

**SPECIAL SECTION**

An Outsourcing Acceptance Model: An Application of TAM to Application Development Outsourcing Decisions

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ABSTRACT

The use of outsourcing is expanding rapidly. This study empirically tests a model of application development outsourcing acceptance based on the technology acceptance model (TAM). TAM suggested perceived usefulness and ease of use mediate the effects of other variables on users' attitudes towards a technology. The model tested in this study suggests perceived usefulness and ease of use of outsourcing mediate the effects of the external environment, prior outsourcing relationships, and risks on decision-makers' attitude toward application development outsourcing. One hundred and sixty respondents to a survey sent to 3000 IT decision makers provided data to confirm the applicability of TAM and the influences of these external variables. Support for applying TAM in this alternative context was found. Three sub-dimensions of risk, project management, relationship, and employee risk emerged. Project management and employee risks along with prior relationships were found to significantly influence decision maker perceptions about application development outsourcing.

Keywords: IS development strategies; information technology adoption; outsourcing of IS; risk management; technology acceptance

INTRODUCTION

An increased reliance on information technology (IT) for success combined with the rapid, accelerating rate of IT change, has intensified both the importance and complexity of managing this now vital corporate resource. IT outsourcing, the transferring of all or part of a company's IT functions to an outside party, offers additional

alternatives to organizational decision makers. Hence, there is an increasing focus on determining the correct sourcing strategy for IT and IT services (King, 2001). However, choosing the appropriate IT functions to outsource and the best outsourcing vendor is very complex (Kern, Willcocks, & van Heck, 2002). This is especially true now because the motivation for

IT outsourcing has moved beyond traditional cost cutting or efficiency gains to become more transformational. IT outsourcing now plays a much more strategic role, enabling companies to be more adaptive and respond quickly to new opportunities (Mazzawi, 2002).

Kodak brought IT outsourcing to the forefront with their landmark decision to outsource their IT functions in 1989. Recent surveys indicate that around the globe, firms of all sizes across many industries view outsourcing as a realistic alternative for some or all of their IT functions (Barthelemy & Geyer, 2001; Kakabadse & Kakabadse, 2002). The use of IT outsourcing continues to grow at a phenomenal rate (Kernet al., 2002; Ross & Westerman, 2004).

A wide variety of IT functions are outsourced. This study focuses on one particular function, applications development (AD), defined as any efforts in the organization involved with the analysis, design, or implementation of information systems. AD was identified in multiple prior studies as an IT function commonly outsourced (McFarlan & Nolan, 1995; Hurley & Schaumann, 1997; Elmuti & Kathawala, 2000; Ross & Westerman, 2004). Furthermore, recent surveys indicate that AD outsourcing is on the rise (Hurley & Schaumann, 1997; Ketler & Willems, 1999; King & Cole-Gomolski, 1999). More and more AD outsourcing is also done offshore which adds complexity to the decision making process (Elmuti & Kathawala, 2000; Robb, 2000; Prencipe, 2001). Thus, a better understanding of the AD outsourcing decision is important. More importantly, this knowledge may help to improve the understanding of other outsourcing decisions.

A prior outsourcing study (Benamati & Rajkumar, 2002) proposed an application of the technology acceptance model (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) as a basis for investigating AD outsourcing decision making. The model also proposed risk, prior outsourcing relationships, and an organization's external environment to be important antecedents to decision-maker perceptions and hence

important factors in AD outsourcing decisions (Benamati & Rajkumar, 2002).

The goal of this research is to empirically test and validate that model as a basis for further study and shed new light on factors that influence AD outsourcing decisions. The following section reviews the proposed model of outsourcing acceptance and develops hypotheses from it. The methodology used and findings from an empirical validation of that model are then explained. Finally, implications of both the results and the model for future research are discussed. No other research has empirically applied TAM in this way. Nor has there been empirical testing of the influence of these three antecedent factors on the decision to outsource AD.

THEORETICAL BASIS FOR THE RESEARCH MODEL AND HYPOTHESIS

TAM states that users' perception of the usefulness of a technology, defined as the degree to which a person believes that using the technology will enhance his or her job performance, and ease of use, defined as the degree to which a person believes that using the technology will be free of effort (Davis, 1989), directly affect the users' attitude about and hence their intention to use the technology. These two perceptions also moderate the effects of antecedent constructs on the decision to use the technology.

The AD outsourcing acceptance model (Benamati & Rajkumar, 2002) that is the focus of this study, shown in Figure 1, illustrates TAM constructs, outsourcing decision antecedent constructs, and posited relationships among the constructs. It proposes that TAM constructs are applicable to the acceptance of AD outsourcing. The TAM constructs and interrelationships are applied consistently with previous TAM research (Davis et al., 1989; Mathieson, 1991; Karahanna, Straub, & Chervany, 1999). Decision-maker perceptions of the usefulness, defined as the degree to which the decision maker believes that AD outsourcing will enhance the performance of the IT group,

and ease of use, the degree to which the decision maker believes that AD outsourcing will be free of effort, are posited to influence their attitude about AD outsourcing which in turn affects their intention to do it. Consistent with TAM, the model proposes that a decision-maker positively inclined towards outsourcing is more likely to have intentions to outsource.

Many organization level decisions are ultimately made by an individual within the organization. IT managers most often prepare sourcing evaluations (Dibbern, Goles, Hirschheim, & Jayatilaka, 2004) and IT sourcing decisions elevate to the CIO, CFO, and CEO levels in organizations (Kakbadse & Kakabadse, 2002). A study of 160 French and German companies found the decision to outsource IT was made by an individual executive in 90% of the French and 75% of the German organizations studied (Barthelemy & Geyer, 2001).

The studies indicate most IT outsourcing decisions are organizational decisions primarily made by individuals. The unit of analysis in prior TAM research has predominantly been individual adoption of a specific technology. Recent studies apply TAM to organizational level adoptions decisions by owners or executives in small and medium sized enterprises (SME) and more general technology categories such as e-

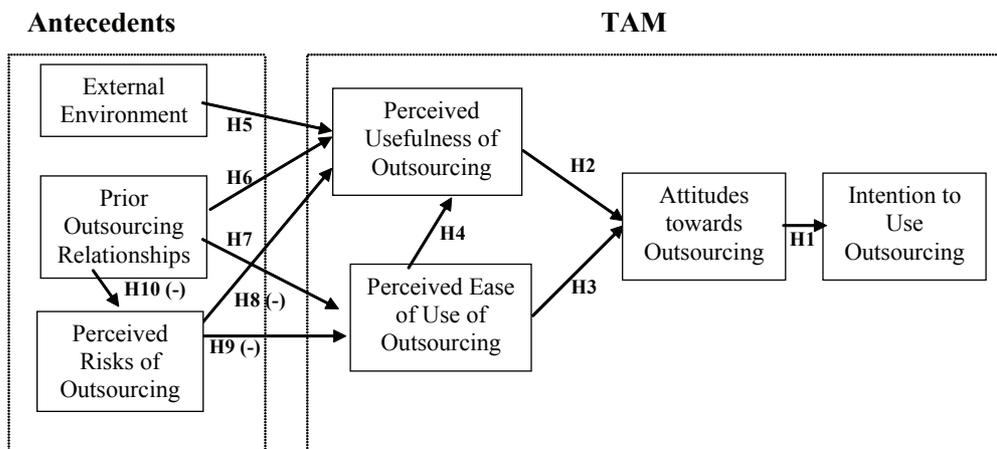
commerce (Granden & Pearson, 2004) or having a Web presence (Riemenschneider, Harrison, & Mykytyn, 2003). Since AD outsourcing is a solution to a general technology problem, TAM constructs and relationships may be applicable to high level decision-makers' acceptance of AD outsourcing.

Furthermore, TAM is rooted in the theory of reasoned action (Azjen & Fishbein, 1980) and other research has drawn on attitude based choice theory rooted in the theory of reasoned action to study organizational level decisions. Mykytyn and Harrison (1993) studied the acceptance of strategic information systems by senior management and Candel and Pennings (1999), the choice of financial services by entrepreneurs. This provides further support for organizational level decision makers as a unit of analysis.

Figure 1 also illustrates the hypotheses tested in this study. Hypotheses one through four stem directly from the established TAM relationships. It is hypothesized that these relationships will hold in the AD outsourcing decision context as well. Hence, it is hypothesized that:

H1: *Decision maker attitude toward outsourcing AD positively affects their intention to use it.*

Figure 1. Outsourcing acceptance model



H2: *Decision maker perception of the usefulness of AD outsourcing positively affects their attitude towards it.*

H3: *Decision maker perception of the ease of use of AD outsourcing positively affects their attitude towards it.*

H4: *Decision maker perception of the ease of use of AD outsourcing positively affects their perception of its usefulness.*

The model also proposes the external environment, prior outsourcing relationships, and the perceived risk of outsourcing AD as antecedents to decision maker perceptions of AD outsourcing. Each is proposed to affect one or both of the TAM perception variables. Support for the influence of these antecedents on outsourcing decisions exists in prior literature.

A firm's external environment plays a role in decision-making (Goll & Rasheed, 1997). A dynamic, competitive, or uncertain environment can lead firms to focus on core competencies and outsource others (Slaughter & Ang, 1996). As hypercompetition becomes an unavoidable way of life in many industries (D'Aveni, 1994), IT plays a bigger and bigger role in achieving and sustaining competitive advantages. Furthermore, environmental change prompts organizations to maintain flexible organizational structures (Burns & Stalker, 1961; Perrow, 1970; Thompson, 1967; Woodward, 1965). Outsourcing provides flexibility and offers a way to adjust organizational boundaries in response to pressures from the environment (Lonsdale & Cox, 2000). For example, the critical contingencies that arise due to stiff competition were found to influence IT outsourcing decisions in the banking industry (Ang & Cummings, 1997). This provides support for the fifth hypothesis in the model.

H5: *A more competitive external environment positively affects decision maker perception of the usefulness of AD outsourcing.*

The importance of the client supplier relationships has received increasing attention in the outsourcing literature. Organizations and their outsourcing vendors have become more tightly coupled (Lee, Huynh, Chi-wai, & Pi, 2000) and long term partnerships are more appropriate (Nam, Rajagopalan, Rao, & Chaudjry, 1996; Saunders, Gabelt, & Hu, 1997; Mazzawi, 2002). Some outsourcing arrangements form as strategic alliances with deep levels of interdependence (Lacity & Willcocks, 1998; King, 2001) and the ability to build a trusted partnership and avoid relational trauma is imperative for success (Kern et al., 2002). It becomes critical to consider outsourcing as the management of relationships with service providers as opposed to simply managing contracts for IS commodities (Kishore, Rao, Nam, Rajagopalan, & Chaudhury, 2003). A recent survey of 700 IT professionals indicates that reliability and trust in the outsourcing vendor were the two most important factors in selecting an outsourcing vendor (Gareiss, 2002). Surprisingly, these two relationship qualities ranked above more traditional selection criteria such as cost and technical skills. Whitten and Leidner (2006) found that for varying perceptions of product and service quality (high, low or poor), poor relationship quality has caused the decision to backsource or bring application development back in-house. The quality of the outsourcing relationship is clearly important (Lee & Kim, 1999) as these relationships are becoming mission critical (Kern & Willcocks, 2002).

From a decision making perspective, early outsourcing research predominantly overlooked the fact that many outsourcing decisions are not independent decisions but instead are based on prior outsourcing experiences (Nam et al., 1996; Lee et al., 2000). Past marketing research into customer-service provider relationships found that customer satisfaction with prior experiences with a provider affected their loyalty to that provider and the strength of the relationship increased with the length of prior experience (Bolton, 1998). Likewise, prior outsourcing experiences certainly influence follow-on out-

sourcing decisions. The outsourcing acceptance model posits that prior outsourcing relationships will influence decision maker perceptions about outsourcing's usefulness and ease of use as stated in hypotheses six and seven.

H6: *Positive prior AD outsourcing relationships positively affect decision maker perception of the usefulness of AD outsourcing.*

H7: *Positive prior AD outsourcing relationships positively affect decision maker perception of the ease of use of AD outsourcing.*

Risk is also an important factor in the AD outsourcing decision (Earl 1996; Aubert, Patry, & Rivard, 1998; Ketler & Willems, 1999). Risk, if ignored, leads to undesirable consequences, such as increased likelihood of project failure (Lyytinen, Mathiassen, & Popponen, 1998; Bahli & Rivard, 2005). IS managers may perceive outsourcing to reduce risk because it can provide skills the organization lacks to develop a particular application. However, outsourcing introduces many new risks such as hidden costs, lack of proper skills or infrastructure to manage the engagement, staff morale problems, and loss of control to or key dependence on a third party (Ketler & Walstrom, 1993; Hurley & Schaumann, 1997; Smith, Mitra, & Narasimhan, 1998; Barthelemy, 2001). Offshore outsourcing adds many additional challenges and risks to the outsourcing engagement (Ramarapu, Parzinger, & Lado, 1997). For example, the project team is, by definition, virtual and must be managed across time, distance, and perhaps even borders or oceans. Although some virtual organizations succeed, the value of virtual organizations has been oversold and more fail than succeed (Chesbrough & Teece, 2002).

Perceived risk has been shown to inhibit system or product evaluation and adoption in e-service settings (Featherman & Pavlou, 2003). That study also provided strong empirical evidence that perceived risk adversely influences perceived usefulness. In an AD outsourcing context, perceived risk can be expected to negatively influence the perceived usefulness

of outsourcing. Hypotheses eight states this expectation.

H8: *Decision maker perception of the risk of AD outsourcing negatively affects their perception of the usefulness of AD outsourcing.*

The risks associated with outsourcing highlight the need to outsource in the right way (Ross & Westerman, 2004). When risk is perceived, users introduce standard risk management mechanisms such as risk assessment, and developing risk mitigation plans to handle the perceived risk. Contracts for example, are one mechanism used to effectively manage the outsourcing relationship and provide for early termination, in case of underperformance (Osei-Bryson & Ngwenyama, 2006). The outsourcer also typically sets up an organizational unit to coordinate interactions between its information technology staff and the vendor as well as monitor the vendor's performance. Users must pay close attention to coordination in the early stages of the AD outsourcing projects so that costly adjustments to the coordination mechanisms do not occur later (Sabherwal, 2003). This additional effort to manage risks introduces a burden on the user to invest more time and effort in governance, oversight, and coordinating mechanisms, reducing the ease-of-use of outsourcing. Hence, this leads to the hypotheses:

H9: *Decision maker perception of the risk of AD outsourcing negatively affects their perception of the ease of use of AD outsourcing.*

Today's outsourcing relationships involve strategic alliances with shared risk between the provider and the purchaser of the outsourcing services (Lacity & Willcocks, 1998; Kishore et al., 2003). Just as good prior relationships should increase perceptions of ease of use and usefulness, it would be expected that positive past experiences would reduce the perception of risk associated with outsourcing. This expected inverse relationship forms the basis for a final hypothesis.

H10: Positive prior AD outsourcing relationships negatively affect decision maker perception of the risk of AD outsourcing.

METHODOLOGY

A survey instrument was implemented to empirically test the model and hence, the applicability of TAM and the influence of the antecedent variables. Most prior outsourcing studies applied more qualitative or case study research. Very few studies employed quantitative methods. This research is the first to employ a quantitative instrument to study the applicability of TAM and one of only a few to quantitatively examine antecedents to outsourcing decision making.

Instrument Development

The instrument items used to operationalize the constructs in Figure 1 were all derived from past research. All questions used a 1 to 7 scale where 1 meant “strongly disagree” and 7 meant “strongly agree.”

The items for the four TAM constructs are revisions of items from previously validated TAM instruments (Agrawal & Prasad, 1999; Hu, Chau, Liu Sheng, & Yan Tam, 1999; Venkatesh & Davis, 2000). The items were reworded to change the focus from systems to application development outsourcing. For example, the TAM intention to use item “Given that I have access to the system, I predict that I would use it” became “Given that I have access to an outsourcer for applications development I predict that I would use them.” These items were applied to test the TAM hypotheses (H1-H4).

Consistent with previous instruments applying TAM to organizational level adoption decisions (Grandon & Pearson, 2004), the items for ease of use focused on the decision maker’s perception of their own ability to use outsourcing. Grandon and Pearson (2004) operationalized perceived usefulness as a mix of the decision maker’s perception of the usefulness to themselves and to the organization. For example, “Using e-commerce would improve my job performance” and “Using e-commerce would enable my company to

accomplish specific tasks more quickly” were used. For consistency, all usefulness items in the developed instrument addressed the usefulness of outsourcing to the organization.

The items for external environment and prior relationships originated from instruments used in marketing research. To measure the competitive nature of the environment, items from Industuct (Pecotich, Hattie, & Peng Low, 1999), an instrument developed to measure Porter’s (1980) five competitive forces model were adapted. Only items from intensity of rivalry defined as “the extent to which firms in this industry frequently and vigorously engage in outwardly manifested competitive actions and reactions in their search for competitive advantage in the marketplace” (Pecotich et al., 1999) were applied. That study found that rivalry was the strongest force of the five. Competitive rivalry is also probably the one most directly applicable to help test hypothesis five.

Many marketing studies have measured dimensions of relationship quality. The items for measuring relationship quality used here were drawn from two separate marketing instruments. This was done to tap into a representative set of relationship quality dimensions that may be applicable to outsourcing relationships. The first dimension adapted was relational norms (Heide & John, 1992). Relational norms allow both buyer and supplier to judge whether each party’s actions conform to established standards (Ivens, 2006). The measures tap into three aspects of the relationship norms; flexibility—the expectation of a willingness of the parties to be adaptable to changing circumstances, information exchange—the expectation that a proactive exchange of useful information will occur, and solidarity—the expectation that both parties place a high value on the relationship.

Trust is also commonly identified as an important aspect of relationship quality (Crosby, Evans, & Cowles, 1990; Moorman, Zaltman, & Deshpande, 1992; Morgan & Hunt, 1994; Rindfleisch, 2000; Ulaga & Eggert, 2004; Huntley, 2006). Rindfleisch’s (2000) five item scale for organizational trust, which he defined

Table 1. Source of survey items

Construct	Prior Study Factor	Number of Items	Source
Intention to Use	Intention to Use	5	Venkatesh and Davis (2000) Agrawal and Prasad (1999) Hu et al. (1999)
Attitude	Attitude	4	Agrawal and Prasad (1999) Hu et al. (1999)
Perceived Usefulness	Perceived Usefulness	9	Davis (1989) Venkatesh and Davis (2000)
Perceived Ease of Use	Perceived Ease of Use	5	Venkatesh and Davis (2000)
External Environment	Competitive Rivalry	9	Pecotich et al. (1999)
Prior Relationships	Relational Norms	10	Heide and John (1992)
	Trust	5	Rindefleisch (2000)
Outsourcing Risks		18	Elmuti and Kathawala (2000)

as "...confidence in an exchange partner's reliability and integrity" was adapted.

This combination of 15 measures adequately represented the dimensions of relationship quality from an outsourcing perspective. These measures were applied to test hypotheses six, seven, and ten.

Established measures for outsourcing risk were not found in prior research and hence were developed from outsourcing risks identified by Elmuti and Kathawala (2000). This was the most complete list that was found and is applied to explore risk factors and test the last three hypotheses. Table 1 details the number and the source of survey items for each construct in the proposed framework.

Instrument Pretest

A pretest of the instrument was conducted with two IT academicians experienced in survey development, three IT executives who have outsourced applications development, and two executives from application development

outsourcing providers. The pretest was done to ensure that the survey was clear and concise, and that items portrayed their intended meaning. Feedback was also sought on the length of the survey, its overall appearance, and how each participant would react to receiving it in the mail. Comments and suggestions were used iteratively to revise the survey.

During each pretest, one of the authors met with each of the participants individually and discussed the purpose of the survey. The subjects were asked to complete the survey. They were also asked to suggest improvements and to identify anything not clear to them. After completion of the survey, the attending author clarified and recorded subject feedback and suggestions.

The comments of each participant were incorporated before meeting with the next participant and the pretest iterated until all clarity issues in the survey were flushed out. The pretest resulted in substantial improvement in the clarity of the survey definitions and items.

It also resulted in the addition of one ease of use item—using application development outsourcing makes it easier to share risk with the vendor. The Appendix lists all the survey items along with the instructions to subjects.

Data Collection

To implement the survey, a random sample of 3000 IT executives was drawn from subscribers to an IS journal focusing on enterprise application issues. The journal qualified subscribers based on their level in the organization and provided a randomized sample from the over 25,000 subscribers with the level of director or higher in their organizations.

Two mailings were done. The first contained a solicitation letter, the survey, and a postpaid return envelope. The letter also included the URL of an online version of the survey. The second mailing was a reminder card that also

pointed to the online version. The IT executives provided a total of 160 usable responses.

Subjects' organizations represented a variety of industries. Table 2 summarizes them. The "other" category includes all industries represented by only one organization.

Subjects' demographics indicate they were indeed high level IT executives. They averaged 19.4 years of IS experience, 9.6 with their current employer. In addition, they managed on average 78 subordinates. All subjects also indicated they played significant roles in outsourcing decisions for their organizations.

Table 3 summarizes the size of the subjects' organizations in terms of number of IT professionals and IT budget. Subjects estimated that on average 13.2% of their IT budget was spent on application development outsourcing and 19.7% on all types of IT outsourcing. AD outsourcing decisions were being made in these organizations.

Response rates in surveys of executive level individuals are often low (Pincus, Rayfuekdm, & Cozzens, 1991; Baruch, 1999) due to the numerous demands on their time. Many executives have buffer systems in place to control the receipt of requests for information such as surveys (Cycyota & Harrison, 2002). Subject organizations that are small exacerbate the low response rate problem (Dennis, 2003). Not unexpectedly, the response rate of 5.33% was low. Low response rates can introduce response bias. However, the absence of differences in the responses received at different times would be consistent with the claim that response bias was not present (Anderson & Gerbing, 1988). The responses for all of the factors and numeric demographic variables collected were tested for responses received before and after the second mailing. None of the t-tests (continuous variables) or chi-squared tests (categorical variables) showed responses to be significantly different. Hence, response bias was not found.

DATA ANALYSIS

The data analysis proceeded through two phases. The first phase examined the applicability of

Table 2. Subject organization industries

Industry	Number	Percentage
Finance	20	12.50%
Other	19	11.88%
Education	18	11.25%
Manufacturing	18	11.25%
Consulting	15	9.38%
Government	14	8.75%
Communication	9	5.63%
Health Care	8	5.00%
Transportation	7	4.38%
Insurance	6	3.75%
Systems Integrator	5	3.13%
Utilities	4	2.50%
Marketing	4	2.50%
Software development	4	2.50%
Banking	3	1.88%
Publishing	2	1.25%
Construction	2	1.25%
Legal	2	1.25%

Table 3. Subject organization size

Number of IT Professionals	Number of Subject Organizations	Reported IT Budget (Thousands)	Number of Subject Organizations
1-49	77	Under \$99	5
50-99	13	\$100-\$499	22
100-249	30	\$500-\$1,999	29
250-499	16	\$2000-4,999	18
500-999	5	\$5,000-9,999	22
More than 1000	18	More than \$10,000	56
Not reported	1	Not reported	8

TAM to outsourcing decision making and the second the influence of the three antecedents on decision maker beliefs about outsourcing. The following two sections discuss these phases.

The Applicability of TAM

The TAM analysis proceeded through two steps. The first employed exploratory factor analysis (EFA) techniques to establish the validity of the instrument and identify the coping mechanism categories (Hatcher, 1994; Stevens, 1996). The second used simple linear regression to test the TAM hypotheses in the context of AD outsourcing.

The EFA used the principle factor method with promax oblique rotation. Oblique rotation is suggested when factors are thought to be correlated factors (Harman, 1976; Hatcher, 1994). The factors are hypothesized to interrelate (in fact, the data later showed that each resulting factor correlated with at least one other factor at .24 or higher). Based on the prior expectation of four TAM factors and the percent of variance criterion (Hatcher, 1994) with a five percent cutoff, four factors variables were retained.

In the factor analysis items PU2, PU8, and IN5 (see the Appendix) cross loaded onto the attitude construct, indicating multidimensionality in these measures. All three were dropped. Additionally, PU1, PU5, and EOU1 did not load above the recommended .40 cutoff on their factors and were also dropped. All remaining

items loaded on their expected constructs. The constructs all had Cronbach alphas of .77 or higher, well within recommended thresholds (Nunnally, 1967). This indicated the reliability of the instrument. Table 4 presents the descriptive statistics for the analysis including the mean factor scores.

The second step in this analysis employed simple linear regression to test the TAM research hypotheses (H1 through H4). The regression results illustrated in Table 5 indicate that all four hypotheses were strongly supported.

The Effects of the Antecedents

The same two steps were followed to analyze the effects of the three antecedents, the external environment, prior outsourcing relationships, and the perceived risk of outsourcing. An EFA was done including all 42 antecedent items. The expectation was that three factors would emerge. However, five factors accounted for more than 5% of the variance in the data and thus were retained. The risk items loaded onto three separate factors accounting for the two additional factors.

Five items were dropped in subsequent runs. Items EN9, RSK7, RSK15, and RSK17 did not load above .40 on their respective factors and REL9 cross loaded onto one of the risk factors. All remaining items loaded on their expected constructs. The constructs all had Cronbach alphas above .73 indicating the reliability of the instrument. Table 6 presents the descriptive statistics for the analysis.

Table 4. Final results of TAM exploratory factor analysis

Item	Attitude Towards Outsourcing	Perceived Usefulness of Outsourcing	Intention to Use Outsourcing	Perceived Ease of Use of Outsourcing
AT2	.90	.03	-.07	-.02
AT3	.79	.08	.09	-.13
AT1	.77	-.09	.09	.11
AT4	.62	-.08	.05	.17
PU4	-.13	.80	.05	.01
PU7	.07	.66	-.13	.06
PU3	.12	.63	.14	-.14
PU9	.28	.55	.09	.02
PU6	-.11	.49	.09	.06
IN2	-.02	-.01	.95	.01
IN1	.02	-.01	.91	.01
IN3	.19	.15	.48	.05
IN4	.17	.25	.41	-.04
EOU2	.04	.07	-.04	.75
EOU1	-.10	-.11	.03	.67
EOU3	.16	.21	.00	.60
EOU4	.26	-.01	.07	.46
Alpha	.87	.82	.87	.77
Eigenvalue	6.833	1.564	0.832	0.688
Percent of Variance Explained	71.0	16.3	8.7	7.2
Mean	4.25	5.12	4.72	3.23
Std. Dev.	1.16	0.96	1.19	1.09

Table 5. TAM hypotheses linear regression results

Dependent Variable	R ²	F-Value (p-value)	Independent Variable (Hypothesis)	T value (P-value)	Estimate
Intention to Use Outsourcing	.37	93.44 (<.0001)	AT (H1)	9.67 (<.0001)	.6317
Attitude Towards Outsourcing	.45	61.95 (<.0001)	PU (H2)	7.11 (<.0001)	.4414
			PEOU (H3)	5.59 (<.0001)	.3794
Perceived Usefulness of Outsourcing	.12	20.86 (<.0001)	PEOU (H4)	4.57 (<.0001)	.3769

The authors named the three risk factors: project management risk, relationship risk, and employee risk based on an interpretation of the concepts embodied by the items in each. These

names are reflected in Table 6. Table 7 explicitly defines these three sub-dimensions of Risk in terms of those items.

Table 6. Final results of antecedent exploratory factor analysis

Item	Relationship	Environment	Project Mgt. Risk	Relationship Risk	Employee Risk
REL11	0.76	-0.07	0.17	-0.07	-0.05
REL4	0.74	0.00	0.06	-0.03	-0.10
REL7	0.68	-0.19	-0.11	0.05	-0.03
REL10	0.67	0.10	-0.07	0.12	-0.12
REL13	0.65	-0.04	0.11	-0.12	0.14
REL1	0.65	-0.23	-0.09	0.05	0.04
REL8	0.65	0.06	0.26	-0.17	0.02
REL3	0.64	0.18	-0.04	-0.01	-0.11
REL2	0.63	0.16	-0.08	-0.03	-0.15
REL14	0.58	0.09	-0.08	-0.02	0.10
REL6	0.56	0.14	0.03	-0.05	-0.08
REL15	0.54	-0.02	-0.21	0.24	0.23
REL5	0.51	-0.06	-0.01	0.00	0.08
REL12	0.51	-0.03	0.01	0.02	0.08
EN6	0.03	0.81	0.10	0.03	0.00
EN3	0.00	0.79	0.05	0.05	-0.01
EN8	-0.06	0.74	0.02	-0.03	0.09
EN1	-0.06	0.73	0.06	0.00	-0.01
EN5	0.02	0.73	-0.17	0.18	-0.04
EN2	0.01	0.71	0.00	0.02	-0.04
EN7	0.02	0.67	-0.03	-0.09	0.08
EN4	0.08	0.41	0.04	-0.02	0.11
RSK4	-0.09	0.09	0.70	0.06	-0.07
RSK3	-0.05	0.09	0.59	-0.12	0.10
RSK5	0.13	0.04	0.54	0.13	0.03
RSK11	-0.06	-0.07	0.50	0.12	0.11
RSK16	-0.04	-0.27	0.46	0.12	-0.07
RSK1	0.07	0.23	0.45	-0.01	-0.02
RSK14	0.06	0.07	-0.13	0.74	0.04
RSK9	0.01	0.04	0.09	0.72	0.00
RSK8	-0.15	0.03	0.11	0.55	-0.18
RSK18	-0.10	0.07	0.07	0.53	0.00
RSK13	0.07	-0.24	0.31	0.45	0.03
RSK12	0.07	0.00	0.27	0.43	0.14
RSK2	0.07	0.02	-0.01	-0.10	0.82

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Table 6. continued

RSK6	0.05	0.05	0.06	0.05	0.78
RSK10	-0.13	0.07	0.04	0.04	0.77
Alpha	.89	.87	.73	.76	.86
Eigenvalue	6.402	5.252	3.487	1.935	1.435
Percent of Variance Explained	26.1	21.4	14.2	7.9	5.8
Mean	4.86	4.04	4.70	4.64	4.42
Std. Dev.	0.87	1.30	0.96	1.07	1.50

Table 7. Definitions of the risk sub-dimensions

Risk Sub-Dimension	Definition
Project Management Risk	Environmental uncertainties or the lack of, management skills, control mechanisms, infrastructure, or high level support for the outsourcing effort.
Relationship Risk	Risks associated with vendor relations including vendor's lack of knowledge of the business, contract length, flexibility in the relationship, meeting schedules, and maintaining security and confidentiality of information shared.
Employee Risk	Fear of layoffs and the accompanying risk of lower employee morale and performance due to outsourcing.

To test hypotheses H5 through H10, again simple linear regression was employed. Due to the multiple sub factors of perceived risk of outsourcing, hypotheses H8, H9, and H10 were replicated as H8a, H8b, H8c, and so forth, to represent project management risk, relationship risk, and employee risk respectively. Table 8 summarizes the results. Support was found for 6 of the 12 hypotheses. The effect of prior relationships on perceived ease of use (H6, $p < .001$) and perceived usefulness (H7, $p < .01$) suggest it to be an important antecedent to outsourcing decisions. The risk factors' inverse relationships with the other factors in the model were partially substantiated. Results indicated that project management risk inversely affected perceived ease of use (H9a, $p < .01$), employee risk inversely influenced perceived usefulness (H8a, $p < .05$), and prior relationships negatively affected relationship risk (H10b, $p < .01$). Surprisingly, employee risk had a positive affect on perceived ease of use (H9c, $p < .01$).

Table 9 summarizes the results of all the hypotheses tests. Six of the first seven hypotheses were supported. Mixed support was found for the three risk hypotheses.

The variance inflation factors of the independent variables in the tested models were all less than two indicating multicollinearity was not a problem in the data collected (Stevens, 1996). Additionally, Harman's single method test failed to demonstrate common method variance was a problem (Podsakoff & Organ, 1986). The two factor analyses produced neither a single factor nor one general factor that accounted for the majority of the variance and each factor accounted for more than the viable cut-off of 5% (Hatcher 1994).

DISCUSSION

The use of outsourcing is rapidly expanding. It is even growing outside the realm of IT outsourcing. Outsourcing decisions are strategically important to organizations. While

Table 8. Antecedent hypotheses linear regression results

Dependent Variable	R ²	F-Value (P-value)	Independent Variable	T value (P-value)	Estimate
Perceived Usefulness of Outsourcing	.26	7.57 (<.0001)	PEOU (H4)	3.61 (.0004)	.3441
			EN (H5)	1.16 (.2486)	.0418
			REL (H6)	2.95 (.0037)	.0983
			PrjMgtRISK (H8a)	1.21 (.2267)	.0921
			RelRISK (H8b)	-1.37 (.1736)	.0863
			EmpRISK (H8c)	-2.53 (.0127)	.2363
Perceived Ease of Use of Outsourcing	.19	8.10 (<.0001)	REL (H7)	4.25 (<.0001)	.1211
			PrjMgtRISK (H9a)	-2.63 (.0094)	-.1770
			RelRISK (H9b)	0.05 (.9624)	.0027
			EmpRISK (H9c)	3.22 (.0016)	.2632
Project Management Risk	.02	2.19 (.1409)	REL (H10a)	-1.48 (.1409)	-.0574
Relationship Risk	.05	6.91 (.0095)	REL (H10b)	-2.63 (.0095)	-.1127
Employee Risk	.01	1.07 (.3029)	REL (H10c)	-1.03 (.3029)	-.0316

Table 9. Hypotheses testing summary

Hypothesis	Supported	Significance
H1: Decision maker attitude toward outsourcing AD positively affects their intention to use it.	Yes	***
H2: Decision maker perception of the usefulness of AD outsourcing positively affects their attitude towards it.	Yes	***
H3: Decision maker perception of the ease of use of AD outsourcing positively affects their attitude towards it.	Yes	***
H4: Decision maker perception of the ease of use of AD outsourcing positively affects their perception of its usefulness.	Yes	***
H5: A more competitive external environment positively affects decision maker perception of the usefulness of AD outsourcing.	No	
H6: Positive prior AD outsourcing relationships positively affect decision maker perception of the usefulness of AD outsourcing.	Yes	**
H7: Positive prior AD outsourcing relationships positively affect decision maker perception of the ease of use of AD outsourcing.	Yes	***
H8: Decision maker perception of the risk of AD outsourcing negatively affects their perception of the usefulness of AD outsourcing.	PrjMgtRisk—No RelRisk—No EmpRisk—Yes	*
H9: Decision maker perception of the risk of AD outsourcing negatively affects their perception of the ease of use of AD outsourcing.	PrjMgtRisk—Yes RelRisk—No EmpRisk—Yes	** (**) Reversed
H10: Positive prior AD outsourcing relationships negatively affect decision maker perception of the risk of AD outsourcing.	PrjMgtRisk—No RelRisk—Yes EmpRisk—No	**

*** ($p < .001$) ** ($p < .01$) * ($p < .05$)

much research has focused on IT outsourcing decisions, little has done so empirically. By empirically focusing on application development outsourcing decisions, this research has made several significant contributions to this body of knowledge.

First, it contributed by empirically validating that the technology acceptance model has application to organizational level decision makers. Many organizational level decisions are ultimately made or strongly influenced, by a single individual. This study found that for outsourcing decisions, TAM may apply. Perceptions of the usefulness and ease of use of outsourcing strongly influence decision makers' attitudes about and hence their intention to use AD outsourcing. This finding perhaps indicates that TAM is applicable in the study of other organizational level decisions. It is interesting to note the striking difference in the means factor scores for usefulness (5.12) and ease of use (3.23). There is general agreement in the sample that AD outsourcing is useful, but not so easy to do.

Useful information can be garnered from the items that were dropped in the factor analysis of the TAM items. Most of them were from the perceived usefulness construct. It appears that the usefulness of AD outsourcing to improve the IS function's effectiveness, improve the quality of IS applications, and reduce costs is not recognized in the subject organizations surveyed. Perhaps this finding indicates this is not what is happening. Recent research has asserted that outside support may not be the panacea that it is touted to be (Benamati & Lederer, 2001).

Empirical support was also found for two of the three hypothesized antecedents to decision maker perceptions, prior outsourcing relationships and perceived risk of outsourcing. Prior outsourcing relationships strongly influence both perceptions. While this seems intuitive, perhaps this study provides the motivation needed for both providers and receivers of outsourcing to attend to existing relationships more carefully. Positive prior relationships increase decision maker perception of outsourcing AD

as well as attenuate relationship risk, one of the dimensions of risk identified in the study.

AD outsourcing decisions are made in the face of risk. Categorizing the risks allows managers to select appropriate management tools and actions for each type of risk (McFarlan, 1981; Jurison, 1995). Thus, the three dimensions of risk empirically identified in this study employee, project management, and relationship risk provide necessary knowledge for the purpose of outsourcing decision making. The individual items in each category provide additional knowledge. Prior academic research and popular practitioner press have identified these potential hazards faced when outsourcing. The current empirical research more firmly establishes their relevance to the context of AD outsourcing decisions.

Employee risks such as decreased morale (Antonucci, Lordi, & Tucker III, 1998; Kliem, 1999; Lonsdale & Cox, 2000) or performance (Garaventa & Tellefsen, 2001) are often cited as issues faced in the outsourcing process. Managers and their employees are interdependent on each other for success. This goes beyond any written contract stating responsibilities and remuneration for a job well done. Employees develop individual perceptions or psychological contracts of what they owe to their employers and what their employers owe to them (Robinson, 1996). A breach of this contract in the eyes of the employee negatively affects employee performance (Robinson, 1996; Garaventa & Tellefsen, 2001). Outsourcing can be viewed as such a breach and has actually been described as a betrayal of workers (Gordon, 1996). This study found that employee risk negatively impacts the perceived usefulness of outsourcing and hence the outsourcing decision.

Proper management of the outsourcing engagement is also imperative for success. "Outsourcing does not eliminate the need to manage the function. Rather, it creates a situation requiring managers to utilize a different set of skills" (Garaventa & Tellefsen, 2001). A recent survey of 116 companies found that the struggle to manage the outsourcing process was a key reason for dissatisfaction with outsourcing

arrangements (PA Consulting Group, 2003). Lacity and Willcocks (1999) identified the lack of active management of the supplier and lack of maturity and experience of contracting for and managing the outsourcing arrangement as two of the main reasons for negative outcomes in IT outsourcing deals (Lacity & Willcocks, 1999). Furthermore, one often cited reason for outsourcing IT functions is inadequacies in the current IT organization's performance (Ketler & Walstrom, 1993; Lacity & Willcocks, 1998; Smith et al., 1998). "If the IT activity has been badly managed in the first place, will the IT managers be any better at managing an external provider?" (Earl, 1996). Clearly, project management risk is an issue and this study found it negatively affects decision maker perceptions of ease of use.

The third category of risk identified, relationship risk, stems from the risks involved when depending on a third party to deliver important products or services. Excessive contract length could lock the organization into a negative relationship (Kliem, 1999) in which they are held hostage by the vendor (Antonucci et al., 1998). Rigid outsourcing contracts, while intended to protect the buying organizations, might actually lead to less flexibility to take advantage of new technologies or react to changing business needs (Antonucci et al., 1998). Multiple studies have examined outsourcing contract parameters (Ketler & Walstrom, 1993; McFarlan & Nolan, 1995; Lacity & Willcocks, 1998; Kelter & Willem, 1999). Confidentiality and the proper care of sensitive data and business knowledge are now in the hand of a third party and must be protected (Jurison, 1995; Antonucci et al., 1998; Lonsdale & Cox, 2000). Another source of relationship risk is the vendor's ability to deliver (Jurison, 1995), especially without prior relationships with that vendor. It was found that positive prior relationships reduce the perception of relationship risks.

This research also found no support for the influence of the external environment on outsourcing decisions. The structured interviews in the model building study (Benamati & Rajkumar, 2002) found mixed responses about the

importance of the external environment. Other studies report similar mixed responses. For example, Loh and Venkatraman (1992) found that outsourcing behavior of other organizations is a good indicator of outsourcing events, but Hu, Saunder, and Gabelt (1997) did not find corresponding effects. In spite of assertions that competition may influence decision maker perceptions about outsourcing, this was not the case in the subject organizations in this study.

IMPLICATIONS FOR FUTURE RESEARCH

This research was the first empirically study of the application of TAM to the decision to outsource. The applicability of TAM as a basis for explaining the mediating effects of decision-maker attitude on organizational decision making is a major contribution of this study. The instrument developed here based on prior TAM research could provide a basis for other decisions made at this level. The decision-making processes for outsourcing other IT functions or entirely different technology decisions could be examined. Influential external variables for these alternative decisions could also be studied.

Additionally, the antecedents established in this research provide a basis for further study. This study identified prior relationships, employee risks, and project management risks as important to the AD outsourcing decision. Future research should look more closely at these to both validate and extend these findings. It might also be interesting to explore why increased perceptions of employee risk increased perceived ease of use for decision makers. Perhaps IT executives do feel that keeping employees on edge is good and helps ease the use of AD outsourcing. It is also possible that this result was due an anomaly of the sample or flaw in the measures. This finding is not unique to this study. A study of TAM and mobile commerce found, perceived risk positively influenced intention to use (Wu & Wang, 2005). They speculate that users are perhaps well aware of the risks, and weigh the

benefits more than the risks. In either case, more research is required.

The antecedents' influences could also be examined for the outsourcing of other business processes. They could also be studied across organizations of different size, of different organizational structures, or in different industries. The R^2 values in Table 8 indicate that these are probably not the only antecedents to outsourcing decisions. The methodology applied here could be used to identify and study other important influential elements in outsourcing decisions. Finally, this study focused only on the decision to outsource. The antecedents identified here as influential to the decision most likely play significant roles in the outsourcing process itself. Future research could explore these relationships.

IMPLICATIONS FOR PRACTICE

Useful knowledge for practitioners also results from this study. Decision maker perceptions about outsourcing obviously influence their decisions. The identification of prior relationships and two of the three dimensions of risk: project management, employee, and relationship risk as strong influencers of these perceptions is useful knowledge to decision makers in both outsourcing customer and provider organizations.

Application development outsourcing providers should work to manage decision maker perceptions about relationship quality and relationship risks when trying to sell further business. For example, the study indicates that organizations seeking an AD outsourcing vendor are sensitive to the length of the outsourcing contract and the amount of industry knowledge the outsourcing vendor has. Both should play a role in the marketing strategy to win outsourcing contracts.

Outsourcing decision makers can learn from the experiences of others presented here. They should pay particular attention to the individual items from the risk antecedents identified as influential. Decision makers should also understand that the results indicate negative prior outsourcing experiences may predispose them to choose not to outsource in a future

decision. While, this may indeed be the correct path, it may not.

LIMITATION

A limitation of this study is the low response rate, 5.33% of the executive decision makers surveyed. Response rates in surveys of executive level individuals are often low (Pincus, Rayfuekdm, & Cozzens, 1991; Baruch, 1999) due to the numerous demands on their time. Regardless, this limitation should be carefully addressed in similar future studies. Doing so will help to ensure the generalizability of the findings of future research.

CONCLUSION

The use of outsourcing application development is increasing. This study is the first to empirically validate the applicability of technology acceptance model to enhance the understanding of the decision to outsource application development. Outsourcing decision makers in organizations and outsourcing providers can glean useful insights from the results. Additionally, researchers can use this work as a platform for future research.

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APPENDIX

For the purpose of this survey, outsourcing vendors are defined as any organization external to your own to which you have in some way transferred responsibility for any type of application development efforts. This definition excludes contract workers.

Industry Environment

Please indicate your level of agreement with the following statements about the industry in which your organization operates.

- EN1 In our industry, price cutting is a common competitive action.
- EN2 In our industry, firms compete intensely to hold and/or increase their market share.
- EN3 In our industry, competitive moves from one firm have noticeable effects on other competing firms and thus incite retaliation and counter moves.
- EN4 In our industry, foreign firms play an important role in industry competition.
- EN5 In our industry, firms have the resources for vigorous and sustained competitive action and for retaliation against competitors.
- EN6 In our industry, price competition is highly intense (i.e., price cuts are quickly and easily matched).
- EN7 In our industry, advertising battles occur frequently and are highly intense.
- EN8 In our industry, appropriate terms used to describe competition are "warlike," "bitter," or "cut-throat."
- EN9 In our industry, there is a diversity of competitors (i.e., competitors may be diverse in strategies, origins, personality, and relationships to their parent companies).

Potential Outsourcing Risk

Outsourcing applications development involves a level of risk to the organization requiring the application. To what level do you agree that each of the following is a concern when outsourcing application development in your organization?

- RSK1 Inadequate training/skills needed to manage application development outsourcing
- RSK2 Fear of job loss by employees due to projects being outsourced
- RSK3 Unclear expectations/unclear objectives of outsourcing
- RSK4 Inadequate control mechanisms on the outsourced project
- RSK5 Uncertainties in the environment
- RSK6 Decline in performance of in-house employees due to the project being outsourced
- RSK7 Over emphasis on short term benefits of outsourcing
- RSK8 Meeting and enforcing time schedules are problematic with outsourcing
- RSK9 Security is harder to maintain on outsourced projects
- RSK10 Decline in morale of employees due to outsourcing
- RSK11 Lack of infrastructure to support outsourcing efforts
- RSK12 Excessive length of outsourcing contract
- RSK13 Lack of flexibility by you and/or vendor
- RSK14 Confidentiality is harder to maintain on outsourced projects
- RSK15 Fear of becoming dependent on the outsourcing vendor
- RSK16 Inadequate high level management support for outsourcing
- RSK17 Inadequate knowledge transfer back from the outsourcing vendor
- RSK18 Vendor's lack of knowledge of our business

Perceptions of Outsourcing

Please assess your level of agreement with the following statements relative to outsourcing applications development work in your organization.

- PU1 Using applications development outsourcing improves the IS function's effectiveness.
- PU2 Using applications development outsourcing improves the quality of IS applications.
- PU3 Using applications development outsourcing allows the IS function to accomplish tasks critical to the organization.
- PU4 Using applications development outsourcing allows the IS function to develop more systems than would otherwise be possible.
- PU5 Using applications development outsourcing allows the IS function to reduce costs.
- PU6 Using applications development outsourcing helps the IS function meet staffing goals.
- PU7 Using applications development outsourcing allows the IS function to develop systems more quickly than would otherwise be possible.
- PU8 Using applications development outsourcing makes it easier to perform IS functions
- PU9 In general using applications development outsourcing is useful.
- EOU1 I understand how to use outsourcing.
- EOU2 Using outsourcing does not require a lot of mental effort.
- EOU3 I find outsourcing to be easy to use.

- EOU4 I find it easy to accomplish what I set out to do through outsourcing.
- EOU5 Using application development outsourcing makes it easier to share risk with the vendor.
- AT1 I like using application development outsourcing.
- AT2 Outsourcing provides an attractive alternative to in house application development.
- AT3 Using application development outsourcing is in general a good idea.
- AT4 Using application development outsourcing creates a pleasant project environment.
- IN1 Assuming I have an outsourcer for applications development, I intend to use them.
- IN2 Given that I have access to an outsourcer for applications development I predict that I would use them.
- IN3 I intend to increase my usage of application development outsourcing in the future.
- IN4 I intend to use application development outsourcing as often as needed.
- IN5 To the extent possible, I would use application development outsourcing frequently.

Outsourcing Relationships

If your organization has never outsourced application development work, please skip to the Demographic Information section.

Otherwise, please think about your organization's relationships with past outsourcing vendors and indicate your level of agreement with the following statements.

- REL1 We generally trusted our vendors.
- REL2 Flexibility in response to requests for changes was a characteristic of past relationships.
- REL3 We kept each other informed about events or changes that might have affected the other party.
- REL4 Both our vendors and us did not mind helping each other out.
- REL5 If we were unable to monitor our vendors' activities, we trusted them to fulfill their obligations.
- REL6 Both us and our vendors expected to be able to make adjustments in the ongoing relationships to cope with changing circumstances.
- REL7 We trusted our vendors to carry out important project-related activities.
- REL8 Problems that arose in the course of these relationships were treated by both us and our vendors as joint rather than individual responsibilities.
- REL9 We were willing to let our vendors make important decisions without our involvement.
- REL10 In these relationships, it was expected that any information that might have helped the other party would be provided to them.
- REL11 Both our vendors and us were committed to improvements that benefited the relationship as a whole, and not only the individual parties.
- REL12 When some unexpected situation arose, together with our vendors, we worked out a new deal rather than hold each other to the original terms.
- REL13 We trusted our vendors/vendors to do things we could not do ourselves.
- REL14 Exchange of information in these relationships took place frequently and informally, and not only according to a prespecified agreement.
- REL15 It was expected that we and our vendors would share our proprietary information if it could help the other party.

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