Chapter 2

The Conceptual Framework

This chapter provides the analytical framework that has been used to analyze the strategies for marketing innovative products. This framework embeds marketing in the broader framework of diffusion of technological innovation.

The chapter is divided into four sections. Section 2.1 offers the introduction to the theoretical framework and introduces the model. The relationship of marketing strategy with the adoption of innovations is given by section 2.2. Section 2.3 details the effect of external environment- target market characteristics, contextual factors and other stakeholders on marketing strategy for adoption and diffusion of innovations.

2.1 Theoretical framework-

One of the first (conceptual) frameworks developed for understanding the relation of science and technology to the economy has been the linear model of innovation. The model postulated that innovation starts with basic research, is followed by applied research and development, and ends up with production and diffusion. This Schumpeterian trilogy suggests that technical change happens in a linear fashion from Invention (generation of new ideas) to Innovation (development of ideas through first marketing or use) to Diffusion [spread of new technology across its potential market] (Stoneman and Diederen, 1994).

According to Tidd (2006), commercial success is highly dependent on the later stages of the innovation process, namely, development and diffusion. Out of these, processes of diffusion and adoption of innovations need greater emphasis. Thus diffusion has emerged as the key process of technological change.

Research on diffusion attempts to identify what influences the rate of adoption of an innovation. The study of the diffusion of innovations is of vital importance because new products/innovations affect every aspect of the life of individuals, communities, countries, and economies. The major impetus behind this research has been the perceived
high failure rate of new products and the consequent need to improve the marketing decisions concerned with the launch, diffusion and adoption of such products (Wright and Charlett, 1995).

Diffusion models entered the marketing discipline after Bass in 1969 realized that it is possible to use diffusion theory to mimic the growth pattern of durables and technologies (Radas, 2005). Since its start in the 1960s, diffusion research has been, the only modeling framework in marketing that is targeted at modeling the entire lifecycle course of an innovation from the perspective of communications and consumer interactions (Peres, Mahajan and Muller, 2010). Hence the relationship between diffusion and marketing has become all the more important.

An accepted definition of diffusion of innovations is “the process by which an innovation is communicated over time among the members of a social system” (Rogers, 1995). The factor in the diffusion process which is common to the marketing of all the technology products is the “chasm” between early and later innovation design and adoption. This means that the Initial development of an innovation tends to be technology-driven, as its widespread uses and critical mass of users have not yet been established. But at the later stages, market is more concerned about relative advantage, compatibility, and low complexity of the innovation rather than its technological aspects. Thus, the technology itself is not perceived as important; rather, usable devices, commodities, services, and content become more valued. The challenge for the developer and implementer, then, is to cross this “chasm,” knowing when to emphasize technology and when to emphasize the general marketplace.

Research on new product diffusion has traditionally focused on the adoption perspective (Anderson and Ortinau, 1988). This is labeled as adoption-diffusion (AD) paradigm, which examines the process by which an innovation reaches a critical mass of adopters, the diffusion is accelerated, and innovation is considered successful. Adoption involves persuading the individuals to buy the product and convincing them as to how the product is made to solve their problems and fulfill the very need.
The adoption of the product is dependent upon how well it has been marketed. Marketing is about speeding up adoption of innovations, beyond its natural social speed of adoption. The success of an innovation is measured by its adoption among the target audience which is in turn affected by its marketing. Marketing and adoption are quite simultaneous as the better the marketing capability of a firm, there are more chances that it will produce better products that are more acceptable to the society. A firm might have a strong R&D ability but be incapable of converting it into commercially viable products due to its poor marketing ability (Dutta et al, 1999). Hence, the adoption of the product is dependent upon how well it has been marketed.

Adoption /diffusion of an innovation are affected by the personal characteristics of the target audience. These characteristics pertain to their demographics, psychographics and behavior which are in turn affected by their environment. Other stakeholders like the NGO’s, customer action groups, media personnel etc too influence the ultimate adoption/diffusion. The studies of these factors help the marketers in making their products/services more acceptable among the target audience. These factors must be taken into account by the firm and reflected through its marketing strategy. This is practically feasible given the fact that strategy is essentially determined inside the firm and is relatively controllable. Hence, the factors affecting adoption/diffusion must be built into the marketing strategy. Moreover, continuous marketing effort is required by the firm to prevent the rejection of innovation at the later stages of adoption. Thus, In order to enter and penetrate the market, marketing strategy must assimilate the factors affecting the adoption and diffusion. The degree of integration between marketing function, a firm’s strategy and how it perceives the environmental uncertainty determines the success of the innovation in the market place (Gupta, Raj and Wielmon, 1986). Thus marketing is at the core of the diffusion/adoption of innovations.

Marketing is defined as the study of social and managerial process involved in fulfilling the needs and wants of the consumers through creating and exchanging products and services. Marketing was born out with the awareness that the business should start with the customer's wants and end with the satisfaction of those wants. Marketing basically
aims at providing profits to the business through customer satisfaction. This concept puts the customer at both the beginning and the end of business cycle. In general connotation, the term ‘Marketing’ is used synonymously with selling-pushng the product to the market or promoting-attracting the customer to buy the product. But the real essence of the concept lies in the fact that marketing goes far beyond the one time sale of the product and aims at its repeat purchase by the customer. Marketing is the sum total of strategies adopted by various stakeholders in persuading the customer to buy, use and adopt the product. It focuses upon two questions- how to encourage customers to purchase new products and technologies and how to forecast success in the marketplace. That is it often looks for factors that can be influenced in order to increase the number of agents that will choose a particular product. Thus, given, that if product is there in the market, marketing is the only tool in the hand of the marketer that can determine its success or failure. When it comes to innovative products and services, marketing is less about persuading people to buy, and more about making it possible for them to buy (Lambe, 2003). Marketing ability of a firm as integrated with its operations and other functional capabilities also occupy a strong place in the competitive strategy of a firm (Ray, 2005; Nath et al., 2010; Weerawardena, 2003).

Marketing literature identifies the broad paradigm of marketing strategy having two basic components- STP’s (Segmentation, Targeting and positioning) and the marketing mix (4P’s). Marketing strategy implements itself through these two components. These components have an impact on the adoption and diffusion of innovations. Logically, the factors that affect the adoption/diffusion must be modeled in the formation and implementation of these two components. These factors direct the marketer about-

1. How to divide the market in such a way that each segment which is targeted yields profits for the company
2. How to convince the customer that the product is specifically designed to fit their needs
3. Which of the product features, price, distribution channel and positioning techniques (USP, mode of advertising etc) will be most suitable? This has to be
decided while keeping into account the demographic, psychographic and behavioral characteristics of the target market.

Developing an innovation into a product, price changes, advertising, and setting the distribution channels all influence the success of a new product, as well as its rate of growth. In turn marketing strategy influences these factors by having an impact on the standard of living of the customers, health, their affordability of the product and employment and income generation.

Marketing strategy has a two way interaction with the environment also. As a part of environment, firm shapes as well as influences political, geographic, sociocultural, competitive and technological environment through its operations and transactions. Environment manifests itself through the marketing strategy by defining the boundaries within which the firm is supposed to operate. Hence the marketing strategy takes into account of

1. What is permissible by law and designs the pricing, product features and promotion strategies accordingly.
2. What is permitted and accepted according to the rules and norms of the society
3. How to design strategies in such a way as to survive and excel the competition.
4. Whether to be a leader for technological innovation or just be a part of technological change.

In addition to these other stakeholders like the consumers of the innovative product and other social groups affect the marketing strategy and how strategy should be made as to not offend them and improve the dialogue between them. The model which incorporates all these points is depicted here.
Figure 1: Linkages between Marketing Strategy, Environment and Adoption

**Marketing strategy of the organizations producing/selling innovations:**

1. STP’s -Segmentation, Targeting & Positioning
2. Marketing mix(4P’s)- Product, Price, Place & Promotion

**External environmental factors-contextual variables**

- Political
- Geographic
- Sociocultural
- Competitive
- Technological

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**Target market characteristics (customers)**

- Demographic characteristics-age, education etc
- Economic Variables – affordability, Capital Base/Land
- Need and familiarity with innovation
- Heterogeneity-Degree of innovativeness, personal influence & risk taking
- Behavioral patterns-usage-quality, frequency

**External stakeholders**

- Academicians
- Media
- NGO’s/customer groups/associations
- Consumers

**Source:** conceptualized by the author
2.2 Effect of marketing strategy on adoption of innovations

2.2.1 Relationship between segmentation, targeting positioning and adoption/diffusion of innovations

The concept of STP originated with the awareness that the markets are heterogeneous. Customers differ on the grounds of their geographic, demographic, psychographic and behavioral characteristics. Thus they have dissimilar requirements, interests, understanding and economic status. Segmentation involves dividing the total market for an offering into relatively smaller, internally homogeneous groups (Etzel et al., 2006). The essence of segmentation is that the members of each group are similar with respect to the factors that influence demand. The same is followed by targeting where the firm decides which segment/segments it should cater to and customizes its offering and the related 4P’s accordingly. Then the firm tries to establish an attractive position for its offering in the mind of target audience. This is referred to as positioning.

The interaction of the firms selected target market and the way it implements its marketing orientation determines its capability to successfully develop and commercialize the technological innovation (Slater and Mohr, 2006). The STP decision requires a systematic evaluation of possible customer segments and uses of the new innovation.

One of the pioneer studies which related the concept of Segmenting targeting and positioning strategy with the diffusion of innovations was given by Moore (2002). He started with diffusion of innovations theory by Rogers and argued that there is a chasm between early adopters and early majority. Both the customer groups have different expectations and he attempted to explore to those differences. He suggested the techniques to cross the “chasm” successfully including choosing a target market, understanding the whole product concept, positioning the product, building a marketing strategy and choosing the most appropriate distribution channel and pricing. According to Moore, the marketer should focus on one group or segment of customers at a time, using each group as a base for marketing to the next group.
According to Hawkins, Best and Coney (in Wright and Charlett, 1995), in order to speed up the diffusion/adoption for the innovative products, firm should adopt moving target market approach. According to this approach, once overall target market for the innovation or new product is selected, the firm should specifically target the innovators and early adopters in this target market. As the product gains acceptance, the focus of attention should shift to the early and late majority, who are now more inclined to adopt the innovation because of word of mouth reports from innovators and early adopters. Advertising themes and media vehicles should be progressively tailored to appeal to each new adopter category targeted, and the net effect is to speed up the diffusion process, resulting in increased first time sales and earlier repeat purchases. The firm might choose to market to one segment at a time or a number of segments simultaneously in order to induce adoption and diffusion of the innovation.

2.2.2 Marketing mix and diffusion/adoption of innovations
Marketing mix consists of 4P’s which must be customized by the marketer in accordance with the segment /target market chosen by the marketer. The basic idea behind the concept of marketing mix was proposed by James Culliton (1948). The term marketing mix was coined by Neil.H.Borden in 1953 in an article written by him. The ingredients in the Borden (marketing) mix included product, planning, pricing, branding, distribution channels, personal selling, advertising, promotions, packaging, display services, physical handling and fact finding and analysis. E.Jerome Mc Carthy (1960) later grouped these ingredients into four P’s of marketing. Product is the generic term which includes services, ideas, events or any concept which is to be marketed. Price refers to the money value and the non monetary value which is estimated by the customer when he buys the product, place means the distribution channels through which a product reaches the customers and promotion includes the methods adopted by the producer or the seller of the product in order to persuade the customer to buy it. Marketing refers to the proper mix of all these and their skewed manipulation in order to benefit all the stakeholders involved. Ideally, the ingredients of a good marketing mix flow logically from all the
relevant dimensions of a target market. Product must meet the customer needs. If and how customers search for information helps marketer in defining promotional blend. Demographic, psychographic, behavioral dimensions of the target market help the marketer in understanding the value of substitutes in meeting those needs. This further determines the price sensitivity of the market. Through marketing mix, a company puts together the controllable variables that satisfy the chosen target market. Thus in order to market any product, an organization must define its target market and then tailor the marketing mix elements accordingly.

**Role of Product- (innovation)**-The nature, characteristics and performance of an innovative product has an important bearing upon how quickly it spreads and is adopted by the market. Empirical evidence indicates that product characteristics have influence on the growth pattern (Peres, Mahajan and Muller, 2010). According to Roger’s (in Wright and Charlett, 1995), innovation, to spread and be adopted should show certain characteristics which affect its rate of adoption. The same is expressed as the Theory of Perceived Attributes (Rogers, 1995) which states that potential adopters judge an innovation based on their perceptions in regard to five attributes of the innovation. These attributes affect the adoption of the product. They are described as-

1. Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. The degree of relative advantage may be measured in economic terms, but social prestige, convenience, and satisfaction are also important factors. Rather than the objective advantages of an innovation, the perception of the targeted market as regards to its utility carries importance. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption will be.

2. Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. An idea that is incompatible with the values and norms of a social system will not be adopted as rapidly as an innovation that is compatible. The
adoption of an incompatible innovation often requires the prior adoption of a new value system, which is a relatively slow process.

3. Complexity is the degree to which an innovation is perceived as difficult to understand and use. Some innovations are readily understood by most members of a social system; others are more complicated and will be adopted more slowly. New ideas that are simpler to understand are adopted more rapidly than innovations that require the adopter to develop new skills and understandings.

4. Trialability is the degree to which an innovation may be experimented with on a limited basis. New ideas that can be tried on the installment plan will generally be adopted more quickly than innovations that are not divisible. An innovation that is trialable represents less uncertainty to the individual who is considering it for adoption.

5. Observability is the degree to which the results of an innovation are visible to others. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt it. Such visibility stimulates peer discussion of a new idea, as friends and neighbors of an adopter often request innovation-evaluation information about it.

These factors can be built in the marketing and media strategy of the product and help in its faster adoption and diffusion. Besides these factors, cost associated with the product adoption and its performance also affects its speed and extent of adoption.

Cost variables relate to monetary and nonmonetary direct and indirect costs or risks associated with the adoption of an innovation. While indirect costs are not often clearly identifiable as outcomes of innovations, they can add markedly to the cost or risk of adoption and can significantly modulate the rate of adoption. Direct costs or financial uncertainty are typically clear and are relative to the economic situation of an actor. Direct and indirect costs of innovations often inhibit adoption, especially when costs exceed an actor's resource potential (Wejnert, 2002). As explained earlier, if the performance of a product is made certain and then it is adopted by the risk averse
customers. Moreover, if the expected performance is more than its price, adoption of the product is facilitated

**Role of promotion** - Communication is the process by which participants create and share information with one another in order to reach a mutual understanding. A communication channel is the means by which messages travel from one individual to another. A company's total marketing communications mix—also called its promotion mix consists of the specific blend of advertising, personal selling, sales promotion, public relations, and direct marketing tools that the company uses to pursue its advertising and marketing objectives. Communication channels also play an important role in diffusion/adoptions of a product. Because the innovation is a new product, process, or idea, it must be communicated to potential adopters in order for them to assess its attributes and decide whether to try out and eventually adopt it. Thus, Marketing communications increase the possibility of successful adoption of innovation (Banyte and Salickaite, 2008)

Influence of communication on adoption was also studied by Bass. His model is built on two basic assumptions, that potential adopters of an innovation are influenced by two types of communication channels-Broadcast media and interpersonal channels. Mass media channels are more effective in creating knowledge of innovations, whereas interpersonal channels are more effective in forming and changing attitudes toward a new idea, and thus in influencing the decision to adopt or reject a new idea. Interpersonal communication is especially important in changing opinions and reducing uncertainty about the innovation, as potential adopters turn to credible and important sources to provide first-hand experiences and legitimization of the new idea. Thus most individuals evaluate an innovation, not on the basis of scientific research by experts, but through the subjective evaluations of their peer group who have adopted the innovation.

The influence of interpersonal communication, including nonverbal observations, is seen as a key factor accounting for the speed and shape of the diffusion curve (Rogers, 1983; Gatignon and Robertson, 1985; Mahajan, Muller and Bass 1990).
Role of price-Price decline affects the market potential by adding new households whose reservation price structure accommodates the new prices. Price declines also increases probability of adoption by converting households from being potential adopters to adopters.

According to Kalish (1985) the adoption of a new product is characterized by two steps: awareness and adoption. Awareness is the stage of being informed about the product search attributes and the information is spread by advertising and word of mouth. The second step, adoption, is conditional on awareness, and it occurs if the perceived risk adjusted value of the product exceeds its selling price. The population is heterogeneous with respect to valuation of the product. Individuals are risk averse, and therefore are willing to pay more for the product, on the average, as information from early adopters reduces uncertainty about the product. Thus the pricing strategy needs to be adjusted according to various stages of diffusion process.

The effect of price on the adoption of durables is studied by Jain and Rao (1990). Empirical results suggest that price influences consumers’ decisions on whether or not to buy.

Kamakura and Balasubramanian (1988) find that price seems to influence only the probability of adoption and only for relatively high-price goods. Hence according to them the role of price seems to be heterogeneous across products.

In order to provide value to the consumers and overcome their resistance to adopt the innovation, manufacturing costs of the innovation should be reduced and savings should be made to pass to the customers by lowering the prices.

Role of Place element-Place element includes the distribution channels used by the manufacturer, marketer of the innovation to reach its target audience. Diffusion through channels is described as a double diffusion process having two layers- the distributors and the end users (Jones and Ritz, 1991). This implies that number of retailers who have adopted the product determines the size of the consumer’s potential market.

Impact of availability of the product on adoption in long run has been studied by Ho, Savin, and Terwiesch (2002). Authors suggested that when faced with the choice between
selling an available unit immediately versus delaying the sale to reduce the degree of future shortages, the firm should always favor an immediate sale. The authors thus show that the time benefit of immediate cash flows outweighs the limitation of demand acceleration. In the presence of a supply constraint, potential customers who are not able to obtain the new product join the waiting queue, generating backorders. This results in lost sales, generates negative word of mouth and potentially reverses their adoption decision.

Research on channels of distribution has focused typically on traditional brick-and-mortar channels. The very first study on digital environment has been done by Rangaswamy and Gupta (2000). In case of digital products, most suitable for distribution and adoption in digital media, good products, with positive word-of-mouth will succeed faster, whereas bad products, with negative word-of-mouth, will fail faster.

The role of distribution channels becomes more intense in case of innovations because the marketer needs to balance appropriateness and accessibility of distribution channels for the customer along with their product placement and remuneration.

### 2.3 Effect of external environment

#### 2.3.1 Effect of target market characteristics on the marketing strategy for innovative products

The personal characteristics of the target market individuals should be taken care of by a firm while designing its marketing strategy. Individuals are studied as a part of target segment and hence the marketing strategies must be designed accordingly. Marketing strategy of the firms also effect the personal characteristics of an individual by affecting his awareness level, degree of smartness and responsiveness towards any marketing tool. According to Martinez et al. (1998), the speed of diffusion of innovation does not depend only on the characteristics of the product itself, but also on the predispositions of the target adopters. The characteristics of target audience form the very basis for STP and affect adoption directly too. According to Kundu and Roy (2010), personality, attitude and innovativeness of the employees effect the adoption decision in an organization. The
relationship between target market characteristics and adoption of innovations is further explored.

**Demographic characteristics** - the population related characteristics like the age and the education level of the target audience have a direct bearing upon the adoption of innovations. It is logical to assume that the adoption of innovation should increase with the level of education because educated individuals are more likely to be receptive to new ideas. According to Laukkanen et al. (2007), mature consumers consider new technology to be more complicated than their younger counterparts. Hence higher cognitive effort is used in adoption of innovations by the mature consumers resulting in more resistance to the new technology. Moreover elderly consumers are less likely to try and adopt new technologies and are more satisfied in the marketplace than the young consumers. It has been predicted that the elderly consumers are more dependent upon mass media and family than friends and neighbors as information sources and rely more on print than broadcast media (Gilly and Zeithmal, 1985). This has an important implication for the communication strategy.

**Economic characteristics** - like income status and affordability of the target segment affect the STP and pricing strategy directly. Income status of the target audience is one of the major segmenting dimensions. According to Golder and Tellis (1998), high prices hold back most of the customers from purchasing new/innovative products. New products are expensive when they first appear on the market, and become attractive to the mass market only when their price drops sufficiently. Consumers delay their purchases until prices decline or incomes rise sufficiently for them to afford the new product. Hence, affordability is a key driver of new product growth. This affects adoption at the customer level. Setting the proper price the first time when the innovation is launched in the market, can allow business to build positive relationships with customers and provide positive cash flow on which to build the business.
Psychographic characteristics - these include degree of innovativeness of the prospects, personal influence of the adopters and their risk taking ability.

a. Degree of innovativeness - Research findings show that highly innovative people tend to be more likely to adopt new products than people with a low level of general innovativeness (Goldsmith and Newell, 1997).

According to Midgley and Dowling (in Phang et al., 2010), innovativeness is the degree to which an individual is receptive to new ideas and makes innovation decisions independently of the communicated experience of others. According to Rogers (1983, p.245), Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system. A specific set of demographic, psychographic and behavioral characteristics determine who will adopt the innovation earlier or who will do it at a later stage. This is explained by Roger’s through individual innovativeness theory which states that individuals who are predisposed to being innovative will adopt an innovation earlier than those who are less predisposed. On this basis, Rogers has proposed that adopters of an innovation can be classified into five categories -

1. Innovators - innovators are the individuals who have enough control on the financial resources, ability to understand and apply technical knowledge and ability to cope with uncertainty.

2. Early adopters - they are the opinion leaders. Potential adopters look to early adopters for advice and information about the innovation.

3. Early majority - they adopt new ideas just before the average member of a system. They have frequent interaction in their peer group but they are not the opinion leaders.

4. Late majority - they adopt new ideas just after the average member of a system. They adopt through the peer pressure. They have scarce resources.

5. Laggards - they also have scarce resources. They are suspicious of innovations and change agents.
According to this approach, once overall target market for innovation is selected, the firm should specifically target innovators and early adopters in the market. As the product gains acceptance, the early and late majority should be focused. Thus the marketing strategy for the innovations should be built around the degree of innovativeness of the target audience. This point has been further emphasized by Zikmund (1993) as quoted by Banyte and Salickaite (2008). According to the author, Communication channels should be chosen according to the behavior and preferences of the target category. For innovators and early adopters it is advisable to use public relations and advertising. For early majority direct marketing should be used in addition to the PR and advertising. For late majority and laggards-advertising and sales stimulation can do the needful. even the content of the communication varies according to various stages in the consumer adoption process-introductory information at the awareness stage, detailed information regarding benefits and value at the interest stage, information from cost benefit analysis at evaluation stage, information regarding the possibility of trying out the innovation at trial and reinforcing the customers that they made a good choice or to reconsider their decision respectively in case of adoption/rejection. The thorough analysis of potential customer behavior is important to identify the communication channels to be used and the message content.

b. Personal influence of the adopters- The personal influence of the target segment in the form of status, respect and position in the society is also an important determinant of adoption which needs to be taken care of while deciding upon marketing strategy for innovations. Moreover this influence affects their ability to influence the potential adopters also. Only a few adopters turn out to be the opinion leaders. According to Feick and Price (in Jordaan and Simpson, 2006), opinion leaders are individuals who act as information brokers intervening between mass media sources and the opinions and choices of the population. They often have a substantial effect on the diffusion of a product throughout its
intended market. This is because an opinion leader is a person who exerts disproportionate influence on others through interpersonal communication. Opinion leaders appear to be more knowledgeable about, and involved with, the product class. These consumers are therefore very important to marketers in distributing product information. Thus the marketing strategy for innovations should specifically aim at identifying the opinion leaders and then target them.

c. **Need for uniqueness**- Individuals with high needs for uniqueness were more apt to adopt new products than were individuals with low needs for uniqueness, Roehrich (in Jordaan and Simpson, 2006). This is due to the reason that the need for uniqueness includes independence in judgment, which is necessary for innovative purchasing. Hence the marketer must emphasize the self-esteem and self-actualization needs of the segment while designing the communications strategy.

d. **Risk taking ability of the target market**- This ability varies from one individual to another. It is a blend of his economic and psychographic characteristics. Roberts and Urban (1988) assume that individual consumers choose the brands that provide them with the highest expected risk-adjusted utility and update their prior beliefs about the brand in a Bayesian fashion with the arrival of new information. Oren and Schwartz (1988) study the choice between an innovative new product with uncertain performance and a currently available product with certain performance. The study revealed that Uncertainty leads risk-averse consumers to delay adoption until they get more evidence on the performance. Early adopters are those who are less averse to risk while later adopters are imitators who delay purchase until they get enough information from the market to overcome their initial uncertainty. Chatterjee and Eliashberg (1990) develop a model where consumers are risk averse and adopt a product only if their expectations of its performance exceed a “risk hurdle” and a “price hurdle.” The consumers update their expectations of performance based on the information (positive or negative) they receive. Consumers are hence heterogeneous in the cumulative information they need for adoption.
Karshenas and Stoneman (1993) describe that individuals adopt as soon as the utility of the innovation exceeds some critical level or threshold. If the utility increases systematically over time and the thresholds follow some bell-shaped distribution, then the cumulative number of adopters, that is, the diffusion curve will be S-shaped.

**Behavioral characteristics** - needs of the target audience, familiarity with the innovation, usage of innovation.

a. **Needs of the targeted individual** - whether an innovation is considered for adoption by an individual actor is strongly determined by compatibility between the characteristics of an innovation and the needs of an actor (Wejnert, 2002). Further, the performance of the product also determines how well it has fulfilled the needs of the target audience.

b. **Familiarity with Innovation** - The familiarity associated with an innovation relates to how radical it is (Rogers, 1995). According to Greve (1998) (in Wejnert, 2002), because people are naturally cautious in approaching novelty, the rate of adoption of an innovation-all other factors being equal-increases as its novelty decreases. When the apparent familiarity of a new idea is increased, for instance by media information and the opinion of experts, the perception of risk by an adopter is substantially reduced, facilitating adoptive behavior (Wejnert, 2002). Thus marketing strategy can assist in the adoption of innovations by reducing their perceptual risk.

If the consumer is already familiar with the product or can map it to the multiple existing categories, marketers can leverage the power of consumers existing knowledge to help them learn (Moreau et al., 2001). Thus the distribution channels, market communications and price elements of the marketing strategy should complement the market’s existing knowledge and familiarity with the innovation.

c. **Usage of the Innovation** - it refers to the question - how do the target audience use the related products or how will the target audience use the innovation? Marketers
should analyze the existing habits, practices and workflows in the area where innovation will be used. Innovations that require significant changes in the daily routine of the target audience require a long market development process. In order to overcome usage barrier of the customer, marketer integrate the innovation to the preceding activity or product and estimate that how the innovation will fit into the existing system. Marketer can also make the innovation usage mandatory through government legislation (Sheth and Ram, 1987). This will facilitate the faster adoption and acceptance of the product.

2.3.2 Effect of contextual factors on marketing strategy

Innovations evolve in a specific ecological and cultural context and that their successful transfer depends on their suitability to the new environments they enter during diffusion. The significance of environmental factors has been established. James (1993) refers to contextual environment factors as "externalities" and suggests that they affect the practicality and benefits of adoption, as well as an adopter's willingness and ability to adopt an innovation. Moreover they have an impact upon how the firm should market its innovations. Political and legal environment determine the areas where firm can operate or segments it can target. Cultural environment has an impact upon how the innovation will be viewed and used. Social environment has an important bearing on the communication and distribution strategy whereas product element is strongly affected by technological as well as competitive environment.

Political environment- whatever industry the marketing firm is involved in, changes in the political and legal environments at both the domestic and international levels can affect the company and therefore needs to be fully understood.

Literature is concerned with the impact of political conditions on adoption of innovations and has primarily analyzed the character of political systems along with the regulations and norms inherent in the legal systems. Political situations could inhibit or postpone adoption of some innovations. Parente and Prescott (2000) argue that while technology is
global, countries differ in their resistance to adopt new technologies, due to the greater or lesser influence of domestic lobbies and state bureaucracies. Particular emphasis has been placed on the extent to which state policy, by supporting Traditional practices affects adoption.

(James, 1993) demonstrated that the rate of adoption is strongly influenced by protecting domestic technologies from replacement by technologies from foreign countries. Several studies suggest that the rate of adoption of innovations by companies or professional organizations is a function of state legislative systems. Patent laws, for example, have regulated firm's adoption of technological innovations and professional-license laws have modulated the diffusion of professional licenses.

According to MacLeod (1991), the inventions which are considered worthwhile by the customers escape from the patent systems and get diffused but whether the inventors are able to reap its benefits or not will depend upon the configuration of the patent system. This encourages/discourages the inventors to support the invention in future. The same can be provided through a well planned marketing effort. States' ideological doctrines and political censorship determine the structure as well as effectiveness of the marketing strategy.

**Geographic environment** - the product strategy and the distribution strategy are strongly affected by this environmental variable.

Geographical environment manifests itself in two forms- spatial dimensions and ecological infrastructures.

Spatial dimension refers to an automatic spread of innovations between individual actors who are in close geographical contiguity, such as within rural or urban communities or counties located within the same geographical region (Wejnert, 2002). Geographical proximity is generally estimated as the relative rate of adoption between geographically spaced actors. Because proximity can affect the frequency of communication and the personal nature of interactions between actors, it enhances the spread of information and ideas and facilitates imitative behavior (Rogers, 1983). Further the location matters for
the diffusion of technology, through increased trade links, foreign direct investment and contacts between researchers (Abreu and Groot, 2004). This also affects the formation of social networks. The geography affects formation of social networks and the social networks affect diffusion and adoption of technologies, depending on the type of network. In particular, networks based on frequent meeting promote knowledge diffusion but does not necessarily promote adoption of new technologies. The farmers who know technologies require some kind of reinforcement through social networks for adoption; the reinforcement is not generated from frequent meeting. With respect to social networks, the effect is most notably visible in isolated networks, such as youth gangs or in covenant communities, rural or religious communities that are established by homogeneous groups. In such networks, adoption of an innovation by a network's more prominent members induces adoption across community members. Thus the opinion leaders need to be identified in these cases. Choice, size and nature of distribution channels (place mix) are also influenced by geographical proximity.

Geographical settings also affect adoption by influencing the applicability of the innovation to the ecological infrastructure of the potential adopter. The impact of ecological infrastructures such as climate, weather, or soil conditions on adoption generally applies to agricultural, Fliegel (1993) (in Wejnert, 2002) innovations because some of these innovations can be adopted only when they are suitable to an actor's ecological conditions. Thus while marketing such innovations; marketers should customize its product features to suit that geographical setting.

Cultural environment- Marketing strategy of a firm is highly affected by the culture of the area in which it operates. Core cultural values are firmly established within a society and are therefore difficult to change. They are perpetuated through family, the religious institutions, education and the institutions of society and act as relatively fixed parameters within which marketing firms are forced to operate. Secondary cultural values, however, tend to be less strong and therefore more likely to undergo change.
Generally, social change is preceded by changes over time in a society's secondary cultural values.

Socio cultural aspects can act like a barrier for the diffusion and the adoption of innovations (Deligiannaki, 2011). A broad spectrum of variables of societal culture is studied in diffusion research-belief systems (values, norms, language, religion, and ideologies), cultural traditional, cultural homogeneity and socialization of individual actors-as influencing adoption of innovations. In addition, studies emphasize actors' adoption behaviors as a function of an impact of culture on societal values, characteristic that confer high status and composition of networks. Belief systems constitute culture, but culture also affects societal values and, in turn, influences adoption of innovations (Wejnert, 2002).

Two other aspects of culture can affect adoption rates at the country level. First, a high degree of social inertia in adopting practices and ideas, adversely affecting a country's adoption of technological developments and extending the time between early and late adoptions. Second, the degree of cultural homogeneity of a country's population may be positively related to adoption because it increases the degree of structural equivalence between transmitters and potential adopters. There is one additional way in which cultural variables may influence adoption rates: socialization of individual actors, which is influenced strongly by culture, may mobilize available societal talents of entrepreneurship, perseverance, determination, and marketing skills required of actors who consider adoption of new practices or policies.

**Effect of social environment**-A social system is defined as a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal. The members or units of a social system may be individuals, informal groups, organizations, and/or subsystems. The social system constitutes a boundary within which an innovation diffuses. How the system's social structure affects diffusion has been studied. The components of social; system are studied by Rogers. According to Rogers, external or social conditions that may accelerate or slow the process of Diffusion/Adoption are:
1. Whether the decision is made collectively, by individuals, or by a central authority.
2. The communication channels used to acquire information about an innovation, whether mass media or interpersonal.
3. The nature of the social system in which the potential adopters are embedded, its norms, and the degree of interconnectedness.
4. The extent of change agents’ (advertisers, development agencies, etc.) promotion efforts.

The effect of social environment or the social system in itself works through interpersonal communication channels. Rogers's (1983) model of diffusion is based on the classical "bell-shaped" normal distribution curve, where the curve represents the frequency of consumers adopting a product over time. If the cumulative number of adopters is plotted, the result is an S-shaped (sigmoid) pattern. Rogers (1983) contends that the adoption curve is normally distributed because of a learning effect due to personal interaction within social systems. As the number of adopters in the system increases so does the level of interpersonal influence on non-adopters. The result of this influence on adoptions is held to follow a binomial expansion, a mathematical function that follows a normal curve when plotted over a series of successive periods. There comes a point at which enough individuals have adopted an innovation that the innovation's further rate of adoption becomes self-sustaining (critical Mass). The concept of the critical mass implies that outreach activities should be concentrated on getting the use of the innovation to the point of critical mass. **This further has implications for marketing strategy**- These efforts should be focused on the early adopters, the 13.5 percent of the individuals in the system to adopt an innovation after the innovators have introduced the new idea into the system. Early adopters are often opinion leaders, and serve as role-models for many other members of the social system. Early adopters are instrumental in getting an innovation to the point of critical mass, and hence, in the successful diffusion of an innovation.
**Effect of competitive environment** - An innovation may establish a new product category, may be a substitute product or a complementary one. 

The adoption of an innovation is dependent on the presence of related innovations (e.g., Rogers, 1995). Literature has accounted for two-way interactions in diffusion processes. Bucklin and Sengupta (1993) develop a model to examine the co-diffusion (both one-way and two-way interactions) of two complementary products. The authors find that co-diffusion does exist and may be asymmetric in that one product has a stronger influence on the other product’s diffusion than vice versa. Co-diffusion effects are found to be stronger than innovation effects.

There are a number of models that attempt to understand strategic interdependencies among complementary and competing products. It would also be useful to trace these effects when a new market of an initially complementary product grows to the extent that it becomes a competitive product. Further, research on competitive effects indicates that the diffusion process/ultimate adoption may differ depending on the order of a new brand’s entry and the competition it faces.

According to Parker and Gatignon (1994) (in Chandrashekhran and Tellis, 2007), for the pioneer product/brand, there are strong brand identification effects and the diffusion of innovation is independent of competitive effects. For the second brand and other generic followers, prior adopters of the product class as a whole negatively influence their trials. The sensitivity of the diffusion of these brands to marketing variables also varies with the entry of competing brands.

Krishnan, Bass, and Kumar (2000) (in Chandrashekhran and Tellis, 2007) study the impact of a late entrant on the diffusion of a new product. Using brand level sales data from the cellular telephone industry, they find that the impact of entry of a new brand varies from market to market, increasing the market potential of the category in some, hastening or slowing the diffusion process of other brands in others.

Lehmann and Weinberg (2000) (in Chandrashekhran and Tellis, 2007) focus on sequentially released products: new products that are released sequentially across channels (for instance, movie releases via movie theaters and then video rentals). A
crucial question in the distribution of these products is the optimal timing of release across the channels in the face of cannibalization. Waiting too long to release the videos may reduce the marketing impact from the theater release. The authors determine that the sales of the initial product (theater attendance) can help forecast the sales of the sequential product (videotape rentals), and also that the optimal time to release the video is sooner than what is being done in practice. Hence there is a strong impact of competitive environment on the diffusion/adoption of innovations. The same needs to be built into the marketing strategy of the firm.

Effect of technological environment- The technological environment refers to new technologies, which create new product and market opportunities. Technological developments are the most manageable uncontrollable force faced by marketers. Organizations need to be aware of new technologies in order to turn these advances into opportunities and a competitive edge. Technology has a tremendous effect on life-styles, consumption patterns, and the economy. Advances in technology can start new industries, radically alter or destroy existing industries, and stimulate entirely separate markets. The rapid rate at which technology changes has forced organizations to quickly adapt in terms of how they develop, price, distribute, and promote their products. Dynamism of the technology, affects the market structures as well as the marketing strategy of the firms selling the innovations. An innovation must erect some barriers so as to prevent itself from being copied fast in the market. Another threat which an innovation faces in the market is from the better technology. Thus the firm themselves launch better products or new generations of the existing products. Mahajan and Muller (1996) (in Chandrashekhran and Tellis, 2007) account for the fact that users may skip a generation and buy a later generation (leapfrogging behavior) of the same product/brand. They propose a “now or at maturity” rule for new product introduction, that is, they determine that the optimal rule for a firm to use in the decision to introduce a new generation of a technological durable goods is either to introduce it as
soon as possible or to delay its introduction until the maturity stage in the life cycle of the first generation.

According to Michalakeli (2010), the saturation level for a new former generation of a high technology product is affected by the diffusion process of its next generation. Kim, Chang, and Shocker (2000) (in Chandrashekhran and Tellis, 2007) try to capture not only the substitution effects between successive generations within a product category, but also complementary and competitive effects among product categories in a single model. Hence, the market potential of a generation of a product category is affected not only by technological substitution from another generation within the category but also by the sales of other categories.

Hence it can be concluded that the wider economic, regulatory, and social and technological environment heavily determines the success or failure of an innovation. The description of diffusion modeling in which incorporates the effect of marketing mix variables has also been provided by Peres, Mahajan and Muller (2010). But there are a few researches which talk about performance as it relates to marketing strategy of the firm along with the environmental variables. Thus where the marketing mix variables like product and distribution channels are under researched, the impact of performance and environmental characteristics cumulatively with the marketing mix variables need to be established.

2.3.3 Other stakeholders

These refer to the general public that has an impact on the marketing strategy for the innovative products. They include NGO’s, citizen action groups, consumer associations, media, scientists and academicians. They affect the diffusion/adoption of innovations through their collective power as large groups or contribute individually too. Collective actors with high status, i.e., those that control either political power or economic resources, such as governments, large corporations, or world economic organizations, usually adopt an innovation first and then impose adoption of the innovation on lower status actors (Wejnert, 2002). Publics like media and researchers,
academicians have a power to influence the opinion as well as attitude of the target market as well as society at large. Hence the marketers should push the innovation through these parties and marketing strategy should take special care of these parties and try not to offend them. The above analysis suggests that if the innovation has already been developed, marketing strategy is one of the prominent tools in the hand of marketers that determine its success/failure. Marketing strategy is required to support adoption since its first stage and goes up to the last one. Adoption means the acceptance of the product by the customers. There are several stages of decision adoption process: knowledge or awareness of the innovation, persuasion (reactions to and evaluations of the innovation), decision (to obtain, purchase, try out), implementation (acquiring, adjusting, applying, including a “fair trial” period), and confirmation (including public display of the adoption, and recommending the innovation to others). Hence the factors important for the adoption have to be considered while designing marketing strategy. These factors gain extra momentum in case of radical innovations. This is due to the fact that the radical innovations are surrounded by a number of concerns and controversies because of the uncertainty and risks associated with them. Hence in order to develop a framework for the marketing of innovations, a few radical innovations have been studied in the next chapter.