Adoption of Organizational Internet Technology: Can Current Technology Adoption Models Explain Web Adoption Strategies in Small & Mid-Sized Organizations?

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Abstract

In this exploratory study, Internet adoption decisions are examined from an organizational perspective. We postulate that when the technology considered for adoption demands a shift of paradigm, involves support of a corporate-wide infrastructure, and/or nascent skills of technology developers, individual-based technology adoption models may lack explanation power. This study identifies eight factors that may facilitate or inhibit technology adoption. Results from the interviews of top managers reveal that Internet technologies indeed demand the considerable organization-level deliberation in adoption decisions since Internet technologies requires a re-examination of existing business models and strategies. Yet, interestingly, this same technology was adopted by small and medium organizations with very different reasoning logic, ranging from using the Internet as an additional channel for promotion and advertisement to being pressured from competitors to adopt (the "we gotta have one, too" syndrome).

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1. Introduction

A wide range of research on technology adoption has been published during the last decade. The findings of these studies have furthered our understanding of the technology adoption and acceptance process. However, the issue of technology adoption has primarily focused on the understanding of individual behavior, not the adoption behavior of an entire organization. Many of those organizational-level studies on technology adoption and diffusion of technology have focused on larger organizations. As new technology may require new infrastructure and nascent skills, it becomes necessary that researchers expand their efforts to investigate not only the adoption decisions made by organizations, but also the underlying strategy and beliefs of key decision makers that is influencing the adoption decision. In addition to determining what factors influence an organization's decision to adopt a new technology, we should also consider the underlying strategy for which the technology was adopted.

This exploratory study investigates the technology adoption process for small to mid-sized organizations by identifying the factors that affect organizational technology adoption. These organizations typically have a single decision maker or a relatively small number of employees in the decision making role. The focus of our research was the organizational adoption of Internet technologies. Internet technologies were selected because of the strong network externality property associated with them. Such technology adoption decisions not only have an internal impact (e.g., employees' usage) but they have an external implication as well (e.g., fulfilling customers' needs, matching competitors' offerings).

Interviews were held with upper-level managers from 76 companies within a mid-sized university community. Selected companies varied in age, company size, and product industry, with ownership ranging from national to local levels. Studying the development and strategies for Internet technologies from this wide range of businesses is not only valuable in our understanding of organizational adoption, but it also furthers our understanding of the impact that the Internet has on the small- and mid-sized companies that are less frequently researched in electronic commerce studies.

2. Theoretical foundation

Four research models and theories frequently have been cited in technology adoption research. The Technology Acceptance Model (TAM) presented by Davis [6] has commonly been used as the groundwork for technology adoption research at the individual level. Roger's Innovation Decision Process [21], the Theory of Reasoned Action [9], and the Theory of Planned Behavior [2] have also been frequently used in adoption research. Each will be discussed below.

2.1. Innovation Decision Process

In his publication, Rogers outlined five steps that occur during the innovation decision process [21]. The first stage occurs when an individual develops an initial awareness of the innovation. Sometime thereafter, the individual forms an attitude toward the innovation, which may be favorable or unfavorable. This is followed by the decision to adopt or reject the innovation. If the individual decides to adopt the innovation, he/she moves into the fourth stage of the Innovation Decision Process by actually using the innovation. After using the innovation, the individual reaches the final stage by reinforcing and institutionalizing the innovation decision.

The identification of these stages has assisted researchers in identifying the variables that influence adoption decisions. Primary constructs from the Innovation Decision Process have

been used in research models for technology adoption, including the Theory of Reasoned Action, the Theory of Planned Behavior, and the Technology Acceptance Model.

2.2. Theory of Reasoned Action

In the late 1960s and early 1970s, Fishbein and Ajzen began developing a theory that would help researchers in understanding and predicting the attitudes and behaviors of individuals. Their work resulted in the Theory of Reasoned Action (TRA) [9]. TRA has been successful in predicting and explaining behavior across a wide variety of domains. Frequently, it has been used as a theoretical model in information system literature.

According to TRA, *Behavioral Intention* is the primary determinant of an individual's behavior. *Behavioral Intention* was conceptually defined as a person's intention to perform a behavior, with *Behavior* being described as the transmission of intention into action. An individual's intention to adopt an innovation is influenced by a personal factor and a social influence factor. The personal factor, *Attitude* toward performing the behavior, is an individual's positive or negative belief about performing a specific behavior. The social influence factor, *Subjective Norm*, is the perceived influence of social pressure on an individual to perform or not perform a behavior.

An individual's *Attitude* and the *Subjective Norm* are also influenced by several factors including the individual's *Behavioral Beliefs*, the individual's *Evaluation of Behavioral Outcomes*, the individual's *Motivation to Comply*, and *Normative Beliefs*.

2.3. Theory of Planned Behavior

An underlying assumption of TRA is that behavior is under volitional control. In reality, individuals do not always have control over their attitudes and behaviors. In 1988, Ajzen revised TRA to include the concept of *Perceived Behavioral Control*. This new theory was entitled the

Theory of Planned Behavior (TPB) [2]. *Perceived Behavioral Control* is defined as the degree to which an individual feels that the decision to perform or not perform is within his/her control, and is determined by two distinct factors: *Control Beliefs* and *Perceived Power*. Studies on the adoption of technology have used both TRA and TPB as the theoretical models, but the TRA is more commonly used.

2.4. Technology Acceptance Model

Another frequently cited technology adoption model found in information systems research is Davis's 1986 Technology Acceptance Model (TAM) [6]. The TAM adapted the Theory of Reasoned Action [9] by incorporating technology into their model to explain the usage behavior of computers. Specifically, TAM identifies the causal linkages between an individual user's attitudes and perceptions toward technology and the actual adoption of technology.

According to Davis et al. [8], the goal of TAM is "to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified (pg. 985)."

Like TRA, TAM compares *Behavioral Intentions* and *Usage* and states that behavioral intention is an indicator of computer usage. Additionally, TAM states that *Attitude* directly influences *Behavioral Intentions*. *Attitude*, is defined as the individual's attitude toward using the system. According to Davis et al. [8], several studies have found a relationship between attitude and usage.

TAM considers the impact of external factors on *Attitude*, and thus *Behavioral Intentions,* by adding two additional constructs that influence the technology adoption process. The first construct, *Perceived Usefulness,* is defined by Davis et al. [8] as "the prospective user's

subjective probability that using a specific application system will increase his or her job performance within an organizational context (pg. 985)." The second construct, *Perceived Ease of Use*, was conceptually defined by Davis et al. [8] as the "degree to which the prospective user expects the target system to be free of effort (pg. 985)." Davis excludes TRA's *Subjective Norm* as a determinant of *Behavioral Intention*.

Both *Perceived Ease of Use* and *Perceived Usefulness* directly influence *Attitude* in the TAM, and thus, influence *Behavioral Intention* through its direct relationship with *Attitude*. In addition to its influence on *Behavioral Intention* through *Attitude*, *Perceived Usefulness* has a direct relationship with *Behavioral Intention*.

Both TRA and TAM have satisfactorily predicted intentions and usage for individuals. In fact, some researchers have used both models in their studies. Igbaria et al. [14] state that TAM is simpler, easier to use, and a more powerful model of the determinants of user acceptance of computer technology.

2.5. Research based on the TAM

The TAM has successfully predicted and explained individuals' intention to adopt and actual adoption across a variety of studies. An article written by Gefen and Straub [10] provides a synopsis of the various TAM studies from 1989-2000. These studies have considered a range of computer systems and technologies. Research has been conducted using both behavior-oriented variables measured in the laboratory [23] and using self-reported measures on surveys [5, 15]. In addition to the cross-sectional studies [4, 7], longitudinal studies have been conducted [8,18]. The mix between student subjects and employee subjects is balanced among the studies. Some studies have even focused on employees within a single industry [13, 17]. All 45 studies

included in Gefen and Straub's summary of TAM research used individuals as the research subjects (e.g., knowledge workers, students, clerical staff) [10].

Various external variables and factors have been tested using the TAM. Gefen and Straub [11], and Vekatesh and Morris [24] have extended the Technology Acceptance Model by including the variable *Gender*. *Age* has also been found to influence various factors in the adoption and use of technology [18]. Rawstorne et al. [20] considered usage behaviors when usage was mandated. Straub et al. [22] extended the application of the Technology Acceptance Model to countries beyond North America to determine if TAM applies in other cultures.

The research of Igbaria et al. [14] considered how intraorganizational and extraorganizational factors, such as internal computing support and external computing training, impact *Perceived Ease of Use* and *Perceived Usefulness* as a determinant of *Usage*. Compeau et al. [5] also used other dependent variables (e.g., self-efficacy, affect, anxiety, and outcome expectations) in their longitudinal study on usage. Chau and Tan [4] found that *Perceived Barriers* were significant in a relationship with *Usage*, while *Perceived Benefits* were not significant. Karahanna et al. [15] compared the adoption beliefs between pre-adopters and post adopters.

Although there is a need to understand technology adoption decisions for the individual, there is also a need to understand these decisions as they are made for an entire organization. All of the studies identified by Gefen and Straub [10] focused on the individual decision maker's choice in adopting a technology for one's own use. Technology adoption decisions on the organizational level can have a wider implication, as they not only impact the decision maker's usage of the technology, but also it can impact business processes, customer relations, and other

employees. Thus, it becomes important to understand the adoption decision for those individuals in small to mid-sized businesses who make the adoption decision for the entire organization.

3. Developing a model for organizational technology adoption

Published research articles on the topic of technology adoption primarily have used one or more of the previously mentioned theories/models as foundations for their studies. These studies used similar constructs to explain the technology adoption process from the standpoint of an individual. The TAM has been validated in several studies that have considered various technologies, industries, cultures, and individual factors. However, the TAM and subsequent research have continued to analyze an individual person as the unit of study. The variables that were identified by these studies may become more salient or less pertinent in an organizational decision to adopt. Additional variables, that are not relevant when analyzing an individual, might become relevant when developing a model for organizational technology adoption. Strategic organizational adoption decisions can affect all levels of the organization. Thus, it is important that we develop a model that illustrates technology adoption from an organizational perspective.

Afuah and Tucci [1] suggest that businesses adopt new technologies to reinforce an existing competitive advantage, surpass existing competitors, deter new competition, or to improve profit. Before a technology is actually adopted, a decision making process must occur. The decision making process begins by developing knowledge of the specific technology. Key decision-makers must be persuaded that this technology is appropriate for their organization. Perceptions of the value that this technology may bring to the organization are weaved into the existing strategic vision of the organization. These visions not only influence the adoption decision but also the implementation of the technology within the organization.

4. Variables to consider in an organizational technology adoption model

Several variables may have an influence on the organizational adoption decision and the implementation of the adopted technology. These variables include forces both internal and external to the organization. The following is a list of variables to consider, building upon existing models with additional organizational factors that are relevant to an organizational technology adoption model included.

1. *Characteristics of the technology:* Characteristics of the technology may influence the adoption decision. These variables can include: (a) the costs associated with the technology and its use, (b) the expected benefits derived from the technology (e.g., perceived usefulness), (c) the complexity of the technology (e.g., perceived ease-of-use), (d) and the compatibility of the technology with existing systems.

2. *Organizations' existing business models and paradigms:* Organizations' existing business models (e.g., the method by which the organization uses its resources) and their competitive strategies may influence technology adoption decisions and the way technology is implemented.

3. *Managerial logic:* Each manager brings his/her managerial logic to the decision process. This logic is a culmination of his/her beliefs, biases, assumptions, and experiences. Afuah and Tucci [1] state that a dominant managerial logic (e.g., the best way to do business) usually emerges, particularly if the business has had success with past strategy decisions. They suggest that dominant managerial logic can have disastrous consequences when the company is faced with radical or disruptive changes. In regards to technology acceptance, a dominant managerial logic can inhibit managers from understanding the rationale for adopting new technologies.

4. *Locus of control:* This variable identifies the level within the organization where adoption decisions are made. This locus, which might be departmental, local, or national, might influence the adoption decision and the implementation of the technology.

5. *The availability of a knowledgeable IT staff:* Due to the rapid evolution of information technologies, the specific IT skills that are needed within an organization are frequently changing. IT departments (or key personnel for smaller businesses without a dedicated IT department) are battling the challenges of fulfilling these needed skill sets through the continuing training of existing employees or the hiring of new employees. This availability can also influence how an information technology is maintained (e.g., internally vs. outsourced).

6. *Organizational size:* Organizational size may affect the adoption and implementation of technology. For example, the decision to adopt a technology may become more complex in larger organizations. In such circumstances, decision makers have to consider the impact that their decisions will have on the large number of end users who will ultimately adopt the new technology.

7. *Financial resources:* Financial resources within the organizational may affect the adoption and implementation of technology. Not only are the expenses associated with purchasing and implementing the technology considered, but the costs of maintaining the technology throughout its useful life.

8. *Pushes from within the industry:* The industry in which an organization competes has a strong influence on the IT approaches of a firm [3]. Additional industry influences can include: (a) competitor's technological implementations and product offerings, (b) influence from customers (e.g., the ability to conduct banking from home), and (c) influence from government.

5. The adoption of Internet technologies as an organizational decision

Afuah and Tucci [1] classified the Internet as a technology that "has the potential to transform the competitive landscape in many industries while at the same time creating whole new industries (pg. 6)." Organizations have adopted Internet technologies regardless of internal and external variables, including industry, product type, company size, and location. Afuah and Tucci [1] suggest that the organizational adoption of Internet technologies can be relatively simple because the standards used on the World Wide Web are fairly easy to learn and use (e.g., web browsers, HTML) and the cost of developing an Internet presence can be relatively low.

The adoption of Internet technologies was selected as the focus of study not only because of the wide-range of businesses that have chosen to adopt them, but also because of the unique characteristics associated with Internet technologies. Unlike adoption decisions for software applications and operating systems, the decision to adopt Internet technologies expands beyond the internal organization. The external properties of Internet technologies must be considered in the adoption process, as the business's relations with customers will depend on the business's selection and implementation of such technologies.

The level of Internet presence that is adopted can accommodate varying objectives and business strategies. The objective of the organization's Internet presence could be relational, transactional, or a combination of both. A relational strategy is most commonly achieved through an informative website, and can involve the creation of a long-term relationship with consumers by building customer loyalty and brand identity. A transactional strategy exists when the organization's website is capable of accepting online purchases from customers. This need for additional network communication channels makes the transactional strategy more complicated to develop when compared to relational. For some businesses, the combination of a transactional marketing strategy and a relational marketing strategy will be ideal in developing

an electronic retailing plan. The selected business strategy can also influence the cost of implementing the technology. For example, the cost of developing an Internet presence can range from less than $50 a page (e.g., a simple relational website providing basic corporate and product information) to several million for an entire web marketing plan [12].

Palmer and Griffith [19] suggest that the level of intensity that information plays in an organization's products and the company's existing distribution channels will be influential in determining if the organization will use their web site in a relational or transactional manner. Industries with products that are highly information intensive, such as the insurance and banking industries, will utilize a web site differently than would an industry with products that have low information intensity like the petroleum industry.

The aforementioned statements have been mostly antidotal. This study takes a systematic approach to examine why and how Internet technologies are adopted into organizational settings.

6. Research method

Data on the Internet adoption decision were gathered during interviews with key personnel from seventy-six companies during the period of 1998 to 2000. Because of the exploratory nature of the study, interviews were selected as the preferred methodology so that deeper, more detailed information would be gathered to provide insights for future research in this area. The key personnel that were interviewed included CEOs, IT managers, or general managers, depending on the organization's structure.

All of the businesses were located in Champaign-Urbana, Illinois. This location was selected for its wide scope of businesses (e.g. national brands and locally owned businesses across various industries), its technological profile (e.g. Champaign-Urbana was rated one of the new hot tech cities by *Newsweek* [16]) and for interviewers' convenience. Champaign-Urbana

are twin communities found in Champaign County in East Central Illinois. Champaign County had a population of 167,788 and a median household income of $33,947 [25].

The companies were randomly selected and varied in regards to ownership, product industry, size, and age. Questions asked during the interviews included responses to the following variables: length of Internet presence (in years), Internet strategy (e.g., relational, transactional), managerial logic affecting Internet adoption, Internet development (e.g., in-house, outsourced), company age (in years), product type, industry type, ownership (e.g., nationally, locally), and company size. Additionally, information about the benefits and drawbacks of the company's adoption decision were also collected.

7. Findings

Nine industry types were represented in the seventy-six companies interviewed. The number of employees for the companies ranged from 3 to 30,000. The age of the companies ranged from less than a year to 209 years, with an average age of 59 years. The majority of the companies adopted the Internet within the last four years, with only four companies not having an Internet presence. Less than a third (27.63%) of the companies interviewed had adopted Intranet technologies in their organizations. A detailed description of the company profiles can be found in Table 1.

As Afuah and Tucci [1] stated, managerial logic can play a dominant role in facilitating or inhibiting the adoption of Internet technologies. Our findings suggest that top managers not only bring in their own perceptions to the Internet adoption decision but also that these perceptions are distinctive to their decision. Their managerial logic was categorized into six types. The most predominant logic is that the Internet is just "another form of advertisement/promotion" (34%). The next most common logic is that the Internet can "provide

customer service" (22%). "Generate revenue/cut costs" was ranked third (19%), with "enhance communication/exchange messages" as the fourth most prevalent logic (11%). The next to last managerial logic was that the Internet can provide "Information gathering/retrieving/research" capabilities (10%). Some top management believed that if their competitors had Internet access, "we got to have one, too" (4%). Similar managerial logics were found to influence Intranet adoption decisions. (See Table 2.)

Internet technology requires specialized skills for adoption. The availability of knowledgeable IT staff can be a key determinant for organization adoption decision. The results of our study, as shown in Table 3, demonstrate that 80% of the companies that adopted Internet technology developed it internally with their in-house staff, with 20% outsourcing the development process to external consultants or contractors. This further supports the notion that IT departments' readiness can play a major role in new technology adoption.

In terms of the organizational strategy for Internet adoption, four categories emerged from the interview results. They are transactional-oriented strategies, relational-oriented strategies, a combination of both transactional-oriented and relational-oriented strategies, and no strategy. As described in an earlier section of the paper, a transactional strategy focuses mainly on expanding existing sales channels to generate additional revenue. A relational strategy uses the Internet technologies to inform existing and potential customers about the company and its product lines without the ability to accept online purchasing. This study finds that most companies attempt to use the Internet as a relational building tool. This finding is consistent across product types, industry types, and company ownership. Interestingly, when managers were asked to elaborate their company's future Internet strategy, more than half (55%) of nationally-owned companies indicated the development of transactional strategies while only

13% of the locally-owned companies suggested the same. On the other hand, 62% of the locally-owned companies emphasized a relational strategy as their focus in the near future, in contrast with 28% of the nationally-owned companies. (See Table 4.)

8. Conclusion and future research

The phenomenon of Internet technology has swept corporations and has created a significant impact on existing business models and processes. It is imperative for researchers to understand not only if technology, such as the Internet, is adopted by organizations but also how the technology is adopted. Current research on technology adoption, such as the TAM, has mainly focused on the individual as the unit of analysis. This study proposes that the individual-based technology acceptance model may not be the best fit for company-wide technology adoption. This is particularly evident in situations where the new technologies that are being considered for adoption demand new paradigms, new infrastructures, and/or new technological skills. Our findings suggest this is the case across industry types, product types, and company sizes.

Thus, it becomes important for us not only to study individual technology adoption decisions but also organizational technology adoption decisions. Several factors that are not identified in the TAM, such as managerial logic and industrial pushes, can impact these organizational level decisions. This study found that these factors are not specific to just those technologies with strong external properties, such as the Internet, but were also apparent in the adoption decision for technologies that have a stronger cross-functional influence, such as Intranets.

This study demonstrated that the adoption of Internet technology indeed involved top management's considerable effort in contemplation and justification. It is equally interesting

that these top managers' decisions to adopt the same new technology originated from distinctive and varied reasoning logic. Our findings also suggest that IT departments' technological readiness facilitate the adoption process. For a majority of the companies, the in-house IT staff developed the Internet presence. It was a surprising finding that companies have used internal staff instead of hiring consultants, since Internet technologies require many new skill sets.

The interviews took place at the early stage of Internet adoption by corporations. Thus, it is not surprising to see that the Internet strategies of most companies were relationally focused. Nevertheless, most companies, particularly nationally-based corporations, hope to apply the Internet's capabilities to generate revenues. In the future, longitudinal studies are needed to examine the change in organizational Internet strategy over time as their adoption process evolves.

The adoption of Internet technologies by organizations is still in its early stage since the technology is continuing to emerge. Relevant research, such as examining adoption factors, is imperative and needed. Such knowledge can help top management understand the scope and variables involved when dealing with new technological innovation adoption decisions. By identifying the salient factors affecting management adoption decisions, cumulative research can be conducted that will result in model development and generalizable theory.

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Table 1. Profile of companies interviewed

	# of companies	%
Industry type		
Service	18	23.68%
High technology	16	21.05%
Retail	13	17.11%
Banking	10	13.16%
Non-profit	5	6.58%
Learning institute	5	6.58%
Manufacturing	4	5.26%
Media	3	3.95%
Transportation	2	2.63%
Total response	76	100.00%
# of employees		
1 – 70	26	34.21%
71 – 200	24	31.58%
201 – 650	18	23.68%
650 and above	8	10.53%
Total response	76	100.00%
Average # of employees	*15.1*	
Company age		
1 – 10	23	30.26%
11 – 20	18	23.68%
21 – 80	15	19.74%
80 and above	20	26.32%
Total response	76	100.00%
Average company age	*59*	
Length of Internet presence		
5+ years	6	7.89%
4 years	14	18.42%
3 years	9	11.84%
2 years	24	31.58%
1 years	12	15.79%
less than 1 year	7	9.21%
No Presence	4	5.26%
Total response	76	100.00%
Average length	*2.62*	
Intranet availability		
Presence	21	27.63%
No presence	55	72.37%
Total response	76	100.00%

Table 2. Managerial logic affecting adoption

Categories of managerial logic	# of companies	%
Internet technologies		
Another form of advertisement/promotion	47	34.06%
Provide customer service	30	21.74%
Generate revenues/cut costs	26	18.84%
Enhance communication/exchange messages	15	10.87%
Information gathering/retrieving/research	14	10.14%
We got to have one, too	6	4.35%
Total response	138	100.00%
Intranet technologies		
Enhance communication/exchange messages	17	47.22%
Information retrieving	8	22.22%
Inventory/order tracking	3	8.33%
Reduce costs	2	5.56%
Improve customer service	2	5.56%
Data analysis	2	5.56%
Hosting application software	2	5.56%
Total response	36	100.00%

Table 3. Internet development by industry type

Industry Type	In-house	Outsourced	Total
Banking	6	2	8
Retail	9	2	11
Service	12	4	16
Manufacturing	3	1	4
High technology	15	1	16
Non-profit	4	1	5
Media	2	1	3
Learning Institution	2	2	4
Transportation	2	0	2
Total response	55	14	69

Table 4. Internet strategies

	Transactional	Relational	Combination	Can't Decide	Total
Product type					
Durable	1	2	0	2	5
Non-Durable	4	8	2	2	16
Service	4	32	8	7	51
Total response	9	42	10	11	72
Ownership					
National	4	20	8	4	36
Local	5	22	2	7	36
Total response	9	42	10	11	72
Industry type					
Banking	1	4	2	1	8
Retail	3	6	2	2	13
Service	2	10	1	3	16
Manufacturing	0	2	0	2	4
High-Tech	2	11	2	1	16
Non-Profit	0	3	1	1	5
Media	1	1	1	0	3
Learning Institution	0	4	0	1	5
Transportation	0	1	1	0	2
Total response	9	42	10	11	72