Technology Change And Innovation Management

Introduction

“Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.” (Baregheh, Rowley, & Sambrook, 2009, p. 1334)

“Innovation is not a single action but a total process of inter-related sub-processes. It is not just the conception of a new idea, nor the invention of a new device, nor the development of a new market. The process is all these things acting in an integrated fashion.” (Myers and Marquis, 1969)

Innovation is derived from the Latin word “Innovare” which means to make something new. It is a process of up-gradation of a product or service being prevalent in the society so that the new product or service which was created after innovating it can be of advance use to the users. There are 2 types of innovation – incremental and radical innovation.

By elaborating on the topic whether user inputs are of any help or not, this paper will deal with the pros and cons of the users input in the process of innovation. It will clear the mind process of the reader whether how important is it to take in the review by the user before innovating the product or whether after innovating the product, reviews of the user shall be taken.

Usage of various models and theories would be seen all over the paper to answer the question of essay. Literature like linear models of ‘technology push’ & ‘demand pull’, interactive models, closed innovation principles and open innovation principles would be the main points of focus to describe this question counterfeiting each other.

Background of Innovation

From the legal dictionary, the term ‘Novation’ referred to as “renewing the clauses by changing a contract for a new one in favour of the debtor”. In the same way in the field of science and technology, any up-gradation to a product or service for the better experience of the user is termed as ‘innovation’. (Rothwell and Zegveld (1995)

In the 19th century there were various discoveries and inventions done, so the 19th Century was termed as “Invention Era”. On the same platform, 20th century was all about making the prevailing things better and upgrading them to a better usable manner which was done by the process of innovation.

The 20th century saw the term innovation used by some scholars to explain technological advancement as well as being the subject body of the literature assessing the processes behind the innovation. Preceding theories briefed about the psychological aspects associated with innovation, process models, the development of linear and the creative dimension of innovation was recognised. Slowly, towards the end of the 20th century, innovation had become various advancements developmental, social & technological change.

Pros of Having User Inputs in Innovation

Benoit Godin has written extensively on the intellectual history of innovation. This helps us place users as innovators within the innovation literature. His work provides a detailed account of the development of the category of innovation. The European tradition saw invention as part of the innovation process and introduced the function of market uncertainty. This begins to shift the focus to product development and the role of users in the testing of such products.

In his seminal and often cited work, von Hippel was first to identify and evidence the role of users as innovators. In this study of medical equipment manufacturers in the 1970s he claimed that 80% of innovations were developed by users (von Hippel, 1976; 1977). In these papers, he argued that users were the major source of innovation. Following this ground breaking work other studies have identified different types of user innovations for example: ?consumer users‘ and ?intermediate users‘. Von Hippel (1988) argues that users in general and ?lead-users‘ in particular are a source of innovation and he considers the notion that companies (i.e., product manufacturers) innovate is a ?basic assumption (that) is often wrong which reflects a ?manufacturer-as-innovator bias, but is nevertheless ?conventional wisdom (idem. p.117). The lead-user school sees a (predictable) distributed innovation process of which the sources vary greatly and in which users play a very important but overlooked role. There have been several studies that provide strong evidence to support lead users as innovators.

When it comes to explaining why users innovate it is argued that they possess the distinctive knowledge and expertise necessary. For example, the development of kite surfing was only possible because of the expertise gained from years of experience of windsurfing (Franke & Shah, 2003). Indeed, in his more recent research, Von Hippel (2005) argues that when one compares innovations from producers with those of users frequently those from users are distinctive because of the unique tacit knowledge they have gained from extensive use of the products (Bogers et al., 2010).

The lead-user school further contends that while many users modify products for their own use, for example, computer hardware and software for industrial processes and high-end sports equipment, these innovations are concentrated among the ?lead-users. A group of surfers as an illustration, who developed an experimental surf board with foot- straps that enabled them to leverage the energy of waves to make controlled flights. Lead- users, are characterised as ahead of the majority of users with respect to an important market trend, and they expect to gain relatively high benefits from the solution to the needs they have encountered. Further, it is argued that by focusing on working with lead-users, companies can increase the probability that they will discover innovative solutions that they can leverage and sell to their other customers. For companies seeking to increase their capacity to innovate, the lead-user school argues that it provides a firm foundation for a strategy of innovating with selective customers; and that it is a much more effective basis for an innovation strategy than the more traditional technology-centered approach, where scientific exploration and technology development lead to opportunities for firms to exploit. This approach led to the growth of a whole new sport, ?kite-surfing‘: ?Clearly this had little to do with surfboard manufacturers who did not discover this innovation; rather it was innovative surfers? (Franke et al., 2006).

The lead-user school recognizes users (both consumers and companies) as an essential knowledge source for the innovation process.

The development of commercially successful new products has consistently shown the need for accurate understanding of the needs of the user. Within the marketing literature, this is firmly established (see Deshpande‘, Farley, and Webster, 1993; Kohli and Jaworski, 1990). Although Von Hippel, discusses the limitations of market research in The sources of Innovation (first section of Chapter 8), it is from this premise that Von Hippel builds his arguments for the role of lead-users. According to Von Hippel lead-users are familiar with conditions that lie in the future for others, they can serve as a need-forecasting laboratory for marketing research (1988, p.107). Significantly it is their activities at attempting to fill their needs, which Von Hippel identifies as providing opportunities for firms wishing to develop new products. Much of the work on the users as innovators has centred on how firms should identify lead-users and how firms can incorporate their perceptions into new products. This has tended to focus on technology-intensive industries and products.

Cons of Having User Inputs in Innovation

Hence, it distinguishes between ordinary users and lead users. It argues that ordinary users have difficulties in providing fresh and relevant insights into the product development process since their familiarity with existing products ?interferes with their ability to conceive of novel products and uses when invited to do so? (Von Hippel, 1988, p.103). This is rooted in their inability to come up with new solutions because they are not creative enough and they have difficulties in evaluating new and (thus) unfamiliar products that fall outside their real-world.

In the previous section we described how users can contribute to innovation processes and how lead-users can be a valuable source of innovation.

1 - Conceptual: invention is not innovation

One major problem with the lead user school is that even though the word ?innovation‘ appears so many times, Von Hippel does not provide the reader with a definition of innovation. For example, a sample of tractor shovel innovations in two categories: ?major improvements‘ and ?significant special-purpose accessories‘. Adding power steering to a tractor shovel can be considered a major improvement, but is it an innovation? Von Hippel claims that in both the process equipment industry and the electronics industry ?the innovators are most often users.

In general, innovation is understood to mean much more than having an idea that could lead to the development of a new product or service (Garcia & Calantone, 2002). Innovation encompasses the entire process of developing an idea through to a new product or service that is implemented in a market and which consists of activities such as R&D, technology transfer, knowledge management, market research, futures research, technology intelligence, product development, and many more. In that respect, the lead-user school distinguishes four different stages in this (innovation) process: 1) identify a need, 2) research/development, 3) build prototype, 4) apply to commercialize and diffuse innovation; of which the user is carrying out the first three and the manufacturer only the last step (Von Hippel, 1988, p.25). The lead- user school does not explain why the first three roles are only played by users and not by manufacturers. Consequently, the lead-user school portrays lead-users as a source of ideas (which is undoubtedly true) but then overstates their role within the innovation process by underestimating the amount of ?innovation resources‘ (money, time, risk) other actors (i.e., not-users) spend in carrying out that part of the innovation process.

The limited role of the user in the innovation process is also clearly illustrated in the theories of ?innovation systems‘ (e.g., Carlsson, 2002) and ?open innovation‘ (Chesbrough, 2003). Both views on innovation are based on the notion that nowadays knowledge has become widely distributed and every actor involved in the innovation process should be aware that most of the required knowledge for innovation can be found elsewhere. Not only are there more sources of innovation (than just the user) but also that ?modern innovation is about how these different actors are related to each other and are capable of sharing information and knowledge. Indeed, much empirical research on finding success factors for innovation show that there can be many different sources of innovation, often depending on the type of industry in which the innovation is being developed (see e.g., Miller & Blais, 1993; Pavitt, 1983).

So, we conclude that the lead-user school‘s emphasis on the large or even dominant role of users in the innovation process is based on an old fashioned definition of innovation. Because of this it has understated the activities of the other actors that play such a vital role in the entire innovation process most notably the firm. As a consequence, what the lead-user school label as innovations are predominantly inventions.

2 - Methodological: case studies are difficult to generalize

The lead-user school is almost entirely based on the case-study research methodology. In general, this methodology is applied when no theory is available and the researcher carries out an exploratory study to establish the first cornerstones of a theory that later-on can be tested and validated (Yin, 1994).

Strictly speaking, one can argue that the lead-user school is not really doing case studies. The case-study method attempts to discover (causal) mechanisms and processes that relate different found concepts or empirical phenomena. The case study method is mainly qualitative by nature and holds a process view on the units of analysis under investigation. In the lead-user school cases are innovations that have been developed either by users or by producers. As such, the lead-user school is merely looking at the outcomes of innovation processes and listing who was the main source of the innovation. Its main concern is not to go deep into how these innovations are being developed, but to decide which part of the innovation is developed by users and which part by producers. The descriptions of the user-developed innovations is limited and does not provide an understanding of how specifically these user-centred innovations are being developed.

Furthermore, the difficulty of extending the conclusions of a few cases to other non- researched cases also presents a methodological problem of a temporal nature. That is, the lead-users in one case (i.e., an industry at a certain time) do not necessarily have to be the future lead users in that industry. Lead users might be good predictors of future demand in that industry, but that does not imply that they will also be the right forecasters of the next generation of new products and services in that industry. For instance, because of their special relationship with a new product they might be more locked-in to that product and have many more difficulties to switch to new products than non-lead users might have since they are less (emotionally and functionally) attached to the former new product. So, for companies listening to former lead users in developing new products and services this is certainly not without any risks. And from a research perspective it means that the predictive power of case-studies should be seriously questioned.

Another methodological weakness is that the lead-user school puts lead users and companies within the same research population while they are two different empirical categories. Users are, in principle all the inhabitants of a certain geographical area and surely will outnumber the amount of companies which are institutional constructions. Stating that users innovate more than companies is comparing apples with oranges; especially because the role of the user and the company are so different in the innovation process: you simply cannot consider them as one research population.

3 - Empirical: most radical innovations are of technological origin

When we consider some of the most significant technological developments over the past twenty years such as the World Wide Web (1990); gene therapy (1990); or the Hubble telescope (1990) it seems these were the result of scientific curiosity, unfettered by the demands of the market. So, if users are the predominant source of innovation, the list of the recently most important (radical) innovation should contain many innovations that were based on ideas developed by users.

Conclusion

This study shows that there is a process connected with innovation and that there are different definitions within the academic literature about innovation. Innovation can be considered as being product or process that is new or is existing but has been improved. There are different models regarding the process of in- novation and from these it can be identified that there is a strong link to creativ- ity as part of the innovation process. In looking at the application of innovation in social housing as part of the public sector this study has focused on two aca- demic studies which looked at Housing Associations and Innovation and these identified that innovations can be seen with a typology as new products or ser- vices or improvements on existing products and services. Further research could be undertaken to look at innovation within the social housing sector within the United Kingdom within the twenty-first century.

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