

Innovation Diffusion Theory

Review & Scope in the Study of Adoption of Smartphones in India

Tahir Ahmad Wani and
Syed Wajid Ali

Centre for Management Studies, Jamia Millia Islamia,
New Delhi
E-mail: taha.wani@gmail.com, saiyed.wajid@gmail.com



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Abstract

When mobile phones were introduced in the world markets, little did one expect that these small handheld devices would transform the world as we knew it. This small innovation transformed the lives of millions of people. A simple device which was invented basically as a vocal-communication tool got transformed into a complex gadget that facilitates almost all forms of communication now-a-days be it vocal, written or multimedia. Mobile phones have metamorphosed into smartphones which are far advanced than their predecessors. These smartphones are new innovations in themselves as with each passing day they come up with added features and uses never thought of before. With markets being flooded by these smartphones it will be occupying to study their diffusion across global markets. Indian markets in particular have been swamped by millions of smartphones each month in the last two years or so. This study is aimed to use the framework of Innovation Diffusion theory to

suggest a model for the analysis of adoption and ultimately the diffusion of smartphones in India. The innovation diffusion theory in itself has developed immensely from the time of its origin (1962) till the present day. This paper will try to discuss some of the key elements of Innovation Diffusion theory.

Keywords: Innovation Diffusion theory (IDT), Technology Acceptance Model (TAM), Smartphones, Indian Consumers

INTRODUCTION

The last few decades are known for the technological happenings. The pace of development of new technologies has led to the development of innovative products. These technologies in themselves are innovations and have led to many new inventions and discoveries that were never thought before. It took man hundreds of years from the discovery of fire to the invention of wheel. The gap between innovations or innovative products was huge but with time, the gap became less and less. In today's world we wake up to a new innovation each morning. Be it a new invention or be it an innovative or new use of an old discovery or product. This rapid generation of new ideas, products or services is good for a customer but equally difficult and challenging for a producer or marketer. An innovation or an innovative product or service is useless and fruitless until it is properly diffused to the final user. Diffusion alone is not important, the new product or services shall be adopted and acknowledged by the user for further diffusion. With the rise of

internet it has become easy for users to check the pros and cons of every new innovation before proceeding to adopt it. The innovation diffusion theory (IDT) has remained one of the strong theories to predict the diffusion of innovations in a social system. Smartphone is one such product that falls in the category of innovation that changes with passage of time. Smartphones are becoming smarter by each day. The addition of new features in a way reinvents the use of this product. This paper is a humble effort to present a comprehensive review of the innovation diffusion theory (IDT) and then link it to the diffusion of smartphones in Indian consumer market. India is making its way to become the global leader in smartphone usage and with increasing internet penetration the sales of smartphones have surged further. Given the cheap call rates and data packs the Indian consumers are slowly making a shift from tradition mobile phones to smartphones. The companies have started offering smartphones at a price as below as Rs 2500 boosting the sales further. So one can conclude that the smartphone market in India will grow further in the coming years making it an interesting field for academicians and practitioners to study the behaviour of Indian consumers towards smartphones and their adoption as well as the diffusion of this innovation.

OBJECTIVES OF THE PAPER

The innovation diffusion theory (IDT) is a very well established theory both in academics as well as in practice. It has been theoretically

and empirically tested in various fields of human endeavour. The main objectives of this research article are:

- To provide a comprehensive review of the innovation diffusion theory (IDT).
- To summarise the various components of the theory as well as the process of diffusion.
- To provide an introductory summary on the smartphone market in India.
- To suggest a model based on IDT for studying the adoption as well as diffusion of smartphones in India.

LITERATURE SURVEY

What is an innovation? Rogers (1983) has defined Innovation in his book titled “Diffusion of Innovations” as ‘an idea, practice, or object that is perceived as new by an individual or other unit of adoption.’ It matters little, so far as human behaviour is concerned, whether or not an idea is “objectively” new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation. From the above definition it can be said that an innovation needs not to be something new or recent in origin, rather it can be an erstwhile idea or object that a user perceives to have an unexampled use. Smartphones, if brought into such family of objects, can be called an innovation in itself. Yet some people may argue that smartphones are not innovations

rather developments to an innovation i.e. a mobile phone. But one should keep in mind the additional features that are added each quarter to these smartphones change the basics of the use of such technologies. These features add unexampled uses to mobile phones such as video conferencing, cloud sharing, instant multi-media sharing, online purchasing etc. which no one had thought about doing with these small handheld devices which were meant for communicating with people over distances. If one sees smartphones in this manner they will surely fit in the category of innovations as defined in the theory of innovation.

INNOVATION DIFFUSION THEORY (IDT)

Introduced in 1962, the Innovation Diffusion Theory was fine-tuned by Rogers (1995). Innovation diffusion theory focuses on understanding how, why and at what rate innovative ideas and technologies spread in a social system (Rogers, 1962). In terms of the theories of change, Innovation Diffusion theory takes a contrary approach to study changes. Instead of focusing on persuading individuals to change, it sees change as being primarily about the evolution or “reinvention” of products and behaviours so they become better fits for the needs of individuals and groups. In diffusion of innovations, it is not people who change, but the innovations themselves (Les Robinson, 2009). On the other hand, diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 2003). Fichman

(2000) defines diffusion as the process by which a technology spreads across a population of organizations. The concept of diffusion of innovations usually refers to the spread of ideas from one society to another or from a focus or institution within a society to other parts of that society (Rogers, 1962). The whole theory of Innovation Diffusion can be divided into four main elements (Ismail Sahin, 2006).

Innovations

An idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, 1983). It includes all sets of products and services which are new or old but present an unexampled use for the user when he uses it or simply when a user perceives it to be new in terms of use, it becomes an innovation.

Communication Systems

The communication system is a channel through which users share the information with each other. It is a means that handles the to and fro movement of the information between users. The better and faster a communication system, quicker the diffusion of Innovations. Rogers has classified the communication systems into *Mass Media* and Interpersonal channels. While mass media can disperse information more rapidly, Rogers believes that it is the interpersonal channel that is more important for the diffusion of new innovations or technology. On the other hand, “diffusion is a very social process that involves interpersonal communication relationships” (Rogers, 2003). Tarde (1903)

conceptualized the patterned communication process as social imitation or the duplication of something new by members of a community, e.g., one observes the washing of hands and replicates the action.

Time

The time aspect of the innovation diffusion process actually records adopter categorization and rate of adoptions. It measures the clock from the moment of the creation of an innovation till it ceases to be one. It registers the pace with which the innovation is diffused into a society and adopted by different users.

Social System

A set of interrelated units engaged in joint problem solving to accomplish a common goal (Rogers, 2003). An innovation is of no use unless it is accepted as one by a social system. If a society fails to recognise an innovation it ceases to be one. The diffusion of innovation only takes place when a social system accepts it as an innovation and then shares information about it within the system and with other systems.

While analysing the social systems, Rogers (2003) classified the people in the society into five categories on the basis of their innovativeness. Innovativeness is the degree to which an individual is relatively earlier in adopting new ideas than other members of a system (Rogers, 2003). These categories illustrate variability around the mean, when half of the target population has adopted an innovation (Kaasinen, 2005).

Adopter Categorization

The Innovation Diffusion theory assists in understanding the user adoption of different innovations in target populations. Ryan and Gross (1943) found five types of adopters who adopt the technology/innovation in course of its diffusion into the social system. These five types of person are differentiated from one another on the basis of time dimension. The innovators are people readily willing to imbibe new ideas and products while as laggards are sceptical about innovations. Rogers (1995) divided all the adopters into five categories. Rogers went as far as assigning precise notional percentages for each segment. a. Innovators: 2.5% b. Early Adopters: 13.5% c. Early majority: 34% d. Late majority 34% e. Laggards 16%. However, the “20:60:20 Rule” is a good all- purpose rule of thumb (Les Robinson, 2009).

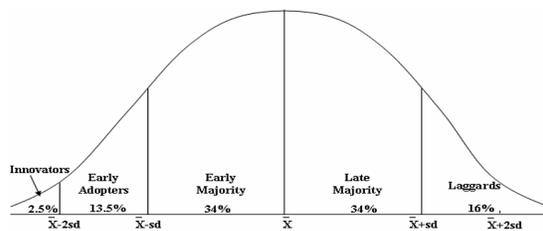


Figure 1: Adopter Categorization (Rogers, 2003)

Innovators are venturesome risk-takers who serve as gatekeepers for those who follow (Kaasinen, 2005). The adoption as decision process requires the potential adopter to collect information regarding the technology, examine the technology and consider whether it provides sufficient improvement to deserve the investment of energy and time that is needed to add it to his/her range of skills

(Rogers, 2003). Innovators are quick to act to a change and quick to adopt it. They not only provide the time and effort but they furnish timely information flow for others to adopt as well. Innovators are more like risk takers and are willing to test new technologies first-hand. Thus, they should be prepared to cope with unprofitable and unsuccessful innovations and a certain level of uncertainty about the innovation (Ismail Sahin, 2006).

Early adopters are opinion leaders who are the first within their group to adopt, and are willing to maintain their position by evaluating innovations for the others (Kaasinen 2005). Compared to innovators, early adopters are more limited with the boundaries of the social system (Ismail Sahin, 2006). Early adopters have a flagship role in the diffusion process of a new technology or an innovation. The success and failure or the rate of further diffusion is directly dependent on the verdict of this group. Leaders play a central role at virtually every stage of the innovation process, from initiation to implementation, particularly in deploying the resources that carry innovation forward (Light, 1998). Thus this category of adopters, even if less in number, are critical to decrease the levels of uncertainty prevailing around the adoption of an innovation. Early adopters are vital for another reason. They become an independent test bed, ironing out the chinks and reinventing the innovation to suit mainstream needs (Les Robinson, 2009). This category has a more of an information carry over role to the other members of a social system about the innovation. They are the advisors of a social group about an innovation,

Table 1: Characteristics of Early Adopters and Early Majority (Geoghegan, 1994)

<i>Early Adopters</i>	<i>Early Majority</i>
<ul style="list-style-type: none"> ▪ Technology focused ▪ Proponents of revolutionary change ▪ Visionary Users ▪ Project Oriented ▪ Willing to take risks ▪ Willing to experiment ▪ Individually self-sufficient ▪ Tend to communicate horizontally (focused across disciplines) 	<ul style="list-style-type: none"> ▪ Not technically focused ▪ Proponents of evolutionary change ▪ Pragmatic Users ▪ Process Oriented ▪ Averse to taking risks ▪ Looking for proven applications ▪ May require support ▪ Tend to communicate vertically (focused within a discipline)

so their judgement goes a long way not only to decide the fate of an innovation but also to determine the further rate of adoption by other users as well.

Early majority includes those users who are more watchful and mooted to adopt an innovation. They usually rely on the information provided by early adopters to use a new technology or an innovation. Whilst they take some time to decide on the usage of an innovation, they don't wish to be the last ones to adopt the innovation. Early majorities are pragmatists, comfortable with moderately progressive ideas, but won't act without solid proof of benefits. They are followers who are influenced by mainstream fashions and wary of fads. They want to hear "industry standard" and "endorsed by normal, respectable folks" (Les Robinson, 2009). Moore (1991) studied the categories in relation to the adoption of technological products in business. His findings suggest that the success or failure to adopt a particular technology or an innovation is more critically dependent on the gap

between early adopters and early majority. Geoghegan (1994) went a step ahead to analyse and interpret the characteristics of these two categories within the context of higher education. His interpretation can be summarised as in Table 1.

Late Majority and Laggards—still more traditional, often poorer, lower status individuals for whom peer pressure is required to motivate adoption (Rogers 1995). The Late Majority category adopts after the mean (average) part of the population has adopted, their main characteristics being that they are sceptical and cautious (Gouws and George, 2011). These include sceptical users who prefer to wait until most others have adopted the innovation (Kaasinen, 2005). Late Majority always doubts the adoption of an innovation at first but eventually succumb to peer pressure (Murray, 2009). The last to adopt are the laggards, who base their decisions on the past rather than the future. Rogers regrets the selection of the term "laggard" and emphasises that it would be a mistake to imply that laggards would be somehow at fault for being

late to adopt (Kaasinen, 2005). They may be known as resisters to change. However they might have their own constraints to resist a change e.g. the monetary problems associated with adoption of a new technology may force them to opt for an innovation at its dying stages. They are purely cautious people towards adoption of a new innovation. Some of them are so worried that they stay awake all night, tossing and turning, thinking up arguments against it (Les Robinson, 2009). Because of the limited resources and the lack of awareness-knowledge of innovations, they first want to make sure that an innovation works before they adopt (Ismail Sahin, 2006). Despite their dissent towards innovations, they may sometimes prompt the innovator in bettering the innovation itself. In that way one can say that they play a part in the diffusion and further development of innovations in a social system.

Moore (1991) extended Rogers' work and argued that there exists a chasm between the early adopters of the innovation and the early majority Moore believed that these two groups have very different expectations, and he attempts to explore those differences and suggest techniques to successfully cross the "chasm". His research suggests that innovations that succeed among innovators or early adopters may fail among the early majority or late majority, if the innovation lacks characteristics that appeal to these groups (Kaasinen, 2005). Moore claims that the chasm – the different needs of early majority compared to early adopters – needs to be bridged if an innovation is going to be

successful in the mass market. Moore describes the common delay that accompanies diffusion of an innovation, following an initial period of rapid uptake (Sunyoung, Mathiassen & Michael, 2008).

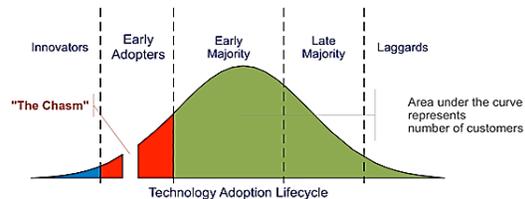


Figure 2: Technology Adoption Lifecycle, "The Chasm", (Moore, 1991)

Attributes of an Innovation

Regardless of the nature and characteristics of people, the properties of an innovation itself affect its rate of adoption in the society (O'Connor, 2007). Rogers and Shoemaker (1971) focused on the innovation as the cardinal agent in diffusion theory. Using the attributes of innovation model to explain the characteristics of an innovation may influence acceptance or rejection of an innovation (Feder, Gershon and et al., 1982). Barnett (1979) suggested that whether a person actually adopts or negates a particular innovation is a decision arrived after a series of thinking and thought making. Rogers (2003) described the innovation-diffusion process as "an uncertainty reduction process" (p. 232), and he proposes attributes of innovations that help to decrease uncertainty about the innovation. Rogers and Shoemaker (1971) observed that five attributes of an innovation are largely involved to influence the adoption

of an innovation: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. The individuals' perceptions of these five characteristics predict the rate of adoption of innovations (Rogers, 2003). Rogers believed that these five qualities determine between 49 and 87 percent of the variation in the adoption of new products (*Les Robinson, 2009*).

1. *Relative Advantage*: A simple yet a powerful concept for diffusion of an innovation. It is common sense term that a person will only adopt a new idea, a new product or a service if he perceives it to be a better option than the one in practice. If a user finds a new innovation more advantageous than the operational one he will be compelled to adopt to the new innovation. Thus more advantageous the new innovation the more quickly will it diffuse in a social system. The degree of relative advantage is often expressed by a pot of sub dimensions (economic profitability, low initial costs, decreases in discomfort, social prestige, saving time and effort, immediacy of rewards) (Francesco, 2012). The other elements of innovation diffusion like communication channels are crucial to disperse the information about relative advantage of an innovation over current practices and objects. The faster and reliable the communication system the quicker the rate of diffusion of an innovation.
2. *Compatibility*: is the extent to which adopting the innovation is compatible

with what people do (Kaasinen, 2005). It is the degree to which an innovation is perceived as consistent with consumer needs, values and beliefs, previous ideas and past experiences. It helps give meaning to the new idea and regard it as more familiar (Francesco, 2012). The more compatible the innovation the better chances of adoption. E.g. a firm which wants to introduce a new line of operations will find it suitable to have a technology that doesn't a much impact on the existing lines of operation. If the new line will disrupt the existing operational lines it may increase the cost involvement and the firm may scrap the deal. However one shall not blank out this possibility that two much compatibility can be sometimes a problem as the users may find it unworthy to try a new innovation or might not perceive it to be an innovation.

3. *Complexity*: it is the degree to which an innovation is perceived as relatively difficult to understand and use (Roger, 2003). Opposite to other attributes this attribute has an inverse impact on the rate of adoption of an innovation. To Rogers the simpler the innovation the greater the rate of adoption. This may not hold good in all situations as some high tech products are perceived more advantageous because of their complexity but quite often the rule of simplicity does help the diffusion of an innovation. E.g. It was reported that farmers in the Sudan did not accept new irrigation practices instituted by the agricultural department

because the use of those practices involved a great deal of direction and precision which were too difficult for the farmers to follow (Barnett, 1953).

4. *Observability*: It is the easiness with which the results of an innovation are not only visible but their communication to the prospective users. Here again communication systems play a crucial role, the more neatly a communication system is able to share the results of an innovation the faster its rate of adoption. E.g. companies launching new products often advertise the comments and reviews of the customers who have adopted/purchased their innovations. This creates a sense of assurance among the potential users to adopt to an innovation. Moore and Benbasat (1991) found the observability construct quite complex, so they divided the construct into a result demonstrability construct and a visibility construct. While demonstrability means the ease of presentation of working and features of an innovation, visibility defines the degree of exposure to public notice. Result demonstrability is the tangibility of the results of using the innovation, including their Observability and Communicability (Moore & Benbasat, 1991). Visibility is the degree to which others can see that an innovation is being used (Benham& Raymond, 1996). Both these constructs ultimately measure the degree of observability of an innovation. O'Connor (2007) found that high visibility and demonstrability of internet services prompted more users to take up

internet connections.

5. *Triability*: It is the degree of examining or testing a new innovation before actually adopting to it. Simple example of trainability is the test drive offers by the automobile companies where prospective customers can have a real life feel of the product before the actual purchase. It gives the prospective users a sense of sureness to adopt to a new innovation. Triability determines whether a new innovation will be adopted or rejected by the prospective users.

Tornatzky and Klein (1982) identified five more attributes of an innovation. These included cost, communicability and divisibility, profitability, and social approval. It is argued that communicability is a synonym of observability and divisibility is proximate to Trialability. Price and profit are not always a key factor for adoption of an innovation while social approval somewhat is dependent on the previously discussed attributes. Other researchers have extended Roger's work (Barnesand Huff, 2003), suggesting additional factors for the model: Image as the degree to which adoption and use of the innovation is perceived to enhance one's image or status. *Trust* as the extent to which the innovation adopter perceives the innovation provider to be trustworthy.

STAGES OF ADOPTION

An innovation takes some time to spread in a social system, it does not happen all of a sudden. Whether a person actually adopts or negates a particular innovation is

a decision arrived after a series of thinking and thought making (Barnett, 1979). Roger and Shoemaker (1971) and Rogers and Beal (1957) had proposed five stages through which an innovation passes before an individual takes it into use:

- *The awareness stage:* at this stage an individual gets to know about the being of an innovation.
- *The interest stage:* at this stage the individual starts collecting specific data and information about the innovation.
- *The evaluation stage:* at this stage the individual ascertains or fixes the value or worth of an innovation and decides whether to try it or not.

- *The trial stage:* at this stage a person takes the innovation into experimental use or applies it on a smaller scale.
- *The adoption stage:* At this stage the innovation is taken into continual full scale use and is given a favourable approval by the society members.

Rogers (1983) however proposed an additional and improved model for studying the stages of adoption which he called Innovation-Decision Process Model. Innovation-decision process is essentially an information-seeking and information-processing activity in which the individual is motivated to reduce uncertainty about the advantages and disadvantages of the innovation (Rogers, 1983).

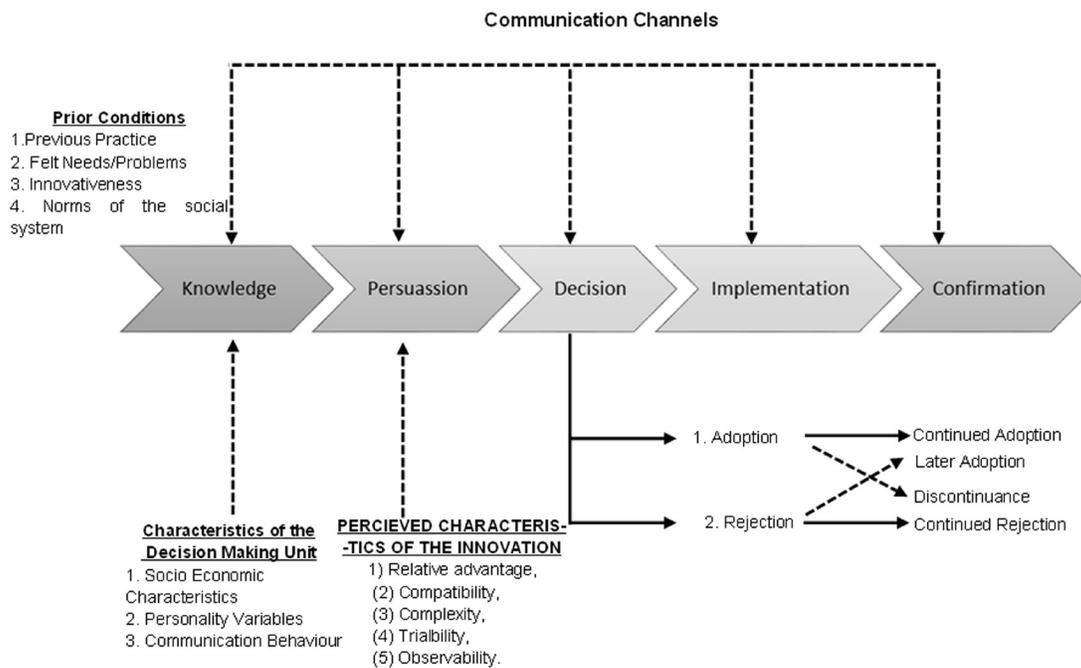


Figure 3: A Model of Five Stages in the Innovation-Decision Process

Source: Diffusion of Innovations, Third Edition by Everett M. Rogers, 1983, p.165.

Innovation-Decision Process

The innovation-decision process is the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision (Rogers, 1983). The five steps identified in the process of Innovation-Decision are:

1. *The Knowledge Stage*: The first step of an innovation-decision process begins with the knowledge stage. In this stage the individual comes to know about the being of an innovation. The existence of an innovation becomes known to a person through communication channels. The individual starts to ask questions like “What” “How and “Why” about the innovation. During this phase, the individual attempts to determine “what the innovation is and how and why it works” (Rogers, 2003). The questions posed by an individual cause three types of knowledge formation: *Awareness-knowledge*: Awareness-knowledge represents the knowledge of the innovation’s existence. *How-to-knowledge*: The other type of knowledge, how-to-knowledge, contains information about how to use an innovation correctly. *Principles-knowledge*: The last knowledge type is principles-knowledge. This knowledge includes the functioning principles describing how and why an innovation works (Ismail Sahin, 2006).
2. *The Persuasion Stage*: Persuasion occurs when an individual (or other decision-making unit) forms a favourable or unfavourable attitude toward the innovation (Rogers, 1983). However Rogers argues that the positive or negative attitude formation about the innovation may not be directly involved in the decision of adoption or rejection of an innovation. A person only forms an attitude about a thing or idea only when he perceives its existence. Thus the persuasion stage correctly follows the knowledge stage. In addition to that persuasion stage is more latent and but affective more like feeling centred while as knowledge stage is cognitive and known. It is in this stage that the uncertainty revolving the use of an innovation may increase or decrease. A wrong word of mouth or wrong publicity may increase the levels of uncertainty while a positive feedback from close friends or peers or family members will considerably decrease the levels of uncertainty. Sherry (1997) reasons that individuals usually trust information from close circle peers and family members about an innovation and filter the information coming from outside this circle.
3. *The Decision Stage*: Decision occurs when an individual (or other decision-making unit) engages in activities that lead to a choice to adopt or reject the innovation (Rogers, 1983). While adoption refers to “full use of an innovation as the best course of action available,” rejection means “not to adopt an innovation” (Rogers, 2003). To Rogers

if an innovation can be tested on a smaller scale or trials can be more it enhances its chances of adoption or acceptance by the individuals. The same may not hold good for all innovations. Rogers (1983) says that in the decision stage the individual decides to adopt or reject the technology. However the adoption or rejection may not be permanent and the individual may later change his/her decision, so Rogers proposed four outcomes of this stage:

- *Continued Adoption:* An individual finds an innovation favourable and adopts to it permanently.
 - *Later Adoption:* An individual perceives the innovation favourable and intends to adopt to it in near future. The lag of time may be because of monetary or other social issues.
 - *Discontinuance:* An individual adopts to an innovation but rejects it afterwards.
 - *Continued Rejection:* The individual rejects the innovation from its outset and continues to do so.
4. *The Implementation Stage:* In this stage the innovation is applied in daily use or one can say the innovation is put to practice. Until the implementation stage, the innovation-decision process has been a strictly mental exercise. But implementation involves overt behaviour change, as the new idea is actually put into practice (Rogers, 1983). Implementation stage can prove to be a difficult task for a user. The newness of an

innovation and uncertainties prevailing can hamper the further adoption process of an innovation by the individual. It is because of these circumstances that the information flow keeps on displacing from users to other people. Uncertainty about the outcomes of the innovation still can be a problem at this stage. Thus, the implementer may need technical assistance from change agents and others to reduce the degree of uncertainty about the consequences. Moreover, the innovation-decision process will end, since “the innovation loses its distinctive quality as the separate identity of the new idea disappears” (Rogers, 2003).

5. *The Confirmation Stage:* Human behaviour change is motivated in part by a state of internal disequilibrium or dissonance, an uncomfortable state of mind that the individual seeks to reduce or eliminate (Rogers, 1983). According to Rogers even after an adoption decision is made about an innovation it is human behaviour to seek information about the innovation to feel motivated or to shed off the innovation. Rogers (2003) argues that even after the decision of adoption is made it can be reversed if the individual is “exposed to conflicting messages about the innovation. However, the individual tends to stay away from these messages and seeks supportive messages that confirm his or her decision (Ismail Sahin, 2006). It is in this stage that attitude of a person towards the innovation formed in persuasion stage play a huge role whether the person will

continually adopt or discontinue the adoption. The discontinuance that may occur in this stage can be of two types:

- *Replacement Discontinuance:* An individual may discontinue the use and adopt a better option or innovation available
- *Disenchantment Discontinuance:* An individual rejects the innovation because he/she feels unsatisfied about the innovation. The reason of non-satisfaction may be that the innovation doesn't meet the requirements of the user.

The Concept of Reinvention: defined as the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation (Rogers, 1983). Reinvention generally takes place in implementation stage. Reinvention is the process by which a new idea is discovered or created, while adoption is a decision to make full use of an innovation as the best course of action available. Thus, adoption is the process of adopting an existing idea. As innovations, computers are the tools that consist of many possible opportunities and applications, so computer technologies are more open to reinvention (Ismail Sahin, 2006).

Rate of Adoption of an Innovation

Rate of adoption is the relative speed with which an innovation is adopted by members of a social system. It is generally measured as the number of individuals who adopt a new

idea in a specified period. So rate of adoption is a numerical indicant of the steepness of the adoption curve for an innovation (Rogers, 1983). From the figure one can see that the rate of adoption is itself depended on various variables which start from an individual and engulf the whole social system.

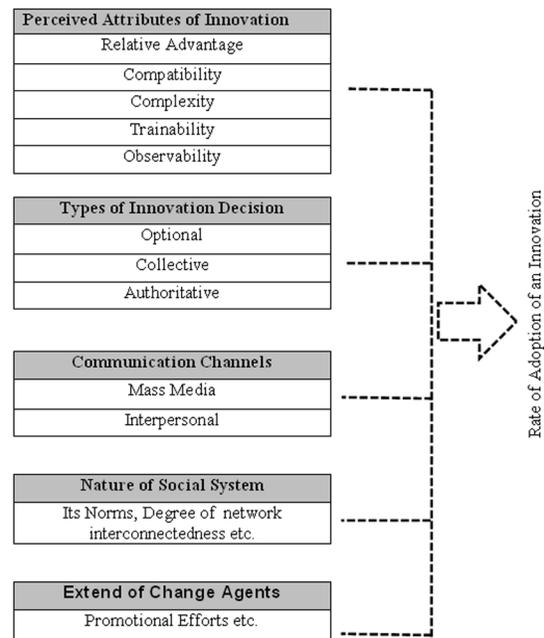


Figure 4: Variables Determining the Rate of Adoption of Innovations, Rogers (1983)

The Diffusion of an Innovation

Rogers has separated the adoption process from the diffusion process. While the diffusion process permeates through society and groups, the adoption process is most relevant to the individual (Couros, 2003). Rogers (1995) defines the adoption process

as “the mental process through which an individual passes from first hearing about an innovation to final adoption (As discussed above from knowledge to confirmation stages). On the other hand the diffusion effect is the cumulatively increasing degree of influence upon an individual to adopt or reject an innovation, resulting from the activation of peer networks about an innovation in a social system.

Limitations of Innovation Diffusion Theory

The concept of innovation diffusion did not originate by studying any high-end technological product rather its origin can be traced from agricultural fields. It all started in 1928 when researchers started to study the adoption patterns of farmers using hybrid corn by the Iowa State Agricultural Experiment Station. Between 1933 and 1939, the number of acres planted to hybrid corn increased from hundreds to thousands. By 1940, it had been adopted by most Iowa corn growers. (Ruttan, 1996). It was after that when Ryan and Gross (1943) introduced the categorization of the adopters, in this case the farmers. Rogers (1958) carried forward the work of his predecessors and in 1962 published his famous work “*The Diffusion of Innovations*”. The first and foremost criticism that the theory faced was that it was more agrarian in approach and would not hold good for innovations of other sectors. Even within the agrarian scholars the criticism started to creep in. Goss (1979) noticed that the usage of this theory by scholars and practitioners

in developing countries led to development of various problems. Not only the adoption pattern varied and the rate of adoption differed but sometimes farmers developed negative attitudes about good innovations. The business community also raised its voices against the theory questioning the static nature of categories of adopters. Anyone can be an innovator if innovations are matched with organizations targeted for adoption (Downs and Mohr, 1976). Brown (1981) pointed out that carrying out of projects the theory require focusing monetary and personnel resources on a small number of people, the category traditionally considered innovators. He recommends using marketing techniques to target appropriate innovations to specific segments of farmers .Gilfillan (1935) minted the term “Sailing Ship Effect” as a response of producers to produce ships using older technology as against to the new innovations in the shipping industry. He noted that in the maritime industry some market segments did not replace sailing ships (the old technology) even after the emergence of steam ships (the new technology) in the nineteenth century, and diesel in the twentieth century. Lyytinen and Damsgaard (2001) found that an innovation needs not necessarily pass through various stages of adoption for an individual to adopt to it. Sometimes adoptions took place in dyadic relationships and it became difficult to identify the stages of adoption. Further they found some of the Laggards being more visionary than the innovators defined in the theory. Criticism has always bettered innovations and theories and Rogers always acknowledged criticism. He in his

book (1962, 1983, 1995 & 2003) had given special consideration to the criticism that was posed against the theory. One must admit the fact that amidst all the criticism and literal battles against the theory, the diffusion of innovations theory has been a great story in itself. Thousands of papers have been written and many thousands of projects carried out on the basis of this theory. One must not forget the role this theory has in development of the later theories of diffusion or adoption of technologies.

SMARTPHONE-AN INNOVATION

Smartphones have tremendously evolved over the last few years. Smartphones when introduced were thought as mobile phones with additional capability of computing. It is still defined in some books and dictionaries as a hand-held computing mobile phone. But as time has passed new features have been added to the smartphone and each of these features is an innovation in itself. A smartphone has turned into a complex amalgam of innovations. These innovations are making the smartphone smarter by each passing day. Smartphones have replaced watches, cameras, calculators, hand held video games, music pods, internet cafes, posts and especially the telephones. It is an innovation that has replaced all its predecessors as a one against many innovations. It has dispersed and diffused across the globe on a mass scale, perhaps the fastest on such scale than any other innovation. It has produced unparalleled and un-examined uses never thought of. At current date markets are flooded with smartphones and the speciality is that every single month

an innovation changes the shape of these smartphones. It won't be wrong to say that smartphones are an evolving innovation that keeps on evolving and after every addition it turns into a new innovation.

SMARTPHONES IN INDIAN MARKETS

As per the International Data Corporation (Dec, 2013) the Indian smartphone market grew by 229% year over year in the third quarter of 2013 (3Q13). A total of 12.8 million smartphones were shipped alone in the third quarter of 2013. And the market grew so fast that 35% of overall mobile phones business in the country was made up by the smartphones, which is as far as nearly three times of its share in last quarter of 2013. These figures in themselves are huge and project the global market share of India in smartphones. The smartphone business is booming in India owing to the large proportion of population in young age group. As such a study to analyse the buying behaviour of Indian consumers towards smartphones is of great significance. We will try to study the adoption process through which Indian consumer passes to actually adopt or reject a smartphone by using the components of innovation diffusion theory (IDT). Sutee and Jyoti (2012) undertook a similar kind of study to identify and explain how silver surfer owned micro enterprises adopt and use smartphones in United Kingdom (UK). They also proposed a model by combining the Rogers' Diffusion of Innovation Theory (DOI) and the Decomposed Theory of Planned Behavior to study the same.

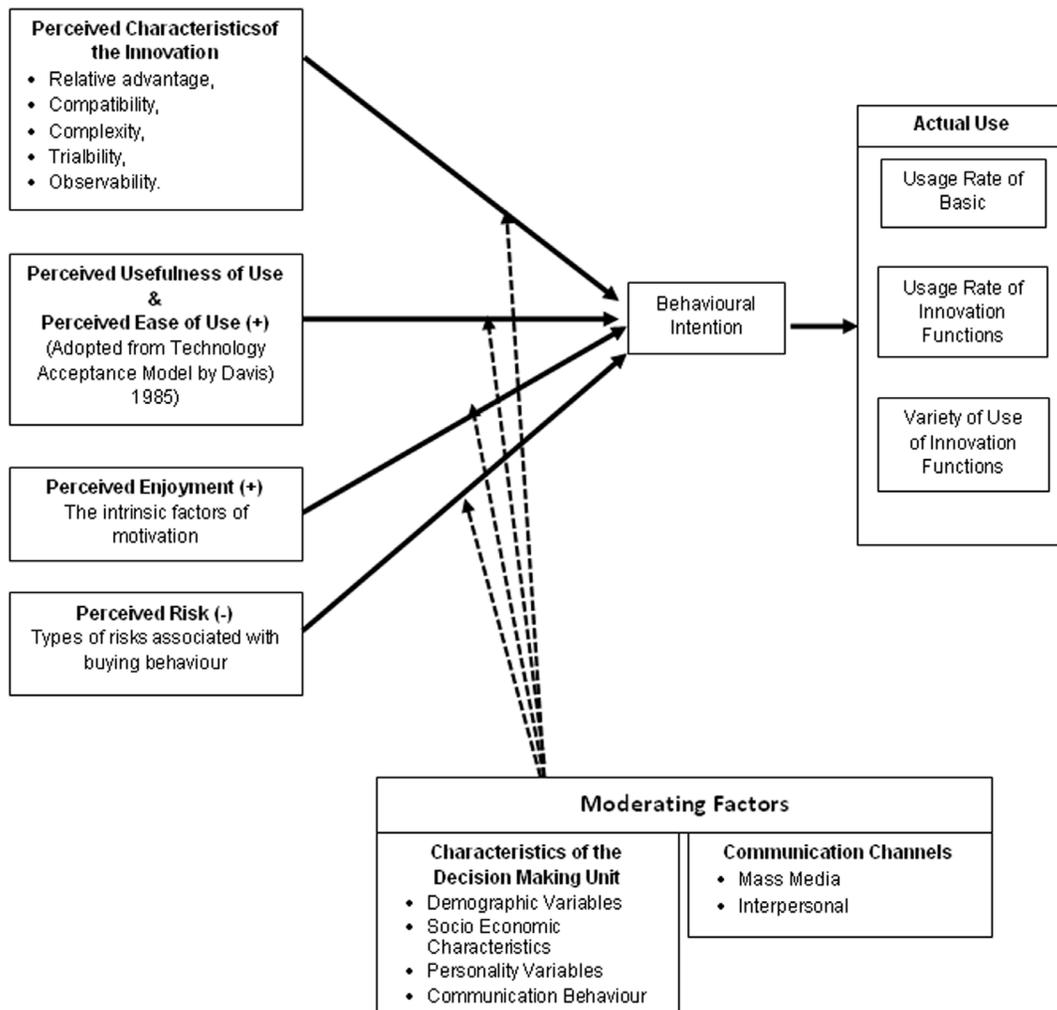


Figure 5: Proposed Model to Study Smartphone Adoption and Ultimately the Diffusion in Indian Markets

As the given figure indicates that the proposed model is an amalgam of Theory of Innovation Diffusion by Rogers and Technology Adoption Model (TAM) of Davis (1985). Additional constructs have been taken to adjust the fact that TAM was actually introduced for work related technological products not the products of direct consumer use, i.e. products of B2C market. We have

thus incorporated “Perceived Enjoyment” and “Perceived Risk” as Motivator and Inhibitor constructs, respectively, in the market of freewill purchase as done by various other researchers working on TAM for consumer goods. After a proper scale development, the authors wish to use SEM technique to see the feasibility and validity of the model.

CONCLUSION

The innovation diffusion theory has been a pivotal theory in study of technology diffusion in the past two decades. Many studies round the globe were done and will be done with the incorporation of IDT. We have also tried to incorporate the IDT for possible study of the diffusion of smartphones in India. The model has been modified with additional constructs that will add to the existing theory as well as help us understand the diffusion of smartphones in the consumer market. The additional constructs of TAM will make it a technology specific study with further addition of constructs like perceived enjoyment and risk giving an insight of consumer perception while considering the purchase of smartphones. As Indian markets are flooded with smartphones, this study will be an eye-opener to all the parties involved like the companies, customers, researchers, regulators, etc.

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