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Role of Innovation, Marketing and Human Resource Management in Development of Lithuanian Laser Companies

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Abstract

This research is to analyze the role of innovation, marketing, and human resource (HR) management in development of Lithuanian laser companies as well as integration of various innovation, marketing, and HR management-related elements via multifunctional and cross-departmental synergies, stronger inter-organizational cooperation and smoother knowledge and innovation diffusion. Based on results of recently conducted semi structured interviews in the Lithuanian laser industry (2010-2011), the present article is the first in the series of articles. This paper addresses the problem of integrating Research and Development (R&D), marketing and HR functions within the innovation process of laser products. A case method has been applied by conducting the qualitative research that covered nearly half of all the Lithuanian laser companies in terms of the number and nearly 90% of companies in terms of their turnover. Results of the present research showed that having a strategic target to maintain a leading position in the segment of scientific lasers and to strengthen the segment of industrial lasers within the global markets, Lithuanian laser companies face the urgency to innovate by efficiently managing their existing HR or attracting more experts as well as marketing their activities, products, processes and services. This can assure a competitive integration of market knowledge in the high-technology companies' innovation process. Simultaneous development and integration of various determinants of innovation, marketing and human resource management should be marked by higher added-value created for both laser companies and the whole National System of Innovation of Lithuania. With this paper potential areas for improvement have been outlined and future directions have been chosen for development of Lithuanian laser companies.

Keywords: innovation, marketing, human resource management, Lithuanian laser companies.

Introduction

Since the foundation of the majority of Lithuanian laser companies in the period of 1985 – 1995 the market was driven by the romanticism that everything is possible. Lithuanian scientists and engineers have been able not only to survive during a long transformation from centrally planned Soviet model of innovation to a knowledge-based national system of innovations within the EU, but also to conquer the leading position in global markets of scientific lasers.

This paper exposes the role and integration of innovation, marketing and HR management within the development of Lithuanian laser companies via multifunctional and cross-departmental synergies, stronger inter-organizational cooperation, and smoother knowledge and innovation diffusion. To achieve the aim of the research the following objectives were set:

- To overview the process of transformation from a centrally planned innovation model to the knowledge-based national system of innovation in Lithuania.
- To examine the necessity for Lithuanian laser companies to switch from scientific to industrial market.
- To identify the role of R&D, marketing and HR in innovation processes of laser companies for strengthening their competitive advantages.
- To analyze the interrelations of innovation, marketing and HR functions.
- To outline possibilities for further development of Lithuanian laser companies.

The innovation process is defined as the development and selection of ideas for innovation and the transformation of these ideas into innovation (Jacobs and Snijders, 2008). The innovation process adopted by Lithuanian laser companies combines the Technology push (i.e. innovation is the result of technological development) (Phillips, 1966) and the Demand pull (i.e. innovation is the result of demand) (Schmookler, 1966) strategies, incremental and radical innovations as well as low-tech and high-tech activities. Through continuous innovations Lithuanian laser companies have found their key strategic niches in global markets. Currently Lithuanian laser companies manage to deliver the annual top line of over 100 million Litas (LTL), of which 20% are generated in industrial manufacturing. The *Prism Award* received by the Lithuanian laser company "Ekspla" for

the best laser of the year also illustrates the global recognition for the Photonics Innovation. In spite of all the positive evaluations of the Lithuanian laser industry, a special attention should be paid to maintaining the leading position in scientific manufacturing and strengthening its weaker link of industrial lasers.

Methods

This study is based on two research methods: the analysis of scientific literature and the exploratory case study, relying on results from semi-structured qualitative interviews. The qualitative interviews, focused on CEOs' answers, took place in 2010-2011. The research scheme consisted of two groups of questions. The first group was oriented to the role of R&D, marketing and HR functions within the innovation process of laser companies. The second group was oriented to interrelations among the analyzed functions. Out of 15 targeted laser companies in Lithuania, there were 7 companies investigated, which represented nine tenths of the whole market in terms of turnover. Having received a set of profound answers from CEOs of Lithuanian laser companies, there were two articles prepared. The present article is the first in this series.

R&D, marketing and HR functions within innovation process

The innovation process has become more complex, more interdisciplinary, more integrated and more connected with its internal and external environment. The role of market orientation and marketing competencies within the innovation process has been largely analyzed in literature (Agarwal et. al., 2003; Mavondo et. al., 2005; Perry and Shao, 2005; Baker and Sinkula, 2007; Atuahene-Gima et. al., 2005; Langerak et. al., 2004; Menguc et. al., 2007 etc.). Most studies cover a wide range of industries, traditional manufacturing or service companies. On the contrary, only a few studies are conducted in high-technology contexts (Im and Workman, 2004; Appiah-Adu and Ranchhod, 1998; Wren et. al., 2000; Laforet, 2009). High-technology companies are characterized by a high degree of R&D complexity and knowledge tacitness; therefore, the management of knowledge assets in these companies becomes fundamental to success (Nonaka and Takeuchi, 1995, p. 11).

Integration of marketing and R&D is defined as the extent to which marketing and R&D personnel cooperate in disseminating and responding to market intelligence during the innovation process (Li and Calantone, 1998; Gupta and Wileman, 1986, Kohli and Jaworski, 1990). The marketing concept "*holds that the key to achieving organizational goals consists in determining the needs and wants of target markets and delivering desired satisfaction more effectively and efficiently that your competitors*" (Dalgic and Leeuw, 2006, p. 12). Bearing this in mind, marketing and R&D efforts have to be integrated in order to recognize new market opportunities, even though many managers point out that marketing is not so important when the pipeline is impressive. Beyond the capability of laser companies to coordinate marketing and R&D activities, the abilities of the employees to integrate marketing knowledge into scientific knowledge in the innovation process are essential. Kohlbacher (2007, p. 96) refers to marketing knowledge as "*all knowledge, both declarative as well as procedural, concerning marketing thinking and behavior in a corporation*". Indeed, it is essential to "*retain, develop, organize, transfer and utilize*" (Wiig, 1997, p. 7) knowledge-based resources across functions, among research projects during the innovation process.

The prerequisites for integration of innovation, marketing and HR functions should be developed in order to convert "*the market into a forum where dialogue among the consumer, the firm, consumer communities, and networks of firms can take place*" (Prahalad and Ramaswamy, 2004b, p. 122). *"The 'need' information (what the customer wants) resides with the customer and the 'solution' information (how to satisfy those needs) lies with the manufacturer*." (Thomke, 2003, p. 244). A process of aligning with customer needs "*can be costly and time-consuming because customer needs are often complex, subtle, and fast-changing*". (Thomke, 2003, p. 244) Therefore, a knowledge management approach should be applied, where "*marketing focuses both on the exploitation (sharing and application) and exploration (creation) as well as the co-creation of marketing knowledge from contexts, relations and interactions in order to gain and sustain competitive advantage*." (Kohlbacher, 2007, p. 103)

The knowledge and innovations diffusion inside and outside companies is a holistic process with a high degree of knowledge complexity and tacitness, which tends to be the key factor in gaining competitive advantage. Companies "*may play a major role in initiating knowledge creation in the marketplace*" (Kotler et. al., 2002, p. 36). As it is depicted in Figure 1, the knowledge about customers, competitors and the macro-environment as well as the integration of marketing and other organizational functions is a source of marketing capability (De Luca and Atuahene-Gima, 2007; Krasnikov and Jayachandran, 2008; Li and Calatone, 1998).

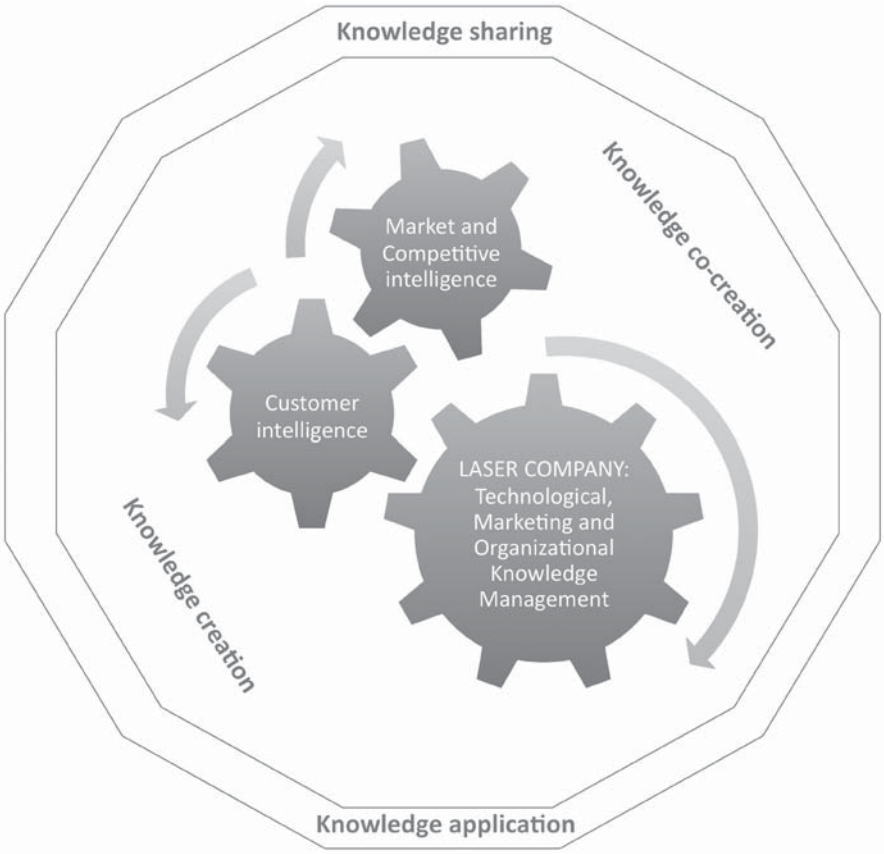

Fig. 1. Marketing capabilities of a laser company
Source: prepared by the authors

Moreover, it is difficult to translate the tacit knowledge into the explicit one as well as to evaluate the contribution of a set of skills, knowledge and experience to the performance of laser companies. For example, a description of a product in accordance with attributes perceived by the target customers tends to be highly tacit (Natter et. al., 2004, p. 472). Therefore, it is critical to somehow convert this tacit knowledge into meaningful information (Nonaka, 1994). In addition, the value-added from each competence and innovative idea is more of sustainable and continuous character, where "*important thing is not one specific piece of knowledge, but an entire package that includes knowledge about clients, competitors, local institutions, suppliers etc.*" (Bjerre and Sharma, 2003, p. 140). This statement supports the importance of integrating R&D, marketing and HR functions within the innovation process.

Transformation from a centrally planned innovation model to the knowledge-based national system of innovation

In spite of criticism about the innovation performance in Soviet times, it is obvious that Latvian and Estonian laser sectors lag behind the Lithuanian one, mainly due to the specialisation in laser manufacturing (particularly in scientific lasers) in Lithuania and Belarus during the Soviet times. It seems that 30 years of experience in the R&D, carrying out researches for Soviet institutes of applied sciences, liaised to lasers, has already started bearing fruits. Firstly, foreign scientists were the principle clients of Lithuanian laser companies. After the appearance and success of the first products on the market, new clients understood the potential of lasers and demanded to manufacture new lasers. Some of them were paying in advance; others after the product had been fully completed.

Based on the Technology push theory, the principle issue of the Lithuanian R&D within the knowledge-based economy of Lithuania is that researches are made without identifying a clear need in the market. Scientific knowledge generated by a Lithuanian laser company's research staff is a primary motivation for innovation. However, more marketing knowledge should be integrated by observing, and subsequently attempting to satisfy, an unmet market need. Based on the *Demand pull* theory, innovation is the result of a demand, and not the result of pure scientific research looking for an application (Schmookler, 1966). Utterback (1974) argues that from 60% to 80% of important innovations in many fields have occured in response to market demands and needs.

Another issue is cooperation, because only projects of a short duration could be carried out without partners; long-term projects require the cooperation with educational and R&D organizations. Attending various exhibitions and cooperating with partners in foreign markets Lithuanian laser companies find the solution to a weak cooperation in the Lithuanian laser industry, which is the open code innovation, where "*anyone who can help the business – customers, trading partners, suppliers, consumers, interest groups – should be involved to create the knowledge the company needs*" (Zack, 2003, p. 71).

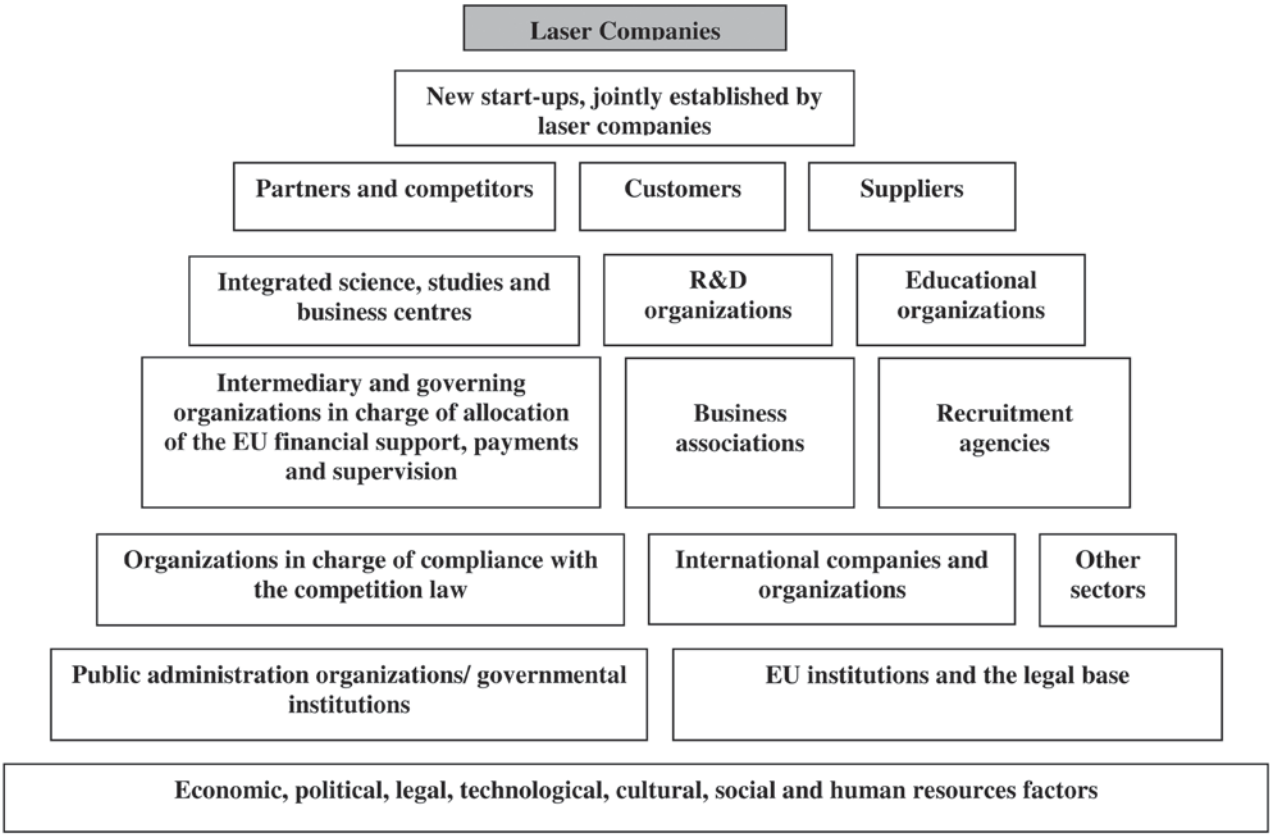

Fig. 2. Players within the National System of Innovation of Lithuanian laser companies
Source: prepared by the authors

Though in today's knowledge-based economies the number of patents signifies a country's effort in innovation processes, the patents performance does not always guarantee the protection of *know-how* or is too expensive. On the other hand, within the Lithuanian laser cluster companies operate in different niches; thus they are not direct competitors. Continuing the cooperation "*by synthesising their own knowledge and the knowledge embedded in various outside players, such as customers, suppliers, competitors or universities*" (Nonaka and Toyama, 2005, p. 430) is of significant importance to Lithuanian laser companies. According to the sample companies, contributions from this cooperation might be more important than the patent performance itself.

Though the National System of Innovation of Lithuania is still at its development stage, there already are all the necessary players to boost the innovation performance of Lithuanian laser companies (see Figure 2). The principle task is to strengthen the cooperation among those players via stronger willingness, programs and funds allocated at different levels as well as efficient diffusion of knowledge, skills and experience. The innovation process within Lithuanian laser companies should be expanded "*from the dyad of seller and customer to include partners up and down the value chain (e.g., suppliers, the customers of customers, channel intermediaries)*" (Day and Montgomery, 1999, p. 4). Such formula should definitely lead to a stronger innovation performance within a knowledge-based national system of innovation.

Necessity to switch from scientific to industrial lasers

Within the mosaic of laser businesses, which encloses such activities as the laser technology application for scientific research and commercial industry, the laser manufacturing as well as services, Lithuanian laser companies largely focus on the laser tech-

nology application for scientific research and services. In spite of a relatively successful performance of Lithuanian laser companies during the economic crisis, the interviewed CEOs, particularly those of younger companies, confirmed that the development of industrial lasers was slightly hit by cancellation of some projects, risk capital barriers, although the scientific direction of the laser industry partly compensated these losses.

In some sample companies the percentage of activities related to scientific lasers accounts for more than 80% of business. Whereas the percentage of activities related to industrial lasers stands at 20% within the entire mosaic of businesses of laser companies. The preserved recognition and market share within the scientific application sector limit the opportunities for laser companies as well as their contribution to the prosperity of the knowledge-based economy in Lithuania, while offering a 5-10% growth rate. Whereas the market of the industrial laser applications is estimated to be 10 times larger with the annual growth rate from 10% to 20% (Lazeriu ir sviesos mokslo ir technologiju asociacija, 2009). Hence, Lithuanian laser companies are able to develop their business by enlarging the number of industrial projects that are normally of shorter duration and faster commercialization. On the other hand, nearly 100% of innovative activities and projects, in spite of being more scientific, tend to bear fruits in the future. The development and introduction of high technologies for industrial applications offer Lithuanian laser companies new opportunities for as well as present challenges to expanding to new markets. The market of industrial lasers seeks more cost-effective benefits of new technologies than the market of scientific lasers. This induces Lithuanian laser companies to be more driven by the *demand pull* theory, where technology itself does not create a market need, but rather technology must satisfy a latent need in order to be commercially successful (Rosenau, 2000).

The role of marketing in expansion of laser companies

Innovation process of industrial lasers requires integrating technological development with marketing capabilities more intensively. Lithuanian laser companies mainly driven by their scientific researches still lack experience and marketing expertise in entering the commercial industrial laser environment. This could be partially explained by constrained managerial, financial and operating resources employed as well as limited management capabilities that are coming not only from the background of applied sciences, but also from the background of international business or economics.

Due to limited resources, marketing alliances become important for Lithuanian laser companies. The needs of the target market of industrial lasers could be identified through business networks as well as the product promotion through word-of-mouth, interpersonal communication and networking encouraged within the industry (Kohli, 1999; Goldenberg et. al., 2002). Thus, in Business-to-Business marketing it is necessary for SMEs with limited resources to build and maintain high quality relationships with their customers, suppliers, distributors, and the local government. To continue, the marketing in Lithuanian laser companies should concentrate more on competences than on technologies, because in most cases Lithuanian laser companies are suppliers of various components for foreign companies, and they tend to lead in global markets in terms of scientific manufacturing.

Within the industrial laser industry, Lithuanian laser companies could initiate more intensively the generation of knowledge about the market potential of new technologies as well as involve customers in innovation projects early. Competitive intelligence within the industrial laser industry becomes more important in order to follow the recent market trends and to protect the company's intellectual property. Integration of marketing and other organizational functions creates an open communication between scientists and business development personnel in order to share ideas, common perspectives on innovation goals and priorities, to assign responsibilities within innovation projects. Thereby the technological and marketing knowledge are integrated within the innovation process.

A switch from scientific to industrial lasers will not happen without development of marketing capabilities of laser companies. The founders or top managers play a significant role in recognizing the need to combine scientific and commercial perspectives within the operating activities of their companies. The importance of emerging markets should not be forgotten; the strategies should be oriented to such markets as Asia, while the expansion process should be smoother having local offices established or more cooperation agreements signed with business partners in targeted markets.

Innovations and R&D in strengthening competitive advantages

The majority of the interviewed CEOs announced their companies invest in R&D from 5% to over 20% of annual revenues. Companies systematically work on both researches while creating new products, processes or services and innovations in different product groups and improvement of various characteristics of the lasers. Decisions related to new products,

processes or services "*have significant strategic implications that determine the future of a business and involve several functional areas within an organization*" (Natter et. al., 2001, p. 1029). However, Lithuanian laser companies are involved in more standardized researches than non-standardized ones. One part of innovations is incremental improvements of existing technologies; another seeks to create things in different ways by combining laser technologies.

Though Lithuanian laser companies consider investment in R&D to be the basic driver of their performance, it could take from one to over two years for the investment in R&D to pay off, which points at the necessity to apply innovative managerial techniques while boosting the top and the bottom lines of laser companies. This phenomenon could also be explained by the demand for laser products and services on the Lithuanian market, where the key strategic clients strongly contribute to the performance of Lithuanian laser companies via larger orders and contracts. In parallel, the highest share of the potential profit is expected to rest among the largest clients.

Analyzing the typology of investment in R&D, based on the target company the researches are dedicated to, it is evident that the majority of R&D is oriented to the key strategic clients. This reduces the possibility to improve the inside organizational structure, production processes, the quality of their laser services as well as the efficiency of organizing work flows via utilisation of existing human resources. Since the leading company is not necessarily the first in introducing a new technology, but rather the first which can best integrate the innovation into the organization (Porter, 1999). It should be added that within the tiny market of laser products and services, where it is difficult to reach higher level of economy of scale, the customers of Lithuanian laser companies often appear as their own competitors. Besides, companies are basically focusing on researches, liaised to their key strategic clients, rather than on improvement of the performance at different departments to increase the organization's ability to import knowledge from the market.

Thus, the current organizational structure of Lithuanian laser companies is mostly developed for responding to key customer needs, where the innovation process is constrained by existing customer needs and subsequently standardised R&D activities. Whereas to satisfy the unmet needs of potential customers, especially on industrial laser market, the organizational structure should evolve in order to integrate R&D, marketing and HR activities more intensively within innovation process as it is shown in the Figure 3.

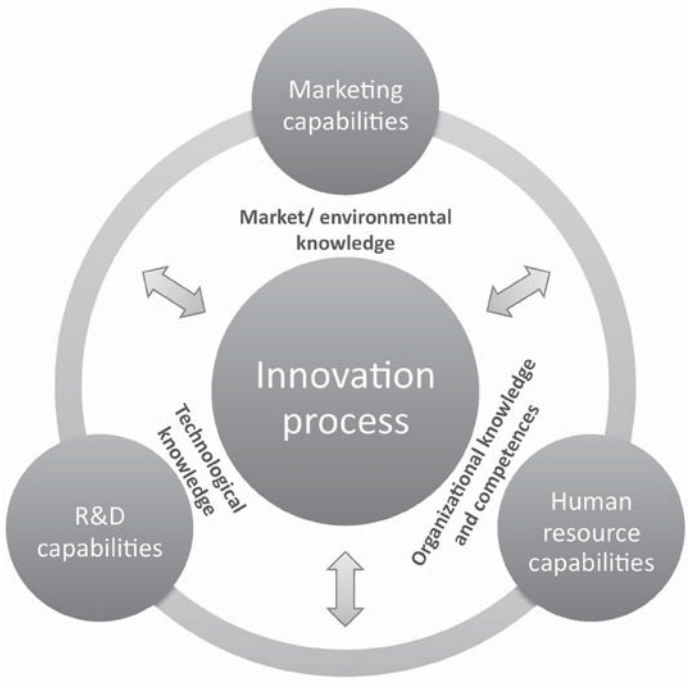

Fig. 3. R&D, marketing and HR integration within innovation process
Source: prepared by the authors

The mix of marketing and R&D within innovation process

Realized market opportunities for laser companies may need the development of new technologies within potential market, or the innovation may encourage the upgrading of technology, applied to the existing products. Therefore, effective management of marketing and R&D staff could be jeopardizing in

the long run, particularly for laser companies that focus on strengthening their competitive advantages in the segment of industrial lasers and impressively growing the number of lasers produced and sold. A marketing specialist can give an insight into the marketplace, which in turn supports R&D activities, when introducing new or improved features of competitive laser technologies. The interviewed CEOs have identified the quality and flexible parameters as the main competitive advantages, while the price is not the most important factor. Thus, accurate market information, competitive and customer intelligence are necessary for effective and relevant innovation process.

CEOs of the largest Lithuanian laser companies stated having the Marketing and R&D departments merged, where investment in the R&D reaches 10-20% of revenues. Quite similar figures – from 5% to over 20% – are indicated regarding their net profit margin, while the value created by one employee per hour exceeds 200 Lithuanian Litas (LTL). However, one of the challenges for laser companies is to get the physicists-technologists accurately understand the needs of the customers, and the marketing and sales managers to anticipate the potential of the technology. Beyond the capability of laser companies to coordinate marketing and R&D activities, it is essential to integrate marketing knowledge within scientific knowledge in the innovation process.

The lack of marketing and sales specialists, which is becoming more important in industrial laser market, leads to the merged departments of sales and marketing or the spread of marketing and sales employees among all the departments of a company without having a department uniquely dedicated to marketing. Developing a financially beneficial, innovative laser products and introducing them to the market at a relevant time should be a responsibility of a cross-functional team within organization.

Employees that focus on administration performance, business management should also be more motivated to know the technological development within innovation processes. They need to know how to attract new clients and generate new ideas. Without a primary positive attitude towards innovations the applied motivation scheme would not be efficient either. Physicists-technologists should know at which stage of value chain the development of the company or a particular project is. Acknowledgement of the market demand, expectations of clients and the knowledge and innovation diffusion is crucial for business, where competences are sold more often than products, and the duration of projects could vary from a couple of months to over 10 years.

Lithuanian laser companies should focus more on enhancing market-oriented behaviour earlier in the innovation process within their business networks. To encourage these processes within the organization, trainings related to managerial techniques should be organized and a mentor from outside should be employed to help with formalizing these processes. Early involvement of market and customer knowledge in the R&D process could be a source for generating new ideas, which could lead to new research projects or patents. Intensive brainstorming sessions by involving customer orientation should be organized in order to motivate research teams to select the best idea and to prepare the execution strategy among team members.

To encourage the process of marketing and scientific knowledge integration within innovation process of laser companies the project analysis and periodic reviews, internal committees to monitor new business opportunities, cross-functional teams and tasks should be organized by involving scientists and business people. It is particularly important to merge competences of different departments and organizational levels, which could also be achieved via rotation of employees among departments.

Combination of the innovation and HR functions

Driven by the performance of sales and marketing experts, the investigated companies should not neglect the importance of the problem when physicists sell the products of laser companies. CEOs or other top level managers of sample companies admitted the need for human resources that come from business background; however that also accentuated the urgency to employ intuitive leaders that could find the possibilities for profits and new strategic directions for development of laser companies. Therefore, the arrangement of research teams that include scientists and business people as well as leadership is important to the innovation process. According to CEOs of the investigated laser companies, business people should be specially trained to work in laser companies, to be initiative, innovative and able to independently carry out innovation projects or to lead in realisation of one or another innovative idea.

Thus, the product and service knowledge, but not a sufficient expertise is important for being a successful business developer and sales executive. In addition, having the average salary in the company varying from 1000 to 3000 LTL, it would be particularly difficult to attract and encourage results driven by human resources performing at their best. The following issue points at the principle weakness of laser companies, which is a weak relationship with educational organizations.

On the other hand, it is a weakness of the whole educational system of Lithuania. Having the laser industry identified among other priorities of Lithuanian high-tech fields, educational organizations should focus more on preparing experts that do have various expertises in this particular industry. For instance, it is not sufficient to develop knowledge and competences in international business, professors should focus on the particularities of laser companies in order to prepare an expert of this particular sector. This trend is supported by a rapidly growing demand for experts of laser businesses in global markets. The majority of employees in sample companies possess the bachelor degree in engineering or physics; however they do need to work in sales, administrative positions and the research. To wit, cross-functional employees with the educational background from such countries as Germany or France emerge as the most valuable resources for Lithuanian laser companies.

Currently most of the employees work in the segment of scientific lasers, although the industrial direction is more attractive. It is evident that improving the segment of industrial lasers will demand somewhat stronger marketing and sales efforts as well as more working space on the tangible side. The principle way to attract new clients in foreign markets is to look for new opportunities to present themselves in exhibitions in such countries as the USA or Germany. It is important to encourage a wide range of employees at different levels while financing their trips to exhibitions in Europe or North America via such sources as structural funds for training programs.

The majority of the interviewed CEOs of Lithuanian laser companies admit that employees from the technological educational background often do not understand employees with managerial qualifications, and graduates from management-related study programs do not always understand physicists. Behind a quite flat organization structure lies insufficient spread, according to the employees' educational background. Employees holding the Doctorate, Master or Bachelor titles are in charge of researching, consulting and managing. Apart from their responsibilities and main functions, they do need to know the product well in order to create and consult clients regarding one or another project. A special attention should be paid to communication techniques, as efficient consulting is the combination of the knowledge of product and communication competences.

In general, the majority of managers and executives in Lithuanian laser companies are physicists; thus they face the necessity to understand the full business cycle. In addition, the laser companies are directly influenced by clients, and the commercialization process of innovations should be arranged according to their expectations and needs. Understanding the significance of employing a great number of business experts, some laser companies in Lithuania prefer to employ specialists regardless of their qualification levels; these companies focus on training at working place. It takes up to one year to train employees in order to reach the desirable set of competences, while human resources in foreign markets rotate from one to another laser company more frequently. The interviewed CEOs stated another important argument that a person could build a reputation and competences of being a laser business expert only in 15 or 20 years. Based on such logics, not the number of employees with Doctorate, Master or Bachelor degrees is important, but the developed personal competences within organization.

The distinctive characteristics of Lithuanian laser companies are based on the constrained managerial, financial and operating resources as well as limited management capabilities. Therefore, the laser companies should attempt to replace existing resource constraints with their employees' specialised expertise, which refers to the education level, professional skills, experience, attitudes, personal networks, values, and the ability to evolve within the organization. Thus, the source of competitive advantage for laser companies is related to the abilities of the employees to integrate the market, environmental and technological knowledge within innovation process (see Figure 3).

New possibilities for Lithuanian laser companies

Anticipating structural growth possibilities in the Lithuanian laser industry, there are some positive trends noticed regarding the establishment of jointly created laser start-ups, mergers, acquisitions or splitting into a couple of companies. Within any sector such structural changes normally are the challenge of integration or appearance of intercultural confrontations and need initiative and enthusiastic people in order to reach desired synergies. Some new companies within the Lithuanian laser industry appear via the cooperation with educational organizations or partners. Such sister companies fill the inside network of niche products and services and strengthen the laser sector itself. Thus, within a network of laser companies some companies focus on selling and manufacturing elsewhere, while others on manufacturing inside, covering all the stages of the business cycle.

Given the intensive dynamics and structural changes in the laser industry, a laser company needs to continue investing in R&D, marketing and HR within the innovation process of organization. Lithuanian laser companies should consider the possibility

to grow their value by being listed on global stock exchanges, by higher flexibility in investment initiatives, some alternative cash flows and stronger marketing activities among investors.

Conclusions

This paper examines the role and possible integration areas of R&D, marketing and HR within innovation process of Lithuanian laser companies. It does not only focus on the alignment of inter-functional goals, activities and mutual benefits, but also provides an insight into the marketing knowledge integration within the scientific, technological knowledge development process. The ideas and concepts presented in the study are based on the analysis of scientific literature and qualitative research conducted in the Lithuanian laser industry. Therefore, further conceptual improvements or empirical researches in other industries should be of significant importance.

Though Lithuanian laser companies were able to take the leading position in global markets of scientific lasers, in today's knowledge-based economies it is becoming critical to focus more on the market, competitive and customer intelligence within innovation processes. Moreover, the market, environmental and technological knowledge have to be (co-) created, not only inside laser companies, but also together with customers, suppliers, partners and competitors. This is becoming of vital importance in the industrial laser market, where the success of new or improved products depends on companies' ability to align with market needs by applying technology when the marketplace is prepared to implement the concept.

The stronger marketing capabilities of laser companies need to be developed and together with R&D and HR capabilities integrated within the innovation process. Firstly, combination and synthesis of both tacit and explicit market, environmental and technological knowledge will lead to satisfaction of the needs of potential customers in the scientific and especially industrial laser market. Secondly, benchmarking competitors' strategies and experience has been outlined as the way to get the insight into the best practice in technology transfer as well as to develop the marketing and scientific alliances. Thirdly, interfunctional coordination within innovation process has to be implemented to increase communication and knowledge generation between scientists and business development personnel. Thereby the scientific, technological and marketing knowledge are integrated within the innovation process.

Thus, the source of competitive advantage for laser companies is attributed to the abilities and competences of the employees to (co-) create knowledge inside and outside organization within innovation process. To encourage the process of marketing and scientific knowledge integration the research project overviews, monitoring of new business opportunities as well as cross-functional teams and tasks have to involve scientists and business people. Human resources evolve over time and may encourage or constrain innovation processes. Consequently, success of innovation processes is highly dependent on effective human resource management in retaining and developing employees.

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Inovacijų, marketingo ir žmogiškųjų išteklių vadybos vaidmuo Lietuvos lazerių įmonių plėtroje

Santrauka

Straipsnio ***tikslas*** – išnagrinėti inovacijų, marketingo bei žmogiškųjų išteklių (toliau – ŽI) vadybos vaidmenį ir jų funkcijų integravimo galimybes Lietuvos lazerių sektoriuje. Atliktu tyrimu siekta išsiaiškinti marketingo priemonių, mokslo tiriamosios ir technologinės plėtros bei ŽI vadybos elementų diegimo ir derinimo organizacijų veikloje problemas, jų priežastis bei pateikti šių problemų galimus sprendimo būdus, kurie padėtų stiprinti Lietuvos lazerių įmonių konkurencinius pranašumus Lietuvoje ir globaliose rinkose. Straipsnyje derinami mokslinės litera-

tūros analizės ir atvejo studijos, paremtos pusiau struktūruotų kokybinių interviu rezultatais, ***metodai***. Šis straipsnis remiasi 2010–2011 m. atliktais pusiau struktūruotais interviu Lietuvos lazerių pramonės šakoje, apklausus pusę Lietuvos lazerių įmonių, generuojančių apie 90 proc. pramonės šakos apyvartos.

Straipsnyje visų pirma apžvelgiamos skirtingos mokslinės literatūros interpretacijos inovacijų, marketingo ir ŽI vadybos vaidmens aspektu ir lyginami skirtingų autorių argumentai: Phillips (1966), Schmookler (1966), Gupta ir Wileman (1986), Kohli ir Jaworski (1990), Wiig (1997), Appiah-Adu ir Ranchhod (1998), Li ir Calantone (1998), Day ir Montgomery (1999), Porter (1999), Kohli (1999), Rosenau (2000), Wren et al. (2000), Kotler et al. (2002), Goldenberg et al. (2002), Agarwal et al. (2003), Thomke (2003), Bjerre ir Sharma (2003), Zack (2003), Langerak et al. (2004), Natter et al. (2004), Im ir Workman (2004), Atuahene-Gima et al. (2005), Mavondo et al. (2005), Perry ir Shao (2005), Nonaka and Toyama (2005), Kohlbacher (2007), Dalgic and Leeuw (2006), Baker ir Sinkula (2007), Menguc et al. (2007), Jacobs ir Snijders (2008), Laforet (2009) ir kt.

Straipsnyje nagrinėjami šalies nacionalinės inovacijų sistemos transformacijos ypatumai (iš griežtai centralizuoto modelio į žiniomis grindžiamą sistemą) ir šio proceso pasekmės Lietuvos lazerių pramonei. Be to, pristatomi Lietuvos nacionalinės inovacijų sistemos veikėjai, darantys įtaką Lietuvos lazerių įmonėms; inovacijų, marketingo ir ŽI vaidmuo Lietuvos lazerių įmonėse; mokslo tiriamosios ir technologinės plėtros, marketingo ir ŽI derinimo galimybės inovaciniuose procesuose; ateities galimybių įgyvendinimo problematika.

Tiriant marketingo žinių panaudojimo mokslinėje ir technologinėje plėtroje ypatumus, dėmesys fokusuojamas į rinkos, vartotojo elgsenos ir konkurencijos charakteristikas, diegiant inovacijas bei stiprinant įmonių konkurencinius pranašumus. Identifikavus žinių ir inovacijų sklaidos lazerių įmonėje problemą, rekomenduotina svarbias rinkos, aplinkos ir technologines žinias ugdyti ne vien uždaroje lazerių kompanijų aplinkoje, bet ir bendradarbiaujant su klientais (vartotojais), tiekėjais, partneriais, konkurentais ir kitais nacionalinės inovacijų sistemos žaidėjais. Marketingo žinios ir gebėjimai turėtų būti ugdomi ir taikomi paraleliai mokslo tiriamosios ir technologinės plėtros bei ŽI vadybos kompetencijų ugdymui. Įmonių bendradarbiavimas, klasterių ir kitų mokslą, technologijas, verslą ir tyrimus sujungiančių aljansų kūrimas skatina technologijų žinių ir inovacijų sklaidą. Nereikėtų užmiršti tarpfunkcinių ir skirtingų departamentų veiklos sinergijų svarbos įmonių inovaciniuose procesuose. Galiausiai inovacinių procesų sėkmė priklauso ne tik nuo ŽI kvalifikacijos ir kompetencijų, bet ir nuo tokių ŽI vadybos funkcijų kaip atranka, motyvavimas, planavimas, koordinavimas ar darbuotojų žinių bei gebėjimų panaudojimo efektyvumas.

Atlikto tyrimo rezultatai parodė, kad lazerių įmonės, turėdamos strateginį tikslą išlaikyti lyderiaujančią poziciją mokslinių lazerių segmente ir sustiprinti veiklą pramoninių lazerių segmente tarptautinėse rinkose, susiduria su būtinybe skatinti inovacijų procesą, efektyviai valdant turimus ŽI, taip pat taikant marketingo veiksmus. Tai gali užtikrinti konkurencingą rinkos žinių integravimą į aukštųjų technologijų įmonių inovacijų procesą. Tvarus inovacijų, marketingo ir ŽI funkcijų įgyvendinimas bei siekimas skirtingų departamentų bendradarbiavimo sinergijų turi sukurti aukštesnę pridėtinę vertę tiek lazerių įmonėms, tiek visai Lietuvos nacionalinei inovacijų sistemai.

Pagrindiniai žodžiai: inovacijos, marketingas, žmogiškųjų išteklių vadyba, Lietuvos lazerių įmonės.

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