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Technology Acceptance Models (TAM) and its Modalities Across the Sectors: An Analysis of Intrinsicality of Variables in the Model

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Abstract

The current revolution that has propelled anthropological progress is digitization. This new phenomenon altered our lives and catapulted humanity into the Digital Age. Today, we observe every aspect of life, from wake-up calls from digital alarm clocks to dialing phone calls and even monitoring blood pressure with digital sphygmomanometers. The current evolution of mankind is the product of and heavily impacted by the digital transition. Walking across the lines, the last two decades have seen a flood of progress in digital technologies. The invention of the personal computer in the early 1970s paved the path to flood new technologies into existence. The pace with which digitalization has overtaken the world is phenomenal. In this scenario, many researchers have developed their studies to evaluate and test the implementation and influence of these technologies both from the perspective of adoption to leveraging of technologies across the sectors. As a result of this, the present literature on Technology acceptance has witnessed models Like Motivational theories from the 1940s to social studies addressing behavioural changes towards Technology adoption. Among them are the significant models developed by renowned researchers like Davis, Fishbein, Ajzen Bandura etc. have developed theories like Social learning, social cognitive theory, Theory of Planned behaviour and Technology Acceptance models (TAM1 to TAM3) and extension to amalgamate extraneous, endogenous variables and their mediating and moderating effect. Hence, the present study is an attempt which focuses on the exploration of different variables developed and studied under each model across the sectors and their intrinsicality and modality to the scenario of its applicability are examined.

Keywords: TAM, Reasoned Behaviour, Planned Behaviour Theory, Social Cognitive Theory

1. Introduction

The Technology Acceptance Model (TAM) addresses a critical need to understand the factors influencing individuals' acceptance and adoption of new technologies. In an era characterized by rapid technological advancements, the success of innovations hinges on user acceptance. TAM, developed in 1986 by Fred Davis and expanded later, provides a structured framework to analyse users' attitudes and behaviours towards technology adoption. The model centres around two key factors: Perceived Ease of Use (PEOU) and Perceived Usefulness (PU), both of which directly impact users' intention to use technology. The Technology Acceptance Model (TAM) provides a lens through which we can unravel the intricate tapestry of user behaviour when adopting new technologies. Comprising several variables, TAM encapsulates a holistic view of the broader nature of user acceptance, shedding light on the psychological and practical aspects that govern technology adoption. Recognizing the psychological and social dimensions of technology acceptance, TAM has become instrumental in predicting user behaviour across diverse technological contexts.

TAM's utility extends to various domains, including business, education, and healthcare, aiding researchers, businesses, and policymakers in designing effective strategies for technology implementation. By elucidating the cognitive processes underlying user decision-making, TAM facilitates the identification of barriers and drivers of acceptance, enabling stakeholders to refine technology designs and interventions. In essence, the TAM model, with its variables, unfurls a comprehensive panorama of user acceptance by encapsulating the broader nature of perceptions, attitudes, and intentions. Understanding these elements holistically is paramount for developers and researchers navigating the complex terrain of technology integration into our daily lives. TAM addresses a fundamental need for insights into user perspectives, fostering more successful and user-friendly technology implementations in an ever-evolving digital landscape. This book chapter is an attempt to explore different models and their genesis from behavioural

studies.

2. Methodology

2.1 Research Design and Approach

The study employed an exploratory research design to examine and aggregate many models of Technology Acceptance from various historical periods. In order to compile many models and their essential components for evaluating the models in various fields of study, a thorough literature review is done. Also, a deductive method was used in the study to conclude the different models and the internal factor components of each model.

2.2 Source and Type of Data

The study is qualitative in nature because its primary goal is to extract several models and see how they have evolved historically. The data is secondary in nature only and is taken from many books, research papers, and articles.

2.3 Objectives of the Study

The following were the main goals in writing this perceptive and educational piece about TAM model development:

• To present an outline of TAM's history, stressing its founding, expansion, and key personalities.

• Dissect the TAM, highlighting key concepts and explaining how these aspects impact consumers' decisions to adopt or reject a technology.

• Show how academics have adapted and customized the paradigm to fit into various academic areas.

• Evaluate TAM's present applicability and address its limitations and objections.

• This article's main body covers the aforementioned goals and ends with some possible directions for further investigation.

3. Theories Related to Diffusion of Innovation and Technology Acceptance Models

This article mainly focuses on different theories and models related to Innovations in Information and Technology. The theories discussed below are extracted from Marketing Theories related to the areas of Consumer Behavioural Studies and psychological and Social Behavioural Models and their relevance and application in Technology Acceptance Models (TAM). The other Technological Acceptance models are compiled based on the recent contributions made in the literature; these are empirical studies that explored and investigated various factors influencing Customer behaviour in decision-making and tested levels of influence and persuasion of Consumer Behaviour while accepting Technology.

The following is the chronological order of epistemology of how TAM genealogy has evolved over a while from Different Models of Behavioural Studies like Psychological and Social Studies:

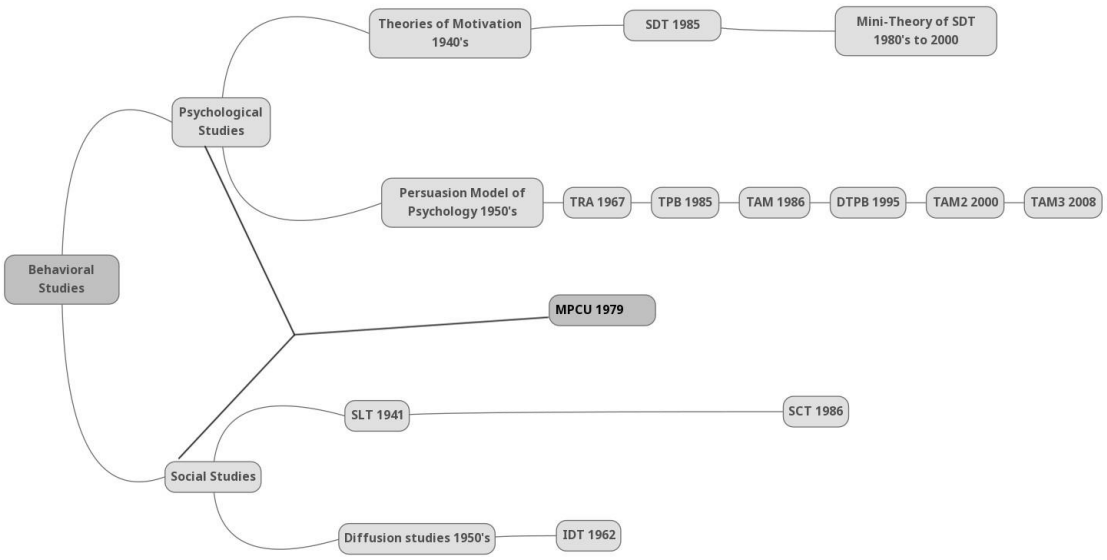

Figure1

The map above picturises the evolution of the technology Acceptance Model over a while and various aspects that amalgamated or incorporated into the model from the Behavioural Studies.

3.1 Theory of Social Learning

The theory proposed by Bandura had its importance in observing and modelling behaviour, attitudes and individual emotional reactions, termed Social Learning theory. Bandura (1977) States: "Learning would be remarkably laborious, not to mention perilous, if people had to trust merely on the effects of their actions to inform them what to do [1]. Fortunately, it is obvious that most human behaviour is learned through observation through Modelling: through observation, only one forms the idea of How a new behaviour can be performed, and in later instances, this coded information serves as a guide for action." This theory elucidates

human behaviour through continuous reciprocal interaction between behavioural, cognitive, and environmental influences. The component processes underlying observational Learning are:

• Attention and Modelling events like Affective Valance, prevalence, distinctiveness complexity and functional values are part of modelled events, and observer characteristics include perceptual set, past reinforcement, sensory capacities, arousal level,

• Retention includes symbolic coding, cognitive organization, and motor rehearsal.

• Motor Reproduction, including physical capabilities, self-observation of reproduction, accuracy of feedback, and

• Motivation, including external, vicarious and self-reinforcement.

3.2 Theory of Self-Determination

The theory of Self-determination had its initial development in the early 1970s when lab and field research combined to develop this model. However, this theory's central concept of the soul was developed in the 1980s. It was Deci & Ryan (1985) who proposed this model based on three essential psychological needs [2]. These needs play a vital in motivating an individual. The needs are categorized as Autonomy, which deals with the sense of control over the lives of an individual. The second need is Relatedness, where individuals connect with others and experience a sense of belongingness. The third is competence, where the individual feels he or she is capable of interacting with the world.

This theory argues that the level of Motivation can be shaped based on these factors. It depends upon the level of satisfaction an individual arrives with fulfilling these needs. This model also developed a scale based on two factors, namely 'Intrinsic', the controlled factors, and 'Extrinsic', which are autonomous. Intrinsic factors influence or motivate individuals out of their interest. It is the Motivation where an individual has greater interest towards the task or likes the work he has to accomplish. On the other hand, the extrinsic factors drive or force the individual to be motivated to complete the given task. These external factors influence the Individual's behaviour towards specific Motivation. Factors like rewards for employees or punishment for not meeting certain expectations in the workplace are some of the better examples of extrinsic Motivation. This theory is very complex as it gets into the roots of elements in the model. Six sub-theories had their essential roots based on the three needs on which the present theory is postulated. The theory of Cognitive Evaluation (CET) was developed by Deci Ryan (1985) and deals with intrinsic Motivation [2]. The other theory is the Organism integration theory (OIT), which was also developed by Deci and Ryan (1985) [2]. It deals with Extrinsic factors that influence individual Behaviour or Motivate to perform specific Behaviour.

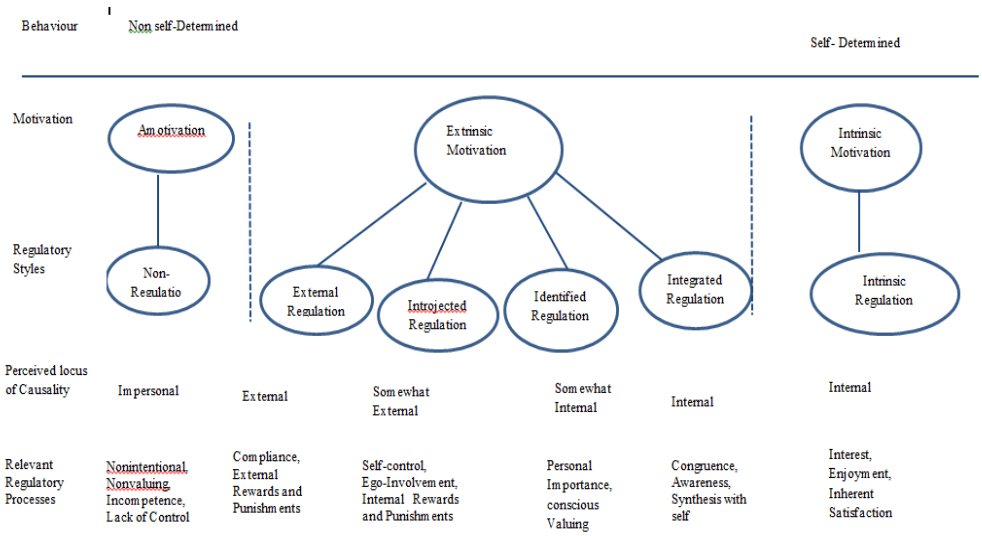

Figure 2

Source: Ryan & Deci, 2000b, p. 72 [3].

SDT has made a great deal of contributions to psychology, yet the theory is not without flaws. One drawback of the idea is that it ignores the social and cultural determinants of behaviour and motivation. Furthermore, the idea has come under fire for overemphasizing individualistic cultures while downplaying the influence of collectivist cultures on behaviour and motivation.

3.3 Theory of Diffusion of an Innovation

This theory mainly focuses on how innovation has its diversity by examining four main factors: time, communication channels, innovation and social systems that spread a new Idea. This theory offers both a theoretical foundation and organizational and individual application levels in adopting an innovation worldwide. This model has three key components: the character of

an 'Innovation', the adopter's characteristics and the innovation-decision process. This theory integrates all these three components. Further elaborating, the first component of innovation decision has five steps: knowledge, confirmation, decision, persuasion and implementation. These steps take place over some time with a series of communications among the member groups and in the social system. The second element is the characteristics of an Innovation, which has five constructs. They are relative advantage, trialability, complexity, compatibility and observability. These factors play an influential role in the acceptance of any innovation. The third element is the adopter's characteristics, which are again classified into five Categories. They are innovators who were the first to experiment with innovation in the market, fuelled by early adopters, early majority, late majority, and laggards [4]. This model focuses on system characteristics, organizational attributes, and environment and could be more practical in predicting outcomes than other technology acceptance models.

The Diffusion of Innovation Theory has several flaws. Adopter categories and other supporting data for this hypothesis were not expressly constructed with the adoption of new habits or health breakthroughs in mind, and the majority of the evidence did not come from the area of public health. It discourages the use of a participatory approach to public health programs. Adopting habits is more successful than preventing or stopping them. It ignores a person's ability to adopt new behavior (or innovation) or their social support network. Many industries, including marketing, social work, criminal justice, agriculture, public health, and communication, have effectively used this method. Diffusion of Innovation Theory is used in public health to accelerate the adoption of major public health efforts, the majority of which aim to change social system behavior. For example, according to the Diffusion of Innovation Theory, an intervention is developed to address a public health concern and then promoted to members of a social system with the goal of adoption. Knowing the target population and what determines their adoption rate is critical to the success of a public health initiative.

3.4 The Social Cognitive Theory

This model is motivated by social psychology theory. It is proposed based on critical components like environment, personal behaviour, and behaviour. These factors are integrated bi-directionally to predict individual and group behaviour. This theory can also identify and test the methods that change or modify behaviours [5]. In this model, behavioural factors include performance, adoption and usage issues. However, there are individual factors that concern an individual's personality, cognition and demographic aspects. In contrast, environmental factors like physical and social elements exist, which are considered external factors for the individual. The SCT model is a triadic, inseparable structure that constantly influences each other. This model evaluates the Usage of Information Technology by considering other constructs like self-efficacy, outcome expectations, anxiety performance, etc.

One limitation of the hypothesis is that not all social learning is observable. As such, quantifying the impact of social cognition on development can be challenging. Lastly, this theory tends to overlook lifelong maturation.

3.5 PC Utilization Model

MPCU model forecasts individual acceptance and PC utilization from an information system perspective. It measures and assesses the actual behaviour of personal computer usage. This model excludes behavioural Intention and habits of the Individual as they have a repetitious relationship with the existing level of PC utilization. This model analyses the direct influence of facilitating conditions, perceived consequences, social influence, long-term consequences, Job fit and complexity of behaviour. The theory suggests that factors like long-term consequences, social influence, complexity, and job fit strongly influence an individual's PC utilization. The other factors, like facilitating conditions and effect, have no significant influence. However, the habits of the individuals and behavioural intentions are vital factors, but the present theory has yet to be considered in the model framework of MPCU [6].

3.6 Theory of Reasoned Action

This Model has its roots in the field of Social Psychology. In 1975, Fishbein and Ajzen developed this theory by forming a link between attitude, beliefs, norms, intentions, and individual behaviour. This theory demonstrates that an individual's behaviour can result from his/her behavioural intentions to accomplish it. The Intention is determined by a person's attitude and social norms towards the behaviour. According to Fishbein and Ajen (1975, p..302 subjective norms can be defined as "the element in which a person perceives how people, who are important to him, think that he or she should or should not exhibit certain behaviour" [7]. The Equations below summarise the TRA theory in a shell:

Behavioural Intention = Attitude + Subjective Norms

The TRA is a most fundamental theory which influences human Behaviour [8]. This model is employed to test a wide range of behavioural studies. In general, whether to accept or reject any technology depends upon the intention based on a set of trade-offs comprising systems' perceived benefits and the complexity of learning or using the technology. This concept of phenomena is explained in the TRA. In a simple sense, the theory of reasoned action suggests that attitude is influenced by individual beliefs and creating intentions that drive behaviour [9].

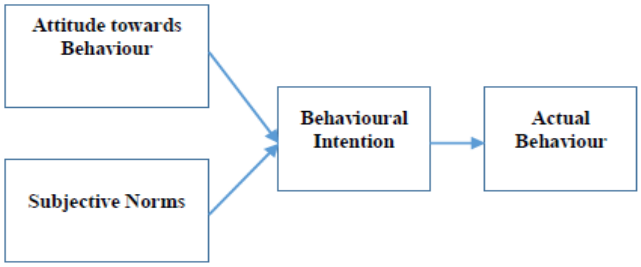

Figure 3
source: TRA [10,11]

According to Kurland (1995), TRA deals with individual conscious intended behaviour, which links to behavioural Intention resulting in the actual behaviour of the Individual [12]. The individual attitude that determines behavioural Intention is coupled with attitude toward behaviour and subjective norms.

According to this theory, a person's attitude towards a particular behaviour results from his or her beliefs on the consequences of outcome behaviour multiplied by his or her evaluation of the consequences. Beliefs are defined as the subjective probability of the individual that performs certain behaviours to produce desired results. Therefore, this theory suggests a model where an individual's attitudes can be influenced by external stimuli to modify the person's belief structure. The subjective norms also determine the behavioural intentions, while the latter is determined by Normative beliefs and Motivation to comply.

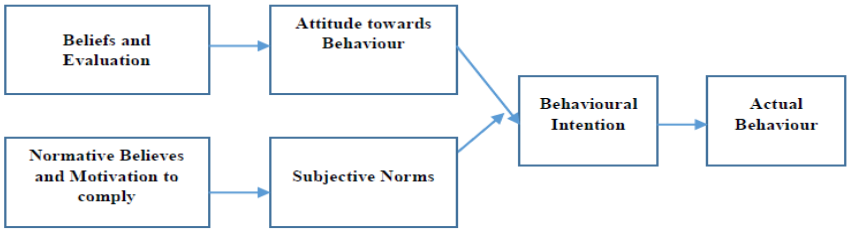

Figure 4
Source: TRA [13].

This theory states that all additional factors will indirectly influence behaviour by influencing the attitude or Subjective Norms. All those factors which have an indirect effect are referred to as external Variables [7]. Some of the examples of these variables include the characteristics of the Tasks, the type of development implementation, interference of the users, political influence, and organizational structure. According to this theory, when analysed, Meta-analysis on the application of this model has shown that the model can produce reasonable predictions of choice made by the Individual when facing different alternatives [14].

There are certain restrictions on the idea of reasoned action. A notable danger of confusion between attitudes and norms is one of these. This occurs as a result of the ease with which norms and attitudes may be reframed. Someone who believes that kale is healthy, for instance, could just be mirroring the subjective norm of a select set of powerful friends, relatives, medical professionals, and social media influencers who also think kale is healthy.

There are also real-world limitations to the theory of planned behaviour, such as the time and resources required by researchers to precisely measure the variables that go into the theoretical models, as well as organizational or environmental restrictions and ingrained habits that restrict an individual's freedom of action [15].

Since attitudes can frequently be reframed as norms and vice versa, there is a high possibility of confusion between attitudes and norms, which is one of the model's drawbacks. The notion that someone will be unrestricted in their ability to act once they decide to do so constitutes a second limitation.

3.7 Theory of Planned Behaviour

The Theory of Planned Behaviour is an extension of the Theory of reasoned action developed by Ajzen [16]. This theory explains the limitations of the previous model in which people's behaviours had little control. Therefore, the third element is added to the existing model; Ajzen opined that an influence exists on a person's Intention to perform a behaviour, which is termed Perceived Behavioural Control. Perceived behavioural control is referred to as readily available resources, opportunities, and skills as well as the person's own perception towards achieving the results. This concept is very close to the self–efficacy concept proposed by Bandura [17]. The latter concept deals with an individual's belief concerning his self-efficacy that can influence the choice of activity. Therefore, it can

be noticed that any two individuals who have strong intentions to learn and intend to master a new language, the one who thinks that he will succeed is the one who will tend to show more perseverance than the other who doubts in his capacities [16].

Considering the previous theory (TRA) considerations, Ajzen's model uses three variables, i.e., Attitude, Subjective Norms and Perceived Behavioural Control, to explain the direct influence of the factors on behavioural Intention. In turn, the behavioural Intention will influence the Behaviour.

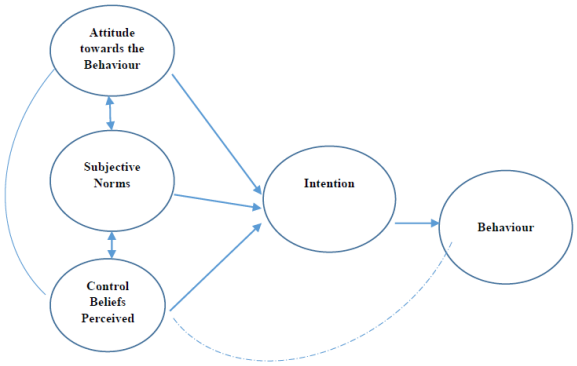

Figure 5
Source: Theory of Planned Behaviour.

3.8 Decomposed Theory of Planned Behaviour (DTPB)

Taylor and Todd (1995) researched the theory of planned action concerning new Technologies. They have used existing literature to identify the antecedents of variables considered in TPB, i.e., subjective norms, attitudes and perceived Control. It was found from the study that factors that determine attitude are PEU, perceived utility and compatibility. Regarding the subjective norms, the influence of peers and superiors had the greatest impact. It is also noted that self-efficacy and favourable conditions such as technology and available resources are regarded as factors determining perceived behavioural control. Decomposed Theory of Planned Behaviour (DTPB) is an extension of the Theory of Planned Behaviour (TPB) by decomposing attitudes towards Behaviour, subjective norms and perceived behaviour control into a multi-dimensional belief construct was prepared within the context of technology adoption by Taylor and Todd in their studies [18]. The DTPB is an enhancement of TRA and an expanded model of TPB. It includes factors from Innovation Theory of Diffusion (ITD) like Relative advantage, Complexity and compatibility. In order to make some effect on factor perceived behavioural control, the relative advantage and compatibility were joined together. According to Taylor and Todd, TRA and TPB are perfect models for predicting behaviour, while DTPB has been demonstrated to explain the behavioural aspect effectively [19].

In another study by Taylor and Todd, have compared TPB and DTPB with the Technology Acceptance Model (TAM) to extract the practical application of DTPB in the Usage of Technology [20]. The factors from TAM and ITD were joined to get a new form of DTPB. Combining these models' complexity from ITD and ease of use from TAM are exchanged to get a new form. Also, the relative advantage of ITD is exchanged with Perceived usefulness from TAM.

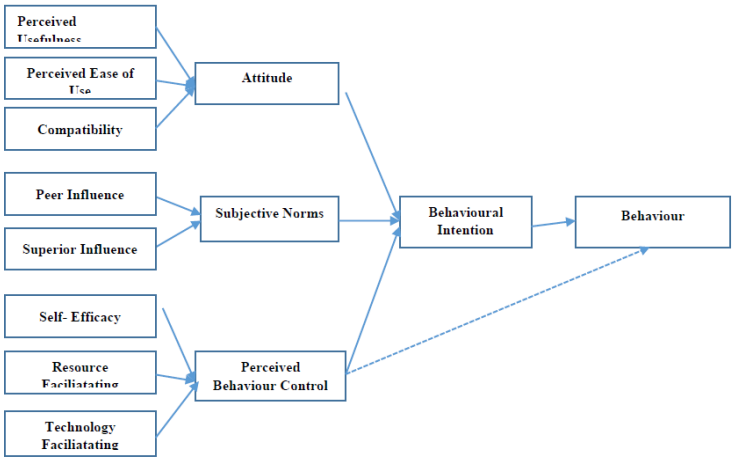

Figure 6
Source: DTPB Model from Taylor and Todd, 1995.

Regardless of the goal, it assumes that the individual has secured the opportunities and resources required to carry out the desired behavior. It does not account for additional factors like as fear, danger, mood, or past experience, which impact behavioral intention and motivation.

Although normative variables are included, environmental or economic factors that may influence an individual's intention to engage in a behavior are often disregarded. It ignores the notion that behavior may change over time, instead assuming that it is the result of a linear decision-making process. Although it was an important addition to the theory, the notion of perceived behavioral control provides no information about real behavioral control. The hypothesis makes no mention of the period between "intent" and "behavioral action".

The TPB is still limited by its incapacity to take economic and environmental factors into account. Compared to the Health Belief Model, it has demonstrated greater utility in the field of public health. In order to create a more comprehensive model, researchers have added elements from behavioural theory to some of the TPB's constructs during the past few years. This is a reaction to some of the TPB's shortcomings in tackling issues related to public health.

3.9 Technology Acceptance Model (TAM)

The theory of the Technology Acceptance Model is developed by Davis (1986) Based on the theory of Reasoned action (TRA) [21]. This model deals explicitly with predicting how an Individual accepts the Information system. The main aim of this theory is to predict the acceptability of a tool and to identify modifications needed to bring to the system to make it acceptable to the users. This Model suggests two main factors that determine the acceptability of an information system, i.e. PU and PEU.

Perceived usefulness is defined as the degree to which an individual believes that the use of a new system or tool will improve his performance. Perceived ease of use explains the degree to which a person believes that using a new system or tool is effortless and makes it easy to complete the task. Several studies conducted considering factorial analyses and found that PU and PEU are two different dimensional factors to be determined to demonstrate individual acceptance of the Technology system [22-24].

The TAM model, according to the theory of Reasoned Action, postulates that behavioral Intention determines the use of the information system; however, behavioral Intention is determined by the person's attitude toward the use of the information system and perception of its Utility. According to Davis, a person's attitude is not only the driving force behind his usage of the system, but it also influences the system's performance. As a result, even if an employee is resistant to accept the information system, the likelihood that he will utilize it is high if his perceptions convince him that the new system would increase his job performance. The TAM model assumes a direct link between PU and PEU. When an individual finds two systems having the same features, the user will find the more useful one which is easier to use [25].

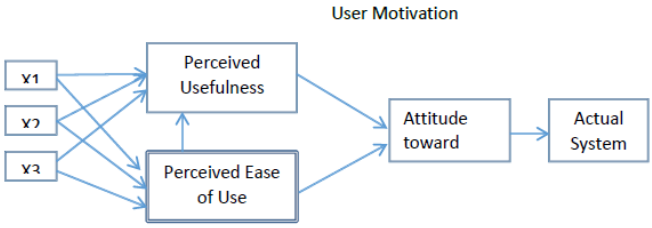

Figure 7
Source: Original Technology Acceptance Model [26].

According to Davis (1986) attitude of the individual will be influenced significantly by Perceived Ease of Use through two main mechanisms: Self-efficacy and Instrumentality. The concept of self-efficacy was developed by Bandura (1982) explains that if the system is easier the greater will be the user's sense of efficacy [17]. However, if the tool is easy to use, that will make the user feel that he will be using TAM at greater level [27]. As per Bandura (1982) and Lepper (1985) efficacy is one of the key component factors underlying inherent Motivation, which illustrates the direct link between PEU and attitude. The PEU play an instrumental role in improving individual performance. Due to his fact, the user will have to deploy minimal efforts with a tool that is easy to use, and he will be able to spare several efforts to accomplish other tasks [26].

However, in one of the researches presented by Davis (1989) I found an exciting fact while evaluating the model and demonstrating that there exists a link between the Intention to use an information system and PU, which is stronger than the PEU [13]. According to this model, the factor that influences the most is the perceived usefulness of a tool to the user. TAM model replaced TRA's attitude toward behaviour with two other variables, PEU and Perceived usefulness. Tam did not consider the Subjective norms discussed in the TRA structure. This model was developed after the introduction of information technology in the organization. Whereas TRA and TPB has its roots in the field of psychology, so this model is considered to be less general than TRA and TPB model.

Over time, it has been found that the development of TAM has

three phases: adoption, validation, and extension. In the first adoption phase, it was tested and adopted by many information systems applications in their studies. In the second validation phase, the researchers analysed whether TAM accurately measures user acceptance behaviour in different technologies. In the third phase, researchers used the TAM construct by introducing more variables to the construct to find the relationship.

Over the years, certain restrictions have been considered in relation to TAM and its expansions. Previous studies criticized TAM for being too simple and for not recognizing the factors that precede technology adoption, such as perceived utility and ease of use [28,29]. A number of scholars were motivated by the original Technology Acceptance Model's parsimony to identify and assess the predictive power of additional constructs that could be incorporated into the model. These included trusts, technology fit, external variables (like social influence and subjective norms), and technology-specific variables (like compatibility and relevance) [30-34].

3.10 Extended Technology Acceptance Model (TAM2)

Venkatesh and Davis developed a technology acceptance model -2 (TAM-2) considering the existing TAM construct. It is an extended model to the TAM by considering the perceived Usefulness the TAM -2 is developed. This model includes Social Norms and treats them as causal antecedents for perceived usefulness. It is a predictor for Intention's detriment to use a technology System. The extended TAM-2 uses two other social forces apart from Social Norms like Image and Voluntariness, which influence Individual PU and behavioural Intention.

The TAM-2 also proposes a Cognitive process that considers job relevance, output quality, and PEU and results in demonstrability that influences PU. This model excludes the attitude towards using, which was considered an antecedent in finding behavioural Intention in TAM [35]. Unlike the Initial TAM Model, Venkatesh and Davis have taken Social Norms in their model as an additional construct, adopting the TRA and the PB models in their Study. subjective norms are considered to be Norms directly related to the perceived usefulness, and Intention to use. The relationship is moderate to use and moderated by user experience and with perceived usefulness.

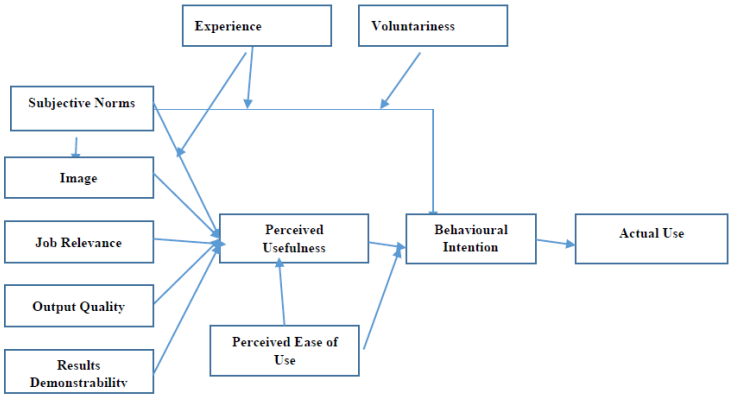

Figure 8
Source: Technology Acceptance Model-2

In the above process, the Social norm is explained as "it is a perception of the Individual where people whom he considers to be important or play a crucial role in his life think that he should or should not perform an intended behaviour" [7]. Venkatesh and Davis (2000) have established a link between social norms and Behavioural Intention. This act is the deliberation of fact that even if a person is not willing to project a behaviour, he may perform it because of his or her close associates' belief in performing a specific behaviour. The researchers also established a link between subjective norms and PU to provide internalization [36]. Internalization refers to a person's organization insisting he or she use the system or incorporate as directed by persons he or she feels important in the organization.

The second important factor is Voluntariness, which means that an adoption is not a mandatory and people consider it to be decision is off people's choice in adopting it. The concept of Voluntariness acts moderately in establishing the link beta, which is based only on Intention and subjective norms. *Hartwick &Barki (1994)* Their research found that if the system is made mandatory, a significant relationship exists between behavioural Intention and social norms compared with Non-mandatory or voluntary norms [37]. The studies also found that if the organization insists on making the use of technology mandatory by superiors heavily and gives the choice of voluntariness, conversely, the establishment or behavioural intention to adopt technology is determined to be firm with persons' attitude like Perceived ease of use and Perceived usefulness and Social Norms.

The Model also uses the system's experience as a moderator to link the PU, Social Norms and behavioural Intention. Venkatesh and Davis also opined that the relationship between PU, SN, and

behavioural intentions will weaken over time. Initially, people take the opinions of others to get primary evaluations and form beliefs towards a system. However, when they gain experience, they establish their belief based on the system's strengths and weaknesses. TAM- 2 model considers four factors to frame cognitive instrumentality to determine PU and PEU in the model construct. Image, job relevance, output quality and result Demonstrations are part of the construct to make theoretical work more rational in the cognitive process. TAM-2 draws its cognitive process model based on action theory (*Fishbein& Ajzen, 1975*, theory of expectancy by Vrooms (1964), behavioural decision theory of Beach & Mitchell (1996) [38,39]. The most common line among the three theories under the framework is a person's belief or mental representation that results in achieving their high Goals. TAM 2 postulates that the factors in the construct of Voluntariness, experience, subjective norms, image, job relevance, output quality and Results Demonstration will influence PUE, PU, which reflects on the behavioural Intention to adopt a Technology in the system.

3.11 Unified Theory of Acceptance and Use of Technology (UTAUT)

A unified theory of acceptance and use of Technology (UTAUT) is a model developed based on the Technology Acceptance Model (TAM), the theory of planned Behaviour (TPB), the Motivational Model (MM), the Model of PC Utilization, the Innovation Diffusion Theory and Cognitive Theory as unified view. This Theory is developed by Venkatesh, Morris and Davis in the Year 2003 [40]. The UTAUT deploys four factors as key constructs. They are performance expectancy, social influence, effort expectancy and facilitating conditions. These four factors influence the individual's behavioural Intention to use technology. It also projects that Behavioural Intention to use Technology is being influenced by Social Influence, effort expectancy and performance expectancy, whereas facilitating conditions and behavioural Intention determines Technology use [41].

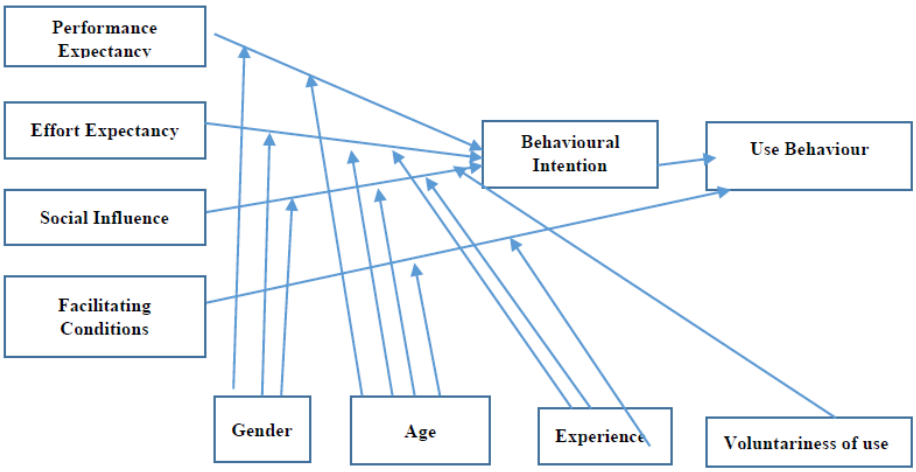

Figure 9
Source: Unified Theory of Acceptance and Use of Technology (UTAUT)

A comprehensive method for assessing technology acceptance and usage is the Unified Theory of Acceptance and usage of Technology [42,43]. Even yet, there are theoretical and methodological issues with UTAUT that have not been resolved in subsequent research, despite the model's rigor. UTAUT came under fire for not being able to adequately describe behavioural intention in various contexts. Due to the model's limited external validity, more research was done to expand it by include other behavioural drivers including trust, innovativeness, computer self-efficacy, perceived threats, and perceived risk [44,45].

Additionally, new moderating elements were included to the model, including wealth, geography, culture, and technological preparedness. For a more thorough analysis, go to Venkatesh, Thong & Xu's review from 2016. However, certain crucial elements—such as computer self-efficacy—remain under studied. While establishing UTAUT, only an indirect effect of self-efficacy on intention was examined, despite the fact that it has been established that this element influences behavioural intention.

3.12 Technology Acceptance Model-3

TAM3 is an integrated model that explains the individual acceptance of Technology adoption and its use. Venkatesh and Bala developed this model by considering their construct of TAM2 (Venkatesh & Davis) with combining the actor determinant PEU (Venkatesh) [46,47]. This model suggests the relationship in three categories, which were not tested empirically in their previous research. In this model, Venkatesh and Bala have suggested that the construct "Experience" will be a moderator in establishing a relationship between PU and PEU, PEU and computer anxiety, and PEU and Behavioural Intention [48].

TAM3 of Venkatesh and Bala have their theoretical framework based on four categories of their previous TAM model research.

It is a synthesis of their previous work. These four categories consist of individual differences dealing with computer self-efficacy, computer playfulness and anxiety. The second is system characteristics: ideal job relevance, output quality, and perceived enjoyment, resulting in demonstrability and objective usability. The third category is social influence, comprised of subjective Norms and Images. The fourth category deals with facilitating conditions, which are perceptions of external control and comprised of perceived usefulness and ease of use [49].

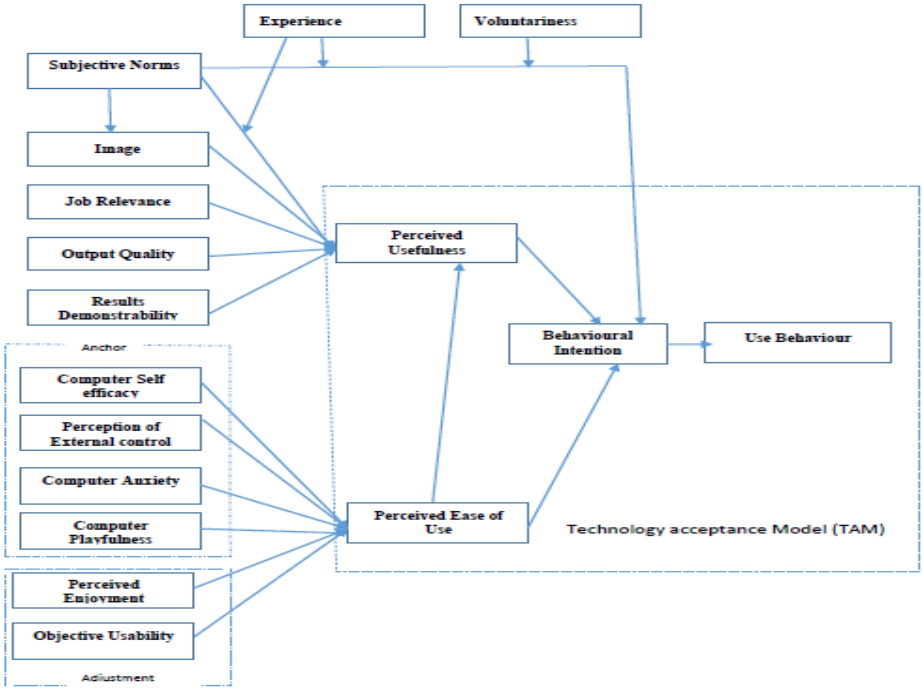

Figure 10

Source: Technology Acceptance Model- 3 (TAM-3).

To summarise the Technology Acceptance Model (TAM), when a person is presented with a new technology to use or adapt, what factors decide the individual to use the new technology? Some of the factors like PEU and PU are said to be critical factors. In some other cases, it is noted that factors like information quality, computer self-efficacy support from top management, etc., have their influence. In one of the researches, Abugabah, Sanzogni, Poropat Have used factors like system usage and user satisfaction to predict the successful use of the system with the TAM model to measure the factor influence [50]. They have used the concept of individual effectiveness or user performance to evaluate individual impact as an indicator of system success.

However, the researchers opined that more is needed to evaluate system success or usage. According to Al Haderi, , the information quality is the factor that enhances the employee's Intention to use technology, and individuals feel the need for technology and its usefulness [51]. Chen and Hsiao, in their work, stated that there should be support from top management [52]. Ragu and Nathan also have the same opinion that there should be support from top Management to have a practical impact towards information support system performance [53]. Self-efficacy is also considered to be the most essential factor determinant in driving system usage (Aktag) [54]. The later models of TAM2, TAM3, and UTAUT have deployed the concept of Voluntariness in system usage. It focuses on user belief and having a choice in their decision-making. In some cases, it has become mandatory for individuals to use the system. In addition, UTAUT does not support the inclusion of Individual actors helping to explain the acceptance of the Information system [55].

3.13 Technology, Organization, and Environment Framework (1990)

The framework of Technology, Organization and Environment (TOB) is work developed by Tornatzky & Fleischer [56]. This framework includes three aspects of an enterprise's context that influence the adoption process or new technology innovation: organizational context, environment context, and technology context. The Technology, Organization and Environment (TOE) has demonstrated initially how an innovation or various Technologies have been adopted or implemented, or innovations assimilated in an organization (Oliveira & Martins) [57]. This has been put in a framework as a theory.

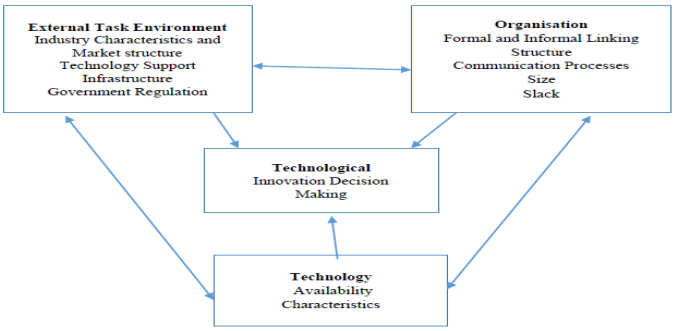

Figure 11: Source: Technology, Organisation and Environment Framework.

This theory focuses on internal as well as external technologies in the Organisation, which are considered very relevant to the firm. Technology refers to both processes as well as equipment. The organization environment consists of the formal and informal structure of the firm, characteristics, size of the firm, structure related to its managerial activity, number of slack resources, degree of centralization, Human Resource management, industry structure, competitors, macro-economic environment and regulatory environment. This framework mainly focused on availability and characteristics from the Technology aspect, formal and informal linking, structure, size, slack and communication process from the organization's point of view; and considering environmental aspects, it focused on market structure, industry characteristics, govt. Regulations and technology support infrastructure. However, these constructs are only consistent with some of the researchers who made their analysis in this regard. Al-Busaidi& Al-Shihi He analyzed with a similar framework considering critical factors in his study like instructor, organization and technology, where technology focused on system quality, service support and information quality [58]. The organization comprises factors like technology alignment, organization support, Motivation, training and technical support.

In this model, the self-efficacy of the individual, attitude toward the system and experience, the person's teaching style, and his or her innovativeness are dealt with under the factor of instructor. Factors like age, education, experience with information systems and individual involvement, training and participation are under User Characteristics. Business Process re-engineering, top management support and organizational culture are considered under Organisational Characteristics. Yusof et al., Their study stated that essential components in information systems are technology, humans and organization. Where system use and user satisfaction are associated with human Factors [59]. Service support, System quality and information quality are put under the Technology factor, while environment and structure are dealt with under Organisation Factors in their study.

4. Conclusion

The details discussion on the different models under Technology Acceptance over the years, the study of technology acceptance has evolved, giving rise to various models that aim to understand the complex interplay of factors influencing users' decisions. From the inception of models like the Technology Acceptance Model (TAM) to more contemporary frameworks, these models collectively contribute to our understanding of user behaviour in the ever-changing landscape of technology adoption.

Undoubtedly the TAM, conceived in the late 1980s, laid a solid foundation by focusing on the core elements of perceived ease of use and perceived usefulness. Its simplicity and effectiveness spurred subsequent research, giving rise to extended versions and variations. The TAM's legacy endures, with its enduring relevance seen in its incorporation into many contemporary models.

The Unified Theory of Acceptance and Use of Technology (UTAUT) emerged as a consolidation of various models, incorporating elements from TAM, Theory of Reasoned Action, and others. This integrative approach sought to provide a more comprehensive understanding of user acceptance, acknowledging the diverse factors at play.

In recent years, models like the Extended Technology Acceptance Model (TAM2, TAM3) and the Post-Acceptance Model (PAM) have further extended the scope, considering additional factors such as social influence, system characteristics, and user satisfaction. These models recognize the dynamic and multifaceted nature of technology acceptance.

As we reflect on the evolution of technology acceptance models, it is clear that the field has matured to embrace the complexity of user decision-making. Contemporary models consider not only the intrinsic features of technology but also the broader socio-cultural context and the post-adoption phase. This evolution reflects a commitment to providing more accurate and holistic insights into the intricate dynamics of technology acceptance, ensuring that researchers and practitioners are equipped to navigate the challenges of an ever-evolving technological landscape.

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