

## Cooperation and Partnership Possibilities within Innovation Process of Lithuanian Laser Companies for Strengthening Their Competitive Advantages

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### Abstract

The present research is to analyze the cooperation and partnership possibilities within innovation process of Lithuanian laser companies for strengthening their competitive advantages. It is inspired by results of recently conducted semi structured interviews in the Lithuanian laser industry (2010-2011), where nearly half of all the Lithuanian laser firms were covered. Results of the research we conducted led to the understanding that a strong position of Lithuanian laser companies in global markets of scientific lasers is only the naissance of Lithuanian laser industry. To strengthen their competitive advantages in the industrial segment and to maintain their strong positions in the segment of scientific lasers, Lithuanian companies need to cooperate not only with other peers, but also with educational and R&D organizations as well as intermediaries within the innovation process. Barriers to the innovation and knowledge diffusion in the laser industry could endanger the organic and structural growth of the investigated firms, cut the expected synergies and imprison laser players in the existing laser market.

**Keywords:** cooperation, partnership, innovation process, competitive advantages, laser companies.

### Introduction

Within the global environment of growing competition, where new knowledge and innovations are continuously emerging, the potential to innovate is essential, particularly for high-tech SMEs. The analysis in this article focuses on the Lithuanian high-tech SMEs in laser industry. In light of the success of the Lithuanian laser industry in both Lithuanian and global markets, the importance of the heritage from Soviet Union times is often wantonly ignored. Many critics point at the basic focus of the Soviet Union laser sector on the military industry and inactive firms as independent agencies within Soviet innovation processes, mainly due to sharp centralization and control. However, the experience gained during the Soviet Union times should not be eliminated, as it helped laser firms to build a set of relationships, competences and experience necessary for further transformation.

The naissance of the Lithuanian laser industry was mainly concentrated around the ‘buy and sell’ model by using differences in prices of laser products and services as the advantage and only then producing integrated innovative solutions. Notwithstanding a strong focus on production of components, some of Lithuanian laser firms managed to be successful in manufacturing and selling innovative integrated solutions for such markets as Japan or having the exclusivity for one or another innovative product in global markets.

In spite of the impressive global market share of scientific lasers (Lithuanian laser companies generate nearly 10% of the global revenue from the segment of scientific lasers, which increased by 33% from 2003 to 2008 and amounts to 181 million US dollars), there is a strong intention to switch to manufacturing of industrial lasers, where the market is estimated to be 10 times larger (Lazeriu ir sviesos mokslo ir technologiju asociacija, 2009). Therefore, companies look for new possibilities, particularly in the global industrial market, and have a stronger focus on integrated solutions than on components. These strategic changes elucidate the importance of cooperation and partnership in the laser industry, the innovation and knowledge diffusion as well as more synergies among organization, liaised with the laser industry.

This paper examines the cooperation and partnership possibilities within innovation process of Lithuanian laser companies for strengthening their competitive advantages. To achieve the aim of the research the following objectives have been set:

- To review the literature on the innovation process through cooperation and partnership.
- To overview the possibilities of combining the high-tech and low-tech activities, which leads to a potential revenue growth.
- To identify the main factors encouraging and inhibiting the innovation performance of laser companies.

- To expose the role of clustering by introducing the model of funnel for competitive advantages of Lithuanian laser companies.
- To examine the main market trends and the processes of commercialization of innovative ideas and formalization of innovations within the Lithuanian laser companies.

## Research method

This article is the second one in the series of articles based on the qualitative research where semi-structured interviews were carried out with the main goal to collect answers from CEOs or other top-level managers of Lithuanian laser companies. The interviews took place in 2010-2011 and had focus on cooperation and partnership possibilities in strengthening competitive advantages and innovation process of laser companies. There were experts from 7 companies interviewed, which represent nearly a half of the targeted laser market of Lithuania in terms of number and approximately nine tenths of the whole market in terms of revenues.

The questionnaire used for semi structured qualitative interviews with CEOs or other top-level managers of Lithuanian laser companies contained 4 question-groups. The first group was related to the primary functions of various departments and the particularities of the organizational structure of laser companies. The second group of questions referred to the commercialization of innovative ideas and formalization of innovation processes of laser companies via integration of the R&D, human resources and innovation strategies as well as utilization of existing human and financial resources. This question-group has also incorporated the aspects of innovative management tools. The third group of questions was aimed at the cooperation and clusterization process within the Lithuanian laser companies and their openness to the market. The last questions were set to collect general information about laser companies and the innovative performance-related indicators as the percentage of commercialized innovative ideas, revenue growth, profit margins, expenditure on the R&D and the value-added net profit from the R&D activities.

## Literature review: innovation process through cooperation and partnership

Innovation can be explained as a change in what a company offers its customers (product/service innovation) and the ways the company produces and delivers these offerings (process innovation) (Francis & Bessant, 2005). Within the changing global environment the most important ways to obtain competitive advantage are innovation and strategic flexibility (Barney, 1991).

*“Studies of innovations have developed towards cross-disciplinarity as there is no single discipline that deals with all aspects of innovation”* (Fagerberg, 2005, p. 3). Marquis (1969) indicates that innovation can be divided into:

- radical innovation;
- incremental innovation;
- systems innovation.

Betz (1993) adds one more type of innovation identified as next-generation technology innovation. Furthermore, Samson (1991) classifies innovation into three categories:

- product innovation;
- process innovation;
- managerial and systems innovation.

The development of innovative and competitive technologies is a critical activity for high-tech SMEs to strengthen the competitive advantages within the international market by generating products, processes and services of higher added value. The growth and complexity of knowledge within global competitive environment limited the capabilities of high-tech SMEs to generate all relevant scientific and market knowledge (Pateli, 2009; Lane et al., 2006). By sustaining the competitive advantage, SMEs are becoming more involved in the cooperation and network partnerships to increase their knowledge base and potential to innovate (Calia et al., 2007; Ford & Hakansson, 2006; Pavitt, 2005). With this view on innovation, the article bases its framework by looking at possibilities for Lithuanian laser firms to utilize inter-firm relationships and networks within their innovation process.

Literature on innovation processes varies from innovations systems (Kautonen, 2006; Lundvall, 1992), inter-firm networks (Dooley & O’Sullivan, 2007; Lubatkin et al., 2001) and internal firm-level (Lazonick, 2005) to the analysis of innovators and experts (Powell & Grodal, 2005) as the key figures in the processes. The recent studies give less attention to the level of analysis, but rather emphasise the importance of cooperation and learning via network (Das & Kumar, 2010; Dilk et al., 2008; Moller & Svahn, 2006). Within the innovation process the cooperation, knowledge generation, sharing and learning among the involved parties are necessary for producing unique and competitive knowledge.

By turning to the literature, which looks at the firm utilising its external relationships along with internal resources within the innovation process, the main three streams of thought can be distinguished. The first stream of studies concentrates on vertically connected firms within the value chain, where buyer-seller as well as manufacturer-distributor relationships are examined (Hsieh et al., 2008; Mesquita et al.,

2008; Dyer & Hatch, 2006). The second stream of studies focuses on horizontal alliances that involve firms from different distribution supply chains (Rindfleisch & Moorman, 2001).

However, both vertical and horizontal cooperation deals with one way learning within innovation process, where one party seeks to learn from already existing knowledge base controlled by another party (Hagedoorn, 2002). In order to gain a competitive advantage within the innovation process of high-tech industry it is crucial to employ reciprocal learning, where the purpose is not to learn what other parties already know, but together develop new knowledge base and innovate (Lubatkin et al., 2001). According to this third stream of studies, an innovative firm opens up its boundaries in order to incorporate knowledge co-creation with external stakeholders such as customers and other entities in the innovation ecosystem (Dodourova, 2009; Ghauri et al., 2008; Narver et al., 2004; Jaworski et al., 2000). “*Collaboration has become an established way of doing business with suppliers, channel partners and complementors*” (Sawhney, 2002, p. 96). This can be seen as a co-development of innovative solutions within an innovation network.

The cooperation and partnership is an efficient and effective way for high-tech SMEs to develop by integrating knowledge as well as technological and managerial skills. Taking into account the increased uncertainty, cost of R&D activities, and growing competition, companies invest not only in internal development but also in cooperation and partnership to strengthen their innovativeness (Ahuja, 2000).

This article focuses on innovation as a process – “*an extended set of activities that translate new knowledge into something of value*” (Bessant & Venables, 2008, p. 3) by cooperation and network partnerships in order to strengthen the competitive advantages of high-tech firms in laser industry. The competitive advantage is seen not as incremental, architectural or discontinuous innovation, but rather as streams of innovation, generated through the cooperation and network partnerships.

### **Combination of high-tech and low-tech and the revenue growth**

Taking into consideration the fact that nearly 90% of laser products are exported to such regions as the EU, North America or Asia, the majority of Lithuanian laser firms do manufacture for larger foreign companies. They need to apply principles and standards that are already established in global markets. Thus, the slogan ‘Think globally and act locally’ is crucial to the laser industry of Lithuania.

To boost the volumes of institutional sales and

to perform on the ‘case by case’ basis Lithuanian laser firms face the necessity to improve their competitive advantages in the quality of their services and products. Thus, their brands should be the quality guarantees in global markets. That is also a key to a successful combination of high-tech and low-tech activities. Some high-tech companies can produce slightly lower tech products or provide a service of lower technological intensity for high-tech companies. While other firms could produce laser components that are of the highest technological intensity or key components of final products, only a few are involved in the full production cycle of lasers. This is largely related to financial resources allocated to the patenting performance, as the majority of Lithuanian laser players find it too expensive or unnecessary to register the patent. Based on their strategic targets or the business conception, the execution of outsourced activities is a perfect fit. The dynamics in the number of small and medium sized laser companies in global markets should not be forgotten. Since, compared to peers, the companies are known by the quality of products, services and performing above the market average, they become a successful acquisition target for larger foreign companies.

In addition, having no diversified revenue structure, Lithuanian laser companies need both long- and short-term agreements, and the commercial department should largely improve this. With the time for developing one or another laser being from a couple of months to over 10 years, the fast revenue could accelerate the organic growth and improvement of the net profit margin reaching the level of 30-40%. In parallel, Lithuanian laser companies should more efficiently use the possibilities to combine high-tech and low-tech activities in order to boost their revenues.

### **Main factors encouraging and inhibiting the innovation performance**

Taking into consideration the influence of macro conditions on the performance of laser companies, the interviewed CEOs mentioned a rather shallow environment for a structural growth and the lack of qualified human resources among the factors inhibiting the development of laser companies. Though, the financial support for investment in R&D has been underlined as one of the best initiatives at the macro level. Having around 400 people working in the Lithuanian laser sector, it is getting difficult to outsource some activities, as there is an insufficient number of experts in niche specialisations. According to this scenario, it should be useful to expand some activities of Lithuanian laser companies to such cities as Shanghai. This could satisfy expectations of shareholders, while both generating more returns and having mo-

re investments in the R&D and innovations. A significant challenge for companies intending to expand some activities and processes to China is seen in the protection of intellectual property rights.

Another issue lies in confrontation of strategic goals among valleys, educational organizations and business. In spite of focusing on preparing a certain number of theoretical researches for educational organizations, currently Lithuanian valleys do not actively participate in business and do not facilitate innovative business processes: from the vision of being the intermediary among business, science and research, currently they are becoming the link of 'science-science' or 'education-education'.

When restructuring the education and science organizations a special attention should be paid to building a set of skills and knowledge, related to managerial techniques and the expertise of organizing processes in the laser industry. The developed skills and knowledge should have a clear focus on the mix of marketing and innovations as well as on the innovation diffusion overall. Bearing in mind a huge potential for Lithuanian laser firms to switch from manufacturing scientific lasers to producing lasers for industrial applications, including all the phases of the business cycle (R&D, manufacturing, sales and marketing, after-sales services), the developed skills and knowledge should not only involve particularities of management in the laser sector, but also the expertise on restructuring the company and achieving the desired results.

### **The role of clustering in the Lithuanian laser companies**

Though the Lithuanian laser cluster has been operating for three years only, it already has start-ups established that support activities of other laser companies, a stronger consensus has been reached regarding some strategic objectives, the introduction of Lithuanian laser companies to the Japanese market has been completed. Similar financial indicators are reached among the majority of members of the laser cluster: the net profit margin varies from 5% to over 20%, although it is a bit lower for components. Approximately 80% of revenues are generated in the scientific market, versus 20% in the growing industrial market.

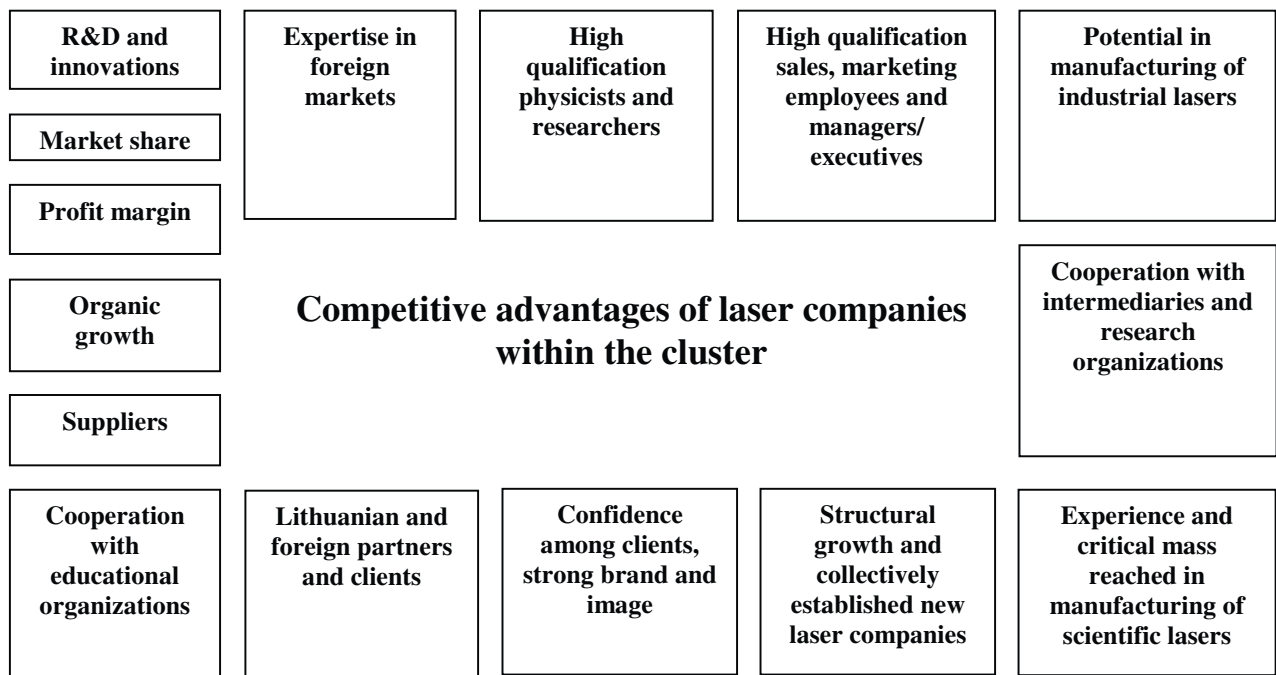
Apart from significant efforts from the Lithuanian Innovation Centre, both educational organizations and valleys do not have sufficient conditions to create a support platform for laser companies. This is because the ecosystem of cooperation is not fully created and all the separate initiatives are mainly linked to the implementation of projects financed by EU funds. The assistance of educational organiza-

tions and intermediaries would be particularly valuable in formalizing such processes as application of new technologies in production of new lasers. Universities should also focus on preparing entrepreneurs that are able to formalize business processes in laser industry. The lack of competences among Lithuanian graduates is particularly visible, compared to foreign students coming for their internships in Lithuanian laser firms. Going deeper, graduates from Lithuanian educational organizations should be ready to be generators of innovative ideas, charismatic and leading.

No physicists or managers alone could solve the innovation-related issues; they need to negotiate and enter into cooperation with various organizations or individuals. It is not enough to have the necessary product knowledge; companies require more managerial and entrepreneurship skills. Some students are afraid of a too early business experience and do not use the existing possibility of incubation. It seems that they are waiting for similar examples among other beginners, driven by the common orientation in the market.

Having approximately 20% of employees involved in the R&D related to creation of a new product and nearly 80% of employees working in the routine R&D after the product reaches the target market, a well established network of distributors, partners and clients is of significant importance, because a successful completion of each project strengthens the image of a firm in the whole market. In spite of the difficulty to employ a certain number of managers/ executives (the number of potential employees with the required qualifications and competences in the market is insufficient), only a few percent of projects are not being completed, late or cancelled. The motivation and financial reward schemes, bonuses and delegation of regularly rotating functions of manufacturing, the routine R&D and innovations from one to another group of employees could encourage the completion of ongoing projects.

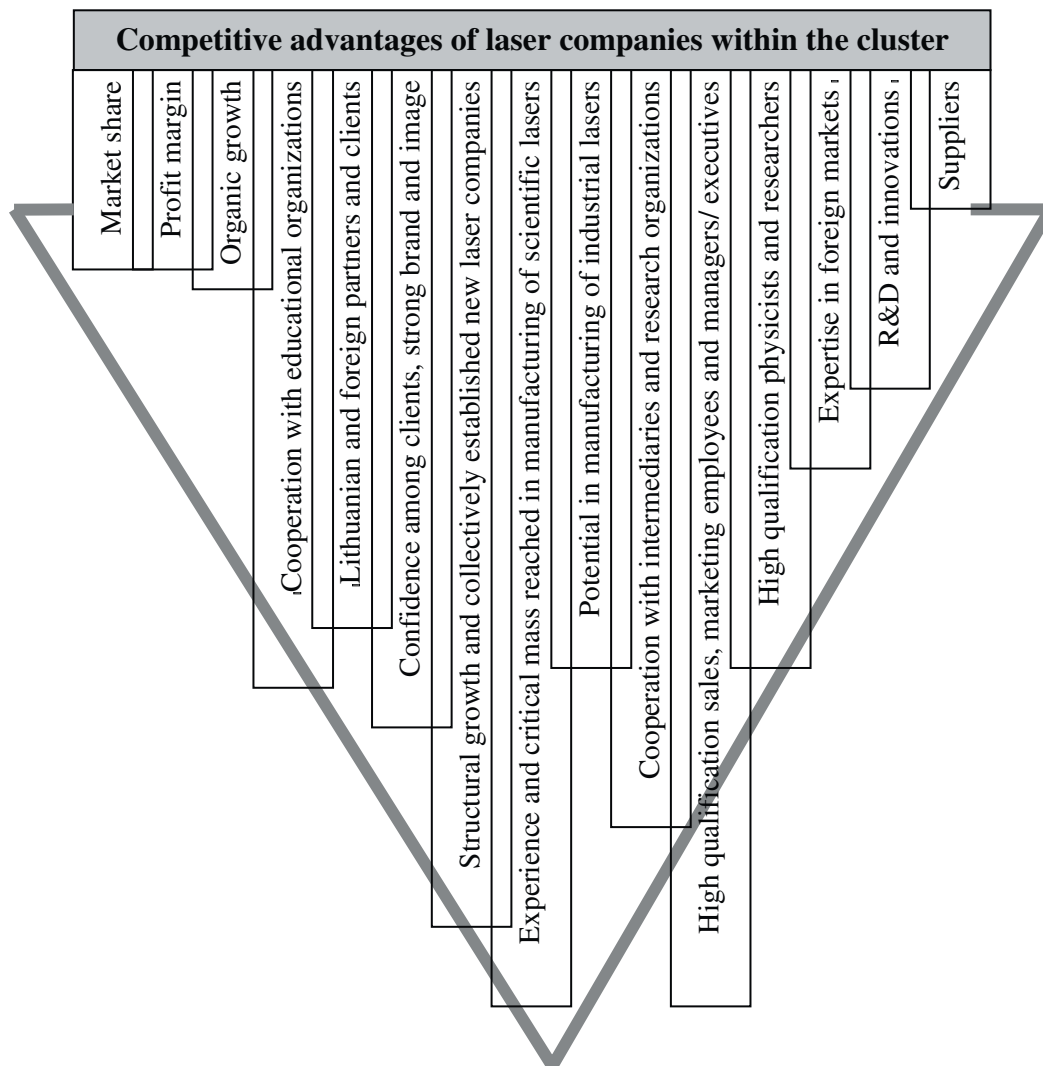
Identifying key strategic partners, the majority of the interviewed CEOs cited distributors as the principal link to end-users. Each laser company needs a well-developed network of partners and clients in order to close the deal with a big company. Only by outperforming a great number of different size and level companies, the laser firm is growing confidence among big companies. Though there is a certain number of possibilities of cooperation with the Government via funds and programs, the role of the Government is considered being of rather modest importance. The more detailed structure of competitive advantages in the cluster, which summarises the answers from CEOs of sample companies and a set of theoretical aspects acknowledged in the scientific literature, is presented in the Figure 1.



**Fig. 1.** Competitive advantages of laser companies within the cluster  
*Source:* prepared by the authors

Technological innovations are the driving force of the Lithuanian laser market. Innovations are more value adding when a couple of different-type innovations are applied. For instance, a process innovation could be applied in a partner company, while the laser company itself could execute a product innovation. Such symbiosis among a few laser companies leads to larger synergies within the cluster. It is interesting to note that the majority of the interviewed companies design their innovation strategies by involving all the employees in a decision-making process and a strategic planning. On the other hand, in general there are no officially appointed and permanent employees responsible for the innovation strategy, as each innovation project has its own leader who can have his/her own line manager. If innovations are not completed, it should be considered the failure of the whole organization. With many projects and innovative activities being organized via Lithuanian consultants who, in general, are more improvisers than experts of the laser industry, consultants from abroad could be a solution to apply a global approach and global principles to solving local problems. Thus, managers of Lithuanian laser firms apply both proactive and reactive ways of organizing work processes and solving problems.

Almost all the interviewed experts point at the necessity to cooperate with other companies on one or another particular activity in order to complete all the projects and commercialise all the innovative ideas. Stricter clients' requirements and a rather limited potential of the laser market in both Lithuania and all the European Union reshape the strategic direction of laser companies: they need to deliver a longer line of products and services with prices at different ranges and strengthen their competitive advantages in their niche markets. This combination of diversification and specialisation, mentioned by the majority of experts, demands a stronger cooperation in the market and reminds the deepening and at the same time widening funnel (see Figure 2). This could be explained by the nature and the main purpose of any cluster to strengthen one competitive advantage or a set of them within a particular industry. In general companies join clusters that already have a particular target defined; however, each company has its own strategic target. Companies' success in the cluster as well as the depth and the width of the funnel depend on the compatibility of the common strategic target of the cluster and the one of each company.



**Fig. 2.** The funnel of competitive advantages within the laser cluster  
*Source:* prepared by the authors

Though CEOs of Lithuanian laser firms have not denied the lack of confidence in educational organizations and such intermediaries as valleys (which discouraged the willingness of laser firms to build a stronger cooperation), they also revealed their dissatisfaction with the motivation and capabilities of educational organizations to enter into cooperation with laser companies. Marketing strategies of educational organizations and intermediaries do not have a strong focus on presenting their functions and cooperation possibilities to laser companies. It is evident that both parties need to show a stronger willingness for cooperation; however, the basic function of educational organizations is to prepare a necessary number of experts for the targeted market and the role of intermediaries is to be a connecting link among business, researches and education; thus, these organizations particularly need to show a stronger focus, without waiting until companies show initiatives themselves. According to CEOs of Lithuanian laser companies, the support in legal base, strategic planning or improve-

ment of managerial techniques would be of significant importance.

Coming back to the problem of the lack of qualified human resources in the laser industry, this is a clear threat to an international laser company that expands to the Baltic States. They will take the advantage of high qualification physicists and will need to show stronger efforts in building a team of competent sales and marketing executives or business developers. Trying to strengthen their competitive advantage of the quality and satisfy their demanding clients' needs, Lithuanian companies could set off their weakness of insufficient number of sales and marketing experts in the laser industry and the lack of financial resources by stronger willingness to cooperate and strengthen the cluster of lasers, where the companies will be reunited by one or a couple of strategic targets. The widening and deepening funnel, presented in Figure 2, enlarges in line with strengthening of the cooperation among partners, given the intention to increase their share in the industrial lasers market,

which is ten times larger, compared to the scientific lasers market.

Having over 20% of revenues invested in the R&D some Lithuanian laser companies have partly compensated these expenses by the EU financial aid. The better partner the company had the higher value added the company could create, mainly due to more possibilities to reach the critical mass and better-known clients. An advantageous tactic would be to cooperate with financially transparent and innovative Scandinavian companies and educational and science organizations. Within the niche business a decision-making process, and particularly its formalization, is rather complicated. Lithuanian laser companies should apply the 'case-by-case' model, where consultants should be both good physicists and excellent sales people.

### **Market trends and formalization of innovation processes**

Lithuanian laser firms as spin-offs from universities continue to cooperate or partly cooperate with educational organizations while creating a new product, process or service; however, the majority of activities are still carried on only in the company. It seems that from being competitors at the beginning stage of development some of the largest Lithuanian laser companies switched to the status of distributors. During the foundation period the innovation process was mainly encouraged by end-users and many products needed to be initiated from generation of the idea itself. Thus, end-users tended to reveal what they needed, while the competition was not severe at that stage. The need to improve the innovation processes came from the side of industrial clients having a focus on the stability and sustainability of parameters of lasers that could last for over 10 years. Various lasers have many specifications and each industrial client can have its own specific needs. Besides, in some cases clients could demand new parameters. Therefore, it is a challenge to create a laser that will be stable for many years. Making a conclusion, products on the industrial market could find many niches for a wide range of clients. Underlining the main trends of the scientific market it is reasonable to maintain a solid and steady revenue growth of 10-20%. Contrary to the industrial market, the scientific one has a very narrow, niche specialisation.

In spite of in-existent clear model of formalizing the innovation processes at Lithuanian laser companies, some leaders stated generating innovation ideas through regular seminars, conferences and brainstorming sessions, where a special focus is on the innovation and knowledge diffusion at different levels of the organizational structure. This proves that CEOs

of Lithuanian laser firms acknowledge the necessity to apply innovative managerial techniques and innovate inside their companies. Many suggestions come from cooperation with clients, distributors and end-users, from collection of interior and exterior informational resources or via the analysis of a scientific literature. Though the majority of the interviewed CEOs were not explicit on the side of commercialization of innovative ideas, there was the important factor of fashion in laser businesses mentioned. Application of new principles and trends in this tiny market proves that Lithuanian laser companies are open to the environment and feel the pulse of the laser sector well. Therefore, they know well what is in fashion among other peers. Most of the sample companies admitted having a strong focus on the R&D, although there were only a few employees being in charge of research activities, while others were more involved in production itself. This fact points at the lack of qualified human resources and a not fully developed organizational structure in Lithuanian laser companies. Only a few of the interviewed CEOs announced about creation of project-teams, involving various specialists and sometimes inviting experts from educational organizations. This reminds the matrix model or managing an organization and is a good solution when facing a shortage of employees from different educational backgrounds. The matrix sales structure could be a combination of the regional sales policy and sales generation, according to a product group or a segment.

### **Conclusions**

Researches on innovations refer to a multidisciplinary approach, where cooperation and network partnerships play a vital role in sustaining competitive advantage, especially in high-tech industry. This article develops an understanding of strengthening the competitive advantages of Lithuanian high-tech SMEs in laser industry through cooperation and partnership.

Given the strategic focus of Lithuanian laser companies to switching to industrial laser market, while maintaining the strong position in scientific laser market, it is vital to develop competitive advantages through innovation stream by combining low-tech and high-tech activities to exploit their limited financial resources. The main challenges for Lithuanian laser companies are the lack of qualified human resources and not fully developed organizational structure. Therefore, Lithuanian laser companies should simultaneously develop their internal and external resources.

Creating project-teams based on matrix organizational structure, involving business development

specialists and experts from education and science institutions can develop competitive internal resources of laser companies. The motivation, financial reward schemes and rotation of functions within innovation process can encourage the finalisation of the ongoing research projects by integrating different knowledge and skills.

By developing external resources Lithuanian laser companies have to encourage the co-creation of knowledge and skills within network of clients, distributors, suppliers, end-users, governmental organizations, universities, science institutions, business incubators, valleys and other intermediaries of innovations. Players within innovation system of Lithuania are not always motivated to create the cooperation platform between different interest groups of business, science and government. For the development and growth of laser companies it is important to create the cooperation and network partnerships, which are based on motivation to build a set of skills and knowledge, related to managerial techniques and the expertise of organizing business processes in the laser industry.

The mutual benefits of partners within innovation process of laser industry can motivate to focus on highly promising activities (e.g. creating a study program, organising internships, evaluating business potential, etc.) by involving different interest groups.

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## Lietuvos lazerių įmonių bendradarbiavimo ir partnerystės galimybės inovaciniame procese stiprinant jų konkurencinius pranašumus

Santrauka

Atliktu tyrimu siekta išanalizuoti bendradarbiavimo ir partnerystės galimybes inovaciniame procese, stiprinant Lietuvos lazerių įmonių konkurencinius pranašumus. Šis straipsnis remiasi neseniai atliktais, pusiau struktūruotais interviu Lietuvos lazerių pramonės šakoje (2010–2011 m.), kurių metu apklausta beveik pusė Lietuvos lazerių įmonių. Siekiant įgyvendinti užsibrėžtą tikslą, tyrime išsikelti penki uždaviniai. Pirmiausia, apžvelgiant mokslinę literatūrą, pagrindžiančią bendradarbiavimo ir partnerystės inovaciniame procese ypatumus, lyginami ir apibendrinami tokių autorių kaip Francis ir Bessant (2005), Fagerberg (2005), Pateli (2009), Calia et al. (2007), Ford ir Hakansson (2006), Pavitt (2005), Dooley ir O'Sullivan (2007) Lubatkin et al., (2001), Lazonick (2005), Das ir Kumar (2010), Dilk et al. (2008), Hsieh et al. (2008), Rindfleisch ir Moorman (2001), Dodourova (2009) ir kt. argumentai bei mintys.

Ižanginiame skyriuje nemažai dėmesio skiriama Lietuvos lazerių sektoriaus transformacijai iš Sovietų Sąjungos centralizuoto lazerių sektoriaus į žinių ekonomikos principus įtvirtinančią dabarties aukštųjų technologijų rinką, kur Lietuvos lazerių įmonės sėkmingai išsikovoja lyderiaujančias pozicijas pasaulyje. Apibendrinus teorinius bendradarbiavimo, partnerystės, inovacijų ir organizacijų konkurencinių pranašumų aspektus, toliau siekiama identifikuoti esmines Lietuvos lazerių įmonių veiklos, ypač vykdomų pardavimų, kliūtis ir tokių priemonių kaip aukšto ir žemo technologinio intensyvumo veiklų ar trumpojo ir ilgojo laikotarpių kontraktų derinimo galimybes.

Aukšto ir žemo technologinio intensyvumo veiklų derinimas pristatomas kaip sėkminga aukštųjų technologijų šakos vystymo galimybė, įtvirtinanti žinių ekonomikos principus. Toliau straipsnyje siekiama identifikuoti esminius veiksnius, skatinančius ir trikdančius Lietuvos lazerių įmonės veiklą. Identifikuotos silpnybės ir neigiami veiksniai byloja apie konkurencinių pranašumų stiprinimo būtinybę. Taigi kitas uždavinys yra orientuotas į partnerystės ir bendradarbiavimo Lietuvos lazerių sektoriuje vaidmens, stiprinant organizacijų konkurencinius pranašumus, pagrindimą. Pristatomas skirtingą mokslinę literatūrą ir apklaustų vadovų atsakymus apibendrinantis „Piltuvėlio“ modelis,

pagal kurį kompanija siekia praplėsti savo visų potencialių konkurencinių pranašumų spektrą, tuo pačiu metu gilindama savo svarbiausią išskirtinį konkurencinį pranašumą. Tinkamas konkurencinių pranašumų paskirstymas tampa dar aktualesnis vykdant tarptautinę įmonių plėtrą.

Identifikavus bendradarbiavimo ir partnerystės naudą, stiprinant įmonių konkurencinius pranašumus, neužmirštama ir tendencijų lazerių rinkoje ir įmonių taikomų vadybinių priemonių, organizacinės struktūros ir inovacinių procesų formalizavimo svarbos, nes bendradarbiavimas ir jungimasis į klasterius be tinkamo žmonių ir finansinių išteklių panaudojimo ir integravimo į įmonių žmonių išteklių ar inovacijų strategijas gali neduoti trokštamų rezultatų. Kita vertus, dauguma novatoriškų idėjų kyla bendradarbiaujant su klientais, tiekėjais, vartotojais, renkant ir apdorojant informaciją tiek iš vidinių, tiek iš išorinių šaltinių. Efektyvių tyrimų ir projektų komandų organizavimas (pvz., matricinio valdymo modelio taikymas), žinių sklaida skirtinguose produkto kūrimo ir pateikimo rinkai etapuose bei organizacinės struktūros lygmenyse nagrinėjami kaip organizacijai itin svarbūs procesai.

Kokybiniais pusiau struktūruotiems interviu su Lietuvos lazerių įmonių vadovaujančiais pareigais užimančiais ekspertais naudotas klausimynas apima keturias klausimų grupes, kurios pagrindžia pasirinktą tyrimo struktūrą ir aukščiau apibrėžtus uždavinius bei tikslą. Pirmos klausimų grupės klausimais siekta išsiaiškinti pirmines skirtingų departamentų funkcijas ir kitus svarbius Lietuvos lazerių įmonių organizacinės struktūros elementus. Antra klausimų grupė dėmesys fokusuojamas į inovatyvių idėjų komercializacijos ir inovacinių procesų formalizavimo procesus Lietuvos lazerių įmonėse, integruojant tokias strategijas kaip žmonių išteklių, inovacijų ar mokslinių tyrimų ir technologinės plėtros strategijos ir efektyviai naudojant finansinius bei žmonių išteklius. Ši klausimų grupė taip pat apima įvairias inovatyvias vadybines priemones, skatinančias Lietuvos lazerių įmonių inovacinius procesus. Trečia klausimų grupė inkorporuoja tokius svarbius tyrimui aspektus kaip tarporganizacinis bendradarbiavimas, partnerystė Lietuvos lazerių šakoje, atvirumas rinkai ar gebėjimas taikyti žinių

ekonomikos principus. Paskutinioji klausimų grupė skirta bendros informacijos apie įmones (pvz., dydis, pajamos, darbuotojų skaičius, gyvavimo trukmė ir kt.) surinkimui ir tokių inovacijų veiklą demonstruojančių rodiklių kaip įgyvendintų inovatyvių idėjų procentinė išraiška, pajamų augimas, pelno marža, investicijos į mokslinius tyrimus ir technologinę plėtrą bei jų grąža vertinimui.

Atlikto tyrimo rezultatai parodė, kad Lietuvos lazerių įmonių užimama stipri pozicija tarptautinėje mokslinių lazerių rinkos segmente yra tik vystymosi etape. Siekdamas sustiprinti savo konkurencinius pranašumus pramoninių lazerių segmente ir išlaikyti stiprią poziciją mokslinių

lazerių segmente, Lietuvos lazerių įmonės susiduria su būtinybe ne tik bendradarbiauti su esamais partneriais, bet ir plėsti partnerystės ryšius su švietimo institucijomis, mokslinių tyrimų ir plėtros organizacijomis bei tarpininkais inovacijų procese. Barjerai inovacijų procesui ir žinių sklaidai lazerių pramonės šakoje gali sutrukdyti organinę ir struktūrinę tiriamų įmonių plėtrą, sumažinti laukiamas sinergijas ir apriboti lazerių rinkos žaidėjus esamoje rinkoje.

**Pagrindiniai žodžiai:** bendradarbiavimas, partnerystė, inovacinis procesas, konkurenciniai pranašumai, lazerių įmonės.

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