VERSLAS: TEORIJA IR PRAKTIKA
BUSINESS: THEORY AND PRACTICE
ISSN 1648-0627 print / ISSN 1822-4202 online

2012 13(4): 365–374
doi:10.3846/btp.2012.38

MARKETING STRATEGY FORMULATION FOR INNOVATIVE PRODUCT DEVELOPMENT PROCESS

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Received 29 June 2012; accepted 14 September 2012

Abstract. The scientific literature widely considers the new product development (NPD) process. Innovation process influencing NPD process brings for the product an exceptional value which stimulates market demand of these products. However to create a successful new product is not easy. Scholars of management, politicians and economists acknowledge the advantages of new products and market power, but the development of these products is a problematic and long-term process that requires considerable time and financial costs, which often does not receive the return. Scholars state that problems are related to marketing. Based on these research results, the article concentrates on the marketing strategy formulation for a NPD process. The aim of this study is to gather, research and generalize recent scientific literature in order to provide conclusions, related to the marketing strategy formulation for the NPD. Implementing the aim of this study, most of the chaos was caused by fact that NPD process, innovation process and the research commercialization process are interrelated, and problem-solving has particular features in common. In order to clarify the relationship between these processes, a comparison of these processes and definitions was carried out. In analysis of NPD process, the limits of research were set - the process was analysed from the initial product design phase and was completed with the product introduction to the market.

Keywords: marketing strategy formulation, innovative product, development process.

JEL Classification: D800, O310

MARKETINGO STRATEGIJOS FORMAVIMAS INOVATYVAUS PRODUKTO KŪRIMO PROCESUI

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Įteikta 2012-06-29; priimta 2012-09-14

Santrauka. Mokslinėje literatūroje plačiai nagrinėjamas naujo produkto kūrimo (NPK) procesas. Inovacinis procesas, darydamas įtaką NPK procesui, suteikia išskirtinę vertę produktui, kuri skatina šių produktų paklausą rinkoje. Tačiau sukurti sėkmingą naują produktą nėra paprasta. Vadybos mokslo atstovai, politikai ir ekonomistai pripažįsta naujų inovatyvių produktų pranašumą ir galią rinkoje, tačiau šių produktų kūrimas – ilgalaikis ir problemiškas procesas, sunaudojantis daug laiko ir finansinių sąnaudų,

kurios dažnai nesulaukia grąžos. Mokslininkai teigia, kad problemos daugiausia susijusios su marketingu. Remiantis šių mokslinių tyrimų rezultatais, straipsnyje buvo susitelkta į mokslinius tyrimus, skirtus marketingui, orientuotam į NPK procesą. Šio tyrimo tikslas – surinkti, išnagrinėti ir apibendrinti naujausią mokslinę literatūrą siekiant pateikti išvadas, susijusias su marketingo strategijos formavimu inovatyviam produktui kurti. Stengiantis įgyvendinti šio darbo tikslą, nemažai painiavos sukėlė faktas, kad NPK procesas yra susipynęs ir su mokslinių tyrimų komercializavimu, ir su inovaciniu procesu, o sprendžiamos problemos turi bendrų požymių. Stengiantis paaiškinti šių procesų tarpusavio santykį, procesai buvo palyginti su sąvokomis. Analizuojant NPK procesą, buvo nustatytos mokslinio tyrimo ribos, apimančios procesą nuo koncepcijos analizės iki produkto išleidimo į rinką.

Reikšminiai žodžiai: marketingo strategijos formavimas, inovatyvus produktas, kūrimo procesas.

1. Introduction

New product development (NPD) is decisive for the prosperity and success of any company (Woodside 2005; Munksgaard, Freytag 2011). Through development and the introduction of new products, new possibilities and markets can be reached or created. Innovative input from customers and markets are often pointed out as significant input which provides a solid foundation for successful product development (Munksgaard, Freytag 2011).

To create a successful new product is not easy. Despite the advantages of new products and market power, the development of these products is a problematic and long-term process that requires considerable time and financial costs, which often does not receive the return, bringing heavy losses to companies. Studies have shown that 46% of their resources, companies devote to NPD and introduction into the market, is wasted on unsuccessful product development projects (Cooper 2006). Also, it has been stated that over 60% of all NPD efforts are stopped before they are commercialized, and 40% of the remaining products are withdrawn from the market (Allen 2003). However, Hopkins has summarized R. G. Cooper's and other authors' researches and presented reasons for new products' failures: 55% of the surveyed companies have stated that problems are related to marketing (Allen 2003). Based on these research results, the article concentrates on the marketing strategy formulation in a NPD process. A well-developed marketing competency includes proactive consideration of the customer in the development process; it helps to guide technical specifications, determine appropriate market segments, establish cost targets to meet pricing objectives, and identify partners that will play a critical role in the value delivery process. In other words, it brings the voice of the customer into the firm.

Scientific research previously has proved marketing solutions importance in the NPD process. Prior research of H. Ernst *et al.* (2010) has identified the integration of marketing with research and development (R&D) as a key success factor for new product development (NPD). An effective connection between marketing and design activities will be a trigger product innovation (Gupta, Wilemon 1990; Sherman *et al.* 2000). More importantly, numerous enterprises admit on the concept that "product design should lead marketing to meet market requirements", and "firms sell both products and designs" (Beckman, Barry 2008). A good design not only can help an enterprise achieve profits, but also it offers consumers product values associated with enterprise image (Olins 1990; Hsu 2011).

To contribute to the research on marketing decisions in NPD process, it would be appropriate to analyse the latest research in this field and make generalizations. In order to achieve the first objective, it is necessary to review NPD process models and the attitudes associated with this process and answer the questions: (1) What is the relationship between the NPD, commercialization and innovation processes? (2) Could the sources associated with the commercialization and the innovation processes be included in the list of literature for analysis of the marketing in innovative NPD process?

2. Relationship between new product development, commercialization and innovation processes

New product development process. It is important to define the concept of the process and limits in the analysis of the processes taking place in a new innovative product development process. After analysis of the literature related to the new innovative product development process it became clear that the NPD process, innovation process and the research commercialization process are interrelated, and problem-solving has features in common. Much chaos is caused by a situation like this while analysing this process. For this reason, it is necessary to review the scientific literature in order to bring clarity to define the limits of the process which will address issues of marketing strategy formulation and research proposals. To achieve this goal the most appropriate thing is to compare the NPD, innovation and commercialization processes with scientific research concepts and processes.

According to Ph. Kotler (2003) NPD is: the creation of original products, existing product improvement or modification and creation of new brands, with the help of company's scientific research department's efforts. D. Dougherty (1992) argues that NPD is a process of linking technology and customers, and it is (Zhang 2009) the source of a

potential competitive advantage of the company. Ph. Kotler (2003) says that a company can acquire new products in two ways, that is, to buy another company or license the patent – to produce someone else's product or a company's research division. Industrial research and development (R&D) utilizes science and technology to construct new or improved products or processes for profit-seeking companies (IRI 2000). NPD, which is an essential part of R&D, can be seen as an activity that is expected to improve a company's competitive advantage and future success in terms, for example, of profitability and market share. Based on the hope and trust that evident return will be greater than expenditure, considerable sums of money are spent on R&D (Suomala, Jokioinen 2003).

According to independent researchers, that is, Product Development and Management Association AMR Research, Booz-Allen Hamilton data show that about, 75-80 % of U.S new products creators use Stage-Gate system or its modifications. R. G. Cooper has created Stage-Gate process – NPD tool, which is used by most of the leading companies around the world. Stage-Gate system, widely practised in new-product projects, was introduced in 1980 (Cooper, Edgett 2010). The system was developed based on research carried out by analysing successful projects and successful experience of developed products. Cooper's Stage-Gate System is a conceptual and operational road map for moving a new-product project from the idea to a product launch. Stage-Gate divides the effort into different stages separated by management decision gates. Cross-functional teams must successfully complete the ascertained set of related cross-functional activities in each stage prior to obtaining management approval to proceed to the next stage of product development. In addition to the discovery stage, there are five key stages: (0) discovery: activities designed to discover opportunities and to generate new product ideas; (1) scoping: a quick and inexpensive assessment of the technical merit of the project and its market prospects; (2) build business case: this is the critical homework stage – the one that makes or breaks the project; (3) development: plans are translated into concrete delivery; (4) testing and validation; (5) launch. Cooper's discovery stage include Scoping, Technical assessment, Detailed investigation stages, which the author identifies as technology development process, further the following stages are identified as NPD stages.

According to Ph. Kotler (2003), NPD is understood as a process resulting from the nine main stages: (1) new product strategy; (2) ideas search; (3) ideas selection; (4) conception creation and check; (5) marketing strategy; (6) business analyses ; (7) creation of the product; (8) trial marketing; (9) product preparation. Many companies have traditionally applied a sequential approach to NPD by strictly aligning with stages, first defining a new product strategy and completing with product on the market. While the application of this sequential method to product development is used, each department of the company is performing specific product development stage in order to transmit completed work to another department which carries out the next step. Sequential product development method has its advantages, it helps to impose order and control of high-risk and complex new product development projects, but using this method of product development can take a long time. In consistent product development, when problems have been solved at some stage, it may slow down or even stop the entire project.

Today, the time spent is more expensive than the increased costs, the company makes every effort to accelerate the placing on the market and shorten the NPD process, therefore, many businesses refuse to accept sequential approach to product development and are looking for faster and more flexible ways. For this reason, the company chooses a parallel product development method or way of working in teams (Kotler 2003). Applying this method company's departments work closely together while carrying out several stages of product development to save time and increase efficiency. Companies gather representatives from different departments to form a team which creates a product from the beginning to the end.

Commercialization process. There are many definitions about commercialization, but in simple words commercialization means - presenting or introducing a new product to market (Caurtois 2004). From Canada's government point of view, commercialization is the processes by which research outcome moves toward practice, ideas and new findings develop in the form of new products. Hence, the technologies and services will generate that what have outstanding capacity to sell around the world (Mc Nealy 2004). Nearly defined commercialization as process through which developing and selling costs of a new product will be declined. Just because of the extent to which the product is totally matched with its customer needs and wants, the selling of that product will be done easier (Kotler 2003). In other studies (Rosa, J., Rose, A. 2007; OECD 2005) commercialization is also defined as a set of actions which conveys knowledge to product (Jalili et al 2011).

Texas Austin University technology commercialization office uses the eight steps model of technology commercialization: (1) research; (2) disclosing an invention; (3) market assessment; (4) patenting and other legal protection; (5) prospecting; (6) due diligence and negotiation; (7) the deal; (8) after the deal – the last stage in commercialization. The path to commercial markets will vary, depending on the nature of invention, the market it is addressing, and the inventions stage of development. Under the terms of the agreement, the commercialization partner provides regular progress reports to the University on its commercialization activities. The inventors may continue to be

involved in development activities with the commercialization partner (The University of Texas at Austin, Office of Technology Commercialization, 2012). A similar scheme in the invention commercialization process can be detected in the scientific works of J. Yencken, M. Gillin (2006), J. G. Thursby, M. C. Thursby (2007), D. S. Siegel *et al.* (2007), F. Zhao (2004) and others dealing with the commercialization of university intellectual property, that means in World Intellectual Property Organization reports and presentations, and many universities, innovation centres Web sites. The subject is the commercialization of inventions university or research institute. In this case, usually commercialization of the invention is typically the last stage of the invention: the signing of the contract is sold, licensed, or established in spin-out company which is engaged in the further commercialization of the invention.

Presented by J. Rosa, A. Rose (2007) R. Goldsmith's commercialization model is a road map of strategies and actions for the commercialization of advanced technologies. The model breaks down into twelve activities that describe the process to maximize the chances for success. Each sequence has a technical stage, a market stage and a business stage. The model is a framework for measuring progress in the different stages, namely identification of information and technical assistance needs, project development costs and the forecasting of financing requirements. It follows quite a specific, ordered process (see matrix diagram below). The Goldsmith's model was designed to provide a mechanism for commercializing new products and processes (totally new ideas). This framework is not suited to commercialization for technology adoption purposes (incremental innovation). The Goldsmith framework was designed for new product introduction and new company creation which is most often reflective of emerging and disruptive technologies. These emerging and disruptive technologies account for a very small percentage of total innovation where the majority of innovations involve adopting or adapting technologies." (Rosa, Rose 2007). This commercialization model is quite old, although some of its modified forms are used up to now.

K. R. Allen (2003) presents innovation and commercialization processes scheme and argues that innovation and commercialization processes are not linear. This chaotic process continues until the goal is achieved. Invention and innovation process generally consists of four broad categories of activities: connection, discovery, invention and application. Briefly, connection involves recognizing a relationship that might lead to a discovery. From this discovery comes an invention that has the potential to produce in a variety of different contexts. The feasibility process is the identification of ideas and looking for the intersection of market needs. The search results are often reflected in the wording of a business concept that describes the product/process, technology, customer/end user, and scalability benefits of the technology and application strategy. The next stage involves an optimal search method to protect intellectual property. For the company it is vitally important to determine which intellectual property to protect, and to find a way to select the most appropriate strategy to meet the commercialization goals. K. R. Allen (2003) argues that in innovation and commercialization processes, there are two crucial moments of self-determination. The first of these is the choice: whether intellectual property should be patented or not. The next step is to answer the questions: Is it possible to make use of technologies? Is the patent necessary for successful technology commercialization? Is technology designed to meet the U.S. Patent and Trademark Office requirements? After this stage, the second major important decision stage is where the inventor has three choices: (1) he claims for licensed rights to manufacture and market existing businesses and to receive royalties tax, which is calculated from the product / service sales (2) he may sell the technology directly to another company, (3) he can establish a company for the purpose of producing and marketing his invention. These are very different solutions for scientists and inventors who work in a university environment, research institutes, government laboratories. The decisive factor in the creation of a firm may mean it will be necessary to maintain the current position and seek resources to maintain the start-up, in which case licensing and direct sales may be more flexible (Allen 2003).

Innovation process. The Oslo Manual, developed jointly by Eurostat and the OECD and currently in its 3rd edition, defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations." Japanese management system specialist, K. Urabe, provides a description of the contents of Innovation: "Innovation is the generation of new ideas and their implementation, new products, processes or services that result in national economic and employment growth, profit growth of innovatory company" (Urabe 1988). This one is now widely used for all types of innovation in descriptive terms: Innovation is - the successful introduction of new technologies, ideas and methods into commercial use and presentation of the new or improving existing products and processes (RIS). Hauser et al. (2006) argue that the main innovation is the goal of maximizing profitability, creating new and modifying existing products. They differentiate between 4 types of innovations, namely "Product Innovation", "Process Innovation", "Marketing Innovation", and "Organisational Innovation" (OECD 2007). The minimum requirement for an innovation is that the product, process, marketing method or organizational method must be new (or significantly improved) to the firm. Innovation

activities are all scientific, technological, organizational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations.

The innovation process includes several systematic steps, beginning from problem/requirement analysis to idea generation, idea evaluation, project planning, product development and testing, and finally, to product marketing. The steps may overlap each other. These steps may be categorized into 3 broad phases, which represent a simplified innovation process. This project takes into account all the three phases of innovation. Special attention is paid to the process of R&D, which in many cases builds a corner-stone of innovation (TUHH 2008).

NASA invented and internationally recognized and applied in industry Technology Readiness Levels (TRL) concept which is a description of the different R&D steps to ensure the cycle of innovation processes by transforming ideas into the market (NASA 2012). TRL is a measure used by some USA government agencies and many of the world's major companies (and agencies) to assess the maturity of evolving technologies (materials, components, devices, etc.) prior to incorporating that technology into a system or subsystem. When a new technology is first invented or conceptualized, it is not suitable for immediate application. Instead, new technologies are usually dependent on experimentation, perfection, and increasingly realistic testing. Once the technology is sufficiently proven, it can be incorporated into a system/subsystem. TRL description is as follows: (1) Basic principles observed and reported; (2) Technology concept and/or application formulated; (3) Analytical and experimental critical function and/or characteristic proof of concept; (4) Component and/or breadboard validation in laboratory environment. Basic technological components are integrated to establish that the pieces will work together; (5) Component and/or breadboard validation in relevant environment; (6) System/subsystem model or prototype demonstration in a relevant environment (ground or space); (7) System prototype demonstration in an operational environment; (8) Actual system completed and 'flight qualified' through test and demonstration (ground or space); (9) Actual system "flight proven" through successful mission operations (The European Space Agency 2012).

Comparing NPD, commercialization and innovation processes in the concepts of the scientific literature and various countries strategy documents (Table 1) it is difficult to discern the differences between these processes and the relationships between these processes.

However, the innovation process involves a broader understanding, which is related to the types of innovation: product innovation, process innovation, marketing innovation, organizational innovation. Thus, after comparing product development process and innovative concepts, it can be concluded that the innovation process involves a broader understanding, which is related to the types of innovation: product innovation, process innovation, marketing innovation, organizational innovation. It is also important to note that the literature on the concept of innovation is often applied to describe the NPD success.

Finally, the examination of alternatives to innovative marketing solutions for NPD process, references to the issue may be both included, and also literature, which focuses on marketing and commercialization of alternative solutions in innovation process. In analysis of NPD process, the limits of research were set – the process is analysed from the initial product design phase and is completed with the product introduction in the market.

3. Marketing strategy formulation for innovative new product development process

Marketing strategy has been a major focus of academic research since the 1980s. Marketing literature presents many different points of view related to marketing strategy formulation. However, most of the opinions agree that marketing strategy provides the means of utilizing the company's skills and resources to achieve marketing objectives. A good marketing strategy provides a framework for marketing activities. In planning marketing strategies, a firm should consider four key factors: (1) Organization situation – What are the firm's objectives, capabilities and resources? (2) Product-market situation –Is the product category relatively new to the marketplace, growing, maturing or declining? What are the current size and expected future growth rate of the product category? (3) Competitive situation –How many competitors are there? What are their characteristics and marketing approaches? (4) Environmental situation –What industry- wide and company – specific environmental opportunities and threats are most important?

Marketing is not something that is undertaken after engineering has developed the new innovative products (Mohr *et al.* 2010). Traditionally, the scientific research literature examines the problems associated with marketing strategy development and implementation at enterprise level, but this study will attempt to make some generalizations related to marketing solutions that bring success in the formulation of marketing strategies for NPD process. The most recent articles related to alternative marketing solutions for new product development process were analysed. M. F. Svendsen *et al.* (2009) investigated the impact of a firm's marketing strategy on involving customers in NPD. Special attention is to be paid to three facets of a marketing strategy: product differentiation, competitor orientation and brand profiling emphasis. The customer involvement in product development scale describes the degree to which the customer is involved in product development processes. Specific investments describe the extent to which the sup-

Table 1. Comparison of new product development, commercialization and innovation processes

Author	Process Name	Process Stages												
R. G .Cooper (2006)	New Product Development Process	Discovery: Project scoping	Discovery: Technical assessment	Discovery: Detailed investigation	Scoping	Business Case	Development	Testing and Validation	Launch					
Ph. Kotler (2003)	New Product Development Process	New product strategy	Ideas search	Ideas selection	Conception creation and check	Marketing strategy	Business analyses	Creation of the product	Trial marketing	Product preparation				
The University of Texas at Austin, Office of Technology Commer-cialization (2010)	Technology commercia-lization process	Research	Disclosing an invention	Market assessment	Patenting and other legal protection	Prospecting	Due diligence and negotiation	The deal	After the deal					
J. Rosa and A. Rose (2007)	Commercialization model	Concept phase			Development phase			Market entry phase			Market expansion phase			
		Market	Business	Technical	Market	Business	Technical	Market	Business	Technical	Market	Business	Technical	
Institute of Technology & Innovation Management, TUHH (2012)	Simplified innovation process	Conception				Implementation				Marketing				
		Requirement Analysis	Idea Generation	Idea Evaluation	Project Planning	Development/ Construction	Prototype Development	Pilot Application	Testing	Production	Market Launch and Penetration (national/ international)			
Author	**Process Name**	**Process Stages**												
NASA, ESA (2012)	TRL ensure the cycle of innovation processes	Basic principles observed and reported	Technology concept and/or application formulated	Analytical and experimental critical function and/or characteristic proof of concept	Component and/or breadboard validation in laboratory	Component and/or breadboard validation in relevant environment	System/subsystem model or prototype demonstration in a relevant environment	System prototype demonstration in an operational environment	Actual system completed and 'flight qualified' through test and demonstration	Actual system 'flight proven' through successful mission operations				
K. R. Allen (2003)	Innovation and commercialization process	Invention and Innovation Connection; Discovery; Invention; Application.	Opportunity Recognition Idea + Customers Need =Business Concept	Protecting IP Assets Patens; Trademarks; Copyrights; Trade Secrets	Critical Decision Point : Patent?	Product development Prototyping Technology Feasibility Alpha Testing	Business Development	Second Critical Decision Point. Build, License or Sell?	Developing the Business Business Plane	Launching the Business				

plier has made specific investments in physical equipment and human assets dedicated to the relationship with the chosen international customer. Product differentiation describes the degree to which the production technology and product are different from the technology and products offered by competitors, and whether the competence required to produce the product is specific to the firm. Competitor orientation describes the extent to which the firm acquires information about competitors' actions in the target market, and the firm's willingness to adapt strategy and products according to competitor moves. Brand profiling emphasis describes the extent to which the firm profiles its brands and reputation in international sales and marketing activities.

First, product differentiation and competitor orientation have a direct impact on customer involvement. Second, these two factors also impact on specific investments, which in turn impact on customer involvement. Both product differentiation and competitor orientation have positive effects on customer involvement, and these two factors also impact on specific investments positively, and furthermore, specific investments impact on customer involvement positively. These findings suggest that product differentiation and competitor orientation, along with specific investments, are important factors enabling a firm to involve its customers in NPD. However, brand profiling emphasis negatively impacts on specific investments. A marketing strategy with a strong focus on branding may thus hamper customer involvement indirectly through lower levels of specific investments. A firm's marketing strategy may thus have both positive and negative effects on customer involvement. On the one hand, strong brand equity may result in the achievement of above-normal product-market returns. On the other hand, a strong brand may make the firm reluctant to undertake specific investments, resulting in a less committed relationship and customers not willing to be involved in NPD. Finally, the results show that firms involving customers in NPD and investing in relation-specific assets report higher levels of relationship profitability.

K. S. Wong and T. Canon (2011) investigated the mediating effects of customer and competitor orientations on new product success. This research found that R&D-marketing cooperation is a key factor for NPS, as it encourages the sharing of ideas and making of joint decisions so that tasks can be accomplished in the most effective way. Customer orientation was found by this study to have a significantly positive influence on NPS. The mediating effect of competitor orientation on new product success is not as significant as the mediating effect of customer orientation. It is therefore possible that a company which is too competitor-oriented may simply follow the products of its competitors and eventually force market participants to compete with each other in a cut-throat price war.

H. Ernst *et al.* (2010) extend prior research and examine the effect of cross-functional cooperation among sales, marketing, and R&D on NPD performance across multiple stages of the NPD process. The results show that the cooperation between sales and R&D and between sales and marketing has a significant, positive effect on overall NPD project performance beyond marketing - R&D cooperation. The authors also find that the effect of cross-functional cooperation among sales, marketing, and R&D on overall NPD project performance varies across stages of the NPD process. More specifically, the authors find that sales–R&D cooperation in the concept and product development stages is critical for greater new product success. Sales–marketing cooperation is important in the concept development stage but has surprisingly less impact in the implementation stage.

M. Brettel et al. (2011) examined cross-functional integration of R&D, marketing, and manufacturing in radical and incremental product innovations and its effects on project effectiveness and efficiency. The present study mainly relies on integration as the multidimensional construct including (a) the frequency of formal and informal communication, (b) the frequency and the amount of information and resources exchanged between the functions, and (c) the existence of collective goals. The findings emphasize that the relationships between various facets of cross-functional integration and performance measures are highly complex. Further, the impact of integration between marketing and R&D depends on the process stage and the degree of innovativeness. Findings regarding the integration between R&D and manufacturing show a strong positive impact on efficiency in the development phase. With respect to the integration between marketing and manufacturing, no significant effects on the performance dimensions can be observed for radical NPD projects. Overall, a positive impact of integration between these departments on effectiveness in the commercialization phase emerges.

M. Mathew *et al.* (2010) investigated measurement of integration between NPD and marketing employees in a software company's product development. One of the major barriers is considered to be differences in the perceptions of marketing and NPD employees about each other's' tasks and the way they are supposed to cooperate. The authors have taken to diagnose the status of integration behaviours between marketing and NPD. The study revealed that there was a significant difference between perception of marketing and NPD employees over the current level of information flow from marketing to NPD as well the improvement required in the same. In this study it was found that, there is similarity between the way the marketing and NPD perceived their integration. Some perception differences are noted and marketing personnel perceive that their information flow is greater than that of the NPD personnel and, on the other hand, the NPD personnel feel strongly that this

area must be improved by comparison with the marketing personnel. Leaders in the company must sense the quality of interaction between marketing and NPD. Lack of this interaction leads to frustration, demotivation and drop in sales. Unfortunately, these issues surface at the time when the product is ready to be delivered to market or even after the first lot is delivered. At this stage there is very little one can do to salvage the loss of effort and cost to the company.

The objective of E. Atilgan-Inana *et al.* (2010) study was to review the international marketing literature on new product development process and compare the changes of the important factors in the process with the changes in the management approaches. The results indicated that organizational factors have always been important for new product development process, which is in line with the nature of the innovation process. But the emphasis on internal factors has increased in the 21st century which is congruent with the change in management perspective foregrounding resource- based view.

This study traces the models developed on NPD, the models used in the studies were grouped. The preliminary grouping of the dimensions used in the models reveal the fact that cross-functional integration is an important determinant in NPD process. This dimension is followed by marketing resources and skills. However, when these dimensions are classified into sub-groups, the intangible firm features appear as the most frequently used by sub-groups. These sub-groups are again classified into groups according to the study of Im *et al.* (2003); (Rosa, Rose 2007). The results of this grouping reveal that organizational antecedents are the most widely discussed dimensions of NPD process. The shift in the theoretical perspective of the studies provides supporting results as resource-based view has begun to overpower in the researches during the last decade. The dominance of organizational factors, therefore, should not be considered unexpected.

4. Conclusion

The first question which had to be answered while analysing NPD process was: Could the sources associated with the research process and the commercialization of the innovation process be included in the list of literature while undertaking scientific research into examining the marketing of innovative NPD process? After analysing commercialization and innovation processes in the concepts of the scientific literature and various countries strategy documents, it is difficult to discern the differences between these processes and the relationships between these processes. However, the innovation process involves a broader understanding, which is related to the types of innovation: product innovation, process innovation, marketing innovation, organizational innovation. Summing it up, it can be said that innovation process is identical to the NPD, that is, product development process can be compared to product innovations. It is also important to note that the literature on the concept of innovation is often applied to describe the NPD success.

Commercialization concept is often used to describe the process of the invention development which is completed with signing of the invention assignment agreement, the establishment of licensing or spin-out company. Usually the subject of this process is university or institute. In the literature commercialization and innovative processes are often analysed together as a seamless process. While the commercialization and innovation processes are interdependent, nevertheless, it is necessary for purposes of comprehension to distinguish between them based on the following principle: commercialization has more to do with taking R&D from the lab to the stage where it can find application in an industrial setting. Actually, using this know- how in developing a new product would be innovation (Cornford 2002).

To sum up, the examination of alternatives to innovative marketing solutions for NPD process, references to the issue may be included, and also literature, which focuses on marketing and commercialization of alternative solutions in innovation process. In analysis of NPD process, the limits of research were set - the process was analysed from the initial product design phase and was completed with the product introduction in the market. Previously scientific research has proved that marketing solutions are very important in the new product development process. To contribute to the research, which is intended for marketing decisions in a new product process, the latest scientific research in this area was analysed and generalization was presented.

It should be noted that the literature dealing with marketing decisions affect NPD to success, projects efficiency and effectiveness. Special attention is given to the relationship between the variables and the relationship between them: customer orientation, competitor orientation, customer involvement in NPD process, marketing activity, R&D, cooperation, cross-functional integration. Organizational factors have always been important for NPD process, which is in line with the nature of the innovation process. But then the emphasis on internal factors has increased in the 21st century which is congruent with the change in management perspective foregrounding resource- based view. Cross-functional integration is an important determinant in NPD process. This dimension is followed by marketing resources and skills. However, classification of the dimensions, otherwise indicated, shows the intangible firm features appear as the most frequently used sub-group. These sub-groups are again classified into groups according to the study of S. Im et al. (2003). The results of this grouping reveal that organizational antecedents are the most widely discus-

sed dimensions of NPD process. The shift in the theoretical perspective of the studies provides results that resource-based view has begun to overpower in the researches during the last decade. The dominance of organizational factors, therefore, should not be considered unexpected.

Companies in formulating marketing strategy of the NPD process have to be cautious in the brand profiling emphasis. A firm's marketing strategy may thus have both positive and negative effects on customer involvement, strong brand equity may result in the achievement of above-normal product-market returns or a strong brand can make the firm reluctant to undertake specific investments, resulting in a less committed relationship and customers not willing to be involved in new product development.

The mediating effect of competitor orientation on new product success is not as significant as the mediating effect of customer orientation. It is therefore possible that a company which is too competitor-oriented may simply follow the products of its competitors and eventually force market participants to compete with each other in a cut-throat price war. The effect of cross-functional cooperation among sales, marketing and R&D on overall NPD project performance varies across stages of the NPD process. More specifically sales–R&D cooperation in the concept and product development stages is critical for greater new product success. Sales–marketing cooperation is important in the concept development stage but has surprisingly less impact on the implementation stage. Also, marketing and NPD staff perceptions related to differences in information flow have been studied and showed that lack of this interaction leads to frustration, demotivation and drop in sales. Unfortunately, these issues surface at the time when the product is ready to be delivered to the market or even after the first lot is delivered. At this stage there is very little one can do to salvage the loss of effort and cost to the company.

The integration between R&D and marketing positively impacts efficiency, but not effectiveness across different types of projects. Further, the impact of integration between marketing and R&D depends on the process stage and the degree of innovativeness. Findings regarding the integration between R&D and manufacturing show a strong positive impact on efficiency in the development phase. With respect to the integration between marketing and manufacturing, no significant effects on the performance dimensions can be observed for radical NPD projects. Overall, a positive impact of integration between these departments on effectiveness in the commercialization phase emerges.

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