

New product innovation

Business



New Product Innovation in SMEs

In the modernized and technologically advanced world the companies are required to develop the products with innovative features and superior qualities that can not only meet the demands of the consumers but also bring competitive advantages of the company hence the companies also strives to present such product in front of the people that can help them in surviving in the highly competitive market place. By presenting new innovative products the companies also get chance to attract the customers towards the company (Poskela , p1, 2003). This situation leads to the emergence of the concept of NPI – New Product Innovation that deals with difference phases of innovation of a product.

The innovation process of a new product is mostly considered from the perspective on the manufacturing companies and it is believes by most of the researchers (Cooper 1993, McGrath,. and Akiyama 1996) that the companies have the complete authority to control, process and influence theenvironmentof the NPI process (Jacob, p3, 2007). The concept of innovating new product is getting momentum as the world is moving towardsglobalizationthat has resulted in rise of competition. This concept is also supported by the advancement in the technologies as there are more advancement in the devices available to the people, they look forward for the products that can meet the demand of their modern lifesdtyle.

Vadim Kotelnikov (2001) revealed that the New Product Innovation process is a “ rhythm of search and selection, analysis and synthesis, cycles of divergent thinking followed by convergence”. He explains that NPI is a process during which the people working to generate new ideas and come

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up with plenty of solutions to the problem through the creative and lateral thinking. NPI is a well managed process in which group of diverse individuals has assigned a job to face a common challenge using the creative side of thinking. In this process the people have different perspectives and ideologies and intellectual conflict often occurs that finally lead to generation of new ideas (Vadim, n. p., 2001)

The process of New Product Innovation – NPI is generally divided in to three steps. These steps also called sub process are “ FFE – Fuzzy Front End, NPD – New Product Development and Commercialization”. The first and front phase of the innovation process is Fuzzy Front End that revolves around the creation of new ideas to innovate the product. It is a general concept that the fuzzy front end provides companies a great opportunity for improving the whole process of NPI (Peter et. al, p3, n. d.).

After FFE, the phase of New Product Development takes place that is concerned with different aspects of the product including its design, size and manufacturing process etc. In this phase also companies can apply some approaches for the betterment of the cycle time and efficiency of the process. These concepts include the “ Stage Gate TM and PACE approach presented by Cooper (McGrath, et. al, n. p., 1996) and McGrath and Akiyama (Cooper, n. p., 1993) in the year 1993 and 1996 respectively.

In the last phase that is Commercialization, the company makes profit from the out put of the development of new product. Companies now give considerable attention towards this phase of the process and utilize this formal and structured process for increasing the value and amount of the concepts generated for the innovation of new product (Peter et. al, p3, n. d.).

Koen P (2001) explained the process of new product innovation with the help of a model that presents and identified different stages involved in the process of new product innovation. The work of Koen also revealed that during the initial phase of the new product innovation, the management of the company must adopt a strategy that meet the requirement of that particular phase and in the following phase i. e. the new product development phase the strategies of the company should be totally different from that of FFE. It is not suitable for the companies to keep on going with the same approach through out different stages of new product innovation. This is because FFE is not a structured and well documented phase but the later phase is well structured and requires different approach and strategy then that of FFE. (Koen, pp. 46-55, 2001) The study of Koen also divides the new product innovation process in to three phases. The model presented to explain NPI process and its stages is as followed

“ Koen divided the process of new product innovation in to three phases as indicated in the model; Front End of Innovation (usually called Fuzzy Front End - FFE), New Product Development NPD and Commercialization”. The front end consists of the creative activities that are conducted before the formal and structures process of product development and both of these phases are quite opposite from each other with respect to approaches, strategies and activities. (Koen, pp. 46-55, 2001)

Peter A. Koen, Greg M. Ajamian, Scott Boyce studies the process of new product innovation and revealed that there are some major differences between the two phases of new product innovation. In the fuzzy front end the nature of work is totally experimental and up to some extent

disorganized and muddled whereas in the second phase the work is goal oriented with the plans identified for the projects and work is done in much disciplined manners (Peter et. al, p3, n. d.). The characteristics of both of these stages are also very opposite with each other. The fuzzy front end is unpredictable and uncertain whereas a high degree of certainty is present in the new product development phase. The financial resources allocation is also done in quite a different way for these stages. The funding is varied in FFE whereas the development phase is conducted through [proper budgeting].

At the fuzzy front end there is uncertainty and suppositions regarding the revenue expectations from the introduction of the new product however when the new product development phase is conducted the company became in the position to make prediction about the expected revenue that could be generated from the product. The companies also do the analysis and documentation regarding the revenues as the date of the product launch comes closer. The activities in both the phases are also different from each other's. in the Fuzzy front end the individuals are grouped in a team that is called the creative team and the member of that team conduct the research work, think about different ideas and concepts and then finally come up with some possibilities where as in the product development stage a team of professionals work for the development of the product and the idea generated in the fuzzy front end is executed by the multifunction process development team. When these stages come to end then the progress of these stages is also measures in different manners. The strength and feasibility of the concepts defines the success of the FFE and determine the

work progress done during the phase whereas the milestones achieved as a result of the product development measure the progress of the new product development phase (Peter et. al, p3, n. d.).

In the global market the competition is getting more and more tough for the companies with regard to the introduction of new products however there are some solution to this situation and the scalars have work out to find out the way through which the companies can perform well in the global scenario of high competition and can also get high profitability and reputation in market

There are several researches conducted that make many suggestions and recommendations for the companies to conduct an effective innovation process so that they can have more chance of success. In the new product innovation process the Fuzzy Front End – FFE is an important and crucial phase for the development of a product but unfortunately there are not adequate and sufficient researches conducted that focus on the ideal practice of FFE and also witness the real practice of FFE being done in the organizations. Hence there is a gap found between the theory and real practice of FFE in organizations.

Fuzzy Front End

The development of a new product is very delicate procedure. The first phase of the process Fuzzy Front End – FFE is the most challenging and most critical phase in the innovation process of a product, at the same time it provides a great opportunity to the companies to show their creative capabilities. It is the phase that started far before the actual development of

a product. During this phase thousands of ideas are generated for the innovation of a product but only few of these ideas are selected to initiate the product development process of these and out of them finally just one product idea is launched in the market (Tan, p1, 2005).

Kim, J. & Wilemon, D define Fuzzy Front End as “ the period between opportunities are first considered and when an idea is judged ready for development (Kim and Wilemon, p 269, 2002)

Jacob Hog Jorgensen (2007) explained that this phase is called the Fuzzy Front end because the term Fuzzy is used to indicate the intangible nature of the of the FFE phase of the innovation process. The nature of FFE is considered intangible because there are usually lot of uncertainties and unknown issues surrounding this phase. There are certain things that are not very clear at this stage like the demands and need of the customers, the expected plans and actions of the competitors and information about the technology and devices that are to be used in the process of development of the new product. (Jacob, p3, 2007)

This phase of the innovation process is also considered fuzzy because at this point the members of the creative team are not fully aware about the strategy alignment, resources required for the product development and the capabilities of the company to conduct the development process. These are the things that are clarified in the next stage of the innovation process that is NPD new product development. But at the FFE these things are not clear so many ideas are generated on the basis of wrong conceptions and thoughts and they are rejected in the net phase of the process. (Jacob, p3, 2007)

Fuzzy Front End is often considered as an intra firm process. (Jacob Hog Jorgensen, p3, 2007). Vadim Kotelnikov (2001) revealed that the early stage of the development of a product is marked with great opportunities however at the same time there are certain definitive facts associated with the phase of FFE. (Vadim, n. p. 2001) Based on a Single Ideation step (Cooper, n. p., 1993) Fuzzy Front End is a complex process. The ideation process is conducted to make sure that there are appropriate numbers of ideas generated for the innovation of a product and in order to gather the relevant information about the competencies and other important elements required for the invention process; adequate sources have been utilized by the company (Poskela , p1, 2003).

To attain these objectives the companies have to adopt appropriate ideation techniques and processes. Moreover it is also very crucial that the companies should develop an efficient procedure that ensures the adequate processing and transformation of the new ideas in to product concepts. The companies are also required to maintain an effective mechanism through which most potential and innovative ideas could be selected for the development of the product. The most potential and selection deserving product idea is the one that “ demonstrates to be feasible to develop, provide a satisfactory return, meet customer needs and fit the corporate strategy” (Poskela, p1, 2003).

In this context it is very essential that different phases and elements involve in the process of innovation of new product must function and interact with each other seamlessly and there must be a pipeline for these phases and elements that assure the uninterrupted flow of these phases right from the

generation of new ideas to the final development and presentation of actual product. The researches conducted to explore different aspects of the FFE are criticized on the basis of the argument that it is based on a single optimal model or process that does not keep in consideration any of the contextual issues like the organizational level, type of innovation of a product, type of product in itself and other essential elements related with the product.

Jacob Hog Jorgensen (2007) explained that the first stage of product innovation FFE is just concern about the development of the concept of the product and the product does not get any real shape or physical form in this phase (Jacob, p3, 2007). Their study also revealed that FFE is an important process for which it is very crucial for the firms to have adequate management skills and organizations and in case of unsuccessful management and organizations, there is a great possibility that the FFE would not bring anything positive for the company and consequently the company has to face some loss. This is because when the second phase of product innovation i. e. New Product Development starts there is requirement of solid background work and proper preparation. In case of insufficient preparation and management the company can face some major problems in form of project delay as well as budget escalation (Jacob, p3, 2007)

In this phase of the new product innovation some very important and fundamental decisions regarding the product development are taken like it is decided in this phase that which ideas should be selected for the innovation of the new product, what would be the criteria for the selection of an idea and what method to process that idea or concept to develop the final

product. Moreover in this phase it is also decided that should be the cost and time frame for the development of the new product and hence an idea is obtained about the expenditure and time required for the development of the product and then the future activities related with the process are line up accordingly (Poskela , p1, 2003).

Lars Deppe, Stefan Kohn (2002) explained that FFE is given the name of front end because it is the issue that is always mentioned at the beginning of the new product innovation process. FFE is concerned with all the aspects that can boost the exploration of new ideas, technologies and finally new product for the company. There are many ideas generated in FFE but later they were refined and the selected are moved to the next phase. Lars Deppe, Stefan Kohn described that there are four stages in the Fuzzy Front End. These stages were identified as:

Preparation of the idea generation

Idea generation itself

Idea screening / evaluation

The first concept (Lars and Kohn, p4, 2002)

Frido E. Smulders, Egon L. Van Den Broek, Mascha C. Van Der Voort (2007) revealed that in the technological driven and competitive market place the requirement for innovating new products is getting higher for the companies however despite the importance of innovating new products, the company's management often face problem in product innovation mainly because they fell short of new ideas. The development of new process could not be start until there is present of a well defined concept for the product that is formed in the light of market conditions and organizational abilities and provide

background for designing strategies for the project execution. In this context the FFE – Fuzzy Front End is an important phase of new product innovation. It is also the most challenging phase because the development of product mainly depends upon the idea generated during FFE and a good idea can lead to successful execution of project and finally successful development of product. (Frido et. al, p1, 2007)

FFE is the considered as the most influential and strong part of the new product innovation process because the success of the entire project mainly depends upon the ideas generated in this phase. The Fuzzy Front End often give outcome in form of “ well defined concept, clear development requirements, and a business plan that have to aligned with the corporate strategy” but at the same time it is also considered as a weak part of the process because many of the ideas are based on non contextual knowledge that are proved useless in the next phase. (Jacob, p3, 2007)

Fuzzy Logic

Vadim Kotelnikov (2001) explained that the Fuzzy Logic is a much defined methodology that is being used by the business leaders in order to address the ambiguity of the FFE and to clarify all the related facts and issues surrounding the Fuzzy Front End. Vadim Kotelnikov (2001) also point out some of the important fuzzy logics associated with FFE.

According to him one of the Fuzzy Logic speaks that ““ No plan survives contact with the enemy”. It means that all the plans made and ideas generated for the innovation of new products are not necessarily to be implemented in the actual process of production and these is no surety that

the developed ideas and concepts will get space in the real development process of the product. There is also a chance that the selected ideas and concepts are amended to use in the development process and they are not kept in the actual form in which they were generated. (Vadim, n. p. 2001)

There is another important logic regarding the FFE that “ Having a plan is better than not having one”. It means that the management or creative team of the organization must have a collective understanding of the issues related with the development of the new product so that they can proceed towards the product innovation with a better understanding of issues in the collective context of the business. If the organization make a defined plan for the FFE then it will be easy for the team members to build effectivecommunicationlink and working coordination between them and to take decisions and gain knowledge about different matters quickly. (Vadim, n. p. 2001)

Another Fuzzy Logic is to “ Make decisions at an early phase”. It explains that the member of the team must gather all the related data and information related with their work before they start the process. They should also complete the market research prior to the start of FFE so that they don't have to wait for any data or information during the idea generation and they have complete information about the issues related to their work. Hence the time is also saved for them when they have already decided that what things they are going to keep in consideration through out the innovation and development process of the product. (Vadim, n. p. 2001)

One important Fuzzy logic is to “ Be Flexible” means that the member of the team must possess flexibility in their thinking style. This is because when the

tem members will keep on thinking then several new concepts and strategies will come in their mind and their ideas will also be refined as a result of the ongoing thinking. The flexible thinking also allows them not to make up their mind according to the market condition, competitors position, and technological advancement. The members don't have to make any prior decision related with any of the issue and they don't have to decide their direction in the beginning but there must be an open ground with enough flexibility that facilitates the generation of innovative and unique ideas (Vadim, n. p. 2001).

“ Find a Partner” is a fuzzy logic that advice the team members not to think alone on the ideas. This logic suggests them that it would be better for them that first they review the entire thing internally and focus on them and then speak them out with the team members. For making any idea great it is very necessary that it must possess the answers of the entire potential question related with it. Once the idea is generated in the mind of a person then expressing and discussing it with the other team members will enable to critically review and refine the idea with the help of the complementary skills, resources and capabilities of the team members (Vadim, n. p. 2001). However this sharing and discussion of the ideas should be done with the office premises and with the office staff only.

Another fuzzy logic is to “ Balance customer feedback with your own understanding of the technology potential”. It means that while initiating the process of innovation of a new product, in the starting the company has to listen to their customers however it is not necessary that what ever the customers say the company has to build their strategy over their opinions.

The team members are required to build their own critical thinking to judge that where the customers are getting conservative and where they are not complying with the rapid changes accruing in the technology and hence they have to make a balance between customer feedback and their knowledge. In many of the cases the customers have no actual idea about the potential benefits of any technology so the company has to keep this in mind while generating ideas and developing the product.

The team members also have to “ Focus on opportunity and not the financial returns”. This logic explains that the member of the creative team must not give importance to the monetary benefits and they must have clear in their minds that money is not the every thing so they must not measure the risk and profit in terms of dollars only, capabilities must be grown by the members of the creative team and their success mainly depend on the fact that how early they can develop capabilities.

Characteristics of FFE

Kim & Wilemon (2002) described that the Fuzzy Front End phase of new product innovation has some specific characteristics from the perspective of intra firm. These characteristics include State of an idea that is generally probable and fuzzy in a firm and can be changes easily. Another characteristic is the feature of information for decision making that is kept qualitative, informal and approximate in the firms. Outcome is an important characteristic of FFE that is a blue print about which the team still has many doubt that weather it will take its physical form or not. Rejection of any idea for the development of the product is easily rejected in this phase.

Kim & Wilemon (2002) also revealed that FFE is a less formal process in which there is involvement of either individuals or some people work in team on a project. Usually this team consists of few members. This team work wither with very small or without budget because in this phase just ideas are generated and nothing is put in practical. FFE phase of development is also characterized by the need of creative management. The team members have to be creative as well as experimental also they can work in unstructured patterns. Though the members have given a task to work upon the idea generation but the CEO has to commitment with them regarding the work. (Kim and Wilemon, p269, 2002)

D. F. Beck, Boyack, Bray, Siemens (2001) revealed that Fuzzy Front End is that phase of innovation process which is mostly characterized by unknown and less understood factors. It is an important characteristic of FFE that the participants of the process are often unaware of their current position with regard to product development because in this phase only the ideas are generated and there is no surety whether these ideas will be executed or not. moreover the participant are often uncertain about the fact that what and how much they have to do next because the status of current concepts and ideas is not clear so they have some confusion whether they have to create few more ideas or many more (Beck, et. al, n. p., 2001)

Tools and Techniques of FFE

There are different tools and techniques of thinking, generating and evaluating the ideas and concepts that can be used in the Fuzzy Front End phase for the innovation of a new product. Following are some tools and techniques that are used in FFE.

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Brainstorming

An important tool of FFE is “ Brainstorming”. It is one of the most valuable and most creative tools of the FFE phase of the projects. It is also known as a “ creative thinking problem solving technique”. It is considered a valuable tool because it allows the members of the creative team to leave the run on the mill ideas behind them and to look towards something unique and out of routine. In this way the creative team can be free from the fixed ideas by using the brainstorming tool in the FFE phase. Brainstorming is defined as “ a pervasive cultural influence for making sure that individuals don't waste too much energy spinning their wheels on a tough problem when the collective wisdom of the team can get them " unstuck" in less than an hour” (Tom, n. p. 2001)

Vadim Kotelnikov (2001) discovered that for effectively using the tool of brainstorming in the FFE phase of NPI, it is very essential to understand the functions of the brain. He revealed that the right side of the brain performs the function of controlling the “ creative, visual, spatial concepts” whereas the left side of the brain do the work of controlling the “ logical, mathematical judgmental, analytical activities” (Vadim, n. p. 2001). In this way the brain performs two basic functions: Evaluation and Judgment.

The members of the creative team have to divide their brainstorming time in a manner that they can conduct both of these activities in the session. First they have to work only on generating the ideas and concentrate more on creativity using their right side of brain. During this time they don't have to judge their ideas and concepts means that the left brain activity should be suspended in the beginning and then after creating more and more ideas

they have to use the left brain for making judgments about the ideas and concepts they have generated. During this time the team members have to evaluate their ideas so that they can come to a conclusion where they have their ideas in refined form. (Vadim, n. p., 2001)

Vadim Kotelnikov (2002) that there are some general rules that are to be followed by the member of the creative team during the process of ideas generation through brain storming. While using this creative tool of FFE there should be differed judgments and all the members should not think on the same lines and themes however they have to build their ideas on the concepts of others. To manage the process effectively that one person speak at one time and during the whole conversation all the member remain focused on the topic but they have to think on different lines to bring out some wild ideas. The team members also have to encourage any unique idea by supporting and refining with own thoughts and ideas.

In the process of brainstorming there are lots of ideas conveyed and people talk a lot on different ideas. It is an important tack to record all the ideas and concepts that are expressed during the session so that selection could be made from these ideas in order to find the solution to the problem. The members have to agree upon the ideas that are chosen to refine and further project towards the next phase of the innovation process.

An important part of the brainstorming process is the management of flow of ideas. It is very important that the ideas that are generated during the brainstorming must align with the objectives that are set for the innovation of new products. In this context it is very important that the strategies of FFE

are clearly guided by the objectives so that the creative team can work on the right targets.

Six Thinking Hats

Another important tool of FFE is “ Six Thinking Hats” that was presented by Edward de Bono in 1985 (Edward de Bono, n. p., 1991). This technique was basically invented to “ encourage parallel thinking, encourage full-spectrum thinking and to separate ego from performance” (Sylvie, n. p., 2005). It is a simple and effective process that is intended to assist people to be more productive, focused and mindfully involved in the thinking process. With the help of this tool the members of the creative team could be able to learn that how they can separate their thinking in to six roles. Each of these six roles is identified by the thinking hat of a different color. The colors are used as symbol and the people can focus and gather their thoughts to a particular point. In a team work hats are revolved between the members and at the end each person gets the hat of same color that he had in the beginning. (Sylvie, n. p., 2005) Following are the thinking hats that have different colors and present different perspectives. (De Bono Group Web Page, 2007)

The White Hat presents the information that are required or acquired by the members of the creative team. “ The white hat denotes facts, figures, information need and gaps”. It call for looking and focusing on the figures, facts and data rather than taking about arguments

The Yellow Hat is the symbol of sunshine, optimism and brightness. This hat calls for exploring the positive points related with the values and benefits of the products.

The Black Hat is called the hat of judgment and caution and considered as

the most important, powerful and valuable hat among all these hats. It logically underlines the difficulties, dangers and wrong possible results of the situation.

The Red Hat is associated with the feelings, emotions, intuitions and hunches. The red hat allows the person to express his opinion or feeling about any particular point without looking for any justification or argument to support that opinion. In this way the group member can get maximum opportunity to express the opinions and feelings.

“ The Green Hat is intended to focus on creativity, different possibilities, proposals, alternatives, provocations, changes and new ideas”. The green hat allows the team member to speak the new idea, concept and perception that has in mind. (De Bono Group Web Page, 2007)

The Blue Hat is the management of the entire thinking process. This hat allows over view, managing and processing the ideas discussed. It is the “ meta cognition” hat that calls for thinking about what ever is thought in the process. (De Bono Group Web Page, 2007)

Factors Influencing Fuzzy Front End

Peter A. Koen, Greg M. Ajamian, Scott Boyce (2001) revealed that there are some factors that have influential effects of FFR because FFE exists in an environment of influential factors. There factors were identified as “

“ Corporation’s organizational capabilities
Customer and competitor influences
The outside world’s influences

Depth and strength of enabling sciences and technology” (Peter et. al, 2001, p6)

It is further explained in the study that there are some factors upon which the successful product innovation process depends. The organizational capabilities of the company play a significant role in successful accomplishment of FFE. The organizational capabilities are responsible for the identification of opportunities and then these opportunities are analyzed. On the basis of this analysis the ideas are generated in FFE. The overall environment of the company, its structure and the management's devotion towards the FFE is among the most important influencing factors of FFE.

The organizational capabilities have also to deal with acquiring the external technologies. For example the organizational capabilities of the electronic and pharmaceutical companies are determined by the licensing, joint development agreements and testing methodology etc. After determining all these factors the innovation process starts at the company and these capabilities draw significant impact on the FFE because ideas are generated keeping in view all the capabilities of the organization (Slowinski, et. al, 2000, p29).

The organizational capabilities have strong influence on the FFE because usually such capabilities result in providing utility, cost, avoidance and value to the customers and the expression of these value play an important role in the innovation of the product hence during the FFE phase the creative team tends to build the ideas and concepts based on these capabilities.

The outside world influences are also the important factors that have some impacts on FFE. These factors include different regulatory and legislative policy of the government or higher authority, the environmental regulations, the laws related with the industry and the socio economic trends prevailing

within the society. The outside world influences include number of factors and among them competition is also an important influential factor.

McDermott, R (1999) pointed out some factors that possess much important to influence the Fuzzy Front End. These factors include an encouraging culture that supports creativity and innovation, the presence of all the necessary equipments, devices and well tested instruments, the interest and involvement of top level and experienced personnel in the process of innovation so that they can not support the FFE phase by conveying their experiences and knowledge but can also use their powers to allocate and channel the resources (McDermott, p19, 1999). Moreover the organizational culture also influences the FFE because knowledge creation in the environment is necessary for FFE.

Koen (2001) “ identified the factors influencing the fuzzy front end of new product innovation process. He disclosed that leadership skills and qualities, culture, business strategies” together work for constructing the environment that can encourage and support innovation and creativity. The companies lacking all these attributes are left behind by others in the race of introducing innovative products for the customers. Koen observed that the companies that succeeded to attract customers and gain high profitability through the introduction of innovative products possess all these attributes and with the presence of these influential factors a company is enable to successfully conduct the process of new product innovation (Koen, p46, 2001)

McDermott, R (1999) and Wenger, E., and W. Snyder (2000) revealed that for creating such supportive organizational culture there are some tools that can
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help the organizations. These tools allow people to people contact that lead to the creation of an encouraging environment for creativity. These tools are “ collaboration at work place, maintenance of constancy of purpose by the leaders and setting out the aggressive goals for the team members (McDermott, R., p19, 1999) (Wenger, p139, 2000).

Porter (1987) presented a “ five force” model and identified the five forces that determine the intensity of the competition between the companies and this competition has great impact on the FFE as well as on the entire innovation process. These five forces were identified as “ relative power of the customers, competitors, new entrants, suppliers and industry rivalry” (Porter, M. E, 1987, p137). Grove (1999) further added that along with these five forces there is another factor that determines the outside world influential factors of FFE. This sixth force was identified as a “ Complimentor” influence and it means that the companies that exist in same industry but they don’t have competition between them instead they support each other in the development process. Like Intel and Dell are not competitors of Microsoft but they are related with same industry and they also support each other in acquiring different technologies and capabilities (Grove, 1999, n. p)

Peter A. Koen, Greg M. Ajamian, Scott Boyce (p14) revealed that there are some important factors that influence the process of new product innovation at it first state i. e. the fuzzy front end. These factors were listed as:

Creation of maximum opportunities by envisioning the future through		
Road	mapping	
Technology	trend	analysis
Customer	trend	analysis

Competitive intelligence analysis
Market research

Scenario planning (Peter A. Koen, Greg M. Ajamian, Scott Boyce, p14, n. d.).

All of these factors have impact of the thinking style of the people as well as their actions and their thought are also influences by all the above describes factors. In the process of generating new ideas all these things lie in the minds of the creative team and the out come of their thoughts i. e. the idea or concept is inspired from these factors.

Model of FFE

The Fuzzy Front End is a highly dynamic phase of the new product innovation process (Jiří Vacek, 2006, p4). It is not properly documented and sometimes it becomes merely difficult to make generalizations regarding the FFE phase of NPI. However in order to put FFE in to a general framework of innovations, researchers have attempted to present some models that describe the possibilities of FFE. An important model of FFE was presented by Khurana and Rosenthal in 1998. The structure of the model is as followed:

Fuzzy Front End Model (Khurana, Rosenthal 1998)

“ In this model present by Khurana and Rosenthal it is defined that Fuzzy Front End is a phase that comprises of “ product strategy, formulation and communication, opportunity identification and assessment, idea generation, product specification, and project planning” (Khurana, A., and S. R. Rosenthal, 1998, p 57). According to this model in the FFE phase of product innovation process the project is started from a preliminary phase that is denoted as phase 0 in the model. The preliminary phase comprises of

market opportunities and assessments. In some of the cases it is also possible that the ideas are generated in the technical department and in that case there is a necessity of inter functional team. The outcome of the phase 0 is the product concept that includes the “ preliminary identification of customer requirements, market segments, competitive position, business opportunity and compliance with strategy” (Khurana, A., and S. R. Rosenthal, 1998, p 57). In the next phase i. e. the first phase of FFI, the business and technical feasibilities are concluded and product definition and the product plan is prepared. And after this agreement of the team members on the point the work on the development of the product starts.

The model presented by Khurana and Rosenthal possess some advantages and at the same time there are some deficiencies that can be observed in this model. The model provides an opportunity to visualize the structure of activities conducted in FFE however the FFE is not a formal structured process that’s why there is great possibility that in many cases the model doesn’t work in the way as described (Jiří, 2006, p4).

Researches on Fuzzy Front End in SMEs

Though the importance of the Fuzzy Front End – FFE has been determined by the scholars, researchers and companies but still there are very few research that are focused on the best practice of FFE in organizations. Moreover there is not enough work done that compares the real practice of FFE in the SMEs in comparison with the theories that present the concepts about the ideal theory of the Fuzzy Front End.

Cooper and Kleinschmidt (1995) conducted an empirical study and revealed that the role of FFE is very vital in the new product innovation and it is one of the differentiating Factors between the successful and unsuccessful companies. The study revealed that the success of the product is largely depend upon two factors and these factors include the “ quality of executing the pre development activities and well managed and well defined plan that is made before the development of a product” (Cooper, et. al, p315, 1995)

P. Koen, Ajamain (2001) examine the importance of Fuzzy Front End for the success of an organization and revealed that FFE is the key factor behind the introduction of an new product by a company each year and in this way it is the main factor behind the success of a company (Koen and Ajamain, 2002, p46).

Gupta and Wilemon (1990) also conducted a research to find out the role of FFE behind the successful introduction of innovative products by the companies. The research was conducted by studying the new product innovation process at 12 large technology based firms of United States. There were 38 major projects completed by these firms studied and it was revealed from the study that right from the beginning of the process i. e. from the Fuzzy Front End there was active and visible commitment of senior management of the firms towards the process of innovation. Moreover the first phase FFE was well organized by the management by inducting functional groups in the process at the early stage. The study shows that there was much importance given to the first phase of the product innovation and as a result these companies succeed to launch their products

in the market and then enjoy good public response as well as rise in the profitability (Gupta and Wilemon, p22, 1990)

A. Khurana and Rosenthal (1997) observed that despite the importance of FFE and its role behind the performance of an organization, the management of some companies over look the importance of FFE and determine it as a weakness of the entire product innovation process. The study discovered that in many of the organizations FFE – the pre development activity get least attention and the management give more attention to other phases of the product innovation like the product development and commercialization phase. On the other hand in many companies where the new products are successfully launched, it was studies that more time and money was devoted to the fuzzy front end phase as compared with the other phases and in these cases FFE came out as an important reason behind the successful launch of products by the companies. The study also revealed that the companies where there are high rates product launch failures, it is observed that during the FFE the company devoted little time and money and poor management was practices during the phase that contributed towards the failure of the products launched by these companies (Khurana, and Rosenthal, 1997, p103).

Birgit Verworn, Cornelius Herstatt (2000) conducted a study on the new product innovation process while keeping the main emphasis on the Fuzzy Front End and the impact of this phase on the entire process of product development. The study was based on the hypothesis that NPI that is a multistage process receives two types of impacts from the FFE; direct impact and indirect impact and as a result of these impacts the next and project

execution stage of NPI that is new product development NPD is much affected. The study was conducted by testing this hypothesis on different firms and from the responses collected from the firms it became clear that the relationship between these two stages of new product innovation exists and FFE draws major impact on NPD. (Birgit Verworn, Cornelius Herstatt, p1, 2000) The study confirmed that if FFE is managed and conducted effectively then it assures the success of NPD. It was revealed that FFE directly affects the NPD because as a result of strong and innovative ideas generated during FFE, the execution of these ideas in NPD results in ultimate success as execution is based on generation of ideas. Moreover FFE also provides the background for reducing market and technical uncertainty that also affects the innovation process at its second stage. (Birgit and Herstatt, p1, 2000) The following framework was constructed by the researchers to witness the impact of FFE on NPD as on the entire process of product innovation:

McDonough and Spital (1984) conducted a research to find the evidence about the role that FFE plays in an organization. The research was focused on 3 companies and 12 new product innovation projects accomplished by these companies were studied to look at the role of FFE in the entire process. The projects selected for the study were successfully launched in the market and gained favorable response. The study of these projects revealed that during the FFE phase the senior management of the company remained involved in the process. There was a clear and well-defined schedule set for conducting the phase. The leaders of the team were the people who not only possess technical knowledge but also have general business skills. The study

of NPI process at these organization shows that the FFE phase was given considerable importance in NPI process and there was proper management and organization of FFE phase, moreover the senior management also remain involved in the process to support it and finally all these measures resulted in the success of the product innovated by these firms through this process. Hence the importance of FFE in the entire process of NPI is clarify from this research (McDonough and Spital, p62, 1984)

New Product Development Process in SMEs

Globalization has contributed towards the emergence of highly competitive market and in this situation none of the companies can grow and earn revenue without introducing new and successful products. The companies often face major challenge in form of implementing FFE for the development of new product. FFE is concerned with the creation of idea and concept for the product and if this process is well managed then the firms acquire high potential product concepts for the development of the product. However after getting the concept and idea the companies often face some barriers due to corporate culture and some companies often fail to successfully implement the ideas generated in FFE in to the actual process of new product development.

Dr. Robert G. Cooper and Dr. Scott J. Edgett (2006) revealed that there was never such demand for the new products in the market as in today's competitive world. The life of the products is getting short and new products are required to replace them. This situation has build up lot of pressure on the companies and the companies that fail to cope with this challenge face some serious problems and the survival of such companies also become in

danger. Cooper and Scott point out the reason behind the failure of some organizations in introducing successful products in the market. They revealed that it is not an easy job for any company to come up with a new product very frequently and win profit and public attention against it. The difficulty exists because there is just one out of the four projects that successfully meet the requirements of the market and customers and in this way about one third of the launched products are failed to survive in the market. (Robert et. al, p1, 2006)

Xeuli Huang , Geoffrey N. Soutar, Alan Brown (2001) explained the term NDP – new product development as a “ set of information-intensive and cross-functional activities that include idea generation, screening, business analysis, product development, market testing, and commercialization. These activities require information from many areas, including the marketplace, technology sources, competitors, and government.”(Xeuli et. al, p1, 2001) They further explained that the functional aspect of NPD deals with the marketing research and development, engineering and production.

Dr. Gerald Susman, Anthony Warren, Min Ding (2006) point out that there are many challenges faced by the SMEs due to high competition in the market place and growing demands of the customers. In this situation the SMEs are often required to cut down their profit margins and make available product for the customers at low rates while giving them best quality. The study reveled that many of the SMEs respond towards this pressure and adopt the strategy of introducing innovating products to the customers and maintain their interest with the help of introducing these innovative products. It becomes very crucial for the companies to offer the customers

some thing that is totally different and unique from what their competitors offer and this they can do only by conducting an effective and efficient process of new product innovation in their companies. (Gerald et. al, p4, 2006)

Prof. Dr. Cornelius Herstatt (2001) revealed that the new product innovation process is gaining more and more importance in the small and mid size enterprises (SMEs) and these companies are emphasizing on different phases of new product innovation so that they can introduce more innovative products in front of the customers and can attract their attention and ultimately there could be rise in the profitability of the company (Cornelius, 2001, n. p.).

Dr. Gerald Susman, Anthony Warren, Min Ding (2006) revealed that before studying the process of new product development in SMEs it is very crucial to keep to remember that the process of new product development can never be same in all the SMEs. The environment, organizational capabilities and company attributes are different for every SME hence a single set of recommendations can never be applicable to all the SMEs. (Gerald et. al, p4, 2006) They further disclosed that there is wide range of options available to the SMEs for the innovation of the product that could be used by these company at different time to serve different purpose that's why there is no any option that could be considered the right one for a SME as different SMEs operating in different industries conduct innovation process according to their own requirements and market conditions. (Gerald et. al, p4, 2006)

Process of New Product Development

There are some approaches presented by different scholars to explain the process of new product development in companies. The Stage Gate Model presented by Cooper in 1999 is considered as a most successful and widely accepted approach to the process of NPD. Dr. Robert G. Cooper and Dr. Scott J. Edgett (2006) point out that there are some factors that make difference between the winners and the loser and an important point is that the companies that properly follow the stage gate process for the new product development have great chance to successfully launch the product as compared with the companies that pay little attention towards the stage gate model. (Robert et. al, p1, 2006)

Stage Gate Model Presented by Cooper – 1999

The Stage Gate system was presented by Robert Cooper in the year 1999. The system breaks up the project of the new product development in to different stages. These stages are discrete and identifiable as well. The NPD project is divided in to these stages in a manner that each of the stages comprises of the information that is needed at that point of the process in order to move forward through the project towards the next stage of the process. The stages presented in the system are multi functional or cross functional. The Stage Gate system has no marketing stage neither there is any stage that specifically speak about the research and development but each of the stages presented in the system consists of set of parallel activities that are to be conducted by the people belonging to different functional areas of the organization. The project leader is also identified in the system who leads the team through out the project. (Robert et. al, p1, 2006)

The Stage Gate system also provide an opportunity to the firms that they can manage the risk involved with the process of NPD through the stages presented in the system. There are parallel activities that are to be conducted within every stage and through these stages the company has to gather significant information about the technical, marketing and financial issues. With the help of the gathered information the company can lower down the technical and business uncertainties faced by the company. (Robert et. al, p1, 2006)

The stages are arranged in the system in such a way that the cost of each stage id higher then that of the preceding one and the companies have to mange their financial resources according to that. As the uncertainties about the project went on declining along with the stage gates, the expenditure on the project is increased. The Stage Gate model also allows higher level of flexibilities to the companies with respect to the acceleration of the projects. The stages are flexible because if a company has to introduce the product in the market in short time of period then it might go got overlapping some stages of the system. “ There are some activities mentioned in the system that take long time to complete, such activities can also be brought forward from one stage to an earlier one”. This is because the system allows to move towards the next stage of them model when the previous stage is not completed. The left over activities of the previous stages could be completed by combining the two stages and performing the activities of the two stages all together. (Robert et. al, p1, 2006)

The key stages in the Stage Gate system are as followed. These stages are very important and overlapping. The flow of information between these stages is typical and generic.

Preliminary Investigation

This is the first stage of the stage gate system. At this stage a very quick investigation and scoping is conducted regarding the project. Usually there is a small core team that has assigned this job of investigation. These people belong to the technical and marketing departments. The investigative team prepares the background necessary for the project. This work includes the “ preliminary market assessment, preliminary technical assessment, and preliminary business assessment” (Robert et. al, p1, 2006)

Detailed Investigation

It is the second stage of the Stage Gate process where detailed information are collected about different aspect of the project and the research work related with the project is also completed at a wide scale. This stage is mainly comprises of the detailed homework that led to a business case. At this stage the market research is conducted that covers different aspects like the consumer behavior is studied in detailed so that information could be gathered about the attribute of the product. The market research provide information about the needs and demand of the consumers and in the light of these demands and consumers the NPD team can set target that what qualities they have to include in the new product. Moreover the competitive analysis is also done at this stage that provide a broad view of the market condition and the team consider the information about the competitors and

their product while performing the work of product development. (Robert et. al, p1, 2006)The detailed investigations also allow the team to have a look at the technical and manufacturing assessment of their capabilities in comparison with the market requirements. The financial analysis help the company to get an idea about the financial resources that will be available for the product development process. The research work at this stage is also done y the team of the technical and marketing professionals and at the end of this stage the team has the documented information collected during the research regarding the product, its target market, target audience, concept, and benefits associated with the product and the requirements for the product. In addition the detailed investigation also provides the business justifications as well as a detailed plan of actions that are to taken in the upcoming stages of the product development process. This plan of action informs about the requirement of the project in terms of resources and time period (Robert et. al, p1, 2006).

Development Stage

At this stage of the NPD process the actual design of the product is prepared and its development is started. It is the implementation stage of the development plan. At first a simple and proto type product is developed by the team and then this product is set for the in house testing. The product is further tested with the limited customers to get an idea about the response of the people. The entire process of manufacturing and the requirements are mapped out and the marketing launch plan is prepared. At this stage the test plans for the upcoming stages are also prepared. At this stage the whole process of the product development gains momentum. There is rise in the

recourses commitment. At this stage all the people related with the development of the product come together and work for the development of the product. A cross functional team is constructed for the product development that consist of the people from the technical, marketing, manufacturing, quality assurance, sales and financedepartments (Robert et. al, p1, 2006).

Training and Validation Stage

At this stage of the product development, the verification and validation of the new product is conducted. The product is reviewed with respect to its marketing and production capabilities. At this stage the product is gone though extensive in house product testing. Moreover the product is also set for the customers trails, these trails could e done in the fields or in the market place. The product is then piloted in the plant and then the marketing and sales of the products is also tested to have a thorough look at all the aspects of the proposed product. After going through all these testing and trails the product finally becomes available for the commercialization. The team members involved in the production of the product in the thirst stage have to answer all the questions and concerned that arises in the testing of product in the fourth stage (Robert et. al, p1, 2006).

Full Production and Market Launch Stage

In the fifth stage of the product development prose the product is completely commercialized as this stage denotes the full production and commercial selling of the product in the market place. The marketing launch plan prepared in the previous stage of the process is implemented in this stage

and all the activities that are decided to conduct just before the launch of the product are also done. These post launch activities include monitoring and adjustment. At this stage of the NPD some new professionals can also be added to the team. More people from the sales and operations department can become part of the commercialization team involved in the launch and commercial selling of the newly developed product. However despite the induction of more people in the team, the members involved in the early stages of the product development also remain part of the team and they are also responsible and accountable in the process of commercialization and beyond that. In this way the product is developed and passed through different stages and finally become available to the customers in the market place. These above described stages presented by Cooper in 1999 are flexible in nature and within real practice of the product development the companies often make changes in these stages according to their own requirements and capabilities because this system is very flexible in nature however it is significant if SMEs follow the same pattern as described by Cooper because the proper commencement and completion of the production process is mainly depend upon the procedures and strategies adopted to conduct it (Robert et. al, p1, 2006). The Stage Gate Model presented by Cooper in 1999 could be better understood with the help of the graphic representation that shows the flow of information through different stages of product development.

Stage Gate Product Development Process (Cooper 1999)

Gates of System

In addition to the above description about the Stages involved in the development process there are gates that are attached with each stage and the flow of information and progress of the stage is monitored through the gates that are present after each stage of the development process as seen in the figure. Gated there are some attributed that are attached with the Gates of the system. It is to be clearly understood by the management of the SMEs that adopt the stage gate system that the proper arrangement of the gates system through out the process ensures the success of the product development process at fast speed. The gated mentioned in the system also perform the duties of the “ quality control check points” means that as the process is moved from one stage to another the quality of the work on monitored and it is checked that weather the progress of that stage is appropriate with the progress quality standards or not (Robert et. al, p1, 2006).

The function of the gates is generally conducted through the staff meetings. The senior members of the company and the members of the production team come together to and monitored the performance of the process in a particular stage and then allow the process to proceed towards the next stage after going through checking in the gates (Robert et. al, p1, 2006).

The Gates presented in the Stage Gate system of the new product development share some common formats that are the input, criteria and out put. The “ inputs” are basically all the deliverables that the team members and the leader of the project expressed in the meeting. These deliverable talk about the results of the actions that took place during the previous phased of the development process. “ Criteria” are the questions or

metrics that are decided by the company management to judge and evaluate the performance and progress of the product development system.

The criteria are not o