Chapter 5
Trust in the System: The Mediating Effect of Perceived Usefulness of the E-Filing System

T. Santhanamery and T. Ramayah

Abstract This study examines the mediating effect of perceived usefulness on the relationship between trust in the system (correctness, response time, system support, availability and security) and continuance usage intention of e-filing system in Malaysia. Data was collected from two urban cities in Malaysia; Selangor and Kuala Lumpur. A total of 355 data was collected and analyzed using Partial Least Squared Method (PLS). The result showed that Perceived Usefulness has a mediating effect on the relationship between trust in the system variables (correctness, response time and security) with the continuance usage intention and trust in the system variables (correctness and response time) has significant positive relationship with continuance usage intention. Perceived usefulness was found to be the most important predictor of continuance usage intention meanwhile response time was found to be the most important predictor of perceived usefulness. However the variables of system support and availability does not have any significant impact on perceived usefulness and also on continuance usage intention.

Keywords Trust in the system • Perceived usefulness • Continuance usage intention • E-filing system

1 Introduction

E-government can be termed as the utilization of ICT, mobile computing, web based networks and the Internet to deliver citizens with necessary services, improve government agencies performance, to assist successful public participation and to transform relations with citizens, business and other arms of government,. The

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success of e-government projects will depend on the best utilization of such investment in these projects [1, 2]. The influence of e-government has witness a dramatic increase particularly by governments in developing countries. More and more developing countries are using ICT to modernize and increase internal efficiency as well as improve service delivery [3, 4]. Today, similar to e-Commerce, citizens' adoption of e-Government services has moved to the post-adoption stage [5]. The use of these services after the initial adoption are subject to changes based on usage experiences [6], which may potentially increase or decrease [7]. Therefore, an understanding of what factors affect citizen's continuous usage intention plays a vital role in e-Government development.

The use of information technology has given a new perspective to the development and integration of Malaysia's tax administration system. Tax administrators understanding of the e-filing system will improve the level of service provided and encourage the users of the system to continuously use it which will lead to the increase in revenue generation [8, 9]. E-filing system as a whole integrates tax preparation, tax filing and tax payment, which serves as a major advantage over traditional manual procedure [10]. Since its introduction in 2006, e-filing has evolved each year in order to provide better service to the taxpayers. The online tax system makes an effective impact on the economic towards improving the level of income generation and tax compliance by the tax payers. This could be due to benefits provided by e-filing system such as convenience, time saving, cost effectiveness for both the tax administrator and tax payers [8]. Therefore, this study will examine the impact of perceived usefulness in mediating the relationship between trust in the system and e-filing continuance usage intention.

The research questions of this study are (1) Do perceived usefulness significantly influences the continuance usage of the e-filing system; (2) Is there a mediating effect of perceived usefulness on the relationship between trust in the system and continuance usage of e-filing system; (3) What is the influence of trust in the system on the continuance usage intention? These questions were answered with the objectives of this study which are (1) to examine the significant relationship between perceived usefulness and continuance usage intention of e-filing system, (2) to examine the mediating effect of perceived usefulness on the relationship between trust in the system and continuance usage intention of e-filing system, (3) to examine the relationship between trust in the system and continuance usage intention of e-filing system. Figure 5.1 below represents the theoretical model.

2 Literature Review

2.1 Trust in the System

Papadopoulou et al. [11] defined trust in the system as the interpretation of the system's functions which will display availability, fault tolerance and its security

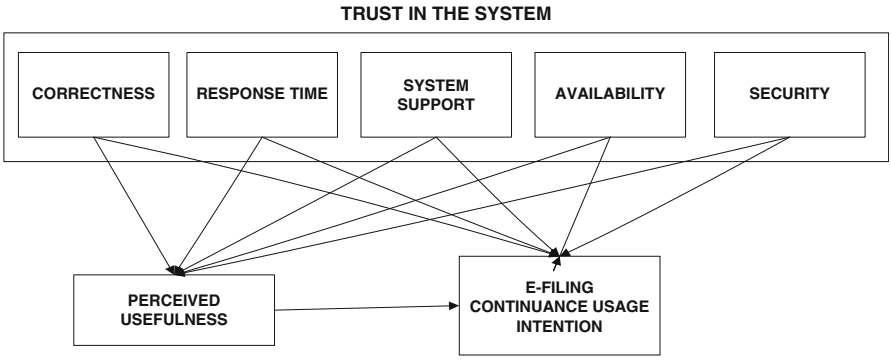

Fig. 5.1 The theoretical model

and correctness is guaranteed together with stability in system response time. Azmi and Aziz [12] have studied the effect of trust on continued use of e-filing by tax practitioners in Malaysia and they found that trust is one of the important factors that determined continued use of e-filing system. Similarly Gao et al. [13] has investigated the impact of perceived usefulness and trust on users intention to return and use e-government services and revealed that both the variable have significant impact on the intention. The study also found that trust has a significant relationship on perceived usefulness towards intention to return and use. In the current study, however, is not investigating the general trust towards e-filing continuance usage intention but more specifically the effect based on the dimensions of availability, correctness, security, response time and system support. As such, in this study, the trust in the system component factors such as responsiveness (response time), reliability (correctness), system support, availability and security will be evaluated to determine their impact on the continuance usage intention of the e-filing system. ***Response Time*** means the system reacts to requests within minimal time. It is also defined as the duration between the time the users initiated request and the reply to the request [14], ***System Support*** is defined as the automated and personalized support to access the needed information without problems. It includes help desks, online support services, tailored support and other facilities [15] and ***Correctness*** is defined as the assurance that the system works properly and produces correct output. Bailey and Pearson [14] defined accuracy as the correctness of the output information. **Availability** is defined as the assurance that the system is up and running, is fully functional whenever needed and is protected from denial of service. It is also classified as the dimensions or items that measures system quality [16]. **Security** is the guarantee that the system is protected against intimidations interference's. Bailey and Pearson (1983) defined security as the protection of data from embezzlement or unlawful alteration or loss.

2.2 Continuance Usage Intention

Continuance intention is defined as ones intention to reuse or repurchase decision after their initial usage of services or products [17]. The research on e-government nowadays are focusing to evaluate the continued usage intention by citizens rather than initial intention. Wangpipatwong et al. [18] examined the role of perceived usefulness, perceived ease of use and computer self-efficacy in determining the citizens continuance intention to use e-government websites. The study found that perceived usefulness is the strongest predictor of continuance intention. Similarly, Ambali [10] also found that perceived usefulness has a strong relationship towards continuance usage intention of e-filing system in Malaysia. Further Gao et al. [13] has concluded that both trust and perceived usefulness has a significant relationship towards continuance usage intention e-government services.

2.3 Perceived Usefulness

Perceived usefulness (PU) was defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context [19]. Research by Min Jiang and Heng Xu [20] found that satisfaction and perceived usefulness have direct impact on continuance intention of e-government in China. Compatibly, Hu et al. [21] found that perceived usefulness as one of the key predictor of continued use of e-tax services in Hong Kong. Similarly, McCloskey [22] found a significant relationship between trust and perceived usefulness which indicates that the higher the trust that consumer has the higher their belief on the usefulness of the system. Similarly, Pavlou [23] also found that trust has a substantial consequence on intention to use electronic commerce through perceived usefulness; which means that there exist mediating effect of perceived usefulness on the relationship between trust and intention to use. Study by Horst et al. [24] revealed perceived usefulness as the main determinant in intention to use e-government services, however the study also found that trust is the main determinant of perceived usefulness. As such, this present study adapts perceived usefulness to mediate the relationships that exist between continuance usage intention of an e-filing system and trust in the system. The hypotheses developed are based on the study model.

H1a: There is a direct positive relationship between correctness and continuance usage.

H1b: There is a direct positive relationship between response time and continuance usage.

H1c: There is a direct positive relationship between system support and continuance usage.

H1d: There is a direct positive relationship between availability and continuance usage.

H1e: There is a direct positive relationship between security and continuance usage.
H2a: There is a direct positive relationship between correctness and PU.
H2b: There is a direct positive relationship between response time and PU.
H2c: There is a direct positive relationship between system support and PU.
H2d: There is a direct positive relationship between availability and PU.
H2e: There is a direct positive relationship between security and PU.
H3: There is a direct positive relationship between PU and continuance usage.
H4a: PU mediates the relationship between correctness and continuance usage intention.
H4b: PU mediates the relationship between response time and continuance usage intention.
H4c: PU mediates the relationship between system support and continuance usage intention.
H4d: PU mediates the relationship between availability and continuance usage intention.
H4e: PU mediates the relationship between security and continuance usage intention.

3 Methodology

3.1 Data Collection Method

A total of 900 questionnaires were distributed among the taxpayers in Selangor and Kuala Lumpur, Malaysia using self-administered questionnaire. A total of 401 questionnaires were received back and out of it, 355 were usable while the other 46 were unusable. As such, the response rate was 44.5%. The questionnaire consists of five sections. The first section elicited the screening question, the second section collected the demographic data, the third section extracted information on trust in the system dimensions, section four measured the perceived usefulness, and last section measured continuance intention. The sample selected were taxpayers who had used the e-filing system before at least once as the measures required them to express the trust in the system, perceived usefulness and continuance intention.

3.2 Measures

The measures were all adapted from the published literature. The measures for continuance intention were from Bhattacherjee [17]. Perceived Usefulness were from Davis [25] whereas measures for correctness were adapted from Nicolaou and McKnight [26], system support were adapted from Wangpipatwong et al. [27], response time from Liu and Ma [28], availability from Ojha et al. [29] and security from Carlos Roca et al. [30].

3.3 Sample Profile

The demographic of the respondents tabulated in Table 5.1 were derived from descriptive analysis. The majority of the age group were in the category of 30–34 years old (23.3%). Male (63.8%) outnumbered the females (36.2%). In terms of ethnicity, the result somewhat reflects the ethnic group distribution in Malaysia whereby the majority of the respondents were Malays (55.2%), followed by Chinese (25.0%) and Indians (19.8%). About 60.3% of the total respondents are highly educated with Bachelor degree and followed by Master's degree. In terms of earnings, greater part of the respondents (31.9%) are earning within RM3000–RM3999 per month with majority (81.0%) are married respondents. Lastly, about 84.5% and 57.8% of the respondents claimed to have experience in computer usage and internet usage approximately 10 years and above, respectively.

4 Data Analysis

Smart PLS version 3.0, a variance based Structural Equation Modelling (SEM) was used to analyze the hypotheses generated. The two step analytical procedure suggested by Anderson and Gerbing [31] was adopted to analyze data whereby the measurement model was evaluated first and then followed by the structural model. Also following the suggestion of Chin [32], the bootstrapping method (500 resample) was done to determine the significant level of loadings, weights and path coefficients. The research model of this study is as below (Fig. 5.2).

4.1 Measurement Model

Convergent validity is the degree to which the items that are indicators of a specific construct should converge or share a high proportion of variance in common [33]. According to Hair et al. [33], factor loadings and Average Variance Extracted (AVE) of more than 0.5 and Composite Reliability (CR) of 0.7 or above is deemed to be acceptable. As can be seen from Table 5.2, all loadings and AVE are above 0.5 and the composite reliability values are more than 0.7. Therefore, we can conclude that convergent validity has been established.

Next, we assessed the Discriminant Validity which is the extent to which a construct is truly distinct from other constructs [33]. This can be established by the low correlations between all the measure of the interest and the measure of other constructs. To address discriminant validity, the square root of the AVE is compared against the correlations of the other constructs, when the AVE extracted is greater than its correlations with all the other constructs then discriminant validity has been established [34] (refer Table 5.3).

Table 5.1 Demographic of the respondents

Age	Frequency	Percent
20–24 years	3	0.80
25–29 years	41	11.50
30–34 years	68	19.20
35–39 years	70	19.70
40–44 years	30	8.50
45–49 years	62	17.50
50–54 years	57	16.10
55 years and above	24	6.80
Gender		
Male	116	32.70
Female	239	67.30
Ethnicity		
Malay	276	77.70
Chinese	42	11.80
Indian	33	9.30
Others	4	1.10
Education		
Diploma/College	34	9.60
Bachelor Degree	87	24.50
Master's Degree	146	41.10
Doctoral Degree	63	17.70
Others	24	6.80
Income		
RM2000–RM2999	36	10.1
RM3000–RM3999	83	23.4
RM4000–RM4999	68	19.2
RM5000–RM5999	30	8.5
RM6000–RM6999	33	9.3
RM7000–RM7999	41	11.5
RM8000–RM8999	15	4.2
RM9000–RM9999	22	6.2
RM10,000 and above	19	5.4
Marital status		
Single	69	19.4
Married	281	79.2
Others	5	1.4
Computer usage		
1–3 years	1	0.30
4–6 years	9	2.50
7–9 years	18	5.10
10 years and above	327	92.1
Internet usage		
1–3 years	7	2.0
4–6 years	24	6.80
7–9 years	55	15.5
10 years and above	269	75.8

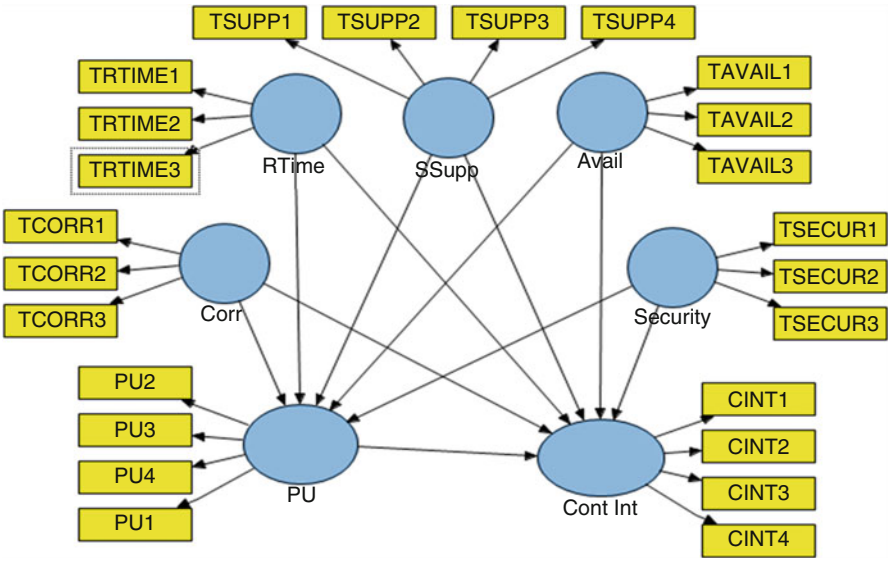

Fig. 5.2 The research model

4.2 Structural Model

The structural model represents the relationship between constructs or latent variables that were hypothesized in the research model. The goodness of the theoretical model is established by the variance explained (R^2) of the endogenous constructs and the significance of all path estimates [35]. Together the R^2 and the path coefficients indicate how well the data support the hypothesized model [32]. Figure 5.3 and Table 5.4, shows the results of the structural model from the PLS output. Correctness was significantly related towards Continuance Intention ($\beta = 0.211$, $p < 0.05$) and Perceived Usefulness ($\beta = 0.293$, $p < 0.01$) thus supporting H1a and H2a of this study. Response Time was found in this study to be significantly related to Continuance Intention ($\beta = 0.181$, $p < 0.1$) and Perceived Usefulness ($\beta = 0.463$, $p < 0.01$), thus supporting H1b and H2b. Perceived Usefulness was found to be statistically significant to Continuance Intention ($\beta = 0.536$, $p < 0.05$), thus supporting H3. However, System Support, Availability and Security was found to be insignificantly related to both Continuance Intention ($\beta = -0.021$; $\beta = -0.018$; $\beta = -0.011$) and Perceived Usefulness ($\beta = 0.027$; $\beta = 0.002$; $\beta = -0.071$), thus rejecting H1c, H1d, H1e, H2c, H2d and H3e.

In verifying the mediating effect of perceived usefulness, Chin [35] testing method for mediation was followed. To establish the mediation effect, the indirect effect between (a) (independent variable and dependent variable) × (b) (moderator

Table 5.2 Result of the measurement model

Model construct	Items	Loadings	AVE	CR
	PU1	0.905	0.838	0.954
	PU2	0.909		
	PU3	0.922		
	PU4	0.925		
Continuance intention	CINT1	0.936	0.895	0.971
	CINT2	0.947		
	CINT3	0.945		
	CINT4	0.954		
Correctness	TCORR1	0.936	0.830	0.936
	TCORR2	0.914		
	TCORR3	0.883		
Response time	TRTIME1	0.879	0.744	0.897
	TRTIME2	0.909		
	TRTIME3	0.796		
System support	TSUPP1	0.864	0.766	0.929
	TSUPP2	0.850		
	TSUPP3	0.882		
	TSUPP4	0.903		
Availability	TAVAIL1	0.899	0.835	0.938
	TAVAIL2	0.929		
	TAVAIL3	0.913		
Security	TSECUR1	0.957	0.905	0.966
	TSECUR2	0.966		
	TSECUR3	0.930		

Table 5.3 Discriminant validity of constructs

	1	2	3	4	5	6	7
1. Availability	**0.914**						
2. Continuance	0.492	**0.946**					
3. Correctness	0.678	0.585	**0.911**				
4. PU	0.491	0.743	0.551	**0.915**			
5. Response time	0.679	0.613	0.608	0.625	**0.862**		
6. System support	0.660	0.487	0.640	0.495	0.693	**0.875**	
7. Security	0.602	0.384	0.599	0.367	0.527	0.597	**0.951**

Note: Diagonal represents the square root of Average Variance Extracted (AVE) while the other entries represent squared correlations

and dependent variable) has to be significant [36]. To test for significance, the t-value based on bootstrapping result is calculated [35]. If the t-value exceeds 1.28 at $p < 0.1$ (1 tail) the hypotheses can be accepted. The t-value is formally defined as follows:

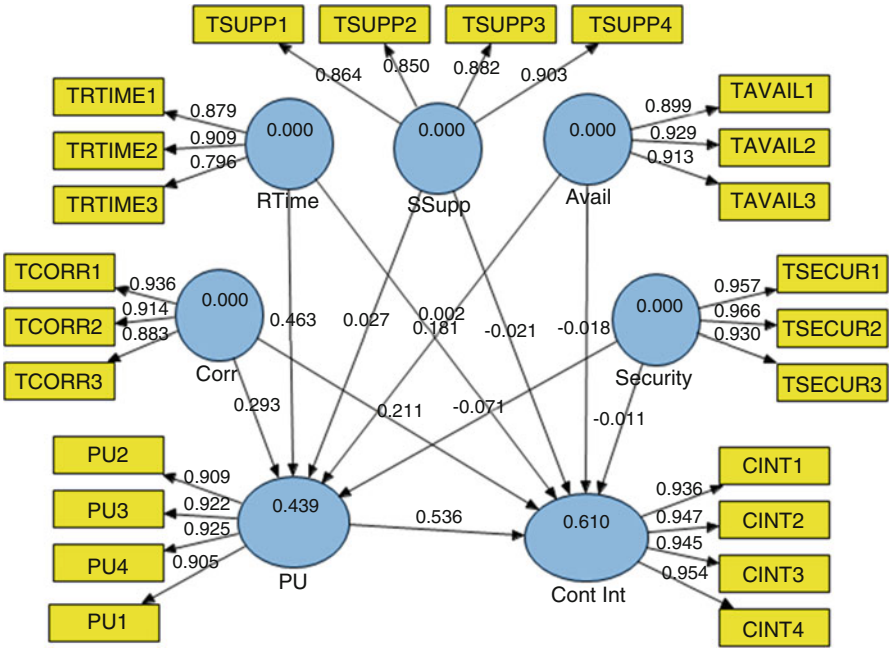

Fig. 5.3 The structural model

Table 5.4 Summary of the structural model

	Path coefficient	Standard error	t-value
Availability → Continuance	−0.018	0.116	0.151
Availability → PU	0.002	0.120	0.019
Correctness → Continuance	0.211	0.113	1.867**
Correctness → PU	0.293	0.122	2.409***
PU → Continuance	0.536	0.118	4.554***
Response time → Continuance	0.181	0.134	1.351*
Response time → PU	0.463	0.143	3.252***
System support → Continuance	−0.021	0.106	0.195
System support → PU	0.027	0.124	0.217
Security → Continuance	−0.011	0.085	0.135
Security → PU	−0.071	0.096	0.736

***p < 0.01, **p < 0.05, *p < 0.1

$$t = \frac{a^{*}b}{StandardDeviation\ (a^{*}b)}$$

The result supports the mediating effect of perceived usefulness between correctness and continuance usage intention ($t = 5.125$), response time and continuance intention ($t = 5.691$) and security and continuance intention ($t = 1.628$), which

Table 5.5 Blindfolding results

	CV Red	CV Comm
Continuance intention	0.535	0.796
Perceived usefulness	0.368	0.838

implies that there is a mediation effect of correctness, response time and security on continuance usage intention via perceived usefulness, thus supporting hypotheses H4a, H4b and H4e. However System Support and Availability are not significant ($t = 0.467$ and $t = 0.034$ respectively), hence H4c and H4d are not supported.

Apart from that, "blindfolding" procedure was also performed to measure the predictive relevance (Q^2) of the model fit. The Q^2 "represents a measure of how well observed values are reconstructed by the model and its parameter estimates" [32]. Models with Q^2 greater than zero imply that the model has predictive relevance. Table 5.5 shows the result of the blindfolding results. Omission distance of 7 was utilized as Chin [32] indicates that values between 5 and 10 are feasible (refer to Table 5.5).

5 Discussion

The purpose of this study was to test the role of mediating effect of perceived usefulness towards trust in the system variables; correctness, response time, system support, availability and security towards continuance usage intention of e-government services in Malaysia. The study also examines the relationship between the five elements of trust in the system; correctness, response time, system support, availability, security and perceived usefulness towards continuance usage intention.

The result revealed that trust in the system variables; correctness and response time was found to be positively related to perceived usefulness. This result is similar to the previous studies by Yang and Fang [37], Floropoulos et al. [38], Carlson and O'Cass [39]. Result of this study also consistence with findings by Al-maghrabi and Dennis [40], Shiau et al. [41], Wheelen and Hunger [42], and Brahmasrene and Lee [43] whereby perceived usefulness was found to be positively influence continuance usage intention. Similarly a significant mediating effect of perceived usefulness was found towards trust in the system variables; correctness, response time and security towards continuance usage intention. This is consistent with the previous studies that also found a significant mediating effect of perceived usefulness, such as Ratna and Mehra [44], Belkhamza and Wafa [45] and Money and Turner [46]. On the other hand, the insignificant effect of system support towards perceived usefulness and continuance usage intention could be due to the fact that the support received by the taxpayers will highly influence the satisfaction of the taxpayers and not on the perception of the usefulness and continuance usage intention. This has been confirmed in the study by Delone and McLean [47] claimed

that effective system support improves user satisfaction of the system. Availability on the other hand is considered as relative advantage of the e-government website by previous researchers [48] and as a system quality [49] which is more likely to provide convenience and operational efficiency to the users [49], as such the direct effect of availability on these variables may deem to be irrelevant. Likewise, the insignificant effect of security towards continuance usage intention could be due to the fact that e-filing system is provided by the government and such the security of the system is believed to be upheld. Previous researches also has claimed that security is more concerned towards the behavior of the taxpayers which has a strong influence towards the attitude of the taxpayers [50] (and not on the usefulness of the system).

The model adopted in this study shows that the perceived usefulness, correctness and response time can explain about 61% of the variance in continuance usage intention. These results showed that the model has relatively good predictive power on continuance usage intention. Further, the blindfolding result in Table 5.5 shows that the CV Comm and CV Red are all above 0 which indicates the model has predictive relevance [51].

As for the implication of the findings, theoretically, this study adds to the growing body of literature of continuance usage intention by supporting the evidence towards the determinant of the usage particularly in Malaysian context. On the other hand, practically, it is important information to the Inland Revenue Board of Malaysia (IRBM) to pay more attention and continuously improve the correctness and response time of the system from time to time to boost optimistic attitude towards the system. In the case of e-filing system in Malaysia, since it is a voluntary based, trust is deemed to be very important.

5.1 Limitation and Suggestion for Future Research

Despite the useful findings of this study, there are several limitations that need to be acknowledged. Firstly, the sample size of the study is only limited to 355 respondents due to the limited time. Secondly, the scope are limited to two states in Malaysia only, as such caution need to be taken when generalizing to the whole country. Lastly, this study only focus on testing the effect of trust in the system variables; correctness, response time, system support, availability, security, perceived usefulness and continuance usage intention and does not incorporate the actual usage behaviour in the proposed model.

Therefore, this research can be done further in future by (1) expanding the study to other states in Malaysia, (2) extend the model by incorporating the actual usage behaviour or any other relevant variables such as availability or security of the system, (3) replicate the study to any other e-government services.

6 Conclusion

In this study, it was found that perceived usefulness is an important determinant of continuance usage intention. This is supported by previous researchers such as Li and Shi [52] and Islam [53]. This result implies that a web portal has to provide all necessary and fundamental capabilities to avoid turning away users after their initial usage [54]. Study by Ambali [10] has indicated that any technological devices that are provided to enhance the service provided by the government must be found to be useful by the citizens. Thus, in the case of e-filing system to be accepted and continued use, it must be perceived as a better alternative, failure on this will lead to citizens discontinue the usage of the system in long run. Furthermore, the findings of this study reveal that perceived usefulness mediates the relationship between the dimensions of correctness, response time and security towards e-filing continuance usage intention. This indicates that correctness and response time had a primary and secondary influence on taxpayers' continuance usage intention of the e-filing system while security has a secondary impact on continuance usage intention. It appears that the system that works properly and produces correct output and a short and reasonable response time is not only able to determine the usefulness of the e-filing system but also affect their intention to continuously use the system.

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