

Review Article

Technology Acceptance Model: A Review

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A B S T R A C T

The use of internet real estate search engines can be an important tool for agents and buyers alike in the information search stage of real estate purchase. Using the Technology Acceptance Model (TAM), a sample of New Zealand purchasers' attitudes and behavior are examined to determine the factors that influence the adoption of this tool in this high-involvement purchase situation. Results suggest that the traditional TAM constructs of perceived usefulness and perceived ease of use along with the intrinsic motivation category of perceived enjoyment have significant relationships with purchasers' attitudes towards and intention to adopt real estate search engines. Managerial and academic implications are given.

Keywords: Internet, TAM, Website

Introduction

Buying property can be an exciting, but also daunting, prospect for home buyers. A recent innovation for potential buyers and sellers which can aid this process has been the introduction of real estate websites, containing a searchable database of property listings and several interior photos of the property on offer. These websites are often touted as offering convenience and efficiency for the house buyer and enabling them to narrow down the homes on offer and make an informed market choice. However, many agents continue to invest heavily in advertising and promotion through conventional media, while a number of house buyers still appear reluctant to, or fail to, use such websites to their full advantage. The objective of this paper then is to investigate the reasons why some house buyers, who potentially stand to benefit from the use of such websites and the detailed information provided within are not accessing this technology. Specifically, the Technology Acceptance Model is used to better understand buyers' attitudes and behavior.⁶

Background

Most of the early models relating to search propensity in housing markets follow traditional economic theories

relating to search intensity and cost of search.⁵ For example, Stigler (1961) established that a buyer will first identify properties for sale and then seek sales price information for a set of suitable properties, continuing to search until any price saving benefits are negated by the time involved. However, a number of other factors have also been found to affect the search duration, including income²; family size; length of residence; number of houses viewed; and number of locations considered (e.g., suburbs).⁵ It is usually believed that the more 'efficient' searches occur when the number of houses visited is low (Palm and Danis, 2001), as a longer search time may lead to buyers missing out on a property and then having to start the search process again.⁵ Beliefs regarding the purchase price necessary to gain the desired house (the reservation price) are also known to impact heavily on search duration, the type of property initial (Smith and Mertz, 1980).^{1,2,5} As purchasers become more knowledgeable about the market, their reservation price, beliefs relating to appropriate property features and neighborhood to reside in, alter (Rothschild 1974).² Real estate agents though can influence purchasers' beliefs by showing houses in a certain order, reducing the geographic region a purchaser is exposed to, causing the purchaser to increase search intensity in only a certain market segment

(Smith and Mertz 1980; Palm and Danis, 2001) with such methods being shown to change the buyer's price and price quality beliefs (Smith and Mertz, 1980).¹

Despite this apparent 'gate keeping' nature of real estate agents, studies show that using agents afford purchasers a number of benefits, including a reduced search time^{1,2}; an increased likelihood of finding an appropriate property¹; and by increasing search intensity, allowing a more informed choice, reducing buyers' perceived risk.² Apart from the real estate agent, other important information sources have been found to be driving around the neighborhood; advice from friends and relatives; and the internet with the newspaper being the least important (Palm and Danis, 2001).⁷

Buyers who are younger (Bao and Cook, 2000; Palm and Danis, 2001; 2002; Zumpano et. al, 2003); male (Palm and Danis, 2002); dissatisfied with a realtor (Bao and Cook, 2000; Zumpano et. al, 2003), a long way from the market (Zumpano et. al, 2003) and with access to, previous experience with, the internet (Bao and Cook, 2000) have been found to be more likely to use real estate websites as an information source. Benefits of internet realty sites are said to be the ability to expose a greater number of buyers to a larger range of properties (Palm and Danis, 2002), but this may mean a longer time to find a property, as there is greater competition due to more market awareness of the property, additionally, this awareness may draw 'window shoppers' instead of genuine buyers.⁹

However, greater competition (even if it is just the perception of competition) leads to higher prices being achieved by internet listings (Zumpano et. al, 2003; Palm and Danis, 2002), although interestingly internet listings may take longer to sell (on average, 6 days longer).⁹

It is not expected that the internet will totally replace the role of the real estate agent. House purchasing is a very complex affair and people still want expert help and advice through the buying process (Patton, 1999; Swanepoel, 1999). In addition, the individual rather than commodity nature of houses also presents challenges to full e-business transactions via the internet (Swanepoel, 1999), as these types of products are difficult to market effectively via the web. Certainly, for unique houses, representing every aspect of them is important, so buyers can be certain of what they are getting. Palm and Danis (2001) highlighted this point, in that personal visits to the home were important to gain an impression of not only the house itself, but the surrounding neighborhood.

The internet is therefore becoming a useful technology for retrieval of information by buyers in the real estate sector, but whether it can fully replace either the agent or physical visits as a means of fully informing the buyer

remains to be seen. To consider the impact and how uptake of such a technology is likely to impact on the consumer decision-making process, in particular the search process, it is important to understand what drives the usage of these types of technologies, whether purely functional elements alone, or the novelty and enjoyment in using a real estate website is a primary motivator also.

A number of models have been suggested in the literature as useful for explaining the motivation of the acceptance of new technologies such as the internet for the acceptance of technology (e.g., theory of reasoned action)⁸, diffusion of innovation models (e.g., Rogers, 1995). Davis FD introduced the concept of the Technology Acceptance Model (TAM), showing that the two constructs of Perceived Ease of Use and Perceived Usefulness are significant in explaining a user's adoption of an Information technology.⁶ Several researchers have subsequently found the model to be useful in explaining user acceptance and uptake across a range of internet-based technologies (Teo, Lim and Lai, 1999).^{4, 11, 12, 14} Therefore, the first hypotheses posit that these constructs will explain consumer acceptance in the context of an Internet search engine: H1: There is a positive relationship between perceived usefulness and attitude to using a real estate website; H2: There is a positive relationship between perceived ease of use and attitude to using a real estate website; H3: There is a positive relationship between perceived usefulness and behavioral intention to using a real estate website; H4: There is a positive relationship between perceived usefulness and perceived ease of use of using a real estate website; H5: There is a positive relationship between attitude and behavioral intention to using a real estate website

Several recent studies have extended the TAM to account for a perceived enjoyment/ fun/ playfulness construct (Teo, Lim and Lai, 1999) and have found support for this construct in the context of non-workplace and internet-based information technologies.^{3, 10, 15} H6: There is a positive relationship between perceived enjoyment and attitude to using a real estate website; H7: There is a positive relationship between perceived ease of use and perceived enjoyment of using a real estate website; H8: There is a positive relationship between perceived enjoyment and behavioral intention to using a real estate website.

Methodology

A quantitative analysis of purchasers' attitudes towards and behavioral intent to use realty websites was the method chosen for this research. The TAM⁶ was the basis for the quantitative data collection. A self-completion questionnaire was mailed out to a database of recent home buyers, obtained from local real estate agents, in late 2005. The option of conducting the research online was purposely discarded to ensure that both those who

are comfortable with technology and those who are less likely to use technology options were accessed. A usable response rate of 44% (99 questionnaires) was obtained in this manner. Questions included asking about the type of property sought and information sources accessed, as well as items pertaining to the TAM. The latter were taken from previous studies that have used the TAM to study acceptance of IT and adapted where necessary to reflect the context for this study. In addition, a construct representing Perceived Enjoyment was posited as an extension to the TAM. Seven-point Likert scales consistent with previous research in the area were used. A number of classification-type questions were also included to enable the profiling of users and non-users along with questions to indicate the length of time and of house visited by the respondents.

Results

The first step in analyzing the data obtained was to test the scale reliability of the constructs used. The Cronbach alpha for all constructs indicated the internal reliability was acceptable (Perceived Usefulness $\alpha=0.896$; Perceived Enjoyment $\alpha=0.905$; Perceived Ease of Use $\alpha=0.893$; Attitude $\alpha=0.896$; Behavioral Intention $\alpha=0.756$).

Findings demonstrate that the TAM model, when extended to include the Perceived Enjoyment construct, has highly significant relationships with both the Attitude towards and Behavioral Intent to use real estate websites (Figure 1). Perceived Usefulness was found to have the highest correlation with both Attitude and Behavioral Intent. However, Usefulness is strongly influenced by Perceived Ease of Use. Perceived Enjoyment has a significant influence on Behavioral Intent but is also mediated through Ease of Use.

As hypothesized, perceived usefulness and ease of use were positively related to respondents' attitudes towards using real estate websites and intention to use. Importantly the hypothesized extension to the TAM, perceived enjoyment, was also found to be positively related although mediated by perceived ease of use. Using a real estate website was found to result in an extended search process on the respondents' part. While counter-intuitive this result may well be explained by the increased enjoyment of the search process experienced by those using websites. The number of open homes visited was also higher among those using real estate sites as part of their information search.

Conclusion and Implications

The TAM, extended to include the perceived enjoyment construct, appears to adequately explain behavioral intention to adopt a real estate website. Additionally, using a real estate website during the search process exposes buyers to a wider range of properties, the study found that this leads to a longer overall search duration,

visits to a larger number of open homes than for those who did not adopt the tool. The study therefore adds to the limited body of knowledge investigating the use of the TAM for interactive technologies and adds support for recent studies indicating the importance of perceived enjoyment on technology acceptance of the internet.^{3, 15} There is currently relatively little information available concerning the high involvement consumer decision-making process for purchasing property. This research complements and supports the findings of studies relating to other high-involvement purchase decisions being impacted by online search capabilities, such as automobiles and banking. It also extends the work that has specifically focused on house purchases, specifically those that are related to the information search process, which have previously focused on search duration², search intensity (Palm and Danis, 2001).^{1, 5}

Intrinsic motivation (measured through the construct of Perceived Enjoyment) appears to have a significant influence on Behavioral Intent. However, the study shows that Perceived Ease of Use significantly mediates this effect. There is a need to ensure real estate websites are simple to use, as this will enhance user enjoyment and further drive behavioral intent (and subsequent use). One way that may make websites easier to use would be the inclusion of a keyword search function, or a list of selected 'common phrases' that are present in real estate listing blurbs. Such a feature would enhance the usability of the site, as the user can then search by benefits sought and for certain types of houses, rather than by physical property features such as the number of bedrooms and living areas, as is currently the case.

Analysis of the intrinsic enjoyment gained versus the tangible benefits of using a real estate website to find information suggests that the use of a real estate website is not necessarily an efficient search means but it is perceived to be more enjoyable and convenient. Such sites appear to be a vehicle by which buyers are investigating a greater number of homes, thus may allow them to consider a wider set of housing types than would otherwise have been the case. Real estate agents could use this to the advantage of exposing buyers to a range of properties similar to the open homes they are viewing, thus developing a larger pool of potential buyers for each property.

Limitations and Future Research

The research was limited to studying only one geographical segment of New Zealand (Bay of Plenty) and may not be representative of national real estate website use. The study focused on determinants of real estate website use during the information search stage of decision-making, rather than overall strategies to improve real estate sales, online purchasing or post-purchase satisfaction by real

estate website buyers. The role of moderating factors, further extensions of the TAM model as they arise, may also be useful in explaining further the behavioral intention to use technology when searching for information on real estate. Additionally, other potential moderators, purchase motivations (e.g., purchasing properties for development) may have to be included in future work, as they may impact the adoption and level of use of real estate search engines.

As the internet becomes more embedded in our everyday lives, innovators are turning their attention to the media of the future. The use of this new technology opens the opportunity for new research.

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