

## **Task-Technology Fit and Technology Acceptance Models Applicability to e-Tourism**

Abel Usoro

University of the West of Scotland, UK

[abel.usoro@uws.ac.uk](mailto:abel.usoro@uws.ac.uk)

Seun Shoyelu

Vaasa University of Applied Sciences, Finland

[seun.shoyelu@puv.fi](mailto:seun.shoyelu@puv.fi)

Matthew Kuofie

Central Michigan University, USA

[Kuofi1m@cmich.edu](mailto:Kuofi1m@cmich.edu)

### **ABSTRACT**

The Internet as an information and business tool has revolutionized the way modern business is being conducted. In tourism, it has led to the emergence of the fast growing and revenue-spinning tourism e-commerce. The patronage of the consumer tourism e-commerce applications is confronted with challenges which include lack of full understanding of why and what motivate the user to use the applications. This is in the backdrop of the reduction in the expected number of online shoppers. The TAM and TTF have been used over the decades to predict and explain the user acceptance and utilization of information technology. While the two different models have been shown repeatedly to offer significant explanatory power, the

combination of both has also been shown to be superior to the individual models. However, there apparently does not exist studies that use the combined models to study e-tourism. Hence in this study the superior explanatory power of the combined TAM/TTF model is used to explore the user acceptance and utilization of the tourism e-commerce websites. A new construct “perceived trust” is also introduced in order to equally explore the role of consumer trust in the adoption of tourism e-commerce applications.

**Keywords:** e-Tourism, Technology Acceptance Model, Task-Technology Fit, Trust, e-Commerce,

## **INTRODUCTION**

Online travel business has been shown to be the biggest and fastest growing of all Internet e-commerce with flight and accommodation accounting for a whopping 31% of all online purchases (European Travel Commission, 2005). Though it has been forecasted that online consumer tourism e-commerce transactions and revenue will continue to grow, there are also worries that the number of users will not continue to grow but is rather declining. There are also well documented reasons why so many current and potential users of the internet will not engage in actual online product purchase. The chief of these reasons include lack of trust, privacy and perceived risk associated with the internet (Jarvenpaa and Tractinsky, 1999; Patrick, 2002; Newholm et al., 2004; Rhett and Lester, 2006; Carlos and Miguel, 2006; Avinandan and Pithwiraj, 2007; Teo and Liu, 2007; Chen and Barnes, 2007; Grabner-Kräuter and Faillant, 2008). Issues concerning trust and its associated dimensions such as privacy have been shown even in recent researches to be important predictors of consumer e-commerce adoption (Teo and Liu, 2007; Grabner-Kräuter and Faillant, 2008). This development has

created a need to increase our very limited understanding of why and how consumers use tourism e-commerce applications. This study regards the consumer use of tourism e-commerce application as a technology adoption process and uses the two most significant technology adoption models found in MIS, namely Technology Acceptance Model (TAM) and TTF in exploring this adoption process. As far as known, the two models have never been combined to examine acceptance of e-commerce in tourism.

The rest of this paper models consumer travel e-shopping using the combined model of TAM and TTF; discusses method of study; presents data analysis and findings; summarises the paper; and draws conclusions with indication of areas for further research.

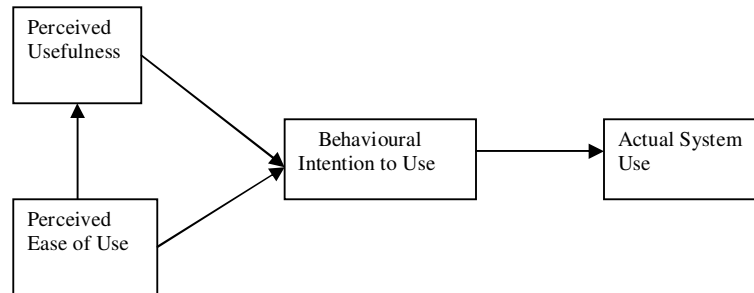
## **MODELING CONSUMER TRAVEL E-SHOPPING**

### **Technology Acceptance Model (TAM)**

TAM was originally developed by Davis in 1986 from attitude and behavioural theories to predict and explain user acceptance of information systems at workplace (Davis, 1986). The model is most popular for determining computer acceptance (Agarwal & Prasad, 1999; Davis, 1989). TAM (see Figure 1) is grounded in established social psychology theories: the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980); and the theory of planned behaviour (TPB) (Ajzen, 1985).

The efficacy of TAM in predicting and explaining Internet and web technology adoption and utilization has been consistently shown to be positive (Chen et al., 2002; Childers et al., 2001). Its effectiveness in predicting and explaining consumer adoption and utilization of e-

commerce applications is also well established by previous research (Chen et al., 2002; Klopping and McKinney, 2004; Childers et al., 2001). Castaneda et al (2009) used TAM to measure and analyse the acceptance of the internet as an information source but not as its use as a medium for purchasing tourism products or services.

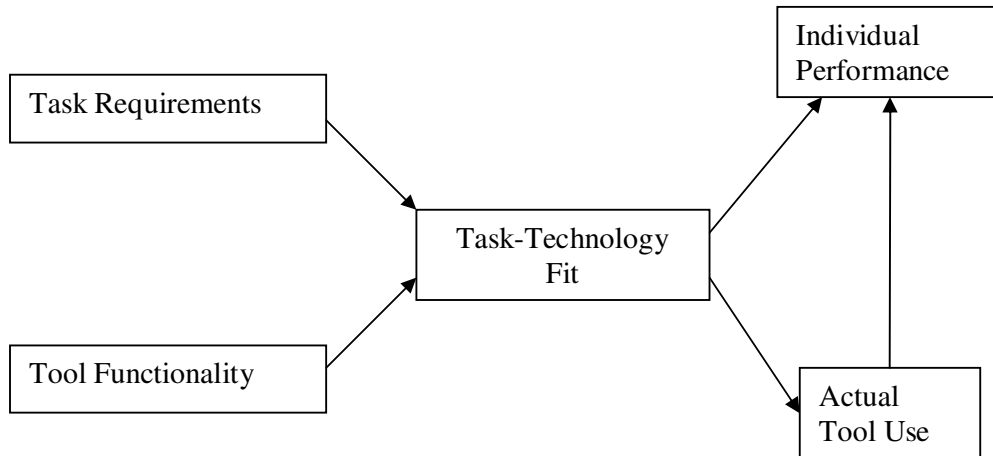


**Figure 1: TAM (Source: Vankatesh et. al. (2003))**

### **Task-Technology Fit Model (TTF)**

Task-Technology Fit (TTF) model is widely used for the prediction and explanation of technology utilization. It was developed by Goodhue and Thompson (1995) to evaluate IT as well as predict and explain its use from the perspective of task; unlike TAM where the emphasis was on using beliefs - “perceived usefulness” and “perceived ease of use” to predict and explain users’ acceptance of IT. The model developed by Goodhue and Thompson operates at the individual level of analysis but, later, Zigurs and Buckland (1998) generated another model that operates at the group level though analogous to that of Goodhue and Thompson.

There are various models built around the concept of task-technology fit construct but the TTF (see Figure 2) is at the core of all of them (Dishaw and Strong, 1999).



**Figure 2: A basic task-technology fit (TTF) model** (Goodhue and Thompson, 1995)

It is reasonable to expect, and research on consumer adoption of online shopping supports the fact, that the consumer will favour an e-commerce application whose functionalities match his or her shopping task(s) (Klopping and McKinney, 2004).

### **Integrated TAM/TTF Model**

The TAM and the TTF models are individually effective in their explanation of the different factors affecting user acceptance and utilization of IT systems and the impact of their adoption on individual performance from two different perspectives – TAM focuses on user attitude while TTF focuses on the correspondence between the user's task and the functionalities of the system. Therefore, it is logical to expect a model that incorporates both TAM and TTF to be more effective than or superior to the individual models in its explanation and prediction of the adoption and utilization process for an IT system by the user.

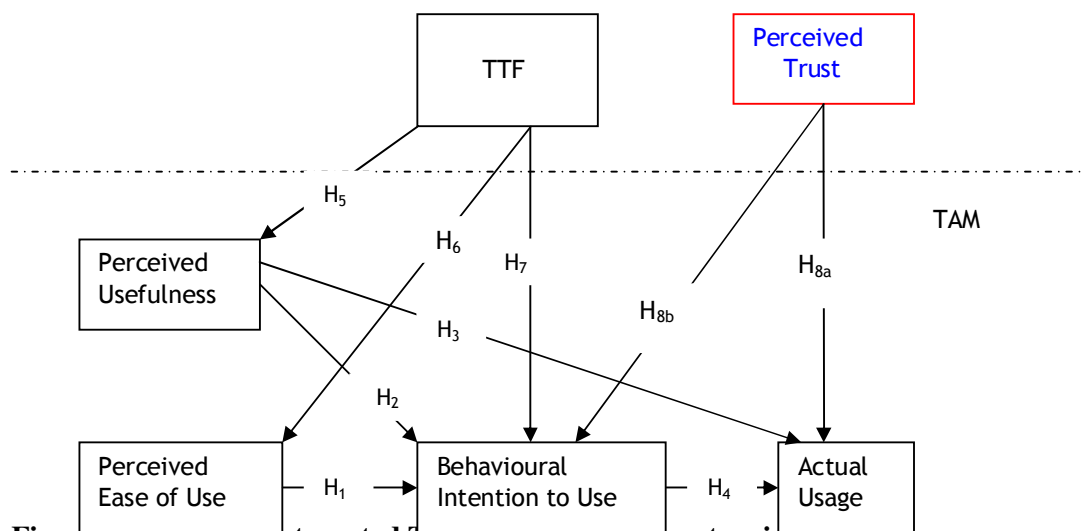
Considering the shortcomings of TAM and TTF, individually, clarifies the argument for integrating both models. TAM posits that the attitude of an individual to using a particular sys-

tem is the most important factor that will influence their adoption and utilization of such a system. The limitation of this assumption, and as confirmed by research, is that the reason a person uses an IT system may not be the possession of a positive attitude towards it but because it improves their performance or out of necessity (Tonita et al., 2004; Klopping & McKinney, 2004). On the other hand, the TTF posits that the user will adopt and utilize a particular IT system as long as the task to be performed is supported by the functionality of the system irrespective of the attitude of the user. Again, that may not always be true because system functionality minus a positive attitude may not result in system usage: the attitude of the user toward the system have been demonstrated in many instances to be a strong determinant of system adoption and usage. Since both user attitude and their perception of the fit between task and technology are important then it goes without saying that a model that combines the constructs derived from both models should be more effective than in individual model in providing needed explanation.

The first attempt to combine the constructs of both TAM and TTF was done by Dishaw and Strong (1999). Their empirical study revealed that the integrated model from both TAM and TTF “provides more explanatory power than either model alone” (p. 9). Furthermore, they concluded that “using the integrated model should lead to a better understanding of choices about using IT” (p.9). Other researchers have applied the TAM/TTF model to other scenarios with little or no modification to the integrated model from Dishaw and Strong. Among these is the TAM/TTF model applied to online shopping by Klopping and McKinney (2004). Klopping and McKinney however extended the TAM with the main construct “task-technology fit” found in TTF model.

### **Proposed Model from this Research**

Clearly, the most notable difference between the proposed model (see Figure 3) to be used in this study and that of Kloppling & McKinney (2004) is the introduction of a new sub-construct “perceived trust” as an antecedent of both the Intention to Use (IU) and Actual Usage (AU). What is the justification for this inclusion? IS researchers in the field of technology adoption and utilization, using either TAM or TTF or the combination of both in an integrated model, have consistently suggested the inclusion of other factors/antecedents/constructs and sub constructs in these models or in the integrated model. Their suggestion aimed to improve our understanding of the technology acceptance and utilization process as well as to increase the efficacy of the models.



**Figure 3: Proposed Integrated TAM/TTF model for e-tourism**

Kloppling and McKinney (2004) used the integrated model to investigate e-commerce adoption and this study proposes to extent the same model to e-tourism. This extension of the same model from online-shopping to e-tourism can be justified from three main perspectives, viz:

1. Similarities between online shopping and e-tourism (task and technology)

2. Similarities between what Klopping & McKinney measured and what this study is to measure (adoption and actual usage)
3. The efficacy of TAM and or TTF in numerous domains of study (proven to be effective in different IT adoption environment)

## Hypotheses

TAM has been confirmed as the most effective tool for explaining information technology adoption by users (Davis, 1989; Davis et al., 1989). It is also very popular as a result of its wide validation from numerous empirical studies as well as its parsimonious nature (Agarwal & Prasad, 1999). Its assumptions have also been substantiated in e-commerce and e-travel (Klopping and McKinney, 2004; Kamarulzaman, 2007). However, there is very little research that uses TAM to examine e-tourism (Law and Bai, 2008). Therefore, this research posits the following hypothesis:

Hypothesis 1 (**H<sub>1</sub>**): Perceived ease of use is positively related to intention to use tourism web sites.

Hypothesis 2 (**H<sub>2</sub>**): Perceived usefulness is positively related to the intention to use tourist web sites.

Hypothesis 3 (**H<sub>3</sub>**): Perceived usefulness is positively related to actual use of tourism website.

Hypothesis 4 (**H<sub>4</sub>**): Intention to use is positively related to actual use of tourism web sites.

Task-technology fit model posits that, besides the user-held beliefs about the system, the chief determinant of the user adoption and utilization of an IT system is the extent to which the system offers functionalities correspondent with the tasks the user wants performed

(Goodhue, 1995). The positive relationship between TTF and the actual system use has been confirmed in numerous researches (Dishaw and Strong, 1999; Klopping and McKinney, 2004). Like TAM, TTF has not been much researched in the context of e-tourism. This research also expects that the users will be more inclined to use a tourist website that provides functionalities that match with the travel tasks of the user. Hence, this research proposes the following hypotheses:

Hypothesis 5 (**H<sub>5</sub>**): Task-technology fit is positively related to perceived usefulness of tourism web sites.

Hypothesis 6 (**H<sub>6</sub>**): Task-technology fit is positively related to perceived ease of use of tourism web sites.

Hypothesis 7 (**H<sub>7</sub>**): Task-technology fit is positively related to the intention to use tourism web sites.

Previous research on the influence of consumer trust on using the internet for product information gathering and for actual product purchase have shown that concerns relating to trust constitute one of the major hindrances to the growth of e-commerce (Wang et al., 1998; George, 2002; McKnight, 2002). The concern about the trustworthiness of the internet is expressed in many ways, chiefly including privacy, integrity, benevolence, competence and security (Patrick, 2002). Going by all of the above, this research presents the following hypothesis:

Hypothesis 8a (**H<sub>8a</sub>**): Perceived trust is positively related to actual usage of tourism web sites.

Hypothesis 8b (**H<sub>8b</sub>**): Perceived trust is positively related to the intention to use of tourism web sites.

Both TAM and TTF models have been shown to individually predict and explain user adoption and utilization of new IT. The integrated model derived from both models has also been demonstrated to provide superior prediction and explanation of IT adoption and utilization to those of the individual combining models (Dishaw and Strong, 1999). In view of this research on e-tourism, a similar result is expected when the integrated model is employed as the environment is similar to that investigated by Klopping and McKinney (2004). Therefore, the following hypotheses are proposed:

Hypothesis 9 (**H<sub>9</sub>**): TAM predicts intention to use and actual use of tourist web sites

Hypothesis 10 (**H<sub>10</sub>**): The combined TTF/TAM predicts the intention to use and actual use of tourism web sites.

## **METHOD**

### **Data Collection**

Data collection for the main study was done both online and physically. The respondents were given the lee-way to analyze any tourism related website of their choice, since the objective of the research was to understand and predict user acceptance and utilisation of tourism web applications that offer products and/or services to users regardless of which website is being adopted. This is in line with methods adopted in previous studies (Roberts et al.,

2003; Flavian and Guinaliu, 2006; Carlos and Miguel, 2006). The sample is highly representative due to the seemingly large number of tourism web sites that the respondents may have used in the evaluation of their adoption process (Carlos and Miguel, 2006 p. 607). 159 valid responses were returned out of the 250 questionnaires distributed to different individuals, representing a response rate of 63.6%. However, a sample size of 150 and above is deemed sufficient for scale development (Hinkin, 1995; Stone, 1978).

### **Instrument Development**

This research followed the examples of previous related research by employing, adapting and modifying items and scales that have been used to measure the constructs of both TAM and TTF (Dishaw and Strong, 1999; Klopping and McKinney, 2004). Moreover, previous research has demonstrated the validity and reliability of the items and their associated scales to be adapted for this research. These variables, items and scales were directly used with little changes to reflect the e-tourism environment.

The construct “trust” has also been measured in previous related studies and the variables, items and scales for its measurement have been substantially demonstrated to be valid and reliable (George, 2002; Pousttchi and Wiedemann, 2007; Hernandez and Mazzon, 2007). These variables, items and scales that have been used in previous research were hence employed, modified and adapted to the e-tourism environment which is the concern of this study.

The questionnaire items were first tested out on a few selected individuals to identify ambiguous questions for the purpose of removing or rewording them as appropriate. Further-

more, a pilot study was conducted using the revised questionnaire with a sample made up largely of students and staff from a University of applied Sciences in Finland. Using students for this type of study is not uncommon (Gefen, 2000; Klopping and McKinney, 2004; Lee et al., 2001). Data resulting from the pilot study was analyzed using Cronbach's alpha and factor analysis, hence items that did not measure their corresponding constructs or that were similar were removed from the questionnaire.

The items to be used to measure the constructs invited the respondents to agree or disagree with statements using a Likert scale of 1 to 5 with the two extremes of "strongly disagree" and "strongly agree". This kind of adaptations and modifications is however not uncommon in this type of research work (Dishaw and Strong, 1999; George, 2002; Klopping and McKinney, 2004).

### **Internal Consistency**

The individual scales were examined for internal consistency by subjecting them to Cronbach's alpha test. All of the variables, but PT (perceived trust), have a Cronbach's alpha greater than 0.70. These suggest that the variables can be used for analyses within acceptable reliability, since five of the six scores had alpha greater than 0.70, demonstrating that the questionnaire has a satisfactory internal validity (Bosma et. al, 1997). Values of alpha, as low as 0.61 (McKinley et. al, 1997) and 0.67 (Bosma et. al, 1997), were regarded as satisfactory in a number of previous research.

## **Construct Validity**

A principal components analysis with varimax rotation was conducted to verify that perceived usefulness (PU), perceived ease of use (PEU), intention to use (IU), actual usage (AU), task-technology fit (TTF) and perceived trust (PT) are indeed distinct constructs. The result of this analysis shows the existence of six distinct factors with Eigen values above 1.0, that also account for 72.7% of the total variance. The result also indicates good discriminant validity because the factors shows no-cross construct loading above 0.50, and the items for PU, PEU, PT and TTF (except for one item out of five) generally clustered at their expected factor groups. However, AU items cross-loaded on IU, one IU item and one TTF item also cross-loaded on PU indicating that these items buttress each other, although theoretically distinct.

## **Data Analysis**

In testing the hypotheses, Pearson bivariate correlations analysis in SPSS was carried out on the variables. This was used to confirm the level of significance between the independent variables and the dependent variables and among all the variables. Multiple regression analysis, specifically hierarchical multiple regression analysis, was carried out to find out the variables that serve as significant predictors of the dependent variables. The variables were entered into the regression model, and in an order dictated by both previous research and the expectations from this study.

## **RESULTS**

### **Bivariate correlations – for hypothesis testing**

Pearson bivariate correlation analysis was conducted to test the hypotheses. All the independent variables show significant correlations with the dependent variable but for PT that shows insignificant correlation with AU, and the combined TAM/TTF model displays greater correlation than TAM and TTF individually to both intention to use (IU) and actual use (AU) at same level of significance ( $<0.001$ ).

### **Multiple regression**

Multiple regression analysis, specifically the hierarchical multiple regression analysis, was carried out to isolate the significant predictors of the dependent variables and their individual contributions to the model.

### ***Technology Acceptance Model and Tourism Websites***

**H<sub>9a</sub>**: TAM predicts the intention to use tourism websites.

This hypothesis is fully supported by the result of the multiple regression analysis ( $R= 0.544$ ,  $R^2=0.296$ , Adjusted  $R^2=0.287$ ,  $R^2$  Change= $0.296$  Sig. F Change= $0.000$ ). The model accounts for 29.6% of the variance in IU, with a very high level of significance that is less than 0.001. The total direct effects of PU and PEU on IU are 0.606 and 0.139 respectively.

**H<sub>9b</sub>**: TAM predicts the actual usage of tourism web sites

The multiple regression analysis results support the hypothesis that TAM predicts the actual usage of tourism web sites ( $R= 0.669$ ,  $R^2=0.448$ , Adjusted  $R^2=0.437$ ,  $R^2$  Change= $0.448$  Sig. F Change= $0.000$ ). TAM accounts for 44.8% of the variance in AU, with a high significance level less than 0.001. The total direct effects of PU and IU on AU are 0.345 and 0.508 respectively.

***Technology Acceptance Model with Task-Technology Fit Model and Tourism Websites***

**H<sub>10a</sub>**: the combined TTF/TAM predicts the intention to use of tourism web sites

The hypothesis is also fully supported by the result of the regression analysis ( $R= 0.577$ ,  $R^2=0.333$ , Adjusted  $R^2=0.320$ ,  $R^2$  Change= $0.037$  Sig. F Change= $0.004$ ). The combined TAM/TTF accounts for 33.3% of the variance in IU, with a significance level of 0.004. The direct effects of PU, PEU and TTF on IU are 0.522, 0.085 and 0.319 respectively.

**H<sub>10b</sub>**: the combined TAM/TTF predicts actual usage of tourism web sites

The multiple regression analysis results support the hypothesis that TAM/TTF predicts the actual usage of tourism web sites ( $R= 0.665$ ,  $R^2=0.442$ , Adjusted  $R^2=0.435$ ,  $R^2$  Change= $-0.006$  Sig. F Change= $0.206$ ) TAM/TTF accounts for 44.2% of the variance in AU, with a significance level of 0.000. The total direct effects of PU and IU on AU in this instance are 0.355 and 0.522 respectively.

It appears that the combined TAM/TTF model may be more effective in predicting the IU of tourism websites than TAM alone. In the first instance, the combined TAM/TTF model explains more variance in the IU (33.3%) than TAM did (29.6%). In the second instance, the individual contribution of the three predictors to the model if the effects of other predictors are held constant is 0.522, 0.085 and 0.319 for PU, PEU and TTF respectively. This is an accurate reflection of the relative importance of the predictor variables (Lewis-Beck, 1974; Klopping and McKinney, 2004). It also appears that the combined TAM/TTF model offers no relative advantage over TAM alone in predicting the AU. The variance explained in AU by the combined TAM/TTF and TAM alone is 44.8% and 44.2% respectively. This is explained by the individual contribution of PEU and TTF when the effects of both PU and IU were held constant. These values are 0.078 and 0.110 for PEU and TTF respectively.

### ***Perceived Trust and Tourism Websites***

**H<sub>8a</sub>**: Perceived trust is positively related to actual usage of tourism web sites. The correlation coefficient between PT and AU (0.141) is insignificant (0.038). Since the correlation between PT and AU is insignificant, **H<sub>8a</sub>** has been disproved.

**H<sub>8b</sub>**: Perceived trust is positively related to intention to use of tourism web sites

The result ( $R = 0.227$ ,  $R^2 = 0.052$ , Adjusted  $R^2 = 0.046$ , Sig. F Change = 0.004, Durbin-Watson = 2.206) of the regression analysis in this instance confirms the positive relationship between PT and IU, with a significant level of 0.004. PT accounts for 5.2% of the variance in IU. The result is summarized in Table 1 below.

Table 1. **H<sub>8b</sub>** Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	Df1	df2	Sig. Change	
1	,227 <sup>a</sup>	,052	,046	1,041928	,052	8,564	1	157	,004	2,206

a. Predictors: (Constant), PT

b. Dependent Variable: IU

Other hypotheses, namely **H<sub>1</sub>**, **H<sub>2</sub>**, **H<sub>3</sub>**, **H<sub>4</sub>**, **H<sub>5</sub>**, **H<sub>6</sub>** and **H<sub>7</sub>** were also fully supported as summarized in table 2, 3, 4, 5, 6, 7, and 8 respectively.

**H<sub>1</sub>**: Perceived ease of use is positively related to intention to use tourism web sites.

Table 2. **H<sub>1</sub>** Multiple Regression Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	Df1	df2	Sig. Change	
1	,217 <sup>a</sup>	,047	,041	1,044367	,047	7,792	1	157	,006	2,107

a. Predictors: (Constant), PEU

b. Dependent Variable: IU

**H<sub>2</sub>**: Perceived usefulness is positively related to the intention to use tourist web sites

Table 3. **H<sub>2</sub>** Multiple Regression Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	,530 <sup>a</sup>	,281	,277	,907217	,281	61,384	1	157	,000	2,332

a. Predictors: (Constant), PU

b. Dependent Variable: IU

**H<sub>3</sub>**: Perceived usefulness is positively related to actual use of tourism website.

Table 4. **H<sub>3</sub>** Multiple Regression Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	,527 <sup>a</sup>	,277	,273	,990737	,277	60,235	1	157	,000	1,891

a. Predictors: (Constant), PU

b. Dependent Variable: AU

**H<sub>4</sub>**: Intention to use is positively related to actual use of tourism web sites

Table 5. **H<sub>4</sub>** Multiple Regression Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	,624 <sup>a</sup>	,389	,385	,910945	,389	99,959	1	157	,000	1,948

a. Predictors: (Constant), IU

b. Dependent Variable: AU

**H<sub>5</sub>**: Task-technology fit is positively related to perceived usefulness of tourism web sites.

Table 6. **H<sub>5</sub>** Multiple Regression Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	,372 <sup>a</sup>	,138	,133	,831028	,138	25,203	1	157	,000	1,799

a. Predictors: (Constant), TTF

b. Dependent Variable: PU

**H<sub>6</sub>**: Task-technology fit is positively related to perceived ease of use of tourism web sites

Table 7. **H<sub>6</sub>** Multiple Regression Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	,285 <sup>a</sup>	,081	,075	,906404	,081	13,891	1	157	,000	1,804

a. Predictors: (Constant), TTF

b. Dependent Variable: PEU

**H<sub>7</sub>:** Task-technology fit is positively related to the intention to use tourism web sites.

Table 8. **H<sub>7</sub>** Multiple Regression Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	,398 <sup>a</sup>	,159	,153	,981503	,159	29,578	1	157	,000	2,174

a. Predictors: (Constant), TTF

b. Dependent Variable: IU

## DISCUSSION

This study uncovers strong support for the use of TAM in predicting the utilization of tourism web applications. The study also finds support for a model that extends TAM with TTF in the prediction of user's utilization or adoption of tourism websites. The relative minor effect of perceived trust on the intention to use tourism websites was also uncovered.

The combined TAM/TTF model explains more variance (33%) in the dependent variable, IU, than TAM (30%). In addition, all four of the paths between the TAM as a model are significant, all seven of the paths between the combined TAM/TTF as a model are significant and finally, eight out of the nine paths in the TAM/TTF/PT model are significant. The insignificant path is that between perceived trust (PT) and actual usage (AU). In TAM, the key predictor of utilization is PU, similar to what a number of other previous research has uncovered (Klopping and Mckinney, 2004; Teo et al., 1999; Lederer et al., 2000), and in the combined TAM/TTF model, the key predictors are perceived usefulness (PU) and task-technology fit (TTF). Perceived ease of use (PEU) has a minor effect on adoption. One explanation may be attributed to the fact that systems become easier to use as the users become more comfortable with and proficient in the use of the technology, resulting in the decreased variation in PEU

(Klopping and Mckinney, 2004; Teo et al., 1999). This explanation may be especially true with the use of tourism websites, as it is true in similar Internet adoption scenarios.

Here, as with Klopping and McKinney (2004), it was found that perceived usefulness impacts on both the intention to use and the actual use of tourism websites. This is especially noteworthy as the pioneer study in this domain could not establish the significant impact of perceived usefulness on actual usage (Dishaw and Strong, 2004). Establishing this relationship in this research further shows the remarkable difference between workplace and consumer e-commerce adoption, especially as it relates to e-tourism web applications. Klopping and Mckinney (2004) are of the opinion that the impact of perceived usefulness becomes obvious in circumstances such as this because of the growing dependence of users on web applications for their shopping activities without realizing it, or without making a conscious resolution to do so. This is particularly true in tourism where the internet and its associated tourism websites serve as a window to tourism destinations, planning and shopping. Users are increasingly sourcing tourism related information from the internet before embarking on their planned trips.

Another similarity with Klopping and McKinney (2004) and dissimilarity with Dishaw and Strong's study (2004) is in the relationship between TTF and perceived usefulness. Dishaw and Strong (2004) expected that relationship to be significant but the results from their study proved otherwise, but Klopping and McKinney (2004) in their study of e-commerce adoption were able to establish this relationship. This study, in the same vein, found this strong relationship between TTF and perceived usefulness, probably because the domain of this study is different from those of Dishaw and Strong, but similar to that of Klopping and McKinney. Similar discovery was made by Chen et al., (2002) in their exploitation of the relationship

between “compatibility”, a more comprehensive definition of task-technology fit, with perceived usefulness in e-commerce adoption. Two reasons may be attributed to this strong relationship between TTF and perceived usefulness (Dishaw and Strong, 2004). The first is that the users probably feel that usefulness of tourism web sites depend largely on the fit between their tourism-related shopping task and the functionalities of the tourism websites. The second reason is probably that the users have a better and clearer understanding of their shopping tasks, and are thus able to assess, firsthand, the fitness of the websites functionalities with these tasks.

This study also found a significant relationship between task-technology fit and perceived ease of use. Klopping and McKinney (2004) similarly found that TTF affects perceived ease of use. This is probably due to a similar reason given by Klopping and McKinney that allowing the respondents to have a lee-way in choosing the websites to use for their evaluations without constraining them to any particular site may have helped in exposing this relationship between TTF and PEU.

Although this study was unable to establish a relationship between perceived trust and actual use, it certainly reveals that perceived trust impacts on intention to use. This means that users have concerns about the different aspects of trust as regards tourism websites which negatively affect their intention to the use of these sites. Trust has been shown to be a key predictor of behavioural intention to the adoption of websites (Avinandan and Prithwiraj, 2007; Rhett and Lester, 2006; Carlos and Miguel, 2006; Chen and Barnes, 2007; Teo and Liu, 2007). But, this concern or caution appears to be thrown to the wind when users suddenly find a reason to use the websites, to buy an affordable holiday package for instance. Anyway, trust has been consistently fingered from results of previous research as influential in the de-

termination of the success of online shops (Zeithaml et al., 2002; McKnight et al., 2002; Luo, 2002) particularly as consumers believe that internet-based transaction is more risky than other means of purchase such as catalogue shopping (Jones & Vijayasathy, 1998).

## **CONCLUSION: IMPLICATIONS AND RECOMMENDATION**

This study was intended to explore the practicability of extending TAM and TAM/TTF model to technology adoption of tourism e-commerce. These two models provide a good variance in the intention to use and the actual use of tourism websites. TAM/TTF explains a higher variance in the adoption process. The task here was generalized to both information gathering and purchase as employed by Kloppe and McKinney (2004). This study confirms the use of these models as a sound theoretical foundation for the study of consumer adoption of tourism websites as an example of e-commerce applications, sequel to the establishment of these models as appropriate for this domain of study by Kloppe and McKinney (2004) and other researchers' such as Chen et. al. (2002).

Tourism operators and Web developers should note that making the tourism websites with functionalities that meet the tasks of the user, and that the user find useful means that the user will use the websites and that the businesses will acquire and maintain customers.

How can the developers ensure task-technology fit? They should endeavour to uncover the needs and or the tasks that their customers intend to realize with the use of the websites before embarking on the actual application development. Based on the questionnaire items employed in this study, the developers may want to pay close attention to making sure that sufficiently detailed product information, accurate information, and up-to-date information are

made available on the sites. Also, this information should be obvious and easy to find, such that at a quick perusal the user can easily get to the information needed.

The user should be comfortable with not only the functional but the non-functional aspects of the system such as speed of loading or response, search function, and navigation (Zeithaml et al., 2002). As recommended by Klopping and McKinney (2004) and also relevant in this instance, the developers should pay more attention to usefulness than to perceived ease of use, since usefulness is a greater contributor to determining the eventual success of the websites.

In addition to all of the above, “trust” was also identified as an important determinant in the adoption process. Reflecting on the result and the questionnaire items shows that developers and tourism websites owners should pay close attention to ensuring that the personal information of their customers are kept private and that their online mode of payment are secured. These are the chief worries of the online consumers regarding trust. Rhett and Lester (2006 p. 135) suggested that companies may employ marketing strategies aimed at convincing the consumers that perceived risk associated with using e-commerce applications has been eliminated. Self-reported privacy statements with a strong guarantee of security are more effective than reliance on third-party seals in offsetting consumer concerns about the security of their personal information (Peterson et al., 2007).

#### **AREAS FOR FURTHER RESEARCH**

One of relevant areas not investigated in this study is the dimensions of trust such as benevolence (Wang et al., 2002; Walker et al., 2002; Dabholkar & Bagozzi, 2002; Rhett & Lester,

2006), consistency (Patrick, 2002), privacy or discreteness (Wang et al., 1998; Yi-Shun et al., 2003).

It is worth mentioning that TAM and combined TAM/TTF models explain more variance in the actual use than they did for intention to use. This is significantly different from previous research results (Klopping and McKinney, 2004). The reason for this disparity calls for further research. Also, Klopping and McKinney (2004) found that TAM and TAM/TTF both gave the same value for variance in actual use, but the result here shows that the predictive power of TAM/TTF model was dragged down by TTF with an  $R^2$  Change of -0.006 (representing the unique contribution of TTF to the model when the effects of the other independent variables are held constant) resulting in TAM explaining 44.8% variance in actual use and TAM/TTF explaining 44.2% of the variance in actual use, with a significant F change of 0.21. This discovery also calls for further research.

It was also discovered that TAM and TAM/TTF models explain less variance in intention to use, 30% and 33% respectively, than has been found in previous research (Dishaw and Strong, 1999; Klopping and McKinney, 2004). This suggests that probably some important factors or independent variables have been left out of the models for the study of the specific domain of consumer tourism website adoption.

## REFERENCE

- Agarwal, R. and Prasad, J. (1999). Are individual differences germane to the acceptance of new information technologies?, *Decision Sciences*, 30, 2, pp. 361-391.
- Ajzen, I. (1985). From intentions to actions: a theory of planned behaviour, in Kuhl, J. and Beckman, J. (Eds), *Action Control: From Cognition to Behaviour*, Springer-Verlag, New York, NY, pp. 11-39.
- Ajzen, I. and Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behaviour*. Prentice-Hall, Englewood Cliffs, NJ.
- Bagozzi R. P. (1982). A field investigation of causal relations among cognitions, affects, intentions, and behaviour, *Journal of Marketing Research*, 19, 11, pp. 562-584.
- Castaneda, J Alberto; Frias, Dolores M; and Rodriguez, Miguel A (2009). Antecedents of internet acceptance and use as an information source by tourists, *Online Information Review*, 33, 3, pp. 548-567.
- Chen, L., Gillenson, M. & Sherrell, D. (2002). Enticing online consumers: An extended technology acceptance perspective, *Information & Management*, 39, 8, pp. 705-719.
- Childers, T., Carr, C., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior, *Journal of Retailing*, 77, 4, pp. 511-535.
- D'Ambra, J. and Wilson, C. S. (2004). Use of the World Wide Web for International Travel: Integrating the construct of uncertainty in information seeking and the task-technology fit (TTF) model, *Journal of the American Society for Information Science and Technology*, 55, 8, pp. 731-742.
- Dabholkar, P. A. and Bagozzi, R. P. (2002). An attitudinal model of technology-based self service: moderating effects of consumer traits and situational factors, *Journal of the Academy of Marketing Science*, 30, 3, pp. 184-201.

- Dabholkar, P.A. (1996). Consumer evaluation of new technology-based self-service options, *International Journal of Research in Marketing*, 30, 3, pp. 29-51.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology, *MIS Quarterly*, 13, 3, 319-339.
- Davis, F.D., Bagozzi, R.P. and Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models, *Management Science*, 35, 8, pp. 982-1003.
- Davis, F. D. (1986). A technology acceptance model for empirically testing new end user information systems: theory and results, doctoral dissertation, Sloan School of Management, Massachusetts Institute of Technology, Amherst, MA.
- Dawis, R. V. (2000). The person-environment tradition in counseling psychology. In W. E. Martin Jr. & J. L. Swartz-Kulstad (Eds.), *Person-environment psychology and mental health* (pp. 91-111). Mahwah, NJ: Erlbaum.
- Dawis, R. V., England, G. W. and Lofquist, L. H. (1964). A theory of work adjustment. *Minnesota Studies in Vocational Rehabilitation* (No. XV), pp. 1-27. Minneapolis: University of Minnesota, Industrial Relations Center.
- Dishaw, M. T., and Strong, D. M. (1999). Extending the technology acceptance model with task-technology fit constructs. *Information & Management*, 36, 1, pp. 9-21.
- eMarketer (2007). Happy Holiday for European Web Shops?, Available at: <http://www.emarketer.com/Results.aspx?N=0&Ntk=basic&Ntt=happy%20holiday%20for%20european%20web%20shops> (Accessed August 28, 2008).
- eMarketer (2008). The Economy and European E-Commerce. Available at <http://www.emarketer.com/Results.aspx?N=0&Ntk=basic&Ntt=the%20economy%20and%20european%20e%20commerce> (Accessed August 28, 2008).

- European Travel Commission (2005). "Market by country: UK online travel market". Available at: [www.etcnewmedia.com/review/default.asp](http://www.etcnewmedia.com/review/default.asp) . (Accessed August 28, 2008).
- Fox, S. (2000). "Trust and Privacy online: Why Americans want to rewrite the rules". Pew Internet and American Life Project. Available at: [www.pewinternet.org](http://www.pewinternet.org) . (Accessed April 25, 2008).
- Gefen, D. (2000). E-commerce: the role of familiarity and trust, *OMEGA: The International Journal of Management Science*, 28, pp. 725-37.
- George J. F. (2002). Influences on the intent to make Internet purchases, *Internet Research*, 12, 2, pp. 165-180.
- Goodhue D. L. (1988). "Supporting users of corporate data: the effect of I/S policy choices". Unpublished Doctoral Dissertation, Massachusetts Institute of Technology.
- Goodhue D. L. and Thompson R. L. (1995). Task-technology fit and individual performance, *MIS Quarterly*, 19, 2, pp. 213-236.
- Hernandez J. M. C. and Mazzon J. A. (2007). Adoption of internet banking: proposition and implementation of an integrated methodology approach, *International Journal of Bank Marketing*, 25, 2, pp. 72-88.
- Hong, W., Thong, J. Y. L., Wong, W. M. and Tam, K. Y. (2001). Determinants of user acceptance of digital libraries: an empirical examination of individual differences and system characteristics, *Journal of Management Information Systems*, 18, 3, pp. 97-124.
- Jarvenpaa S. L. and Tractinsky N. (1999). Consumer trust in an Internet store: A cross cultural validation, *Journal of Computer Mediated Communication*, 5, 2, 1-35.
- Jones, J. M. and Vijayarathy, L. R. (1998). Internet consumer catalog shopping: findings from an exploratory study and directions for future research, *Internet Research*, 8, 4, pp. 322-30.

- Kamarulzaman Y. (2007). Adoption of travel e-shopping in the UK, *International Journal of Retail & Distribution Management*, 35, 9, pp. 703-719.
- Keeney, R. L. (1999). The value of internet commerce to the customer, *Management Science*, 45, 4, pp. 533-542.
- Klopping, I. M., and McKinney E. M. (2004), Extending the Technology Acceptance Model and the Task-Technology Fit Model to Consumer E-Commerce, *Information Technology, Learning & Performance Journal*, 22, 1, pp. 35-48.
- Law, R and Bai, B (2008) How do the preferences of online buyers and browsers differ on the design and content of travel websites?, *International Journal of Contemporary Hospitality Management* 20, 4, pp 388-400.
- Lee, D., Park, J. and Ahn, J. (2001). On the explanation of factors affecting e-commerce adoption, *Proceedings of the Twenty-Second International Conference in Information Systems*, pp. 109-120.
- Lu, J., Yu, C., Liu, C. and Yao (2003). Technology Acceptance Model for Wireless Internet, *Internet Research*, 13, 3, pp. 206-222.
- Luo, X. (2002). Trust production and privacy concerns on the internet: a framework based on relationship marketing and social exchange theory, *Industrial Marketing Management*, 31, pp. 111-8.
- Lynch, D. and Lundquist, L. (1996). *Digital Money*. Wiley, New York, NY
- Maruping, L. M. and Agarwal, R., (2004). Managing Team Interpersonal Processes through Technology: A Task-Technology Fit Perspective, *The Journal of Applied Psychology*, 89, 6, pp. 975-990.
- McKechnie, S., Winklhofer, H. and Ennew, C. (2006). Applying the Technology Acceptance Model to Online Retailing of Financial Services, *International Journal of Retail and Distribution Management*, 34, 4/5, pp. 388-410.

- McKnight, D. Chudhury, V., and Kacmar, C. (2002). The impact of initial customer trust on intentions to transact with a web site: a trust building model, *Journal of Strategic Information Systems*, 11(4), pp. 297-323.
- Moon, J. W. and Kim, Y.G. (2001). Extending the TAM for a World Wide Web context, *Information & Management*, 38, 4, pp. 217-37.
- Patrick McCole (2002). The role of trust for electronic commerce in services, *International Journal of Contemporary Hospitality Management*, 14, 2, pp. 81-87.
- Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: integrating trust and risk in the technology acceptance model, *International Journal of Electronic Commerce*, 7, 3, pp.101-34.
- Perez, M. P., Sanchez, A. M., Carnicer, P. L., and Jimenez (2004). A Technology Acceptance Model of Innovation Adoption: The Case of Teleworking, *Journal of Innovation Management*, 7, 4, pp. 280-91.
- Pew Research Center (2005). Selling Items Online. Available at: <http://www.pewinternet.org>. (Accessed August 27, 2008).
- Pew Research Center (2006). Internet Penetration and Impact. Available at: <http://www.pewinternet.org>. (Accessed August 27, 2008).
- Pew Research Center (2006). Truly a World Wide Web. Available at: <http://www.pewinternet.org>. (Accessed August 27, 2008).
- Pew Research Center (2008). Internet users like the convenience but worry about the security of their financial information. Available at: <http://www.pewinternet.org>. (Accessed August 27, 2008).
- Pikkarainen, T., Pikkarainen, K., Kirjaluoto, H. and Pahnla, S (2004). Consumer Acceptance of Online Banking: An Extension of the Technology Acceptance Model, *Internet Research*, 14, 3, pp. 224-35.

- Pousttchi K. and Wiedemann, D. G. (2007). What Influences Consumers to Use Mobile Payments?, Los Angeles Mobility Roundtable, Los Angeles, USA.
- So, M. and Sculli, D. (2002). The role of trust, quality, value and risk in conducting e-business, *Industrial Management & Data Systems*, 102, 9, pp. 503-12.
- Subramanian, G. H. (1994). A Replication of Perceived usefulness and Perceived ease of use Measurement, *Journal of Decision Sciences*, 25, 5/6, pp. 863-873.
- Tonita, P. M., Benedict G. C. and Ko de Ruyter (2004). What drives consumers to shop online? A literature review, *International Journal of Service Industry Management*, 15, 1, pp. 102–121.
- U.S. Census Bureau, Estimated Quarterly U.S. Retail Sales (Adjusted): Total and E-commerce. Available at: <http://www.census.gov/mrts/www/data/html/07Q3table3.html>. (Accessed August 27, 2008).
- Vankatesh, V. (2000). Determinants of perceived ease of use: integrating control, intrinsic motivation, and emotion into the technology acceptance model, *Information System Research*, 4, pp. 342-65.
- Venkatesh, V. and Davis, F. D. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies”, *Management Science*, 46(2), pp. 186-204.
- Venkatesh, V., Moris, M. G. and Davis, F. D. (2003). User acceptance of information technology: Toward a unified view, *MIS Quarterly*, 27, 3, pp. 425-478.
- Wang, H., Lee, M. and Wang, C. (1998). Consumer privacy concerns about internet marketing, *Communications of the ACM*, 41, pp. 63-70.
- Wixom, B.H. and Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance, *Information Systems Research*, 16, 1, pp. 85-102.

Yi-Shun, W., Yu-Min, W., Hsin-Hui, L. and Tzung-I, T., (2003). Determinants of user acceptance of internet banking: an empirical study, *International Journal of Service Industry Management*, 14, 5, pp. 501-519.

Zeithaml, V., Parasuraman, A. and Malhotra, A. (2002). Service quality delivery through web sites: a critical review of extant knowledge, *Journal of the Academy of Marketing Sciences*, 30, 4, pp. 362-75.

Zigurs I. and Buckland B. K. (1998). A theory of task/technology fit and group support systems effectiveness, *MIS Quarterly*, 22, 3, pp. 313-334.