The chapter provides the detailed description of the theoretical variables chosen in the research and deals with theories which have wide prevalence at present time. It provides a solid base for the selected constructs applied for the empirical investigations of the study. The chapter specifies the variables taken from three research models based on Diffusion of Innovation, Theory of Planned Behaviour (TPB) and Technology Acceptance Model (TAM).

3.1  Diffusion of Innovation

According to Rogers, “diffusion is the process by which an innovation is communicated through a channel over time in a social system” (Rogers, 1983, p.5). In the study of the Diffusion of Innovation, “there are four critical elements in the diffusion process: (a) the innovation, (b) its communication from one person to another, (c) the social system, and (d) over time” (Rogers, 1962, p.12). The first element i.e. innovation was described by Rogers as any idea or item perceived as new by an individual in a social system. Communication is the process by which individuals share information with each other in order to reach a mutual understanding and communication channels are the means by which the message is exchanged with each other. Time refers to the rate at which innovation is diffused or the pace at which it is adopted by an individual in a social system. The social system consists of those individuals, organisations, or agencies that share a common “culture” and are potential adopters of an innovation (Mahajan and Peterson, 1985).

It is pertinent to mention here that Rogers’ diffusion model is a conceptual idea with relevance to many disciplines as it provides the common conceptual ground. The present work is based on the work of Rogers, in so far as mobile services diffusion process can be explained and portrayed into five innovation attributes.

3.1.1  Innovation Attributes

Rogers (1995) categorized the components of an innovation that affect people rate of adoption as follows:
Relative Advantage is the degree to which an innovation is perceived as being better than the idea it supersedes. The degree of relative advantage is often expressed as economic profitability, social prestige, a saving in time and effort, immediacy of the reward, or as a decrease in discomfort (Rogers, 1995). The construct of relative advantage in the study is according to the rural consumers in question. The construct of relative advantage is highly domain specific, although dimensions that are found to have some generality include reduced costs and greater convenience. A key issue is that it is not the superior performance of an innovation in an objective sense that matters, but rather the superiority of performance as perceived by the customer (Szymigin and Bourne, 1999). As mobile services provides rural consumers to access the system at any time regardless of any location, providing tremendous advantage and convenience to rural users. Based on these facts, it can be hypothesised that:

\[ H_01: \text{There is no significant impact of relative advantage on adoption of mobile services.} \]

\[ H_{11}: \text{There is significant impact of relative advantage on adoption of mobile services.} \]

Compatibility of an innovation is the degree to which an innovation is perceived as consistent with past values, experiences and the needs of the potential adopter (Rogers, 1962). An innovation that has resonance with a consumer, and where the consumer feels comfortable or familiar with the innovation, will have a greater likelihood of adoption than an innovation which lacks these attributes (Black et al., 2001). Nevertheless, not all experience is necessarily efficacious in the acceptance of technology-based products, because the switching cost associated with moving to a very dissimilar technology may offset any positive gains due to experience (Agarwal and Prasad, 1999).

\[ H_{02}: \text{There is no significant impact of compatibility on adoption of mobile services.} \]

\[ H_{12}: \text{There is significant impact of compatibility on adoption of mobile services.} \]

Complexity is the degree to which an innovation is perceived as difficult to understand and operate. A few members in the rural social system quickly understood the new innovations while most of the members found it complicated and adopt the technology slowly. According to Tan and Teo (2000), “technology based innovations have indicated that more complex an innovation is to use, and the greater the skill and
effort needed for adopting it, the less likely that it will be adopted.” The people in the rural areas being not well educated found the mobile services complex to use.

H_{03}: There is no significant impact of complexity on adoption of mobile services.

H_{13}: There is significant impact of complexity on adoption of mobile services.

(iv) **Observability** is the degree to which the results of using an innovation are visible to others members of a social system. It describes how easily the benefits can be observed and communicated to others. Since the services are not having physical domain create the problem of observability, even though the service delivery medium (from service provider) provide the physical evidence for the innovation. The present study examined observability as communication process meaning the effects of used channel and mode of communication on adoption of mobile services under the theoretical framework of diffusion of innovations following the approach outlined for example by Suoranta (2003), Lee et. al. (2002), Mahajan et al. (1990), Moore and Bensabat (1991) and Tornatzky and Klein’s (1982) discussion in which it has been noted that communicability was closely related to observability.

H_{04}: There is no significant impact of observability/communication on adoption of mobile services.

H_{14}: There is significant impact of observability/communication on adoption of mobile services.

(v) **Trialability** refers to the degree to which an innovation is perceived as being trialable on a limited basis prior to any decision to adopt (Rogers, 1962). It has become general tendency in India to give an opportunity to the consumer to try out the innovation before purchase so that the fear of the unknown and being unable to use the innovation can be minimised. The trial to rural people can further convince and build confidence in them to use the system. This gives an idea to generate the hypothesis:

H_{05}: There is no significant impact of trialability on adoption of mobile services.

H_{15}: There is significant impact of trialability on adoption of mobile services.

Apart from these five elements of diffusion of innovation, the researchers have contributed additional attributes such as perceived risk augmented by Bauer (1960). Researchers found that perceived risk is influenced by trust towards the transaction and trust works as a mechanism for reducing consumer’s perceived risk (Lee and Kim,
Similarly, Black et al. (2001) have also suggested that errors and the security afford might be considered as measures of risk in the context of internet banking. Hewer and Howcroft (1997) refer to the term trust in this context. Hence, the perceived risk has been considered as perceived trust as risk is hardly involved in the context of rural areas because of few adoption of mobile banking there.

(vi) **Perceived Trust** According to the Rousseau et al., (1998), Trust is defined as “a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another”. Perceived trust is a significant predictor to explain adoption and have influence on consumer behaviour and it determines the success of mobile commerce (Wei et al., 2009). Trust is important because it helps consumers overcome perceptions of uncertainty and risk (McKnight, 2002) and helps build appropriate favourable expectations of performance and other desired benefits (Gefen, 2000). In addition, for trust to exist, consumer must believe that the sellers have the ability and motivation to reliably deliver goods and services of the quality expected by the consumers (Jarvenpaa, 2000). Based on these arguments, it is hypothesized in rural context that:

\[ H_{06}: \text{There is no significant impact of perceived trust on adoption of mobile services.} \]

\[ H_{16}: \text{There is significant impact of perceived trust on adoption of mobile services} \]

### 3.1.2 Communication

The second main element of the diffusion of innovation is communication by which individuals share information with each other to have mutual understanding regarding innovation usage. The Bass diffusion model the potential adopters are influenced by two types of communication channel viz. mass media (external influence) and interpersonal channels (internal influence) such as word of mouth. In the creation of knowledge, mass media plays a dominant role. Whereas interpersonal channels are more effective in forming and changing attitude towards a new idea and influence the decision to adopt or reject a new idea. Most individuals evaluate an innovation, not on the basis of scientific research by experts, but through the subjective evaluations of near-peers who have adopted the innovation (Rogers 1995). The present study examined communication process as observability (being a part of communication process) meaning the effects of used channel and mode of communication on adoption
of mobile services under the theoretical framework of diffusion of innovations following the approach outlined for example by Suoranta (2003), Lee et al. (2002), Mahajan et al. (1990), Moore and Bensabat (1991) and Tornatzky and Klein’s (1982) discussion in which it has been noted that communicability was closely related to observability.

3.1.3 Time

The third main element in the diffusion of innovation is time that has been involved in diffusion in three ways. First, it is engaged in innovation –decision process as mental process through which an individual passes from knowledge of the innovation, then persuasion i.e. forming an attitude towards innovation, decision to adopt or reject and lastly giving confirmation to the this decision. Secondly, it is involved in diffusion is in the form of innovativeness i.e. showing relatively promptness to adopt new idea than other members in the social system. The common extrapolation (e.g. Rogers 1995; Mohr 2001) characterises adopter category into five parts as follows:

(i) Innovators – the first adopters who are interested in adopting the new technology with positive belief and attitude and constitute a very small proportion of population adopt the innovation in the beginning (2.5 percent of the population.

(ii) Early Adopters – a short time later than innovators they interested in adopting technology and willing to take risk and constitute a proportion of 13.5 percent of the population.

(iii) Early Majority – these adopters can be called as pragmatist and process oriented and constitutes 34 percent of the total population.

(iv) Late Majority – more or less unconvinced with the technology due to negative technology attitude and constitute 35 percent of total population.

(v) Laggards – having extremely negative attitude and hence never adopt the technology or adopt when technology is about to outdate and making up 16 percent of the population.

As not everyone in a social system will adopt an innovation, the sixth category has been added by Spence (1994) to Rogers’ five adopter categories, rejector or resistor, which include individual who never will adopt or refuse to adopt an innovation.

$H_{07}$: There is no significant impact of time on adoption of mobile services.
There is significant impact of time on adoption of mobile services.

3.1.4 Social System

Refers to a boundary within which an innovation diffuses and adopted by the members of the social system. The adopters may be individuals, informal groups, organisations, and/or subsytems. Rogers (1995) noticed that “individual innovativeness is affected both by individuals’ characteristics and by the nature of the social system in which the individuals are members” (p.26). The role of family, dealer recommendations (e.g. Laura, 2003; Gupta and Chundawat, 2002) in rural areas had shown significant impact on the adoption of product or services. Based on this, the following hypothesis was developed:

H_{08}: There is no significant impact of interpersonal influence on adoption of mobile services.

H_{18}: There is significant impact of interpersonal influence on adoption of mobile services.

One of the distinct features of rural areas is the demographics of the respondents which cannot be negated in the adoption of mobile services as it gives an idea how consumers make their decision about adopting and using new technology. Many researchers (Branmley, 1989; Bunning, 1992; Mllen & Lyles, 1993; Alavi, 1994; Davis, 2000; Piccoli et al., 2001; Appelbaum, 1990; Brosnan, 1999; Harris & Davison, 1999; Agarwal et al., 1997; Gefen & Straub, 1997; Venkatesh & Morris, 2000; Ono, 2003; Meso et al, 2005) used the demographic profile of the respondents to find the influence on technology use.

H_{09}: There is no significant impact of demographics (Gender, Age, Education, Income, Occupation) on adoption of mobile services.

H_{19}: There is significant impact of demographics (Gender, Age, Education, Income, Occupation) on adoption of mobile services.
Figure 3.1: Determinants of Diffusion Process.
3.2 Making Choice of Mobile Service Provider

Inability to write and read is the largest limiting factor for village markets that mobile service provider face to diffuse mobile services for adoption. Low literacy level can be regarded as the major setback for the service providers for advance mobile services in rural areas such as mobile banking, mobile internet etc. Hence, the strategically role and efforts of mobile service providers in rural areas has become a big challenge to diffuse mobile service there. Nevertheless, it has also become imperative to find out what rural people perceived about mobile service providers while purchasing a mobile connection from the market. In this regard, the three major constructs have been identified viz. Knowledge resources, customer value, facilitating conditions which have influence on the behavioural intentions to use the system discussed as follows:

3.2.1 Knowledge Resources

Based on Theory of Planned Behaviour’s perceived behavioural control, Mathieson et al. (2001) found that perceived knowledge resources have a significant influence on behavioural intention to use an innovation in their extended TAM model. Mathieson et al. (2001) also expressed that an individual with high expertise might rate a system easier to use than an individual with lower expertise. To deal with the lower expertise, the service provider can create a knowledge resource centre in their regional language where specifically rural people can take assistance whenever they feel difficult to use the mobile services. No doubt, the customer care centres through mobile phones are already prevailing but physical resources where representatives can help rural people with proper guidance and knowledge can do the magic in rural areas. Hence, to make the rural people use mobile services with low literacy level and expertise, a strong knowledge resource/support system can be a great assistance to boost the use mobile services. Moreover, the knowledge resource centres/service provider support can increase customer value as the rural people will be able to justify the cost incurred and benefits acquired from these well established mobile service systems where the network connectivity, voice clarity etc are properly managed. All these dimensions will build image in the mind of the rural people regarding service provider and their selection. Based on the fact, the following hypotheses are developed:
H01a: There is no significant impact of knowledge resources on behavioural intention to adopt mobile service provider.

H01b: There is no significant impact of knowledge resources on facilitating conditions to adopt mobile service provider.

H01c: There is no significant impact of knowledge resources on customer perceived value to adopt mobile service provider.

3.2.2 Facilitating Conditions

The rural market is also deprived of efficient infrastructural availability where the speed of development of infrastructure is very slow. The service providers feel reluctant to provider services in remote areas as the cost is high and the usability of the mobile services is low. The rural consumer regard the mobile service provider as the best who provide physical resources to use the mobile system like wider network connectivity that also leads to voice clarity, availability of bill payment outlets and recharging outlets. When these physical resources are properly provided by the service provider it creates value in the eye of the customers that leads to the behavioural intentions to use the mobile services. Based on these, the following hypotheses were developed:

H02a: There is no significant impact of facilitating conditions on customer perceived value to adopt mobile service provider.

H02b: There is no significant impact of facilitating conditions on behaviourial intention to adopt mobile service provider.

3.2.3 Customer Perceived Value

It has been suggested that customer perceived value is formed of the trade off between benefit and sacrifice (Monroe, 1990). Many of the conceptualizations involve the advantages as the benefits and price as the sacrifice. The perspective of value taken is either a multiplicative or additive function of benefit and sacrifice (Cronin et. al., 1997). It has also been suggested that the service environment influences service evaluations (Lehtinen, 1982; Lehtinen and Lehtinen, 1991; Rust and Oliver, 1994; Brady and Cronin, 2001). In the rural context, the service provider can create friendly environment such as less paper formalities to give connections and to give benefits such as more value added services at lesser rates or attractive plans at the same rate to the
rural people to create perceived value. The following hypotheses were developed on the above basis:

\(H_03: \text{There is no significant impact of customer perceived value on behavioural intention to adopt mobile service provider.}\)

### 3.2.4 Behavioural Intention

Behavioural intention refers to the individual decision to adopt or reject or increase/decrease the use of technology in subject. The behavioural construct have been adapted and modified from Nicolas et. al., (2008); Suh and Han (2003) recommending others should adopt the mobile service provider; keep using in present and future the services of service provider.

![Figure 3.2: Making Choice of Service Provider](image-url)
3.3 Adoption of Mobile Services

Although the conditions for the use of advanced mobile services appear to be favourable, market analysis indicates that, although consumers are aware of advanced services, they are reluctant to use their mobile phones to access them (Nicolas, 2008). The situation is apparently inverse in the case of rural areas where the conditions are unfavourable for using mobile services. Based on the literature, the constructs viz. perceived service provider support, perceived ease of use, perceived usefulness, perceived financial resources, perceived credibility and behavioural intention have been developed to represent the adoption of mobile services in rural areas.

3.3.1 Perceived Service Provider Support

Perceived Service Provider Support refers to the assistance provided by the service provider to use the mobile services in rural areas. Since the rural people are having low literacy, the use of services can be increased with timely feedback from people regarding the usage of mobile services and if they find any problem that can be resolved within a suitable time span. Service providers can provide physical resources to help them out to operate the services such as creation of outlets or giving instructions to already opened outlets to resolve the problems of rural people regarding any technicality or problem faced by them whenever they approach the outlet. Moreover, service provider can provide pamphlets in their regional language as special initiative to aware them the usage of the services and benefits associated with these services. The support system leads to the easiness to use the mobile services and increase the behavioural intentions to use the mobile services. Based on these arguments, the following hypotheses have been developed:

\[ H_{01a} \text{: There is no significant impact of perceived service provider support on behavioural intention to adopt mobile services.} \]
\[ H_{01b} \text{: There is no significant impact of perceived service provider support on perceived ease of use of mobile services.} \]

3.3.2 Perceived Financial Resources

Perceived financial resource is defined as the extent to which a person believes that he or she has the financial resources to pay for handset, service fee, communication fee etc. for using the mobile services. Wei et al., 2009 stated that cost factor is one of
the reasons that could slow down the development of M-commerce. He also described that cost factor may composed of initial purchase price such as hand set price, ongoing usage cost, service fee, communication fee and maintenance or up-gradation cost. Mathieson et al. (2001) found that hardware/software and money resources are important for users in adopting an information system. Perceived financial cost has been found to have significant negative influence on the behavioural intention to use mobile-banking (Luarn & Lin, 2005). Researchers recommend mobile service providers should consider reducing cost which has negative effect on the mobile-commerce adoption (Constantinides, 2002; Eastin 2002). An individual with high financial resources might have higher perceived ease of use, perceived usefulness and behavioural intention to use mobile service than the person with low financial resources (Wang et. al., 2006). Based on these, the developed hypotheses are:

\[ H_{02a} \]: There is no significant impact of financial resources on perceived ease of use of mobile services.

\[ H_{02b} \]: There is no significant impact of financial resources on behavioural intention to adopt mobile services.

\[ H_{02c} \]: There is no significant impact of financial resources on perceived usefulness to adopt mobile services.

3.3.3 Perceived ease of use

According to Davis (1989), the perceived ease of use for a system is defined as the degree to which an individual believes that using a particular technology will be free of effort. The perceived ease of use has been incorporated as an important factor in adopting mobile services having impact directly or indirectly on behavioural intention (Davis, 1989; Li et. al., 2007; Wie et al., 2009; Bhatti, 2007; Jackson et al., 1997; Agarwal & Prasad, 1999; Hu et. al., 1999; Venkatesh, 1999,2000; Venkatesh & Morris, 2000). In fact, perceived ease of use prevents the under-utilisation of the system and have favourable impact on the usefulness of the system. Based on these, the following hypotheses have been developed:

\[ H_{03a} \]: There is no significant impact of perceived ease of use on behavioural intention to adopt mobile services.
3.3.4 Perceived Credibility

Based on Wang et al., (2003), perceived credibility is defined as the extent to which a person believes that using mobile service will be free of security and privacy threats. The previous literature suggested that trust has been a significant antecedent of participation in online commerce because of the greater ease with which vendors can behave in an opportunistic manner (Reichheld & Schefter, 2000; Gefen et. al., 2003). Carter & Belanger (2005) trust-worthiness is a significant predictor of citizen’s intention to use e-government services. Perceived credibility also found to have significant positive impact on the behavioural intentions to use online banking (Wang et. al., 2003), electronic tax filing (Wang, 2003), electronic learning (Ong et al., 2004), mobile banking (Luarn & Lin, 2005) and mobile services (Wang et al., 2006). In general, the perceived credibility enables the people to conclude their transaction securely and maintain the privacy of their personal information. It also increases perceived usefulness of an mobile service system. The perceived usefulness of a mobile service system depends on the effectiveness of its relevant technological and non-technological properties (Gefen, 2003). This study tests the following hypotheses:

$H_{04a}:$ There is no significant impact of perceived credibility on perceived usefulness to adopt mobile services.

$H_{04b}:$ There is no significant impact of perceived credibility on behavioural intention to adopt mobile services.

3.3.5 Perceived Usefulness

According to Davis (1989), the perceived usefulness of a system is defined as the extent to which individual believe that using a new technology will enhance their task performance. There is extensive research in the information system that provides evidence of the significant effect of perceived usefulness on usage intention (Davis et. al., 1989, Kim & Garrison, 2009; Khalifa & Shen, 2008; Venkatesh & Davis, 1996; 2000; Jackson et al., 1997, Agarwal & Prasad, 1999; Hu et al., 1999; Venkatesh, 1999; 2000; Venkatesh & Morris, 2000). Recently, number of empirical studies has provided support for the proposition that perceived usefulness is the primary predictor of M-
commerce adoption and it captures the perceived benefit associated with using mobile commerce (Wei et al., 2009; Khalifa & Shen, 2008; Kim & Garrison, 2009). The ultimate reason that people utilize mobile service systems is that they find the system useful in their tasks. Therefore, the study tests the following hypothesis:

\textbf{H}_05a: There is no significant impact of perceived usefulness on behavioural intention to adopt mobile services.

3.3.6 Behavioural Intention

Behavioural intention refers to the individual decision to adopt or reject or increase/decrease the use of technology in subject. The behavioural construct have been adapted and modified from Nicolas et. al., (2008); Suh and Han (2003) recommending others should adopt the mobile service provider; keep using in present and future the services of service provider.

![Figure 3.3: Adoption of Mobile Services](image-url)

Figure 3.3: Adoption of Mobile Services
3.4 Current and Desired Use of Mobile Services and Activities of Mobile Service Providers in Rural Areas

Today, a rural folk with limited technological skill faces the daily challenges of learning and using the ever rapidly changing technology to satisfy certain needs. Though they are not having enough education level or skill, they are somehow using the services partially that seem fit to satisfy their needs. In order to provide full benefit of the mobile technology, it becomes significant to know the current level of usage of mobile services and their desirousness to use the mobile services in future. Since, the rural people require assistance and knowledge to operate the mobile services, the role of service providers have become critical in this respect. Based on these facts, the following hypotheses are developed:

\[ H_{01} : \text{There is no significant difference between the average current and desired use of mobile services.} \]

\[ H_{02} : \text{There is no significant difference between the average current and desired activities of mobile service providers.} \]