

Accelerating Diffusion of Innovation: A Case Based Approach to Explore and Build a Sustainable Framework Relevant For 21st Century

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Abstract

Innovation and its successful diffusion into social system has been an area of prodigious interest among researchers and academicians across the world. Behavioural scientists and social researchers have been attempting to identify the process and stages through which adoption of an innovation takes place among the masses, and consequently, postulated number of theories illustrating the process of diffusion. Since the time Everett Rogers, one of the noteworthy contributors to the theory of diffusion, categorised people into five different segments with descending rate of adoption (Innovators, Early adopters, Early majority, Late majority and Laggards), there has been an accepted belief that all innovations follow these five stages of diffusion. The adoption of any new innovation is primarily triggered by a set of individuals highly innovative and sophisticated in nature. It is the demonstration effect exhibited by these individuals which makes the innovation acceptable to the masses. However, the explosion of social media in 21st Century and its universal adoption has led to something called as 'Innovation optimism', coined by Kit Yarrow in her book, "Decoding the New Consumer Mind", who opines that more and more people across the world are transforming into innovative customers with tendency to take higher risk in the context of adopting new innovation. The concept of 'Lead market' popularised by Marian Beise also considered customer sophistication to be the antecedent of innovation diffusion attributing most of the Global diffusion to developed Countries, until Rajnish Tiwari and Cornelius Herstatt argued that the developing Countries with low per capita income can also lead diffusion of innovation, where the sophistication of customer is offset by size of the population. Interestingly, the Brand Value Chain, developed by Kevin Lane Keller, also appears to have high degree of relevancy in this context, which provides a four stage framework to transform marketing investments into shareholders value. The present study is an attempt to explore the possibilities of accelerating the process of diffusion of innovation by adopting an integrated approach, combining and remodelling the Lead market theory and Keller's Brand Value Chain through case study method. The framework may be instrumental in triggering, sustaining and accelerating mass adoption of socially beneficial innovation. The researchers intend to extract elements from lead market theory and incorporate as adoption multipliers or catalyzers in Keller's Brand Value Chain expecting to smoothen the process of diffusion.

Introduction

The term 'Innovation' is no more a sporadically or infrequently used word. It is rather, the most common and eclectic area of interest which has gained accelerated momentum since the beginning of 21st Century. The ability of sustained survival of individuals and institutions, in this era of hyper competition is primarily attributed to skillfulness and creativity in designing and executing innovative strategies. The element of innovation is, in fact, ingrained in our adaptive survival techniques in this dynamically changing world. Innovation is not a choice any more, but an imperative, which if not perceived properly, prioritized and incorporated as an essential element in day to day operation, would inevitably cease the existence of the entity or institution. However, executing an innovation in the society is probably many folds more important than designing it, as an innovation is considered successful only then, when it is adopted by the masses. This process of adoption is technically known as 'diffusion of innovation'. Precisely, *diffusion is the process by which an innovation is communicated over time among the members of a social system* (Rogers and Kincaid, 1981).

The perceived notion or predisposition that innovation and its social adoption is primarily a leap of faith, is proven irrelevant long back. Many early contributors to diffusion of innovation theory have been successful in proposing and establishing the fact that the process of adoption of innovation is a planned and systematic approach. According to Everett M Rogers, an early and most noteworthy contributor to diffusion of innovation theory, *“One reason why there is so much interest in the diffusion of innovations is because getting a new idea adopted, even when it has obvious advantages, is often very difficult”*. The area of innovation and its mass social adoption has been an immensely interesting subject for exploration to many scholars and researchers, which is visibly evident from the fact that even during early 1960s, when Rogers published his first book, there were more than four hundred empirical and conceptual literature available on the subject. In 1983, when Rogers published the third edition of his book, there were more than three thousand published work available on innovation.

The exponential growth in interest among researchers to explore innovations and their diffusions, however, was natural and in response to growing complexities among societies and enterprises. Corporations, society and individuals have been challenging each other to evolve effectively and relevantly to shield their vulnerability arising from unremittingly changing environmental forces, thereby, threatening their existence. Hence, there had been a constant and restless effort to formulate, organize and reorganize theories and practices to achieve synergy which ensures smoothness in the process of adopting any new innovation by the society.

The social adoption process of any new innovation predominantly demands behavioral change in the members of the society. This behavioral change is required to be learned and sustained for successful diffusion of innovation. However, it had been an all-time herculean challenge for behavioral scientists and researchers, across the world, to bring a permanent change in voluntary behavior of individuals in a society for a desirable social benefit, which continues till today. Social scientists and researchers have tried to address this issue of initiating and sustaining behavioral change among the members of the society for a greater social benefit through diffusion of innovation, since decades and probably centuries. Interestingly, this had been a prime concern for marketers, many of who suffered irreparable damages and losses because of their failure to make the customers migrate from a particular behavioral practice to new behavioral norms to facilitate diffusion of innovative products and services. This paper is an attempt to explore the possibilities of using marketing management concepts, specifically, Kevin Lane Keller's brand value chain and Lead market theory proposed by Marian Beise, to trigger, accelerate and sustain behavioral changes for facilitating the diffusion of new innovations in the society.

Background and Relevance:

According to Linton, Diffusion includes three distinct processes, namely, presentation of the new culture element or elements to the society, acceptance by the society and integration of the element or elements into the preexisting culture (Linton, 1936). All these three stages are immensely crucial, as a trivial error in any of these three stages can not only disrupt the entire process of diffusion, but also rule out possibilities of introduction of the same innovation or concept in future. Diffusion is the process to convey a message which consists of some new idea and it is the newness of the idea which makes it different. However, adoption of any new idea or innovation by the society is confronted by two major impediments which inhibits people to migrate to a new behavioral practice. According to Clayton M. Christensen, the two forces which oppose change are “habits of the present” and “the anxiety of choosing something new”.

Edward Wellin, in 1955, illuminated a very insightful case of the Country, Peru, which was confronted with severe health issues consequential to poor hygiene practices. The public health service in Peru tried to adopt innovative measures to improve the health of the villagers. The health department identified that one of the most vital aspect of hygiene is to drink boiled water, as purified drinking water was not available to the villagers. A change agency, well known for successfully implementing social change programs in Latin American Countries, was hired to facilitate the process of adoption by influencing hygiene related habits of the villagers. In some of the villages, health workers were deputed to bring in the desired change. The campaign, however, failed, particularly in those villages where health workers were deputed. Whereas, the villages under professional change agency registered better rate of adoption. An enquiry into the root cause of failure revealed educating facts to the researchers. The village where the initiative failed was due to identification of wrong internal lead initial adopters by the health workers. A particular village where only two women adopted the practice of boiling water were socially irrelevant to the rest of the villagers. One of the women was sick and the other was a migrant from a different place and hence, were more idiosyncratic in nature than active socializers who could influence others. People in those Peruvian villages could not understand the concept of germs

which can remain dissolved in water and are not visible. Moreover, consumption of boiled water was socially perceived to be related to only sick individuals. So, the very reason to consume boiled water, communicated by the health workers, was rejected by the society because of its cultural and social irrelevancy and failure to convey the message in a contextually relevant way through proper change agents, who are socially recognized and acceptable. Everett Rogers attributed this failure to the common mistake of being more “innovation oriented” than “client oriented”.

The need and importance of reimagining and redesigning a framework for effective diffusion of socially beneficial innovation in the present context would probably be more comprehensible and convincing from a very recent technological innovation in India that has proven itself as a game changer. An Economic Times article headlined, “*India's Lite Revolution*”, highlighted a customer or society centric orientation of Indian technology based companies in visualizing and understanding the requirement of innovation under technological constraints existing in emerging markets like India. The current decade, which has gained a universal acceptance to be known as the decade of mobile revolution in the technological history, is also constrained by technological limitations in some parts of the world. The mobile based applications have seen an unprecedented growth in demand across the world, as a result of which, many electronic commerce based companies deemed it to be wise to migrate completely into mobile application based communication from web based or computer based communication. However, in this process of moving at a sonic speed to respond to hyper competition, the companies ignored a major limitation of mobile phone handsets in India. The limitation was related to storage capacity or popularly known as 'memory' of mobile handsets used by majority of android based mobile phone users in India. The limited memory of android based phones restricts the number of mobile applications with an average size of 10 MB that can be stored in the phone. Consequential to this limitation, the e-commerce companies which exited their web presence and adopted a complete mobile application based business model, started experiencing declining growth in their businesses. It was Flipkart, an Indian electronic commerce based company, which insightfully discovered the unattended or ignored aspect with relation to this technological limitation. The limitation was later addressed with a relevant innovation known as “Progressive web app” or PWA which required hundred times less memory for storage and use. Currently, most of the technology based companies have either adopted or considering to adopt PWA for contextually befitting themselves into Indian pattern of technology usage by masses. So, it is equally challenging, even in this era of digital democracy, to successfully implement an innovation to be adopted by the society. As, according to Anshu Sharma, “the bottleneck of success is not often the knowledge of tools, but lack of understanding of customers' needs in the context of their environment”.

Among numerous contributors to the theory of social diffusion, few noteworthy were Gabriel Tarde, who illustrated diffusion as a societal level phenomenon of social exchange in his book “The laws of imitation”, Georg Simmel, who wrote “Conflict: The web of group affiliations”, Ryan and Gross, the illustrator of hybrid crop diffusion in American agricultural market, Robert K Merton, Lefebvre, Philip Kotler and Eduardo L Roberto.

Everett M Rogers, being one of the prime contributors to the theory of diffusion of innovation, illuminated four main elements which play most critical role in the process of diffusion. He identified these elements as the *innovation* itself, the *channels* through which it is communicated, the *time* taken by the innovation to diffuse and the members of a *social system* who adopts the innovation. He enlisted and illustrated the characteristics of an effective and appealing innovation. According to him, an innovation should primarily have high *relative advantage* for individuals to adopt. The objective advantage is less important than its perceived relative advantage. The *compatibility* of the new innovation with the existing cultural value system, norms and regulations is vital for its adoption. It is also necessary for any new innovation to be as less *complicated* as possible, because simpler the innovation faster will be the adoption. *Trialability* is another critical component of any new innovation which reduces the uncertainty and anxiety in adopting something new. Rogers also considered *observability* as one of the most important characteristic of new innovation, as more visible outcome leads to easier adoption. He discovered that *heterophily* is an impediment in effective communication of new innovation, as individuals who are like each other tend to listen to each other. He conceptualized the process of innovation decision into five stages, namely, *knowledge*, *persuasion*, *decision*, *implementation* and *confirmation*. Rogers, categorized individuals in a society into five different segments depending on the degree of risk that they are ready to take while adopting any new innovation. The most innovative or highest risk takers are termed as *innovators* who represents only 2.5% of the population, next category of individuals who immediately follow the innovators are called as *early adopters* representing 13.5% of the society. Early adopters are followed by *early majority* with 34% of the society, which in turn is followed by *late majority*, again representing 34% of the population, lastly followed by *laggards* who represents 16% of least innovative individuals with high degree of dogmatism. He also highlighted the crucial role played by the opinion leaders and change agents in successful adoption of an innovation.

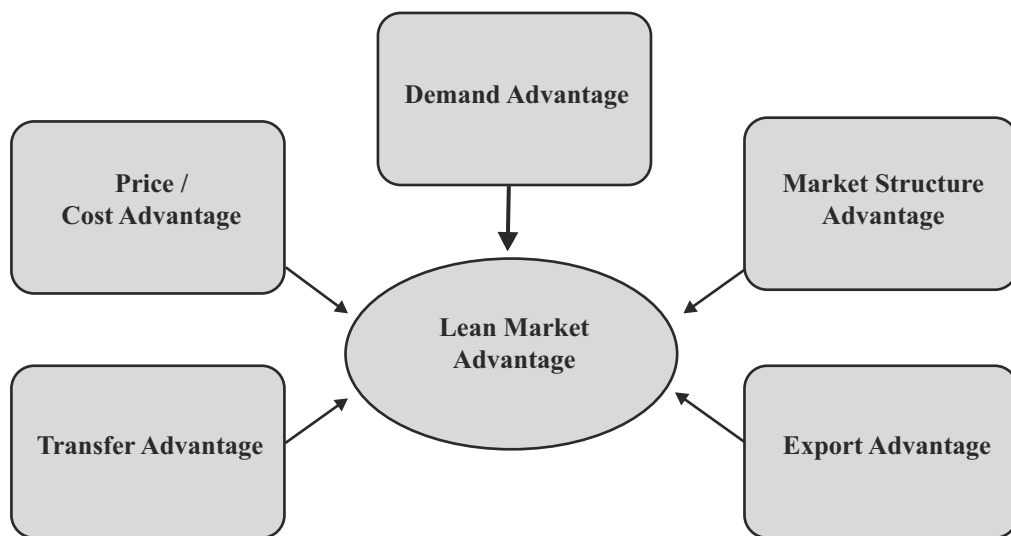
There has been an accepted belief that adoption of all sorts of innovation in the society takes place through these five categories of adopters mentioned by Rogers. It is the demonstration exhibited by the innovative individuals which makes the innovation acceptable to the masses. However, the explosion of social media in 21st Century and its universal adoption has led to something called as 'Innovation optimism', coined by Kit Yarrow in her book, "Decoding the New Consumer Mind", who opines that more and more people across the world are transforming into innovative customers with tendency to take higher risk in the context of adopting new innovation. This very revelation based on empirical evidences extends the scope to conduct further research in the area of diffusion of innovation.

Existing and Proposed Framework for Diffusion of Innovation:

The current research is motivated by the work of few previous contributors like Marian Beise, Kevin lane Keller, James Dearing (Social Marketing and diffusion of innovation), Rajnish Tiwari and Cornelius Herstatt. The proposed framework or model is also supported by a case study of recent past developed by the author.

One of the most noteworthy and recent contributor whose work has been a prime motivation behind this study is Marian Beise, the one who has popularly pioneered the concept of *Lead Markets*, a phenomena or pattern through which technologically innovative products diffuses internationally. In his book titled, "*Lead markets: Country Specific Success Factors of The Global Diffusion of Innovations*", the author has meticulously drawn a detail framework on how new technological innovations are commercialized and adopted across the world. His work provides deep insights into cross border diffusion of innovative technologies and contextual relative advantages which enables a Country to adopt an innovation during its initial stage and act as a lead market, thereby demonstrating the usage of the technology to the rest of the world. Beise's framework on international diffusion of technological innovations consists of five factors or advantages. These five advantages empowers a Country to become the first mover in adopting a new technology. The advantages or the factors are *demand advantage*, *Cost/ Price advantage*, *Market structure advantage*, *Transfer advantage* and *Export advantage* respectively. A diagrammatic representation of Marian Beise's lead market framework is given below:

Fig. 1: The Lead Market Framework by Marian Beise



Source: Marian Beise, 2001

Beise elaborates that the demand advantage of a Country is a natural advantage which is gained because of high per capita income and as a result the relative affordability of the citizens of that Country are higher than others. Individuals with higher disposable income are naturally expected to be sophisticated and demanding and hence, capable of paying high prices for new and innovative products which are an output of expensive research and development activity. The cost and price advantage is an outcome of rapid adoption of the new innovation by the masses of the particular Country, which leads to economies of scale and decrease in cost and price. Market structure advantage is a blessing that comes from having a free and competitive market with minimum degree of control. Empirical evidences have clearly revealed that the rate of new innovation is much higher in those countries which have a free market economy. A Country is bestowed with the transfer advantage if the early adopters of new innovation can effectively demonstrate the use and benefits of the innovation to other nations. This primarily depends on mobility of the citizens to other countries and their

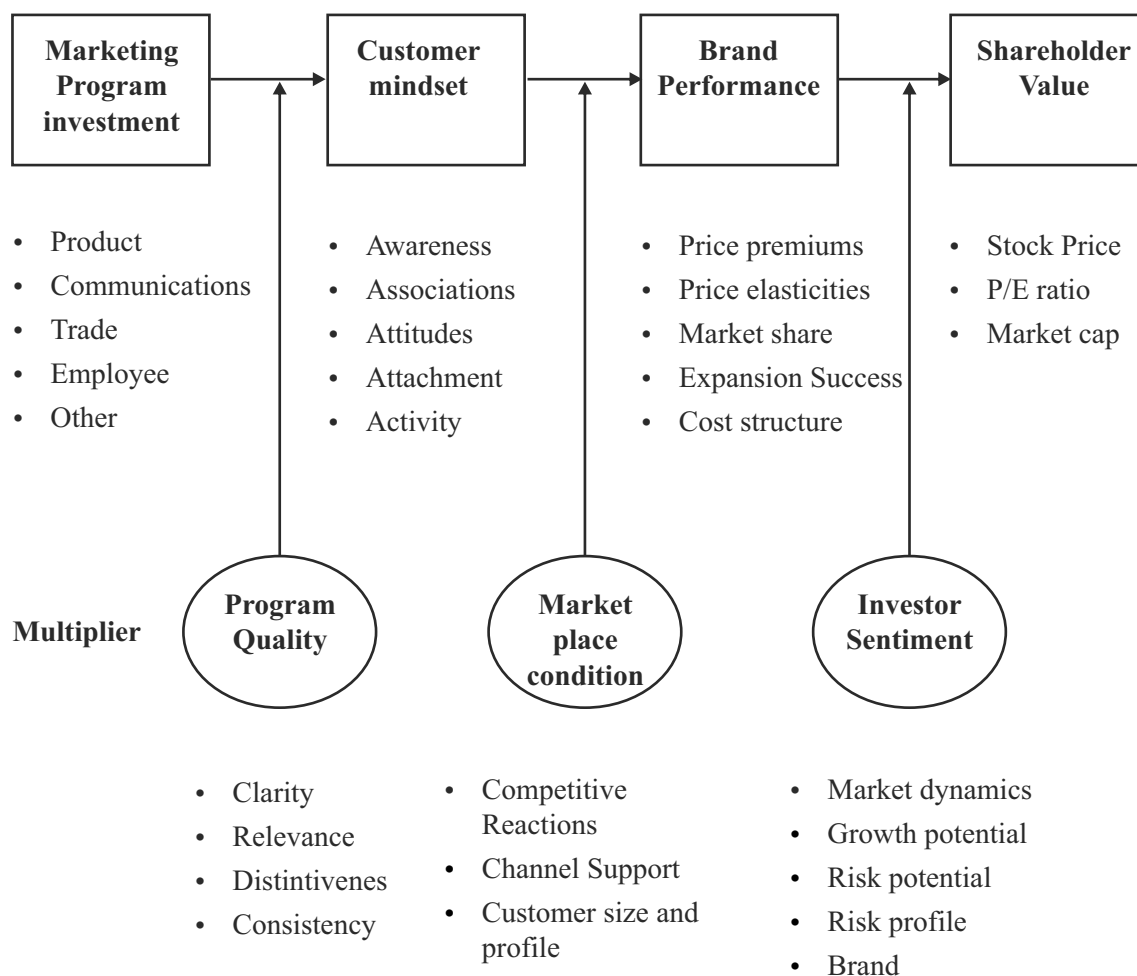
impact on citizens of those Countries which create network externalities. The export advantage, according to Beise, comes from three facilitating forces namely, the similarity of lead market condition with the foreign market condition, domestic demand that is sensitive to the problems and needs of foreign countries and local agents emphasizing and pressurizing companies to develop exportable products.

The above framework by Marian Beise ostensibly relate lead market advantage to developed countries, as the primary criteria here, to qualify as a potential lead market is dependent on customer sophistication which is a function of high per capita income. However, Rajnish Tiwari and Cornelius Herstatt proposed a non-resonating idea with Beise. The argument extended by Tiwari and Herstatt advocates the potential possibilities of developing countries with lower per capita income, to qualify as lead markets (Tiwari & Herstatt, 2014). The rationale behind their argument was that the developing Countries with low per capita income can also lead diffusion of innovation, where the sophistication of customer is offset by the size of population.

Both the theories, however, have not adequately emphasized the behavioral part of diffusion at international level. So, a need for a different framework emphasizing and incorporating the social behavioral aspect was felt.

The proposed framework for accelerated diffusion of innovation is also triggered by a well-known model of brand management in the area of marketing developed by Kevin Lane Keller popularly known as “Keller's Brand Value Chain”. A pictorial representation of the same is done below for the ease of comprehending.

Fig. 2: The Brand Value Chain

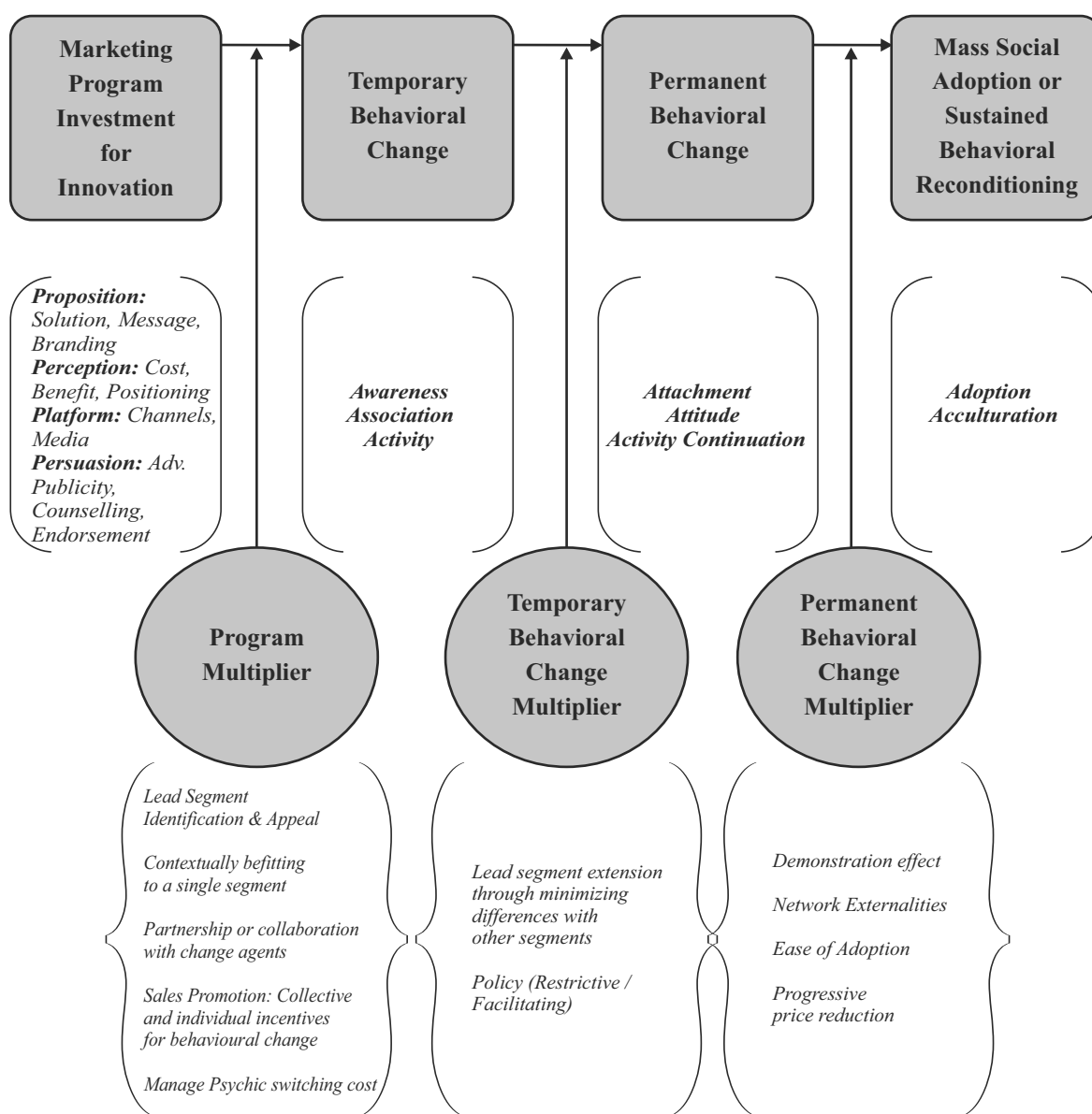


Source: Keller, 2008

The brand value chain is a globally accepted and applied framework of branding which identifies the sources and outcomes of brand equity (Keller and Lehman, 2003). It is a four stage journey through which a brand travels before establishing its dominance in the mind of consumers. The quality of inputs, mentioned as “marketing program investment” decides the degree of equity achieved by the brand. The investment in a brand translates into shareholders value after successfully facilitating the formation of a positive mindset in customers and turning them into measurable brand performance. The creation of value in each stage and its successful transfer to the next stage is intervened by number of factors which acts as moderators. These factors, termed as 'Program multiplier', 'Customer multiplier' and 'Market multiplier' determines the extent to which value is successfully transferred from first to second stage, second to third stage and third to final stage.

The framework provided by Keller seems to have high relevance and have been found to be appropriate to fit in the context of diffusion of innovation, if remodeled properly. A conceptual framework is thus constructed by integrating these two models, one by Keller and the other by Marian Beise. The new framework, however, is subjected to test for validation, not empirically, but, by identifying a relevant case and analytically examining the same. The proposed framework is hereby presented below:

Fig. 3: Proposed Framework for Accelerated Diffusion of Innovation



Source: Conceived by the Authors

It is a well-known fact that any social diffusion or adoption of any new innovation demands behavioral change among the members of the society. This behavioral reconditioning is imperative for any diffusion to take place in the society. The nature of behavioral change needs to be more voluntary and permanent, which can only ensure the sustainability of the diffusion. However, as Christensen rationally opine that the probability of success of a new innovation depends on whether the forces compelling change to new innovation are more dominant than the forces opposing the change. Individuals are often entrenched in the habits of the present (Christensen, 2014). Daniel Kahneman and Amos Tversky have demonstrated, the principle pull of the old is that it requires no deliberation and has some intuitive plausibility as a solution already. The tendency of people to avoid loss is twice as powerful psychologically as the allure of gains (Kahneman and Tversky, 2000). The proposed framework thus, incorporates elements to catalyze the behavioral transition towards adoption of new innovation. The framework, as presented above, has four stages of behavioral transition leading to a sustained reconditioned behavior, favorable towards innovation.

The first stage, “Marketing program investment for innovation”, attempts to build a foundation to trigger behavioral change, through selective and appropriate investment in the four elements of change, namely, *Proposition, Perception, Platform* and *Persuasion*. These four elements were presented as new marketing mix elements for social cause marketing at IIT Delhi, in ICMR, 2013 by the author. Social change, being perceived more as a noncommercial phenomenon, so, a need for rephrasing the marketing mix elements was felt. The effectiveness of these four elements can be amplified by the 'Program multiplier' which are deliberately incorporated to enhance the appeal of marketing program. It is necessary to direct the efforts of proposed marketing mix elements initially towards persuading the most innovative and potential customers, who can then become the flag bearers of the new innovation. It is pertinent to clarify at this stage that innovative customers in 21st Century are not necessarily the one with high individual per capita income, but the ones who are more connected, aware and by virtue of their education and skills, have access to resources. Hence, it is important in the first stage to identify the 'Lead segment' or the innovative customers and make the campaign appealing and relevant to them. It is needless to mention that the colossal power of digital and social media must be leveraged and used to reach the intended target audience. Partnership and collaboration with 'Change agents' and incentivizing the behavioral change would increase the tendency to repeat the behavior. It is necessary to select change agents carefully, as their homophily or heterophily, either may become an impediment towards effective persuasion. In this age of digital and social media explosion, artificial intelligence, and deep machine learning, it is easier, on one hand, to identify opinion leaders and deploy them in the society, whereas, highly risky on the other hand, to control them. The form, nature and frequency of incentive is also a vital part of program multiplier, which depends on the context in which the diffusion is targeted. The collective or individualistic nature of incentive will also be governed by the circumstances. It is however felt, that the digital revolution and social media democratization has led to more individualism, isolation and the crave for recognition and fame, as strongly opined by Sherry Turkle (2012). Managing the psychic switching cost is an integral and inevitable task in the first stage of behavioral change. The contextual distinctive benefits of adopting the new innovation needs to overcome cultural, social, infrastructural and environmental constraints and adopt the strategy of adaptation, opines Pankaj Ghemawat.

The success of the first stage can be determined by merely comparing the targeted number of individuals with the actual number of individuals who adopted the innovation. It can be assumed that the individuals who responded favorably to the initial campaign, have moved to the second stage of behavioral change with adequate degree of awareness and association leading them to activity.

The second stage, presented as the stage of “temporary behavioral change”, can also be termed as the stage of intensified reinforcement and initial democratization of innovation. This stage is also identified as the stage of 'duel challenge' which concurrently attempts to achieve two conflicting goals. The first goal is imported from the stage one, which tries to make the communication more and more relevant and appealing to the lead segment to retain their interest. The second goal is introduced in this as a “temporary behavioral change multiplier” which works towards minimizing the differences with other potential segments. In this stage, policy, restrictive or facilitative, may also be used as a multiplier which, most often, enhances the rate of adoption. However, the enforcement of the policy needs to be perceived positively by the targeted segment and the masses. It is to be mentioned that a restrictive policy can also act as a positive reinforcement for the society, if it accommodates itself as a beneficial proposition.

The third stage or the stage of “Permanent behavioral change” can be identified through indicators such as growing attachment of more segments towards new innovation with positive behavioral disposition or attitude and continuation of activity i.e. adoption. This stage may also be called as “tipping- point”, in words of Malcolm Gladwell (Gladwell,

2000). Tipping point is a stage in any social diffusion process which is marked by the beginning of adoption by the masses. It is thus, the most crucial stage in diffusion of innovation. In this era of social media, the definition of tipping point would be a stage at which any message goes viral. However, the stage of tipping- point can only be achieved through successful and effective execution of “permanent behavioral change multiplier”. Permanent behavioral change multiplier is nothing but cumulative effect and influence of all marketing activities undertaken during preceding stages. In this stage, all efforts needs to be directed towards demonstrating significant relative benefits of adopting the new innovation, which would lead to value enhancement due to network externality. This stage is also very crucial as, mass diffusion would demand simplification of adoption process and also affordable prices. According to G. D. Wiebe, one of the five factors which contribute towards success of any social campaign is '*Distance*', which is the estimate of individuals about the energy and cost required to adopt an innovation with relation to the reward (Wiebe, 1952).

The fourth and last stage is the stage of “Mass social adoption and sustained behavioral reconditioning”, which is identified through wide adoption of innovation and acculturation to the new behavioral norms.

In order to establish the validity of the proposed framework for accelerated diffusion of innovation, a case study has been undertaken. The qualitative examination and exploration of the case is hereby presented:

The Case of Progressive Web Applications or PWAs:

The “Progressive web application” is probably an example of how the diffusion of innovation can be triggered or initiated by a limitation of technology. It resonates with the work of Tiwari and Herstatt and also probably endorses the very idea that less sophisticated market segments can also act as a lead segment and initiate the process of diffusion. Marian Beise's framework of lead markets which considers customer sophistication or affluence to be the prime criteria for a market to be considered as lead segment is partially contradicted by this case.

The world has already moved from desktop or laptop based internet usage to mobile based internet usage. It is now evident that majority of internet users in developed as well as developing countries access internet from their mobile phones. It is because of the obvious reason that mobile phones are portable and much handier to operate than a laptop, however sleek it is, and undoubtedly from a desktop. It took more than three decades for internet technology to reach where it is today. The evolution of internet has fundamentally redefined and reshaped the way businesses used to be conducted before. During its initial phase, desktop based internet usage gained prominence across the world. So, businesses also adopted the same medium to communicate and persuade its customers. A new form of commerce was invented and named as electronic commerce. In later course of time, desktops were replaced by laptops, as people started demanding more mobility. But, unfortunately, the laptops could not live a long desired life and were cannibalized by an even better technology called smart phones.

As businesses inevitably needs to follow technology in order to remain relevant and connected with the customers, so, they too hopped from one technology to another. The desktop or laptop based commerce then innovated and moved to mobile based commerce. As, there was a natural disadvantage of desktop or laptop based web pages to be used for mobile phones, the electronic commerce companies came up with mobile applications. These mobile applications were required to be downloaded into the smart phones for their use. The average size of such applications were between 30 MB to 200 MB, as cited by Girish R. Technically, these applications are known as 'Native apps', as they are built to function in only a specific type of mobile operating system. In order to make them function in different operating systems, one is required to develop many versions of the same application.

In India, there has been an inherent impediment, from users' perspective, to download and use such applications on smart phones, as majority of smart phone users are confronted with the problem of limited memory of their budget mobile phones and compatibility issues related to operating system. It is because of these limitations, most of the smart phone users were unable to store as many applications as they wanted on their mobile phones and also started experiencing declining speed in operation. This user constraint proved to be more expensive to electronic commerce companies and all those who uses this platform for conducting business. Many of them started registering decrease in growth of revenues.

The problem was however addressed soon by development of a technology, technically known as “Progressive web applications” or PWA. The progressive web applications are optimized to direct the users to responsive websites, the websites which connects users to mobile or desktop version of the webpage according to the device that they use. PWAs requires three hundred times less memory for storage and even lesser data for subsequent visits to the webpage.

The advantage provided by progressive mobile applications were obvious. But, as mentioned before in this paper and insightfully stated by Everett Rogers, “*getting a new idea adopted, even when it has obvious advantages, is often very difficult*”. It was not a cake walk for the companies to make people adopt and use progressive mobile applications. The high end mobile phone users were not very keen to use, as the PWAs, also popularly known as 'Lite apps', were perceived to be a product more contextually relevant for budget phone users. Comprehending the prevailing perception about PWAs, the companies found it to be wise to target low end mobile phone users, the majority of whom resides in tier 2 and tier 3 cities of India and hence, they became the lead segment. The Companies started directing significant share of their marketing efforts towards those users and making the applications more contextually relevant to them. The light versions were primarily promoted as mobile memory savers. The change agents were none other than mobile commerce companies, application based service providers, banks and other commercial intuitions. Smart phone users of those cities perceived the saved mobile memory and less data consumption as incentives and their psychic cost of switching was addressed by the prompting messages to download lite applications and replace the native applications, every time they logged on to internet for transactions.

The result was visible in a short span of time. Flipkart, an Indian electronic commerce company, became the market pioneer by successfully launching progressive web application in collaboration with the search engine leader, Google. The company, in this process, also became first mobile commerce company in the world to launch a PWA, as reported by Economic Times Bangalore, dated 3rd November, 2017.

However, it was also necessary for the companies and institutions to gradually reduce the existing perceptual difference between the budget mobile phone users and the high end mobile phone users. The quintessential mobile phone users, being more sophisticated in nature, were attempted to be persuaded by illuminating the optimized use and quick response of mobile operating systems to such applications. This phenomenon is a multiplier used in the second stage of the proposed framework which work towards extending the lead market by reduction of differences between the segments and making the innovation appealing across segments.

The facilitation of this new technology by companies such as Google, in fact, created a sort of implicit favorable policy towards convincing and seeking support from all other companies and change agents which led to intensified reinforcement of the behavior to adopt. The companies could create a favorable attitude among smart phone users towards progressive web applications. It has been also reported that during last few years several leading companies in their respective sectors have discovered strategic advantage in PWAs. The result of which is implementation of these applications across industries, and in turn, leading to network externality.

The demonstration exhibited by the budget phone users led to the 'tipping point' and wide adoption of the technology. This phenomenon of less affluent customers initiating the adoption process of any new innovation followed by affluent customers is known as 'Reverse innovation', a termed coined by Vijay Govindarajan (Govindarajan and Trimble, 2012).

Progressive web applications are still undergoing development to make them more effective and universally contextual. The framework or the model to accelerate the diffusion of innovation proposed in this paper has found significant degree of relevance in this case. It is thus assumed to be rational and wise to pursue further research in this area.

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