

DETERMINANTS OF INTERNET ADOPTION IN MALAYSIAN AUDIT FIRMS

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Abstract—This study examines various factors associated with the adoption of Internet in audit firms. A research model that contains seven independent variables under four broad categories is postulated. The dependent variable, Internet adoption, is measured as the relative frequency of seven Internet applications used by audit firms. The results are based on primary data collected from 89 audit firms located in the northern region of Malaysia. Multiple regression analysis indicates that perceived usefulness, perceived ease of use and age of audit partners are significantly associated with Internet adoption. Implications of the findings and future research areas are discussed.

Keywords—Internet; adoption; Malaysia; audit firms; innovation

I. INTRODUCTION

The Internet represents an extremely efficient medium for accessing, organizing and communicating information (Hanill, 1977). With the increased popularity of the Internet, many organizations are investing substantially to reap the potential benefits derive from Internet adoption. Compared to the other means of communication such as post, telephone and fax, the Internet provides a flexible, reliable and low-cost method for communication, especially with distant markets (Poon & Javons, 1997)

Despite the widespread Internet adoption in the business environment, the extent of Internet adoption by Malaysian audit firms remains unclear. Although the role of auditing in our society is significant, auditing researchers and practitioners have little guidance available on the extent of Internet applications adoption among Malaysian audit firms. The auditing profession is currently operating in a dynamic and challenging environment as numerous forces are affecting the business activities of audit firm. The advent of Internet technologies can give a significant impact on the way information is acquired, stored and disseminated. Given the potential of Internet adoption in the audit firms, it becomes important for researchers to investigate what are the factors that determine Internet adoption in the audit firms' context.

Although studies on Internet adoption by businesses have proliferated in the last few years, this kind of research has, however, been limited in some developing countries like Malaysia (Alam, 2009). Most studies on Internet adoption have been conducted in the advanced economies (Sorensen&Buatsi , 2002). Furthermore, the scarcity of research focusing on Internet adoption by audit firms communicates a need for research that concentrates on this

specific industry. In addressing these research gaps, this study will focus on audit firms in an effort to reveal the factors which predict the adoption of the Internet in Malaysian audit firms.

II. THEORETICAL BACKGROUND

Tornatzky & Fleischer (1990) develop the technology-organization-environment framework to study innovation adoption at organization level. This framework has been tested widely by IT researchers to investigate innovation adoption at organizational context, and the results are promising. However, the specific factors identified in each of the three contexts differ from one study to another. It is worth mentioning that there is no single factor that is universally tested in every innovation research and the identification of factors to be included depends on the specificity of the innovation studied.

Rogers (1995) suggests that the adoption and implementation of new technology in an organization is much more complex than innovation decisions made by individual, as often many people are involved in the decision making. However, in an audit firm, the audit partners to a large extent determine the firm's future direction and policy. Investment in new technologies such as the Internet are, therefore, also subject to the characteristics of the business owner (MacGregor&Vrazalic, 2007&Thong&Yap,1995).

By synthesizing previous research, Thong (1999) developed an integrated model and identified four contextual elements that were relevant to IT adoption:

1. Decision makers' characteristics
2. Technological characteristics
3. Organizational characteristics
4. Environmental characteristics

Although not all the characteristics were found to be significant determinants, Thong (1999) found that CEO's characteristics, technological characteristics and organizational characteristics are three major predictor groups of innovation adoption.

It is noteworthy that numerous factors have been identified in the innovation adoption literature. However, as argued by innovation researchers, it is not possible to develop a unifying theory of innovation due to the

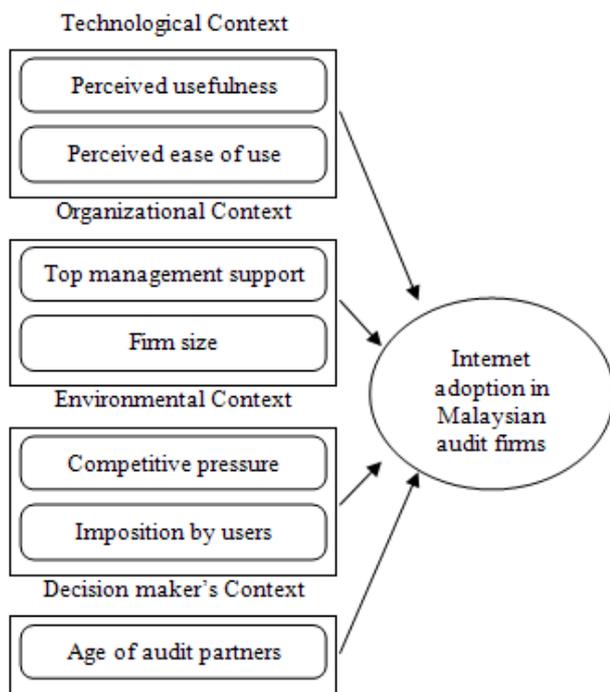


Figure 1. Research Model

fundamental differences between innovation types (Kimberly & Evanisko, 1981). Hence, the applicability and suitability of factors to the context of Internet adoption by audit firms are the main criteria to determine factors to be included in this study.

III. HYPOTHESES

Similar to Thong's (1999) integrated model, the proposed research model in this study can be categorized into four contextual elements, namely technological characteristics, organizational characteristics, environmental characteristics and decision makers' characteristics.

3.1 Technological context

3.1.1 Perceived usefulness

Davis (1989) proposed that perceived benefits or usefulness is one of the two fundamental determinants of new technology acceptance. An organization would be more inclined to adopt new innovation should the adoption of the innovation provides more benefits over the existing method.

H1: There is a positive relationship between perceived benefits and Internet adoption in audit firms

3.1.2 Perceived ease of use

The introduction of a new technology can be intimidating for employees, particularly if it requires them to acquire new skills (Beatty, Shim & Jones, 2001). Research has indicated that firms may be less likely to adopt an innovation or technology if it requires a high level of new skills by members of the organization (Robertson & Gatignon, 1986).

H2: There is a positive relationship between perceived ease of use and Internet adoption in audit firms.

3.2 Organizational context

3.2.1 Top management support

Top management support is a commitment by the top management team to support the technology at all levels of the organization (Beatty et al., 2001). In an audit firm, the chances of Internet adoption might be higher if the top management sponsors its adoption in the office.

H3: There is a positive relationship between top management support and Internet adoption in audit firms

3.2.2 Firm size

According to Welsh & White (1981), small businesses are characterized by severe constraints on financial resources, a lack of in-house IT expertise and a short-range management perspective. As such, small organizations face significantly more barriers to IT adoption and are less likely to adopt IT than large firms (Ein-Dor & Segey, 1978).

H4: There is a positive relationship between firm size and Internet adoption in audit firms

3.3 Environmental context

3.3.1 Competitive pressure

Competitive pressure refers to external force that affects IT adoption as a result of rivalry amongst current competitors. According to Porter & Millar (1985), IT can create competitive advantage by giving businesses new ways to outperform their rivals. As such, audit firms that perceive higher level of competition in the auditing profession would be more inclined to adopt Internet technologies as a means to maintain their own competitive position.

H5: There is a positive relationship between competitive pressure and Internet adoption in audit firms

3.3.2 Imposition by Internet users

Imposition by existing Internet users, such as customers or potential customers, might be another external force that affects Internet adoption by audit firms. As weaker parts in relationships with organizations such as clients or potential clients, which evaluate company achievements annually, companies are extremely susceptible to impositions by their stronger parts (Hart & Saunders, 1998).

H6: There is a positive relationship between impositions by Internet users and Internet adoption in audit firms

3.4 Decision makers' context

3.4.1 Age of audit partners

Hambrick & Mason (1984) propose that youthful managers are more appealing to fresh and unique ideas, and more willing to take risks than older managers. The older managers are slow to adopt new technology unless they believe that there is an advantage in adopting the new technology (Zeithaml & Gilly, 1983).

H7: There is a negative relationship between age of audit partners and Internet adoption in audit firms

IV. METHODOLOGY

4.1 Measurement

Dependent variable

The dependent variable consisted of seven Internet applications used by Malaysian audit firms. Questions were designed to measure the relative frequency of each Internet application used by the audit firms, using a seven-point Likert scale, from 1 (never use) to 7 (always use).

Independent variables

The independent variables identified in the research model were operationalized using single- or multi-item indicators that are aimed to capture the underlying theoretical domain of the construct. Perceived usefulness assessed the perceived benefits of the Internet applications to the audit firms and was measured using three items adopted from Mehrrens et al.(2001). Perceived ease of use measure the relative easiness of learning Internet to audit firms was adapted from a subset of Davis's (1989) instrument. Top management support assessed the level of top management commitment to the technologies using two items adapted from Premkumar & Roberts (1999) . Size of the firm could be assessed by both sales revenue and number of employees (Palyia, Means, & Jackson, 1994). However, audit firms are always sensitive and reluctant to disclose their revenue and as such firm size is measured by the number of full time audit staff. Competitive pressure was measured by a single item that assessed the level of competition in public accounting profession. Impositions by Internet users assessed the pressures from existing Internet users was adapted from Mehrrens et al.(2001). Average age of audit partners was adapted from Chuang, Nakatani, & Zhou (2009).

4.2 Data collection

A list of audit firms operating in northern Malaysia was requested from Malaysian Institute of Accountants. According to their latest update as at August 2009, there were 149 audit firms that remain active in this region. The unit of analysis in this study is the audit firm. The data for the study was collected from the survey conducted on audit firms located in northern region of Malaysia.

A survey questionnaire was conducted between February and April 2010. To ensure a high response rate, follow up phone calls were made subsequent to the questionnaire mailings. A total of 92 responses were obtained but only 89 were usable as three returned questionnaires are either unanswered or answered partially.

V. RESULTS

5.1 Sample characteristics

The characteristics of the respondent firms are summarized in Table 1. The number of full-time audit staff of most of the sample firms (74%) ranged from one to ten employees. The majority of the audit partners are between the age of 41 and 50 (38%). About 98% of the respondent firms have Internet access in the office while only a mere 19% have their own websites.

Content validity assesses if all the dimensions of the construct are being measured (Premkumar, Ramamurthy,& Crum, 1997). It defines how representative the items were in representing the hypothesis and was established through the meticulous process of item selection and refinement in the instrument development. The measurement items in this study were carefully selected from prior validated research instruments and adapted to suit to the context of this study.

For each composite research variable, construct reliability or internal consistency was assessed by computing Cronbach's alpha. The results indicate that all these

composite constructs have adequate alpha values (> 0.60), thus exhibit adequate reliability.

TABLE I. PROFILE OF THE RESPONDENT FIRMS

Measure	Item	Number	Percentage (%)
Number of full-time audit staff	1 – 10	66	74.2
	11 – 20	16	17.9
	More than 20	7	7.9
	Total	89	100
Average age of audit partners	≤ 40	23	26.1
	41 – 50	33	37.5
	> 50	32	36.4
	Total	88	100
	Unanswered	1	
Internet access	Yes	87	97.8
	No	2	2.2
	Total	89	100
Website	Yes	17	19.1
	No	72	80.9
	Total	89	100

5.2 Normality of data and multicollinearity

The data was subsequently tested for the assumption of normality. The result shows that the skewness $-0.118/0.255$ and the Kurtosis $0.189/0.506$ are both less than 5.5, suggesting that the data is considered to approximate the normal distribution.

In investigating the normality of the data, non-existence of multicollinearity is an important assumption to be examined. As a rule of thumb, values of VIF that exceed ten are often regarded as indicating multicollinearity (Belsley, Kuh, & Welsch, 1980). All the VIF values fall in the range of 1.01 and 1.44, suggesting that multicollinearity is not a problem for this study.

5.3 Testing of hypotheses

Multiple regression analysis was used to test the posited relationships proposed in the research framework. The results are shown in Table 5. An adjusted R-square value of 37 percent of the variation in the Internet adoption in Malaysian audit firms is explained by the variations of perceived usefulness, perceived ease of use and age of audit partners. Only hypotheses H1, H2 and H7 are supported.

VI. DISCUSSIONS

6.1 Technological context

The two factors tested in the technological context were found to be significant. Regression analysis shows that

perceived usefulness is the only variable significant at $p < 0.01$, thus suggesting that most of the audit firms adopt the Internet because of the usefulness of this technology. Furthermore, perceived ease of use was also found to be a significant determinant at $p < 0.05$, thereby providing support

TABLE II. REGRESSION RESULTS

Variables	Standardized coefficients (Beta)	t-value	Significance
Perceived usefulness	0.360	3.514	0.001**
Perceived ease of use	0.226	2.323	0.023*
Top management support	0.156	1.534	0.129
Firm size	-0.044	-0.493	0.623
Competitive pressure	0.104	1.153	0.252
Imposition by Internet users	-0.039	-0.437	0.664
Age of audit partners	-0.204	-2.374	0.020*

$R^2 = 0.418$ Adjusted $R^2 = 0.367$
 F-significance = 0.000 Observations = 89

*Significance at 0.05 level

**Significance at 0.01 level

for both hypotheses H1 and H2. These results corroborate the importance of technological context in predicting innovation adoption.

Firms tend to adopt technological innovation when it brings in greater benefits in terms of information to the company (Beatty et al., 2001). One plausible explanation for this phenomenon is the cost-benefit justification. The more an audit firm perceived the usefulness of the Internet, the more likely this innovation is adopted.

Perceived ease of use also plays an instrumental role if affecting Internet adoption among audit firms. If the Internet is perceived to be easy to understand and use, it is more likely that the intention to use is formed and subsequently better chances to the crystallization of the usage intention. Hence, the technology acceptance model is supported in this study.

6.2 Organizational context

As for the factors related to the organizational context, top management support and firm size were found to be insignificant. Therefore, hypotheses H3 and H4 are rejected. Although top management support is essential to the adoption of other typical IT innovations, the influence from top management is not apparent for the underlying sample. The adoption of Internet in an organization might differ from other IT innovation adoption, such as e-commerce or enterprise resource e planning (ERP), where the latter require substantial initial investment. However, the adoption of Internet in an audit firm requires nothing more than a monthly subscription fee. As such, top management might

not interfere much in the Internet adoption decision and this factor plays trivial role in this study.

In terms of the number of full-time audit staff, there is no significant relationship between firm size and Internet adoption. One plausible explanation for this being insignificant is that Internet adoption requires minimal initial capital investment and as such, both smaller and larger audit firms are equally capable of adopting this technology without much difficulty.

6.3 Environmental context

Although some prior studies on technology adoption have found that the adoption of an innovation occurs as a response to environmental forces, this study rejects both hypotheses proposed under the environmental context. Competitive pressure exerts little influence on Internet adoption for the underlying sample. A plausible reason for the insignificant relationship found for this variable could be that the adoption of the Internet provides little impact on the competitiveness of an audit firm. Although the usefulness of the Internet is multi-faceted, the competitive advantage of an audit firm would essentially be unaffected, even if the Internet is not adopted. This implies that the adoption of the Internet was due to the usefulness of this technology itself rather than the competitive pressure to gain an edge in the market.

Imposition by Internet users was also found to be insignificant. A reasonable explanation is that unlike the adoption of inter-organizational systems such as e-procurement which involves more than one organization, the adoption of the Internet requires neither the cooperation nor coordination of business partners in order for the adoption to be successful. This would significantly reduce the impact of external forces in influencing the Internet adoption among audit firms.

6.4 Decision maker's context

Average age of audit partners was found to be a significant variable. This finding is consistent with the review of innovation adoption research of Jeyaraj, Rottman, & Lacity (2006) in which they conclude that decision maker's characteristics could drive the organizational innovation adoption. As the older audit partners were trained decades ago without the benefits of the Internet, they are more likely to have fear of the Internet and therefore are less likely to adopt the Internet than their younger colleagues.

VII. IMPLICATIONS AND CONCLUSIONS

The results of this study have implications for researchers who are interested in looking at the determinants of Internet adoption. While prior studies on Internet adoption tend to focus on SMEs or large organizations, this study shifted the locus of adoption to the audit firms. To the best of the authors' knowledge, this is the first endeavor made by researchers to study factors affecting Internet adoption among Malaysian audit firms. Furthermore, this study demonstrated the promising results of individual characteristics in predicting organizational innovation adoption. This is also to answer the call for future research pointed by Jeyaraj et al. (2006) who suggest integrating individual characteristics in organizational adoption studies.

For the audit firms, the perception of the usefulness and ease of use are two important issues when it comes to Internet adoption. A major implication of these findings is that increasing the awareness of the usefulness and ease of use of the Internet among audit firms would have a positive effect on the adoption of this innovation. With a better understanding of the Internet, older audit partners may develop more favorable attitudes and become more receptive to the adoption of the Internet in the audit firm. For internet service providers intending to penetrate the market of the audit professions, one of the best strategies is to create and promote better community understanding of the benefits of the Internet. In addition, as older audit partners are less likely to embrace the Internet, policy makers such as the Malaysian Institute of Accountants could organize more training seminars targeting at the older members to generate a better understanding of the usefulness of the Internet in their audit practices.

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