Diffusion of Innovation –A Conceptual Framework And Research Propositions

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Introduction

In an era of global business activity, knowledge of new market is really important, even if firm is doing well in domestic market sometimes slips when they expand their operations across the border. Launching new product in global market comes up with different challenges for marketer regarding exact information of market. Consumer response differ from country to country on basis of cultural difference and these difference leaves enough reasons for marketer to do extensive research to have complete knowledge of market and to forecast. Firms launching product in foreign market need to know the complete country profile, especially culture, consumer behavior to avoid falling in international market. Knowledge of cultural differences in social interactions and ultimately adoption of new arrival in a particular country can help the managers to predict demand in future by less ambiguity of host country cultural environment.

A product is anything that can be offered to amarket to satisfy a want or need. The products that are marketed include physical goods, services, experiences, events, persons, places, properties, organization, information and ideas.

There are five levels of product like core product, basic product, expected product, augmented product and potential product.

The diffusion of innovation may fall under 2 patterns.

1) Sigmoid pattern

2) Exponential pattern

Sigmoid pattern

A sigmoid pattern is carried out under the conditions of

The operation of personal influence

A learning hierarchy process of adoption

High innovation costs of high switching costs

Unimodal distribution of initial beliefs towards the innovation within the social system

High uncertainty.
Exponential pattern

An exponential pattern is expected under the conditions of

A relative lack of personal influence

A low involvement process of adoption

Low innovation and switching costs

A uniform pattern of initial beliefs within the social system.

A new product affects every aspect of the life of individuals, communities, countries and economies.

Innovation

Innovation refers to new product, new method, practice, institution or social entity

Diffusion of innovations is defined as "the spread of an innovation across social groups over time".

Diffusion (n) is a spread of cultural or technological practice of innovation fromonregion or people to another.Diffusion ispour, spread out or disperse in every direction, spread or scatter widely.

Diffusion of innovation and subsequent adoption is impacted by socio-economic, cultural, technological as well as legal factors. It is also impacted by individual determinant like psychological variables and demographics.

Adoption process
Adoption and diffusion process of new product

The solid line boxes contain things that influence an individual person's adoption decision and action and the broken lined boxes describes a firm's marketing efforts or things which affect the items in the person's adoption decision and action.

There is certain product and service characteristics that affect the diffusion process and it influence the consumer acceptance of new products and services. The five factors that can impact t the diffusion process and the rate of adoption are

Relative advantage: The degree to which customers perceive a new product/service as superior to similar existing product is known as Relative advantage and thus in terms of its value.

Compatibility: A product will diffuse more quickly if it does not require consumers to change their values, norms, lifestyle, culture and day-to-day behavior. So, it is measured with the help of how closely it relates to the needs, values etc.

Complexity: an innovative product will easily defined into market when it is easy to understand, use and purchase. The easier it is to understand, the product will be accepted more quickly.

Trialability: The ease with which the product or service can be tested and tried also determines the rate of acceptance. This is because, the prospect get an opportunity to try the product/service, asses it and decides to accept/reject it.

Observability:

It refers to the degree to which a product or service's benefit can be observed, imagined and perceived by potential consumers. Those new product offerings are

1) Tangible

2) Have social visibility

3) Whose benefits are readily observed

These products are more readily diffused than that of intangible, have no social invisibility and whose benefits are not readily observed accumulates over a longer period of time.

Relative advantage, compatibility, trialability and observability are positively related aspects and complexity ad perceived risk are negatively related aspects.

Barriers in adoption of new product
The barriers involved in adopting a new product are as follows

1) Usage

2) Value

3) Risk

4) Psychological factors

Usage: Usage is act as one of the barriers in innovation diffusion and it came into existence when the social system finds it incompatible to the existing usage and consumption behavior.

Value: Kotler defines value as a ratio between what the customer gets and what he gives. Consumers could resist acceptance of an innova

$$Value = \frac{Benefits}{Costs} = \frac{Functional\ benefits + emotional\ benefits}{Monetary\ costs + time\ costs + energy\ costs + psychic\ costs}$$

Risk: The product won't get acceptance in the market out of fear of taking risks. There are six types of risk that associated with the product. The risks are

1) Functional risk(would the product perform as expected)

2) Physical risk(Product usage and consumption pose a threat)

3) Social risk(Risk of social embarrassment)

4) Financial risk(Product will be worth the cost)

5) Psychological risk(Innovation hurt consumer's ego)

6) Time risk(Wastage of time while making purchases)

Psychological factors
It relates to a person's background, attitude and belief, perception, values, lifestyles, culture etc. There are two threats under psychological factors

• **Traditional barrier->** relates to socio-culturally accepted norms of behavior that are considered as "right and appropriate". Anything that is new and does not support traditional pattern is regarded as psychologically threatening.

• **Image barrier->** refers to the consumer's attitude and feelings about the product/service offering

The perceived risk barrier act as a big barrier to the diffusion process.

To overcome the problems or barriers of diffusion of innovation, the marketer could make use of both marketing communication (Via- audio visual or print media or company salesperson) as well as interpersonal communication (opinion leadership, word of mouth communication. Trials (free or discounted) as well as interpersonal communication with peers, colleagues and friends can also encourage personal experience by consumers to overcome from this risk.

$$Diffusion\ pattern = \frac{p}{q} \propto \frac{Initial\ value}{Perceived\ risk} \times \frac{Marketing\ efforts}{Supply\ response} \times \frac{Personality}{Similar\ product} \times \frac{Attributes\ of\ adopter}{Competing\ product}$$

While the product enters into the market, not all people gave receptive response to theinnovative offering. People vary with degree with respect to their receptivity towards new product/service offering.

Models in diffusion of innovation
There arethree basic models in the adoption of a new product

1 Pure Innovative models (e.g., Fourt and Woodlock, 1960)

2 Pure Imitative Models(e.g., Fisher and Pry 1971, Mansfield 1961)

3 Combination Models (e.g., Bass 1969).

The pure innovation model exhibit an exponential cire shape and that adoptions are based on individual's exposure to external information source as advertisement, salesman etc. Te equation framed in this model

$$f_t = rM(1-r)^{t-1}$$

Where = change in cumulative sales at time t/ potential sales

r = rate of penetration of potential sales

M= total potential sales/all buyers or market saturation percentage.

The imitative model of Fisher and pry (1971 contains the concept of replacement of old product with the new product and that the rate of adoption of the new product is de-

pendent on the percentage of the old product still in us. It is logistic S-shaped curve.

$$f = \frac{1}{1 + e^{-b(t - t_0)}}$$

f = percentage of market that adopted new product

b=growth to potential constant

t= time since introduction

Bass Model
The pure innovation and pure imitation model have been combined and named as one of the new model as Bass model (1969). The bass model gives the innovative characteristics as **p** coefficient and imitative characters as **q** coefficient. This model describes the differences among consumers in terms of how innovative they are in their tendencies to adopt a new products and which types of information about a new product are most persuasive prior to adoption. When a new product is introduced in the market, there exists uncertainty in the minds of peoples that how far this product is more superior to the existing ones. Therefore, the individuals search for the information to know about the new product by watching the mass media and they also give importance to the interpersonal communication of word-of-mouth communication.

Bass model is the pioneer model in framing the equation for new product adoption. The adoption of a new product spreads through a population primarily due to contact with prior adopter. Hence the probability that an individual purchases at time t, given that the individual has not purchased before is a linear function of the number of previous buyers then the equation is

f (t)/ 1 −F(t) = p +qF(t)

Where f (t)   is   the   density   function   at   time   t for the adopters

F (t) is the ratio of cumulative adopter at time t.

  The figure shows the imitator and innovator in adopting the new product.

Innovators ········ Imitators ┄┄ New adopters ───
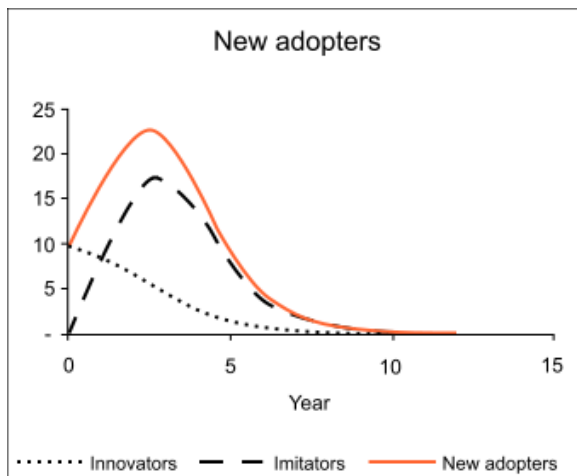
Roger's Model
Roger's categories the customers based upon the adoption on time basis. According to this model there are five different types ofconsumers in the market

• **Innovators** - are first to buy and typically described as venturesome, younger, well educated, financially stable, and willing to take risks. The people who are highly educated, high income groups are ready to try the new product in the market. But they are not loyal to one brand. Theyact according to their inner direction. If the new products match with their expectations, they will become the opinion leader in the market.

• **Early Adopters-** are local opinion leaders who read magazines and who are integrate into the social system more than the average consumer.

• **Early Majority-** solid, middle-class consumers who are more deliberate and cautious

• **Late Majority-** described as older, more conservative, traditional, and skeptical of new products

Early adopters, early majority and late majority depend upon the opinion leader while they would like to try the new product. They had the confidence on the word-of mouth communication (i.e.) interpersonal communication. They look up the advice of innovators and guidance about choosing the new product/services

Laggards

Laggards hate innovative products and the characteristics of laggards are

Resist change

Conservative

Like tradition

Often older & lower in socioeconomic status

Social System and the Network
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 social system may be individuals, informal groups, organizations or subsystem. Members of a social system adopt an innovation in a sequence, so that individuals can be discerned in terms of time of adoption. In the social system the network play amain role in spreading of information about the new product. Previous users (innovators) are expected to accelerate growth due to interpersonal effects which is typically used to reduce both risks and search costs.

The aggregate adoption function (or) the market potential can be identified with thehelp of the some factors. As per the review of literature that quoted by Mahajan and Peterson 1979.

At any given point in time (t), N (t) consumers have adopted. By taking the network effect into account, the market potential is comprised of only those consumers whose thresholds are lower than N (t). Therefore, the aggregate adoption function is given as

$$dx/dt = \left(p + q \cdot \frac{x(t)}{N(t)} \right) \cdot (N(t) - x(t)),$$

Word-of-mouth demands actual communication not merely an assessment of the number of adopters. While people talk with many people through online communication, the new product's image will spread faster in the market and now there is an internet age so, the word-of-mouth act predominantly through off-line phenomenon.

When the product came into being, they are included in a global list. The presence of a product in the global list only announces its availability. When user picks the topic from the global list is termed as adoption. Only, when a product gets adopted, it enters the social network. When a neighborhood speaks on a product, it creates an instance of the product in its local list.

Critical Review of Diffusion of Innovation
Researchers have identified various drivers for the diffusion of innovation. No researcher has developed an integrated theory that either incorporates or differentiates among all these drivers.

In the area of modeling there are some issues about diffusion of innovation. Many researchers have been carried out for consumer durable goods and a little on movies. So, there is a need to carry on the research on other categories of a product like services, software, medical products etc.

The network effects play a key role in the takeoff or success of a new product. So, the coming research has to integrate the role of network effect in determining the fastest rte of adoption of a new product. Bass model has been the platform of diffusion research in marketing because of its simplicity of good predictive ability. So, along with that the Roger's model also gain an importance in this diffusion process

Conclusion
With the rapid development of science and technology, the innovation of product speeds up and also the customer's preferences changes rapidly. In today's market, the product life cycle is becoming shorter and shorter. Many products like cell phone, personal computer life span is about only 6 months. Because, these product is having the close touch with thecustomers of which theyare playing a very big role in the human being's life. Consumer consumption level gets increased and it forces the manufacturers to make innovation in their product to survive in the intense competition in the market. So, they are making heavy investment in the R&D department by association the human and capital in creating a new product