# VALIDITY OF TAM OVER A PERIOD OF TIME: A SENSEMAKING PERSPECTIVE

**Bushra Aafaqi**

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# ACKNOWLEDGEMENT

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# ABSTRAK

Penerimaan teknologi (technology adoption) semakin diperbualkan berbanding dengan satu setengah dekad yang lepas. Kini, daya saing sesebuah organisasi tertakluk dalam kebolehannya untuk menggunakan teknologi baru dalam tugas sehariannya. Kajian ini dijalankan untuk menyelidik kesan "sensemaking" dalam model penerimaan teknologi (TAM) dan kesan perubahan model ini dalam satu siri masa. Kajian ini merupakan satu kajian longitud berdasarkan satu kumpulan panel. Data dikumpul dalam tiga peringkat dan dijalankan di Pusat Pengajian Pengurusan USM. Subjek kajian adalah pelajar-pelajar kursus Statistik Perniagaan Lanjutan (semester II, 2002/2003). Penggunaan teknologi yang dikaji adalah Statistical Package for Social Sciences (SPSS). Penemuan utama kajian ini menunjukkan bahawa "sensemaking" mempunyai pengaruh ke atas TAM, tidak kira sama ada aktiviti dijalankan pada tahap tinggi ataupun rendah. "Sensemaking" didapati mempengaruhi konstruk secara individu dan bukan keseluruhan model tersebut. Walau bagaimanapun, kajian ini tidak dapat membuktikan pengaruh yang ketara dalam perubahan impak hubungan antara konstruk TAM melalui siri masa yang dikaji di bawah pengaruh "sensemaking". Ini bermakna aktiviti "sensemaking" tidak mempunyai kesan pengaruh ke atas konstruk TAM. "Sensemaking" bertindak sebagai pembolehubah luaran terhadap konstruk TAM dan bukan sebagai pengaruh impak hubungan antara konstruk TAM. Ini mungkin kerana teknologi yang dikaji adalah wajib kepada subjek kajian dan bukan berdasarkan pilihan mereka.

# ABSTRACT

Technology adoption is being talked of more frequently now as compared to ten-fifteen years back. It is because today the major thrust of organization's competitiveness is in their ability to employ new technology in their day-to-day tasks. This study was carried out to investigate if sensemaking activities influence technology acceptance model (TAM) and if the strength of relationship between TAM's constructs changes over a period of time. This study was a panel-based longitudinal study, whereby data were collected in three stages in one semester. The setting of the study was at School of Management, USM. Subjects of this study were Advanced Business Statistics class (semester II, 2002/2003) and the technology of interest was Statistical Package for Social Sciences (SPSS). The major findings of the study showed that sensemaking does influence TAM if activities are undertaken at high and low level and also that sensemaking influences individual constructs of TAM rather than the whole model together. This study failed to prove that there is significant changes in strength of relationship between TAM constructs over a period of time under sensemaking influence, that is sensemaking activities were not found to be exhibiting any moderation effect on TAM constructs. Sensemaking acts as an external variable which influences TAM rather than having moderation effect of strength of relationship between TAM constructs. This could be because the technology in question was mandatory to be used by the subjects rather than voluntary choice.

# Chapter 1

# INTRODUCTION

## 1.1 Background

Technology is a very broad term that can be related to every facet of life. It is an essential component in all organizations. From the beginning of time, technological innovation has had a profound effect on mankind. Early adaptations of technology revolved around the basic needs of protection and hunger. Early man went through a process of convincing his or her counterparts to adopt the new tools (technology) that helped them kill their enemies. Similarly, in present time, we face many of the same issues that challenged early man. We first need to realize the existence of new technology and then to evaluate the potential benefits it will be bringing to a given organization.

Most organizations need a reason to adopt a new technology. Adopting a new technology needs two fundamental justifications. First, the new technology must contribute to strong competitive market differentiation, and second, the new technology must increase or create long-term profit (More, 1992).

Technology today is considered one of the most important factors to gain competitive advantage and to succeed in this competitive era of globalization. It helps in faster production and decision-making. It also enhances and changes the traditional way of doing things in any given organization. For March and Sproull (1990), competition is one of the leading factors that make organizations to exploit new and superior technologies. Environmental demands combine with individual and organizational

attributes to generate requirements for competitive success. That is the reason why technology can be found at every single level and area of any organization. Be it in the core and buffer parts of the production system or in the non-production parts of the organization (such as marketing and finance). According to Goodman (1986), technology is a system of components involved in acting on and/or changing an object from one state to another. The object can be a living being, a symbol, or an inanimate object.

According to Voon Seng Chuan, the Managing Director of IBM Malaysia, "Technology is an essential component for success and is an enabler for businesses as it provides the value-added advantage to achieve greater competitiveness and higher productivity so crucial to enable local companies to leap-frog to greater heights in the global market." He further said that the Malaysian government is putting a lot of effort to promote technology adoption among local manufacturing companies to ensure that they remain competitive in the global marketplace (Boey, 2002).

Information technology is one of many tools managers use to cope with change. Information technology can be defined as computer hardware, software, data and storage technology, and networks providing a portfolio of shared information technology resources for the organization (Laudon & Laudon, 2002). The advent of the technology age meant increased leverage for business organizations with international aspirations and connections. The idea that a company can ignore this trend and be successful is rapidly disappearing (Wade, 1996). Successful business organizations recognize the importance of technology in running an efficient operation and maintaining their competitive edge. The exploitation of technology is a

necessity and one can try new technologies only when an individual is ready to adopt the new technology. Successful exploitation of technology occurs at the individual level, as it is the individual employee who operates the various technologies purchased by organization. Thus, adoption of technology leads to another aspect of this whole scenario; that is, how to enhance an individual's desire to use a given new technology.

The pure existence of a technology does not ensure that it will be noticed, let alone adopted and used. In addition to being noticed, individuals need to make sense of the new technology. Griffith (1999) refers to this process as sensemaking. This process includes the conscious perception and categorization of the new stimuli. Once an individual makes "sense" of a new technology, there needs to be a decision concerning adoption or rejection of the technology. The most fundamental component of any project is communication. In fact, technology adoption fails most often because of incomplete communications and lack of correct information in a constructive way.

Most research on technology adoption has been focused either on the adoption process itself or the consequences of the adoption of a new technology. However, as these new technologies continue to pervade the environment, questions remain as to how the adopter himself or herself goes through the process of technology adoption and whether the adopter's perception changes during the course of technology usage.

Hence, it is important to know how the mental framework of the adopter works during the process of decision-making. Monitoring authorities of a given organization should be able to know the technology adopter's decision-making framework and the

changes in their perception related to new technology -- that is, pre and post usage of a given new technology. Understanding these changes are critical to:

(1) Managers/technical personnel to encourage more organizational members to adopt new technologies or for greater utilization of existing technologies to exploit these technologies to its full potential.

(2) Marketers of new technologies, so that they can position their promotional efforts effectively.

(3) For managers to inculcate the sense of innovativeness in their employees because technology exploitation ability is the major thrust to gain competitive position in the industry today.

Therefore, there is a need to understand what takes place in the decision maker's mind while deciding to adopt any new technology. Hence, this study will enhance that understanding.

## 1.2 Problem Statement

In the 21$^{st}$ century, there is a need for organizations to adapt to the rapidly changing environment, which means that organizations have to adopt new upcoming technologies to stay competitive in the market. It means that success of any organization today is largely dependent on their ability and willingness to exploit and adopt new technology in their day-to-day operations. As technology works like a catalyst in gaining competitive advantage over competitors, it is essential for businesses today to adopt new technology. It is important to leverage on technology to achieve profitability and alleviate challenges; hence, it is essential that

organizations understand the importance of new technology adoption. Technologies help organizations become more efficient and effective in achieving their organizational goals and visions.

Managers are beginning to realize this notion that to be successful they have to use new technology to get a competitive edge and they are trying to initiate more and more technology adoption. Despite much investment in technology, returns on technology investment have been minimal. The primary reason behind this dilemma is human factor, that is, operators/users of the technology refuse to wholly adopt the technology to fully utilize the potentials of the technology. This reluctance can be explained in various ways; one of it could be that operators/users of the technology are not usually involved (participate) in its adoption process. This could be one reason why technology implementation fails in any given organization, as employees are reluctant to change.

In a study done by Goodman and Sproull (1990), it has been found that even though some companies adopt technology, they do not really utilize technology to its full potential. They found that sometimes managers just decide that the particular technology must be adopted but once it is adopted they do not really use it – hence, it leads to the wastage of resources. More importantly, companies may be funding the technology, but are unable to reap the full benefit, as employees are doubtful and are reluctant to use a given technology to its full potential. It is therefore important to understand technology adoption at the individual level to enhance the adoption process.

Studies of technology adoption have been quite extensive over the last decade. The theory of reasoned action (TRA) and more recently technology acceptance model (TAM) have been found to be valid for the adoption of various technologies (e.g., Davis, 1989; Davis, 1993; Igbaria, 1993; Igbaria, Schiffman, & Weickowski, 1994; Dishaw & Strong, 1999).

The basic premise of TAM is that it is used to predict user acceptance and use based on perceived usefulness and ease of use. According to Pereira (2002), most of the information technology adoption literature addresses the antecedents of the adoption perception, attitude, behavioral intention, and usage of the technology rather than the mental framework of the adopter. That is, most of these studies done on TAM are technology-centric. It looks at how potential users view the technology. But what actually happens to the individual when making this decision to adopt or not to adopt a particular technology?

The adoption of technology depends on the mental framework of a person who is in charge of making a decision about rejection or acceptance of new technology. A model called the Sensemaking model (Weick, 1995) explains an individual's mental framework. Sensemaking is how an individual uses information regarding any particular thing (in this case, it is the information relating to the technology) available in the environment surrounding him/her to construct mental framework about a given situation or problem. The present study follows a widely used model of technology acceptance, namely the technology acceptance model (TAM) (Davis, 1989) and measures the influence of sensemaking on the three components of this model. Weick (1995) opinioned that there are few researches done on the information technology

variables and sensemaking, but there was no mention of any study conducted with sensmaking and technology adoption as the focus.

Thus, the problems that lead to this research are that organizations are investing heavily in bringing in new technology to enhance their competitiveness and increase their profitability but there is not enough return due to underutilization of these new technologies. It is because the employees are not exploiting the new technology brought in by the management to its full potential, which is leading to the lower returns from underutilizations. Another reason why this research was timely was because there is a lack of research done on this area, in fact while doing the literature review I didn't come across any research, which was done on TAM and SM together.

## 1.3 Objectives of this Study

To promote better understanding--and eventually, prediction, and management--of the technology adoption process, this study set out to achieve the following objectives:

(1)     To investigate the relationship between technology adoption and adopter's mental framework.

(2)     To determine whether the perception about a new technology changes over a period of time under the influence of sensemaking.

(3)     To determine the extent of influence of sensemaking processes on technology adoption model.

## 1.4 Research Questions

In order to achieve the above-mentioned objectives, this study will try to answer the following research questions:

(1) Does perceived ease of use (PEOU), perceived usefulness (PU), and usage behavior change over time?

(2) Do the strength of relationship between the above three construct change over time?

(3) How sensemaking influences perceived usefulness and perceived ease of use?

## 1.4 Significance of the Study

There are few studies done to address the issues of the differences in users and non-users perceived usefulness and perceived ease of use of a given technology. One such study is done by Ramayah, Ma'ruf, Jantan, & Osman (2002), in which it was found that there are significant differences in both the group's perception about a given technology. The present research is initiated to find the reasons "why" these perception differences exist. Sensemaking process will be used to identify why these differences occur and how these processes contribute to the changes in the perception over a period of time.

This study will help managers to identify and manipulate the sensemaking process of an individual to increase the adoption level of any new technology in order to change the employees' reluctance to change and to reduce their uncertainty level about the functionality of a given technology. In addition, it will help to organize the intervention programs whereby managers can make use of sensemaking process to enhance the perception of an individual regarding a given technology. It can be done by providing training, giving employees to try the given technology, having group discussions etc, it will help the employees in constructing a definite mental

framework which in turn will help them make definitive decision about a adoption or rejection of a new technology.

## 1.5 Organization of the Report

This report consists of five chapters. The first chapter introduces the importance of technology in organizations, followed by explaining the research problems, research questions and objectives. The literature review is the second chapter, where the Technology Acceptance Model, Sensemaking Model and some past researches on the two models are discussed. Chapter two also covers the discussion about the theoretical framework and the hypotheses proposed for this study. Chapter three discusses on research methodology and measurement of this study. Discussion on statistical results interpretation is presented in chapter four. Lastly, chapter five concludes the study with overall discussion, implication, suggestions and the limitations of this study.

# Chapter 2

# LITERATURE REVIEW

## 2.1 Introduction

It is very crucial for organizations today to adopt new technology or to accept new technology, new ways of doing work in order to maintain or enhance their competitive position in the industry. Managers or top management must know how and what leads to the acceptance of a given technology and how to enhance the technology adoption in a given organization. This section will shed some light on the issues based on the past researches done on the major components of this study. Hence, this section is divided into four subsections; which are technology and innovation, technology acceptance model (TAM), sensemaking model and its characteristics, applications of sensemaking model, and finally sensemaking & TAM.

## 2.2 Technology and Innovation

According to Hulin and Roznowski (1985), technology is the physical process combined with intellectual or knowledge processes by which materials in some form are transformed into outputs used by another organization or subsystem within the same organization. According to Goodman (1986), technology is a system of components involved in acting on and/or changing an object from one state to another. Berniker (1987) asserted that technology refers to a body of knowledge about the means by which we work in the world, our arts and our methods. Yet another perspective on technology is that technology is knowledge of cause-and-effect relationships embedded in machines and methods (March & Sproull, 1990).

New technologies, such as complex production systems that use computers create unusual problems in sensemaking for managers and operators (Ettlie, 1988; Susman & Chase, 1986). According to Weick (1990), new technologies are equivocal; they require ongoing structuring and sensemaking if they are to be managed. That is, in order to manage a given technology, sensemaking has to be done at each and every step of it its adoption and utilization.

Weick (1990) also mentioned that, in order for a person to adopt new technology, there is always some sort of reasoning and the adequacy of reasoning depends on the adopter's mental framework (i.e., sensemaking). Simple and effective models have been developed for explaining the uptake and success of many information and communication technology tools. Over the last decade, Technology Acceptance Model (TAM) has emerged as the predominant model adopted by researchers to explain the adoption of technology. This study takes this widely used model of technology acceptance (Davis, 1989) and measures the influence of sensemaking on the three components of this model.

## 2.3 Technology Acceptance Model (TAM)

A variety of models that incorporate attitudinal, social, and control factors have been advanced to explain IT usage (e.g., Davis, 1989; Davis, et al., 1989; Mathieson, 1991; Moore & Benbasat, 1991; Thompson, Higgins, & Howell, 1991), of which the Technology Acceptance Model (TAM) (Davis, 1989) is the most well known.

One way of examining the adoption and usage of IT is to use models of planned behavior, one of the most well known of which is Technology Acceptance Model

(TAM) (Davis, 1989). This is an established model of computer usage and has been validated through testing with a number of technologies (Davis, 1989; Davis, 1993; Igbaria, 1993; Igbaria, Schiffman & Weickowski, 1994; Dishaw & Strong, 1999) and cultures (Straub, 1997).

The work of Davis (1989) has been elaborated on by others who have added further variables to the TAM so as to account for a greater amount of the variance in usage. External variables are theorized to influence behavioral intention to use, and actual usage indirectly through their influence on PU and PEOU. PU can be defined as "the degree to which a person believed that using a particular system would enhance his or her productivity", and PEOU as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320).

TAM has been widely used to predict user acceptance and use based on perceived usefulness and ease of use. TAM has been developed under contract with IBM Canada Ltd. in the mid-1980s where it was used to evaluate the market potential for a variety of the then-emerging PC-based applications in the area of multimedia, image processing, and pen-based computing in order to guide investments in new product development (Davis & Venkatesh, 1996).

Many studies using the TAM (e.g., Anandarajan, Simmers, & Igbaria, 2000) have suggested that the theoretical basis for this model lies in the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) and some have noted its links to the diffusion of innovation (Rogers, 1983). That is, TAM can be seen as an extension or parsimonious representation of TRA. The TRA as shown in Figure 2.1 below, is a model of human

behavior that postulates that reasoning flows from beliefs and evaluation of intention to perform the behavior, in turn resulting in its execution.
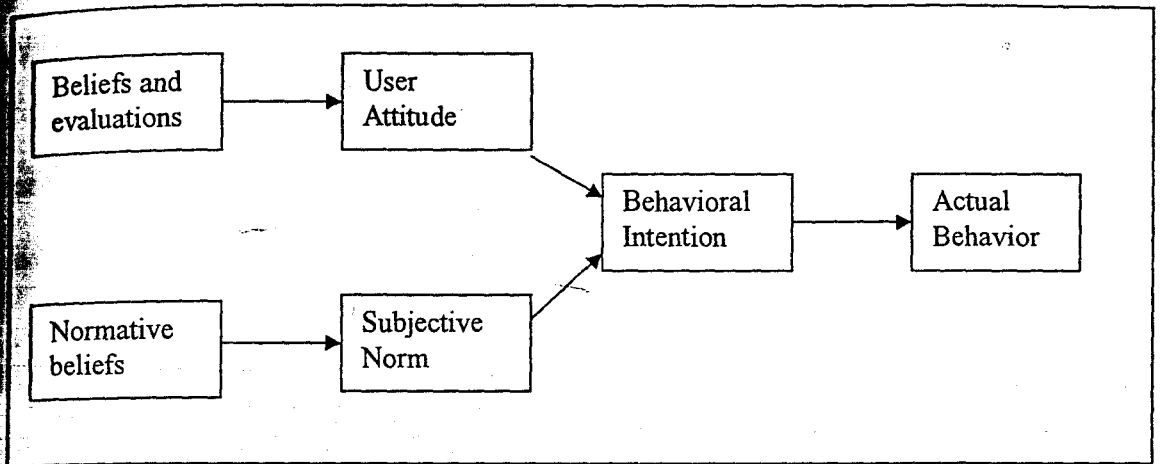


*Figure 2.1:* Theory of Reasoned Action

(Source: Ajzen & Fishbein , 1980).

TAM is usually used for explaining the relationship between usage (both self-reported and anticipated future usage) and perceived usefulness (PU) and perceived ease of use (PEOU). Davis, Bagozzi, and Warshaw (1989) made a comparison between this model and the TRA, in which TAM include an "attitude" element and an "intention" element. Their study found positive relationships between PU and PEU and attitude, between attitude and behavioral intentions and between behavioral intentions and usage. They found that none of the other TAM variables had a significant impact on usage over and above intentions, which suggests that intentions fully mediate the effects of these other variables on usage (Davis et al., 1989). In order to identify a relationship between TAM variables and usage, whether mediated or not, these direct relationships must be tested in the absence of the mediator and shown to be significant.

The original model (Davis, 1989) proposed these variables as being perceived usefulness (PU) and perceived ease of use (PEOU); factors that are captured through a small number of short questions. One goal of such models is to develop diagnostic tools to predict information systems acceptance and facilitate design changes before users experience a system (Davis, 1989). However, empirical tests of these models have generally focused on either systems that were already in use by the study participants, or systems that the participants were familiar with, such as word processing packages and spreadsheets.

TAM has been the most commonly employed model of IT usage, receiving considerable empirical support (e.g., Davis, 1989; Davis, et al., 1989; Mathieson, 1991; Taylor and Todd, 1995). According to TAM, usage behavior (B) is a direct function of behavioral intention (BI). Which is, in turn, a function of: attitude toward usage (A), which reflects feelings of favorableness or unfavorableness toward using the technology, and perceived usefulness (U), which reflects the belief that using the technology will enhance performance. Attitude is determined jointly by perceived usefulness and perceived ease of use (E). Figure 2.2 depicts Davis technology acceptance model.
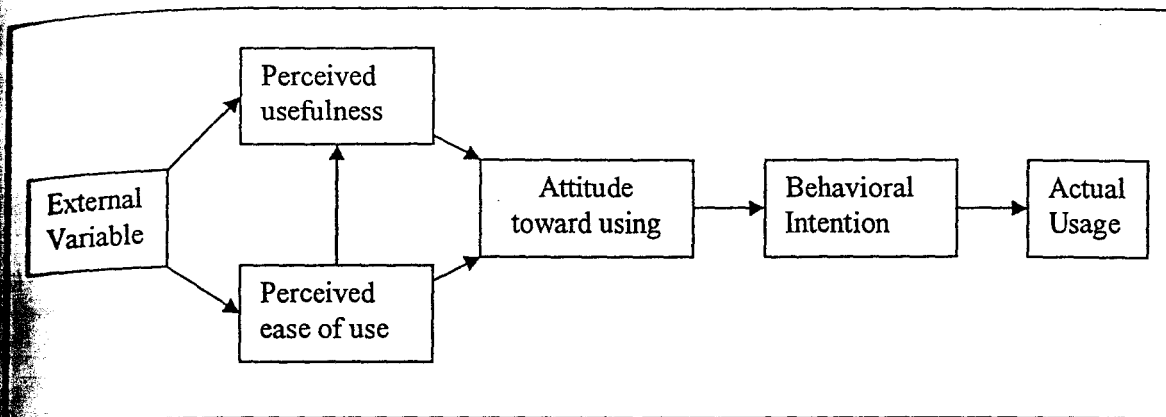
*Figure 2.2:* Technology Acceptance Model

   (Source: Davis, 1989).

Jantan, Ramayah, used the refined TAM model and Chin (2001) to study the various factors influencing personal computer acceptance by small and medium sized companies. TAM was replicated by Basyir (2000) to study the various factors associated with acceptance of Internet shopping behavior. In order to study the factors affecting perceived ease of use, perceived usefulness and the use of Internet, Fok (2001) used TAM incorporated with self-efficacy and its determinants as influencing factors. Wong (2001) extended the refined TAM in order to examine the impact of extrinsic and intrinsic motivational factors in influencing individual's acceptance of Internet job search. In order to find the receptiveness of E-banking by Mlaaysisan consumers, Koay (2002) used TAM model.

Even though TAM has been a strong model to predict the technology usage behavior, it has few constraints as well. According to Venkatesh (2000), TAM is a good predictive model for acceptance but the model does not explain how to promote acceptance. For Mathieson (1991), TAM does not provide sufficient understanding as to how to create or initiate the user acceptance of new systems.

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There are few studies done on how the perception of current users and non-users of a given technology differ in terms of its usage and ease of use (Ramayah et al., 2002). They found that there are significant differences in both group's perception about a given technology.

A study done by Ndubisi, Jantan, and Richardson (2001) on TAM's validity among Malaysian entrepreneurs, found that among entrepreneurs IT usage was influenced directly by perceived usefulness and indirectly (via usefulness) by perceived ease of use.

Though TAM has been researched with a lot of external influencing factors, most of the researches are techno-centric. A study was done by Jackson, Chow and Leitch (1997) to identify whether there is any impact of situational involvement, intrinsic involvement, prior use, argument of change on TAM. They found that there is a direct impact of situational involvement on behavioral intention and they also found that intrinsic involvement plays a significant role in shaping perceptions.

Igbaria, Zinatelli, Cragg, and Cavaye (1997) studied the effect of internal computing support, internal training, management support, external computing support and training on TAM. They found that PEOU is a dominant factor in explaining PU and system use, but PU has strong effect on use. Exogenous variables influence both PEOU and PU.

Chau (1996) tried to find if implementation gap and transitional support have any effect on software acceptance by using TAM model. They concluded that ease of use has the greatest impact on software acceptance.

Yet another study was initiated to find if factors like role of technology, tenure in workforce, level of education, prior similar experience, and training participation influences TAM (Agarwal & Prasad, 1999). They suggested that there is nothing inherent in individual differences that strongly determines acceptance (use) several individual variables like level of education, prior similar experience, training participation has significant influence on TAM.

The present study uses a different approach, that is rather than looking at the technical perspective of TAM this study is analyzing it from a user-centric perspective. To do that sensemaking processes were used to identify whether these processes influence TAM or not and whether these processes changes the strength of relationship between PU, PEOU and usage behavior over time.

## 2.4 Sensemaking Model and its Characteristics

According to Pereira (2002), sensemaking can be defined as the cyclical process of taking action, extracting information from stimuli resulting from that action, and incorporating information and stimuli from that action into the mental frameworks that guide further actions. Glynn (2000) accounts for sensemaking as a conceptual approach to studying the active and intellectual processes that support building a clear representation of information stimuli. Sensemaking is also defined as the process that

involves placing stimuli into some kind of frameworks (Dunbar, 1981; Goleman, 1985).

Sensemaking can be viewed as a recurring cycle comprising of a sequence of events occurring over time. The cycle begins as individuals form unconscious and conscious anticipations and assumptions, which serve as predictions about future events" (Louis, 1980). According to Chun (2001) sensemaking helps in knowledge creation and decision-making. It involves interpreting the raw data of the environment by enactment, selection, and retention of IT-related aspects.

A sensemaking approach to decision-making gives a fresh perspective to technology adoption. Traditionally, most of the research has been focused on TAM model of technology adoption rather than focusing on the adopter itself (Malhotra & Galletta, 1999). A sensemaking approach enriches the technology adoption decision-making, as it focuses on the mental framework of the adopter during the course of deciding whether to accept or reject a given technology.

According to Weick (1995), there are seven distinguishing characteristics that set sensemaking apart from other explanatory processes such as understanding, interpretations, and attribution. Weick further said that sensemaking is understood as a process that is:

(1) *Grounded in identity construction.* Sensemaking is grounded in identity construction, meaning that individuals learn by acting and reflecting upon their actions and actions of others.

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*(2) Retrospective.* Sensemaking is retrospective because people usually make sense of the events that has already occurred in the past rather than making sense of the things that are happening presently.

*(3) Enactive of sensible environments.* Sensemaking is enactive of sensible environments because people try to participate in evolution of their environment and make sense of environmental events that resulted in part of their participation. According to Chun (2001), enactment is when people actively construct the environments, which they attend to by bracketing, rearranging, and labeling portions of the experience, thereby converting raw data from the environment into equivocal data to be interpreted.

*(4) Social.* Sensemaking is social because in order to make sense people take into consideration words and actions of others, and produce sensible action and discussion that contribute to the sensemaking of others. That is, sensemaking is not possible in isolation.

*(5) Ongoing.* Sensemaking is an ongoing process as it is cyclical in nature. During decision-making, a person acts, makes sense of her actions, and then acts again, guided by the sense that she has already made.

*(6) Cue Extraction.* Cue extraction is the process of recognizing or identifying the stimuli that are prominent and useful for mentally representing stimuli. Those cues are extracted from the environment, which are simple, familiar structures

that initial perspective from which people develop a larger sense of what maybe occurring.

(7) *Driven by plausibility rather than accuracy.* Sensemaking is about plausibility, coherence, and reasonableness. Sensemaking is about accounts that are socially acceptable and credible. The things that are observed should be accurate and should be suitable to sensemaker's needs.

For the present study only three processes of sensemaking, those are cue extraction, social influence and retrospective behavior, would be measured as independent variables because identity construction, plausibility and enactment come under the umbrella of cue extraction and as the objective of this study is to find whether sensemaking has influence over time on TAM, ongoing element of sensemaking process is being taken in consideration.

## 2.5 Applications of Sensemaking Model

Sensemaking has been of interest to many researchers and there have been many researches done on this and with several different approaches. Drazin, Glynn, and Kazanjian (1999) studied multilevel theorizing about creativity in organizations from a sensemaking perspective, and they tried to find how sensemaking is built and its influence on multilevel model of creativity. They found that individuals may influence and, in turn, be influenced by cross-level effects derived from sensemaking frames. A similar finding was derived from the study done on issues of level in organizational research (Rousseau, 1985).

Ford and Gioia (2000) studied the factors that influence creativity of the manager's decision. They asserted that the novelty and the value of choice have a direct influence on manager's decisions creativity.

Porac, Thomas, and Baden-Fuller (1989) examined the influence of mental models (sensemaking) on organizational strategies, which determines the perception of competition and responses to competitive conditions in the environment. The research conducted at Scottish Knitwear Manufacturer, found that mental models and strategy choices of key decision makers are entwined to create a stable set of strategy to deal with competitive conditions. Russell, Stefik, Pirolli, and Card (1993) proposed that sensemaking is about finding a representation that organizes information to reduce the cost of an operation in an information task.

Lundberg (2000) investigated the processes of reasoning and problem solving in market-related situations that are not transparent, the study mainly focused on the processes involved in making sense. It was found that by making sense and going through all the processes of sensemaking on-line generation of explanations, decision makers can begin to understand, and possibly re-evaluate on-line and creative economic decision-making.

According to Lundberg (2000), when making decisions at workplace all the managers go through the process of plausibility, that is in order to make decision having accurate information is less important than having some information. That is, if there were some information available it would enhance the decision making for the acceptance or rejection of a new technology.

To cope with uncertainties and ambiguities in starting a new business, the entrepreneur must develop a "vision" or mental model of how the environment works (sensemaking) and then be able to communicate to others and gain their support (Hill & Levenhagen, 1995). They asserted from their findings that metaphors are useful in coping with large amount of data and that metaphors offer flexible framework for understanding and interpretation of information. Weick (1979) also proposed that the best means of coping with equivocality is the use of equivocality.

In a study done by Goodman, Sproull and Associates (1990) on Individual's model of technology, it was found that individual's model of technology is composed of different types of schemata (events, objects, etc.) and over time these schema would reflect cognitive, affective, and evaluative orientations. That is, initially individual will gather some basic knowledge structure about the technology. Over time his or her direct experience with technology would lead to positive and/or negative reinforcement. Also, other (social circle) people's experiences would also shape person's affective orientation about a given technology.

According to Goodman, Griffth, and Fenner (1990), five critical processes shapes the relationship between individual and technology. These processes are not directly related to any given technology but are general in nature and affect the relationship between technology and individual. The five processes are socialization, commitment, reward allocation, sensing and redesigning, and diffusion.

Goodman et al. (1990) further said that these processes explain the development of individual's technology model, how changes occur in individual's behavior with respect to the technology, and how it evolves over time.

## 2.6 Sensemaking and TAM

The researcher could not find any direct study relating TAM and sensemaking, however some studies that have indirect relation between TAM and sensemaking are discussed below.

Description of conditions for sensemaking at organizations can be referred as uncertainty or ambiguity. It comes from the "imprecision in estimates of future consequences conditional on present actions" (March, 1994). That is, the uncertainty in any event, in our case it is technology adoption, initiates the process of sensemaking and through this process only an individual can reduce the uncertainty level and be able to make a more definitive decision. Hence, when making decisions about the technology adoption individuals go through the process of uncertainty reduction through sensemaking activities.

In a study by Stinchcombe (1990) on "oil drilling technology", he argued that uncertainty changes over the course of time. That is, as people start the sensemaking activities—collecting information, discussing with peers—uncertainty levels changes and this leads to a more definitive perception about the technology. Hence, from here it can be deduced that to reduce the certainty people undertake sensemaking activities, which help them construct a more definite – positive or negative—perception about a given technology, thus it changes over time.

According to Milliken (1987) individual can confront uncertainty in three places. One when people lack understanding of how components of the environment are changing, or uncertainty of the response options that are open to them, or uncertainty about the impact of environmental changes on the organization. Hence, when an individual faces the uncertainty in technology adoption options, he or she start to collect information through sensemaking to construct a more definite perception about it.

A study done by Ramayah et al. (2002) on PU and PEOU of a given technology by an individual found that there are significant differences in both group's perception about internet banking. They found that users are more definitive about the information related to Internet banking and it is reflected in the stronger relationship between PU, PEOU and Usage behavior. From here it can be concluded that direct experience (retrospective component of sensemaking) with Internet banking or past technology adoption experience influences the PU, PEOU and usage behavior. Also, as a person will gain more experience with Internet banking over time, his/her usage behavior will be changed as well. From the above-mentioned study, it can also explain that users of a given technology have more definitive beliefs about the technology.

Ndubisi, Jantan and Richardson (2001) studied TAM's validity among Malaysian entrepreneurs and they found that entrepreneur's IT usage was influenced directly by perceived usefulness and indirectly (via usefulness) by perceived ease of use. Few perception drivers were used in this study to measure how perception regarding a given technology is formed. Drivers in this study were prior experience, data intensity, staff support, training, technical support and external influence/pressure. All these drivers influenced PU & PEOU directly or indirectly and later PU & PEOU