technologies are increasing significantly among the organizations and most of the organizations are trying to provide these technologies. Because these technologies have

several benefits related to the decrease in overall cost and ease of use. It has the potential to minimize the interaction between the employees and customers which decreases the overall cost, furthermore, it also decreases the operational cost of various organizations as it decreases the human resources use and increases the use of various artificial systems. Number of previous studies reported the valuable role of self-service technologies among the organizations (Baabdullah et al., 2019; Saldanha, Kathuria, Khuntia, & Konsynski, 2022). Similarly, these technologies has important role among the tax collection institutions in Thailand. The tax collection system based on self-service technologies could be more efficient as compared to the traditional system. In this way, the current study proposed that the tax collection department should support these technologies and introduce the latest technology which may have significant importance for the institutions as well as for the general public. The online tax payment system through these technologies could be more beneficial as well as efficient to produce various results. It has the potential to increase the overall performance of various activities among the tax collection department. Therefore, this study proposed that self-service technology has positive influence to promote efficiency in text collection.

Hypothesis 1: Self-service technology has positive impact on efficiency.

2.3. E-Service Quality

Quality of services is the basic element of customer satisfaction as reported by the several previous studies (Kouthouris & Alexandris, 2005). The quality services are the attraction for users of the system. Good quality services have major influence on the operations of the organization and the users of the system. Recently the concept of e-service quality is increasing significantly (Wilis & Nurwulandari, 2020). In contrast with the service quality, the e-service quality is based on the online services provided by various organizations. Along with the traditional service system, electronic service system also requires a certain level of quality which is most significant to promote the overall performance. Similar with the other organizations the e-service quality also has major importance among the tax collection departments in Thailand. As due to the disturbance of Covid-19, the tax collection institutions started providing electronic services. However, the quality of electronic services must be ensured get maximum benefits. E-service quality is discussed by number of previous investigations in the literature (Zhou et al., 2019); however, it is not addressed in relation to the vehicle involved tax payment system. There are several businesses working online which are investigated by the academicians but tax collection system of Thailand in relation to the vehicle annual tax payment is not addressed by the prior studies. In this way, the current study considered service quality in relation to the efficiency of online payment system. This study recommended that self service quality has influential role in e-service quality. The technology is related to the self-service among the institutions causes to increase the quality of electronic services. The promotion of electronic services can be highlighted with the help of self-service technology. As in the era of industrialization, the role of self-service technologies is increasing significantly which it may influence the online tax collection system.

Hypothesis 2: Self-service technology has positive impact on e-service quality.

2.4 Service Innovation

In the service industry, the role of innovative services has critical importance for the success. Although the innovation in products is most important, however, in the current era of online service system, the role of service innovation can play most important role. All the institutions based on the service sector requires innovation for the clients (Mahmoud et al., 2021; Tang, Zhang, Lu, Wang, & Tsai, 2020). Service innovation can be described as the introduction of new idea in the services which can provide the ease-of-use with lower cost along with the efficiency. The innovation through technology is the mandatory element in the current competitive environment. Several previous studies identified that service innovation has critical role in service industry (Mahmoud et al., 2021; Taimenas et al., 2019). To get higher benefits for the institutions the role of service innovation cannot be neglected. Similarly, service innovation is most important among the tax collection institutions. The innovative features in the payment of vehicle taxes are important for the tax collection. However, the implementation of new ideas is not easy for tax collection department. The promotion of service innovation among departments can be enhanced with the help of self-service technology along with the other technologies. Self-service technology has critical importance to increase the level of innovation among the institutions. As reported by the literature that there is an important relationship between self-service technology and service innovation which is proposed in the current study.

Hypothesis 3: Self-service technology has positive impact on service innovation.

2.5 Technology Acceptance

Although the use of technology in online tax payment system is most important and it can provide valuable outcomes for the institutions as well as for the general public. However, the acceptance of new technology is one of the major challenges (Althuisen, 2018; Molino, Cortese, & Ghislieri, 2020). The resistance to change among the institutions as well as general public is a major problem which must be addressed by the practitioners as well as academicians. The introduction of new technology can only be helpful if the users of technology accept the change. The technology acceptance can face problems through two aspects. First, the technology acceptance among the institutions is a challenge because the employees 'resistance towards the change is a problem to accept the new technology. Second, the technology acceptance among the users of technology such as clients of tax collection department is also a challenge. Most of the clients cannot accept the technology and do not use the technology for their benefits. It is due to several reasons such as the low awareness level and the lower literacy level among the general public. Most of the people could not choose new technology which effect negatively on the level of acceptance. Therefore, the ease of use has critical role in technology acceptance (Grover, Kar, Janssen, & Ilavarasan, 2019). In this way, the current study highlighted those self-service technologies is most important and the innovation of self-service technologies can increase the ease of use and lead towards the technology acceptance. The introduction of self-service technology may promote the technology acceptance among the general public.

Hypothesis 4: Self-service technology has positive impact on technology acceptance.

Along with the above hypotheses, the current study also proposed various other direct effects based on the aforementioned discussion. This study proposed the relationship between e-service quality and efficiency. Along with the positive role of self-service technology on efficiency, e-service quality also has influence on efficiency. Nevertheless, this study addressed the relationship between e-service quality and technology acceptance. Better e-service quality can promote the acceptance of new technology, however, difficulty while using the technology may discourage the use of technology. This study proposed that the relationship between e-service quality and service innovation is also important. The better quality in the service has the potential to encourage the institutions to lead for further innovations. As the positive feedback of the employees on any service provide a new way to start improvements in the online service. Similarly, in tax collection departments, the better-quality service promotes and encourages the customers to use online system which allow the institutions to make further innovative changes. Furthermore, according to the literature, the role of technology acceptance is important in service innovation (Jaw, Oliver, & Gehrt, 2011). The acceptance of technology by the general public causes to lead new innovation in online service. Nonetheless, technology acceptance is also playing important role in efficiency. As the increase in technology acceptance by the users increases the efficiency in the practices because the online use decreases the human efforts and save several resources. Hence, technology acceptance by the users has positive role to enhance efficiency. Thus, from the aforementioned discussion, the current study proposed following hypotheses. Additionally, along with the direct effect, this study also highlighted the four indirect effect hypotheses;

Hypothesis 5: E-service quality has positive impact on efficiency.

Hypothesis 6: E-service quality has positive impact on technology acceptance.

Hypothesis 7: E-service quality has positive impact on service innovation.

Hypothesis 8: Technology acceptance has positive impact on service innovation.

Hypothesis 9: Technology acceptance has positive impact on efficiency.

Hypothesis 10: E-service quality mediates the relationship between Self-service technology and service innovation.

Hypothesis 11: E-service quality mediates the relationship between self-service technology and technology acceptance.

Hypothesis 12: Service innovation mediates the relationship between self-service technology and efficiency.

Hypothesis 13: Technology acceptance mediates the relationship between e-service quality and efficiency.

3. Methodology

Suitable research methodology selection is important for any research study. This study selected the research methodology based on the literature gap in relation to the use of method. Different studies in the field of online technology have carried out research through questionnaire survey by using quantitative method. Few studies adopted qualitative method to examine the relationship between variables. But the use of both quantitative and qualitative research is very rare. Therefore, by considering the mythological gap, this study carried out research through mixed method approach. The use of mix-method research involving quantitative and qualitative research methodologies can provide better results.

In the quantitative study, the research sample consisted of 340 owners of cars that paid annual tax in Thailand. Furthermore, multi-stage sampling is employed in this study for data collection. Questionnaire was based on two sections including the demographic profile of respondents and key study variables; self-service technology, e-service quality, service innovation, technology acceptance and efficiency. All the measures were adapted from previous studies. The sample size was determined based on the criterion of 20 times of observable variables. Finally, a questionnaire was used as the data collecting instrument. Research data were analyzed with structural equation modeling (SEM). In the qualitative study, the researcher conducted in-depth interviews of 15 experts related to the Thailand vehicle annual tax service efficiency. Data Statistics are provided in Table 1.

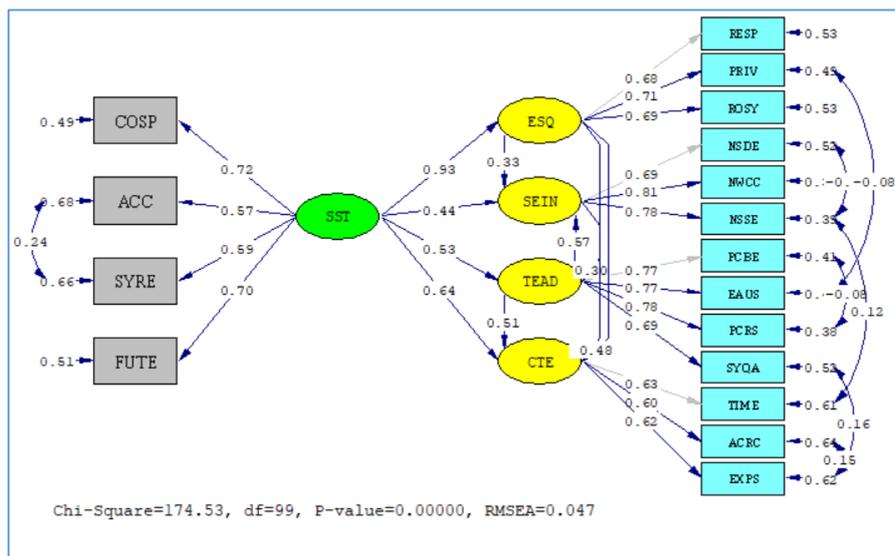
Table 1: Statistical test of empirical variables (n=340)

Variable	\bar{X}	S.D.	%CV	Sk	Ku	χ^2	P-value
COSP	4.45	.66	14.83	-4.857	-2.802	31.441	.000
ACC	4.00	.85	21.25	-2.411	-2.444	11.789	.003
SYRE	4.38	.79	18.04	-5.334	-1.760	31.550	.000
FUTE	4.32	.69	15.97	-3.503	-3.990	28.184	.000
RESP	4.17	.64	15.35	-1.596	-1.828	5.888	.053
PRIV	4.56	.64	14.04	-6.484	-.241	42.095	.000
ROSY	4.49	.63	14.03	-4.954	-1.971	28.429	.000
NSDE	4.05	.74	18.27	-1.700	-2.605	9.677	.008
NWCC	4.24	.68	16.04	-2.707	-2.018	11.403	.003
NSSE	4.45	.63	14.16	-4.650	-2.225	26.573	.000
PCBE	4.34	.68	15.67	-3.705	-3.204	23.993	.000
EAUS	4.20	.67	15.95	-2.097	-2.995	13.365	.001
PCRS	4.39	.61	13.90	-3.488	-2.769	19.836	.000
SYQA	4.11	.75	18.25	-2.011	-3.261	14.677	.001
TIME	4.52	.56	12.39	-4.671	-3.792	36.198	.000
ACRC	3.99	.70	17.54	-1.179	-.994	2.379	.304
EXPS	4.10	.71	17.32	-1.933	-1.873	7.245	.027

4. Results

Computer software is one of the most prominent tools which is recommended by several previous studies in the literature. Data analysis tool work on SEM which is also recommended by several other studies. Number of studies in the field of hospitality industry used structural equation modelling which can provide several benefits. For example, this data analysis technique provides the facility to run the complex model through accuracy (Purwanto, Asbari, Santoso, Paramarta, & Sunarsi, 2020; Rahi & Abd Ghani, 2018). Therefore, this study also utilized SEM technique. This study examined factor loading and composite reliability (CR) and average variance extracted (AVE). It is found that factor loading for all the scale items is higher than 0.5 as shown in Table 2. Additionally, CR and AVE is also above 0.7 and 0.5 respectively. In this way the current study achieved the minimum requirement of reliability and validity. Finally, the discriminant validity also considered in this study by considering the secure root of AVE.

Figure 1: Model (n=340)



Note: Self-service technology=SST; E-service quality=ESQ; Service innovation=SEIN; Technology acceptance=TEAD; Efficiency=CTE

Table 2: Factor Loadings. (n = 340)

Variable	Factor Loading (λ)	Error (θ)	t	R ²
Self-service technology(SST)				
COSP	.65	.48	11.65	.52
ACC	.75	.44	13.51	.56
SYRE	.77	.40	13.99	.60
FUTE	.48	.47	8.13	.53
$\rho_e = .80 \rho_v = .50$				
E-service quality(ESQ)				
RESP	.63	.41	10.80	.59
PRIV	.72	.48	12.16	.52
ROSY	.75	.44	12.58	.56
$\rho_e = .77 \rho_v = .52$				
Service innovation (SEIN)				
NSDE	.61	.63	11.08	.37
NWCC	.90	.20	16.04	.80
NSSE	.71	.49	12.91	.51
$\rho_e = .79 \rho_v = .56$				
Technology acceptance(TEAD)				
PCBE	.71	.49	13.95	.51
EAUS	.83	.31	17.05	.69
PCRS	.73	.46	14.47	.54
SYQA	.71	.50	13.86	.50
$\rho_e = .83 \rho_v = .55$				
Efficiency (CTE)				
TIME	.52	.33	8.64	.67
ACRC	.79	.38	11.7	.62
EXPS	.68	.53	10.61	.47
$\rho_e = .76 \rho_v = .52$				

Note: Self-service technology=SST; E-service quality=ESQ; Service innovation=SEIN; Technology acceptance=TEAD; Efficiency=CTE

After the assessment of reliability and validity, the relationship between independent variables dependent variable and mediating variable is considered. In this process, the direct and indirect effects are examined by using t-value and beta value. The t-value 1.96 is considered to accept the hypothesis, the hypothesis having t-value below 1.96 was considered as not supported. First of all, this study considered the relationship between service technology and efficiency which is found significant. It is found that self-service technology has significant relationship with e-service quality. The relationship between self-service technology and service innovation is significant. Similarly, the relationship between self-service technologies is also significant in relation to the technology acceptance. The effect of e-service quality on efficiency and technology acceptance along with the service innovation has significant. Finally, while considering the direct effect, it is found that technology acceptance has significant effect on service Innovation and efficiency. All these hypotheses are supported because the t-value is higher than 1.96. While considering the indirect effect, it is found that the mediation effect of

e-service quality between self-service technology and service innovation, service technology and technology acceptance is significant. The mediation effect of service innovation between self-service technology and efficiency is also significant. Finally, technology acceptance is a mediating variable between e-service quality and efficiency.

Table 3: Parameter estimation result of direct effect coefficient, indirect effect, and total effect from adjusting model (n=340)

Variable	R ²	Effect	Virable			
			ESQ	SEIN	TEAD	SST
ESQ	.86	DE	-	-	-	.93*(12.13)
		IE	-	-	-	-
		TE	-	-	-	.93*(12.13)
SEIN	.79	DE	.33*(7.83)	-	.57*(3.78)	.44*(5.12)
		IE	.54*(6.38)	-	-	.40*(4.34)
		TE	.87*(6.57)	-	.57*(3.78)	.84*(10.00)
TEAD	.70	DE	.30*(4.58)	-	-	.53*(6.08)
		IE	-	-	-	.31*(4.47)
		TE	.30*(4.58)	-	-	.84*(10.13)
CTE	.83	DE	.42*(5.49)	.48*(5.37)	.51*(7.86)	.64*(7.08)
		IE	.47*(5.21)	-	.35*(6.39)	.32*(4.37)
		TE	.89*(4.65)	.48*(5.37)	.86*(5.72)	.96*(9.47)

$\chi^2 = 174.53$ df = 99 p-value = .00000, $\chi^2 / df = 1.76$, RMSEA = .047, RMR = .017, SRMR = .035, CFI = .99, GFI = .94, AGFI = .91, CN = 258.85

Note: Self-service technology=SST; E-service quality=ESQ; Service innovation=SEIN; Technology acceptance=TEAD; Efficiency=CTE

5. Discussion

Findings of the study reported that self-service technology has significant influence on the efficiency. The introduction of self-service technology in tax collection departments has the potential to increase the efficiency. Furthermore, it is also observed that self-service technology has the potential to increase the service quality. Particularly, service quality can be improved with the help of self-service technology. As results of the study shows that self service technology has positive effect on e-service quality. Previous studies also proved that self-service technology has positive effect of service quality (Hamid et al., 2021; Iqbal, Hassan, & Habibah, 2018; Park, Kwun, Park, & Bufquin, 2021). It is found that self-service technology has the ability to enhance service quality because results of the study shows that self service technology has positive effect on service innovation, additionally, it is also observed that self service Technology can improve the efficiency with the help of technology acceptance. Technology acceptance is one of the major challenges among the organizations, it can be resolved with the help of providing service to the customers through self service technology. Furthermore, it is reported that e-service quality has positive effect on efficiency, Technology

acceptance and service innovation. The increase in service quality can increase the efficiency with the help of technology acceptance and service innovation. In addition to this, technology acceptance has positive effect on service innovations and efficiency.

Moreover the mediation effect hypothesis of the current study highlighted that e-service quality can transfer the positive effect of self service technology on technology acceptance. Service innovation can also transfer the positive effect of self-service technology on efficiency. Additionally, technology acceptance can reflect the effect of service quality on efficiency. Therefore, the indirect effect of e-service quality, service innovation and technology acceptance has the potential to enhance efficiency with the help of self-service technology. Therefore, the current study reported valuable reasons which have the potential to increase efficiency among the tax collection departments of Thailand with the help of self-service technology.

6. Conclusion

The research findings concluded that; (1) the self-service technology, e-service quality, technology acceptance, service innovation, and efficiency of vehicle annual tax service of Thailand are rated to be at the high level; (2) the self-service technology, e-service quality, technology acceptance, and service innovation have influences on efficiency of vehicle annual tax service of Thailand strongly, and (3) the Thailand vehicle annual tax service efficiency model developed by the study is called VTSE Model (V = Vehicle Registration Information; T = Tax Issuing System; S = Service Innovation; E = Efficiency of Public Service). In addition, qualitative part of the study shows that in increasing the efficiency of vehicle annual tax service of Thailand, in addition to the study of self-service technology and service innovation, there should be additional study on the innovation process that focuses on the process, set of activities, the changes of operational set, and the output of innovation. This is because the main component of the efficiency of vehicle annual tax service is the receiving of a vehicle tax sign showing vehicle tax payment to be used as the evidence in case the police want to check. Furthermore, the developed model of Thailand vehicle annual tax service efficiency can also be applied to increase the efficiency of checking any type of verification.

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