

Innovation Management

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Abstract : Innovation is a transfer of creative ideas into a saleable technology produced in a more effective way. The factors of innovation, which driven by the pull from individuals and push from the market, intertwine with all stages of the manufacturing and service processes. This paper presents some good principles for innovation management and analyzes factors that make innovation difficult to manage. The paper also discusses essential managerial issues for innovation management and attempts to make a projection of innovation in future.

Keywords : *Innovation Management, Push-pull model of innovation, Innovation barriers, Future innovation.*

INTRODUCTION

Creativity is the thinking process that helps us to generate ideas and invention is the process of discovering a principle. Innovation is the practical application of such ideas and inventions towards meeting the organization's objectives in a more effective way. Since creativity is the key to innovation, its role in the science of innovation and management needs to be addressed properly for any good innovation. Innovation can be defined in a number of ways. One of them is that it is the first commercial application or production of a new process or a product and the whole process of research, invention design, development, marketing, production and diffusion. There is another school of thought that believes that innovation itself has no components, the vertical as well as the horizontal components. In the vertical chain of components of innovation innovative ideas for a particular application or cause are generated either through basic

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research or by improving upon an existing process. Based on the ideas generated the process for commercial utilization of the idea is developed. As the diffusion of the innovation takes place the innovation begins to spread across and a similar process is developed for different applications. This is the horizontal chain of innovation components.

Importance of innovation

One definition that emerges from the above discussions is that innovation is the whole process of research, invention, design, development, marketing, production and diffusion. This definition involves parameters like design and invention. According to David Pye, invention is the process of discovering a principle and design is the process of applying that principle. While the inventor discovers a class of system the designer prescribes a particular embodiment of it and gives a shape to it. But these shapes can vary depending on need and application. To understand such concepts, one has to address the question why innovation is so important.

Besides money, which definitely is a motivating factor, there are several other reasons that drive people to innovate. Advances in technology bring about a change in industrial structures, strategies and environment, which in turn result in a change in customers needs. To keep pace with changing tastes of the customers, the market-forces drive industries to vie with each other to innovate and produce goods that have competitive advantage. As a result, innovation happens not only in R & D but also in every industry ranging from newer ones like the Genetic Industry to very well established ones like metallurgical industry. By tailoring the goods to suit the changing needs of the customer through innovation industries strive to satisfy their customers. This corporate strategy helps in creating differentiated markets, leading to increase in sales and market share. Besides, innovation as a corporate strategy sends very positive signals to both its employees and its customers. Being first in the market, innovation helps in companies enjoy a premium price structure and establish monopolies. Innovation also helps in motivating its employees. All these issues make innovation an important corporate strategy. In addition to these issues, companies encourage innovation for several other reasons like

responding better to the customer needs, expanding their product range, improving the quality and speed of service, meeting government standards and regulations; and more importantly to reduce their costs and increase their revenue. By introducing a new product, a company responsible for innovation has the advantage of setting standards and forcing others to follow them.

Different ways to innovate

Depending on the nature of application, companies try various methods to innovate. These approaches can broadly be classified as:

- Traditional approaches
- Best Practices
- New approaches

Traditional Approaches: Traditional approaches are based on the current needs of the customer. Due to these needs, the market forces a firm to innovate. Traditional practices for innovation range from literature search and laboratory research to brain storming sessions or soliciting suggestions from its employees through suggestion boxes. Companies also resort to other approaches like copying a competitor's product or process and improving it, or studying the weaknesses of slow moving organizations and developing to methods overcome the weakness. To encourage innovation, some firms also provide time for all its employees to devise innovative products and processes.

Best Practices: The success of traditional approaches are limited if the customers need/requirement is not well defined. In such scenario, some of the better practices that lead to good innovation are to understand the needs of the customer through questionnaires, search for alternate solutions to their problems or learn from them the shortcomings of a product. Monitoring of patent applications and studying various benchmarking activities, the product value chain and the product platforms, also help in understanding the current tastes of customers. Other practices that lead to good innovation include looking into the unexplored fields, making strategic alliances and making use of the web.

New approaches : Over the years, more scientific and professional approaches for innovation have evolved. The theory of inventive problem solving TRIZ has now become a popular approach and there are firms who specialize in providing this service. Other new approaches for innovation that are currently being practiced are virtual prototyping, implementation of knowledge management system, rapid prototyping & market experimentation and hiring of expert innovators. Realizing the potential for innovation market, several agencies now offer services of visionaries through a distributed network of experts and also provide venture planning toolkit, finance and capital.

PRINCIPLES OF GOOD INNOVATION

Some of the good innovations in the recent times have broken a popular myth that good innovations just happen. There are several examples to show that innovation can be managed and engineered. Good innovations generally follow the following principles :

Understand the market and define processes for innovation: For a successful innovation the customer desires/needs both articulated and unarticulated must be carefully studied. This can be accomplished by learning from the experiences of the customers and the innovators and identifying the key success factors responsible for the success of the innovation. Based on the study the various business processes like the product/process/service development, the engineering change process must be redefined in the context of the innovation necessary to address the market demands/needs.

Be open : One must not impose restrictions on the type of innovation and be open to ideas from both within and outside the organization. A broad view of options such as partnership with companies from within the same industry or from other industries may result in a good innovation. While advice from R&D and educational institutions is always welcome, one must also be open to get/receive ideas from other sources. It is necessary to realize that in addition to a firm grip on current trends in technology, one must be aware of what their competitors are doing and be open customer complaints and suggestions.

Create environment to cultivate and nourish innovation: A proper organizational environment is necessary for an innovation to flourish. A climate of trust which is essential for good innovation can be created by getting every one on-board through cross-functional inter-company teams and developing a flexible structure with good information flow. Providing incentives through venture finance for innovation projects and through career and skill development opportunities can create an environment that encourages innovation.

Demonstrate management commitment: By demonstrating its commitment for innovation, a company encourages innovators to develop, communicate and implement the innovation strategy. The commitment can be demonstrated by challenging the orthodoxies, setting goals for innovation.

Be patient but tough: Innovation can take time, so one has to be patient but must also be prepared to weed out low potential innovations so that resources are available for the best hopes. A review and analysis of results/progress helps in identifying good innovation from ordinary ones. To encourage good innovation one must be prepared to take tough decisions like removing blockers who are afraid of change and success, and cynics who lack confidence.

PUSH-PULL MODEL OF INNOVATION

Several models of innovation have been proposed and are under use world over. One of the simplest among them is Push-Pull Model of Innovation where the Push is given by the individual and the pull by the market. The push emphasizes individual creativity and the acts of invention, while the pull emphasizes market forces and collective needs. Push basically is internally generated and is a result of an individual's urge for creativity. Pull is externally generated due to a collective need of the society. The push is driven by the forces of technology, while pull is driven by economy. The push-pull forces for innovation are summarized in Table 1.

This model helps us in realizing the following :

- Innovation is manageable and must be managed.
- Innovation is about finding new ways to deliver customer satisfaction.

- Innovation is about finding and building upon competitive advantage.
- Innovation is about rewriting the rules.
- Innovation is about strategy.
- Innovation is a process not an isolated event.
- Innovation overturns the status quo and establishes a new vision.

Table 1: Paired elements of the PUSH v/s PULL argument

PUSH	PULL
Internally generated	externally generated
Personal creativity	collective needs
Individual	society at large
New idea	necessity
Heroic	impersonal
Transcendental	deterministic
Technologically determined	economically determined

This model also helps us in identifying key prerequisites for a creative organization. One of the prime prerequisites as discussed earlier, is to have a climate/environment for creativity. This is so, because a creative organization is driven by its creative people, and hence the organizational structure, the managerial style and the human resource strategy must be aimed at creating a culture that nurtures creativity. Other prerequisites are i) an effective system to communicate ideas and ii) procedures for managing innovation.

THE DIFFICULTY OF INNOVATION MANAGEMENT

Experience world over has shown that less than 10% of proposed innovations get to the market and less than 10% of new products succeed in the marketplace. According to a recent survey, out of 3000 ideas generated in England on an average only 4 out of them reach the stage of commercialization, which is even less than 10%. To handle such high failure rates, the management must make an in-depth analysis of the barriers to innovation. These barriers together with other factors make innovation management a challenging job.

Barriers to Innovation

Some of the barriers to innovation are listed below

Organization not conducive to innovation : There are a number of barriers to innovation that exist in an organization. Organizations usually have a functional based structure. While this may be helpful for smooth functioning of routine operations, the interdepartmental borders and rivalry prevents communication of innovative ideas. Usually organizations do not take adequate measures to define processes for innovation and for learning from customers what they really want to buy. Such incorrect measures hinder the advance of innovative products and services. Lack of proper incentive and recognition for conceiving innovative products and services often leads to incompatible innovations producing confusion rather than growth. Similarly lack of information on markets and technologies makes the organizations incapable of handling uncertainties about risks, results and timing of innovation.

Environment not conducive to innovation : Over-regulated market and government regulations and rules prevent the introduction of new products and services. In such environment there is no pressure and need for innovation. In such environment, organizations do not interact with one another and hence are blind to whatever innovations that might be happening elsewhere. By not interacting, organizations often do not provide sufficient resources in terms of experts, infrastructure and funds for innovation.

Organizational Behavior : Traditional management behavior is not very conducive to any innovative process. In their desire to be in control, the management prevents people being creative. Poor leadership style especially from middle managers, excessive rules, constraints and bureaucracy prevent innovations getting top-level visibility. Traditional ways of thinking which demand lengthy written reports, unwillingness to change a winning formula, resist all efforts to changes that can be brought about through innovation. In addition to management behavior, group and individual behavior also act as barriers to innovation. Group behavior is often influenced by interdepartmental warfare and the traditional mindset - we are right, they are wrong. Indiffer-

ent attitudes of peer group and fear of offending or being excluded from a peer group divide the organization into we the developers, they the shop floor. Individual behavior that acts as barriers to innovation is driven by the fear of change, making mistakes, being laughed at. Basically it is the fear of failure that prevents an individual to communicate his ideas.

Traditional accounting practices: Traditional accounting practices are not equipped with methods to value innovation. Conventional financial projections and planning too ignore the importance innovation. These practices the value of innovation is very high with long payback periods. This discourages organizations from taking excessive apparent risks of innovative products and services.

Why innovation is so difficult to manage ?

The barriers mentioned above make innovation difficult to manage. In addition, one of the main difficulties in managing innovation is that a change in attitude and the way a business is run at the corporate level needs a sea change. The corporate philosophy of the management is usually to run the existing business; hence any change in attitude encounters some element of risk, which the management may not be willing to take. not to building the future business. The focus is usually on short-term goals and management does not set aside time to focus on innovation. Since everyone is overloaded with everyday problems, management is far too removed from the details of individual products and services and there is no vision for the future. Without this far-sighted vision most innovations fail. The management does not realize that innovation is a long-term activity with long payback period. Due lack of sustained interest in innovation management fails to invest in innovation as a long-term activity. When priorities are evaluated, the management systems that are incapable of handling innovation make it looks prohibitively expensive with its costs too hard to control. This weighs down heavily on investment options and makes innovation is too complex to manage.

Some times misjudgments about the future prevent innovations from happening. Some classic examples of misjudgments about future are given below.

- The Commissioner of US Patents said that everything that can be invented has been invented (1899)
- Thomas Watson forecast a world market for about five computers (1943)
- Ken Olsen, founder of Digital Equipment Corporation, said no one needed to have a personal computer at home (1977)
- Bill Gates said that 640K would be enough memory for anyone (1981)

There are several reasons why such misjudgments do occur. Future is always difficult to forecast and making a prediction of future needs of customers is no exception even for organizations that are progressive. Self-imposed beliefs about the infallibility of corporate strategy committees and the head of the organizations often lead to incorrect assessments about future. The unwillingness to listen to customers and the inability to read the market also result in such misjudgments.

Any new proposal is always met with a natural resistance to change. Due to the self-protection attitude that usually creeps into the system, there is always a tendency to maintain status-quo. Communication is a difficult art and may lead to a misunderstanding if ideas are not communicated properly - an exaggerated rumour may provoke resistance. In organizations where there is a lack of trust between staff and management, resistance is assured and there is a low tolerance to change. Assessment of impact due to change varies from individual to individual and we all differ in our ability to handle change. Factors like uncertainty and dealing with the unknown, including the threat of failure, are difficult to deal with. These are the kinds of questions about resistance to innovation that need to be addressed not only on individual basis but also organizational basis.

ESSENTIAL MANAGERIAL ISSUES FOR MANAGING INNOVATION

For effective management of innovation it is essential that management establish good communication both with customers and with other external sources of ideas. Any development work must be efficient in the sense that technical bugs are eliminated

before commercial launch. The following five different staff roles are necessary for innovation within an organization. Their roles must also be specified properly defined to avoid clash of personalities.

- The creative scientist or engineer;
- The entrepreneur
- The project manager
- The sponsor
- The gate-keeper

For an innovation to succeed it is necessary to involve entire organization, hence in-house skills vital. Innovation is not simply a matter of research, design and development. It is corporate-wide task. One may come up with a brilliant idea, but the product may not be wanted by the market, then in which case the entire exercise is a failure. The supply and demand must match. Successful innovators strive to match their product or process to the needs of the market place. For any development work to be efficient, it must first be made free from all technical difficulties and lengthy paper work before its commercial launch. To eliminate such difficulties efficient managers are necessary. Management of innovation is an extremely taxing undertaking and it requires managers of high quality and ability. Since the product/process/service is new, the customer must be educated properly and launch must be backed by good after-sales service. Even if the entire organization is involved, the role of key individuals can be very significant.

INNOVATION IN FUTURE

Innovations in the past were basically product innovations. Ideas came from the R&D departments, academic researchers and from individuals working alone. Innovations closely followed a scientific discovery or invention. There were no defined processes for innovation. Innovation was unpredictable and unmanageable resulting in high failure rates.

The concepts of innovation and innovation management have changed over the years and present day innovations happen not just in products but in processes and services as well. Services sector may contribute the largest share of GDP (Gross

Domestic Product) in near future. Ideas are no longer restricted to R&D but are welcome from various sources. As ideas/knowledge become more diversified and complex, departments no longer work in isolation. Groups with different backgrounds work as single team to realize an overall organizational goal. Throughout the organization innovation would soon become a continuous process. The future is likely to witness managed innovation. Organizations leverage existing competencies in new ways and look for opportunities beyond the boundaries of the current businesses. Innovations would more customer-friendly and address their articulated and unarticulated needs and cater to both served and un-served markets. All these developments are bound to have an impact and innovations would enjoy high success rates.

Innovation in the future would move so close to the customers that people have to interact not only with customers but also customer's customer. Innovation sources would be from in-house and external marketers; in-house and external R&D; the company's suppliers; the company's management, engineering staff and production workers; the company's competitors

Innovations in the future would obtain new technological developments from other industries and translate these developments into own products, processes and services. To accomplish this, various groups come together to share their expertise. Hence knowledge management would be a key factor for innovation management. Due to the involvement of various functional groups, future innovations would be through internal alliances, through corporate alliances/joint ventures and through mergers and acquisitions.

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