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Intellectual Property – Lever or Barrier to the Globalization of Knowledge-intensive SMEs of Small Country Origin

Tonis Mets, Kalev Kaarna, Aleksei Kelli

University of Tartu
Ülikooli 18, 50090 Tartu, Estonia
e-mail: tonis.mets@ut.ee, kalev.kaarna@gmail.com, aleksei.kelli@ut.ee

Although hundreds of research papers have been published on the issue of accelerated internationalisation, Born Globals and International New Ventures, the advancement for common theory of International Entrepreneurship (IE) has been limited. Little attention has been paid to Intellectual Property (IP) and its strategies in rapidly internationalising companies.

Researching the role of IP in the internationalisation process is especially important in case of knowledge intensive small and medium size companies (KSME). It has been shown that KSME leverage knowledge and other resources in order to internationalise rapidly and gain competitive advantage on global market. This includes building on existing knowledge of markets and technology, and incorporating new knowledge domains until the value of products or services, incorporating all the knowledge, becomes more valuable than the sum of different knowledge domains.

The paper aims to explore the role of intellectual property in the process of becoming global technology- and knowledge-intensive SME of small open economy country origin. The authors suggest that the impact of IP on globalization can be threefold. Intellectual Property Rights (IPR) can be a barrier to internationalisation, it can *be a blocker for constraining competitors' ability to leverage, and it can support the market and knowledge leverage. Conducted case study analysis is based on POM-strategy model, the process theory and market-knowledge leverage framework of globalization of KSMEs, and above mentioned IPR categorisation.*

Four companies were chosen for case studies: Regio (mobile positioning software company), Skype Technologies S.A. (global VoIP company), Asper Biotech (small global biotech company), and Icosagen (small biotech company).

For all companies obtaining IP rights or not obtaining them has been a barrier. Patenting is costly for companies in early stages. In case of software, the best strategy can be the utilisation of copyright and trade secret protection (as in case of Regio). Skype, Asper and Icosagen have used patenting also for either blocking their competition or guaranteeing freedom to operate for themselves. All four case companies gained VC funding or financial support from academic institutions. In case of Regio the funding was gained despite the lack of protected IP in form of patents. The companies used the financing and funding in different development stages and for different purposes.

Only two companies out of the four have used their patents to leverage their knowledge domains or market penetration. Protected patent portfolio has allowed Skype to advance to different markets and increase the number of services provided. Icosagen has been able to standardise their patent protected technology, which is heavy blocker, but also creates leverage effects for Icosagen technology.

KSMEs have usually relatively low resources for marketing, but not only, there is a lack of resources for anything. But this can be not disturbing to global breakthrough as seen on the example of Skype. Clever business model, protected IP and free of charge basic service can create absolutely new approach in the industry.

Moving from a single product/knowledge domain to a "high system" products is not the absolute rule. Market can cause the contrary processes, i.e. simplifying complexity of the product and its IP protection. For SME the focus on the concrete technology and product creates preconditions for global breakthrough, but is not the guarantee for leverage of all accumulated competences globally. It depends on "happy" combination of product development and IP, allied partnerships and market, and business model linking all these factors together.

Keywords: *accelerated internationalisation, International Entrepreneurship, knowledge leverage, IPR*

Introduction

Global business development based on a company's intellectual property (IP) strategy cannot be assumed as habitual issue for small company's growth. Yet the role of IP strategy in rapid internationalisation has been underscored in the research field of entrepreneurial internationalisation.

Research of internationalisation has advanced within last four decades from incremental models such as U- and I-models (Johanson, Vahlne, 1977; Bilkey, Tesar, 1977) to integrated research field of International Entrepreneurship (McDougall, Oviatt, 2000) studying accelerated internationalisation process, which does not have apparent step-by-step behaviour described by incremental models (Oviatt, McDougall, 1994). Several concepts and terms have been proposed for describing the accelerated internationalisation phenomenon starting from "leapfrogging" (Hedlund, Kverneland, 1985; Madsen, Servais, 1997) to "Early Internationalising Firms" (Rialp et al., 2005). The most predominant terms are Born Global firms (BG) and International New Ventures (INV) (Oviatt, McDougall, 1994; Keupp, Gassmann, 2009). The Born Global firms have been defined through the start of

exporting activity relative to foundation of the company and the share of export in company's revenues. The earliest definition of BGs was "companies, which started exporting, on average, only two years after their foundation", compete successfully against larger companies globally, and "gain... (most)... of their revenues from international markets" (Rennie, 1993). Although several authors have tried to improve the original definition and define BG company via share of sales on international/global markets or period of becoming international/global, there is no agreement about the concrete value of criteria (Svensson, 2006; Rialp, Rialp, Urbano, Vaillant, 2005). The BG definition has also lead to defining another category of rapidly internationalising companies: Born Again Global (BAG). These are "firms that have been well established in their domestic markets, with apparently no great motivation to internationalise, but which have suddenly embraced rapid and dedicated internationalization". Rapid internationalisation of BAG companies is triggered by some critical incident such as internationalisation of clients, network partners or change in management or owners. (Bell *et al*, 2001) Such behaviour is defined as reactive (Bell *et al*, 2003). Domestic companies having proactive approach for internationalisation and intentionally build up their knowledge, capabilities and resources over several years for rapid internationalisation are labelled as Learned Global (LG) (Mets, 2008).

The original definition of International New Ventures (INV) is much more accepted and used by research community. Oviatt and McDougall (1994) defined INV as a "business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries" (Oviatt, McDougall, 1994). In general, BG and INV definitions do not differ significantly and therefore could be used interchangeably. In current paper we prefer the term BG for semantic reasons.

Although hundreds of research papers have been published on the issue of BGs and INVs, the advancement for common theory of International Entrepreneurship (IE) has been limited (Aspelund *et al,* 2007; Keupp, Gassmann, 2009). Little attention has also been paid to Intellectual Property (IP) and its strategies in rapidly internationalising companies. Keupp and Gassmann (2009) identified among IE research articles only 5 papers out of 172, which analysed IP as the source of competitive advantage.

In current paper we use extended POM-strategy model (described in detail in the next section of the article) for analysing internationalisation paths and determinants of knowledge-intensive small and medium sized enterprises (KSME) from small and open economy (SMOPEC). Internationalisation of knowledge intensive companies and exporting is seen as source of growth and sustainability for small countries without significant natural resources such as Baltic states (Melnikas, 2008; Saboniene, 2009).

IP can have a crucial role in the internationalisation process of small and medium size knowledge intensive companies (KSME). It has been shown that KSME leverage knowledge and other resources in order to internationalise rapidly and gain competitive advantage on global market (Mets, 2008; Auruskeviciene, Salciuviene, Vanage, 2008; Gudas, 2009). This includes building on existing knowledge of markets and technology, and incorporating new knowledge domains until the value of products or services, incorporating all the knowledge, becomes more valuable than the sum of different knowledge domains. Such leverage process cannot happen accidentally, but require decisions about IP such as protection, sharing, and acquiring.

The paper aims to explore the role of intellectual property in the process of becoming global technology- and knowledge-intensive SME of small open economy country origin. **The object of research** is the role of IP in KSME internationalisation. The authors suggest that the impact of IP on globalization can be threefold. In general, it constitutes a barrier to development of new products (blocking), entry into new markets (freedom to operate), etc. Due to these features a company can use IP as a blocker for constraining competitors and build barriers. However, after an KSME has reached certain level of development (i.e. has globalized) IP can be utilized as a leverage for enhancing, market penetration, and knowledge domains. **Research method** is longitudinal case study of four Estonian origin companies. Case study analysis is based on secondary data and personal interviews. The POM-strategy model, process theory and market-knowledge leverage framework of globalisation are used as theoretical bases for case analysis.

Scientific novelty: The results of the study provide better understanding of strategic options that "new economy" companies may follow in their internationalization process. The paper highlights possible difficulties that KSMEs face when managing their proprietary knowledge, and general possibilities for using IP as a lever. Through analysing cases different strategies are identified for overcoming IP barriers, creating blockers, and using IP for leveraging the internationalisation of the company.

Barriers and leverage in globalization process of KSME

The three internationalisation trajectories discussed the most in the International Entrepreneurship literature are presented in Figure 1. In current paper extended POM-strategy is used for categorising determinants of accelerated internationalisation. The POM-strategy includes three sub-strategies (or fields) of globalization strategy: the product (P), the operation mode (O) and the market (M). The POM-strategy leads to global marketing strategy, which consists of customer strategy, pricing, and distribution (Luostarinen, Gabrielsson, 2004).

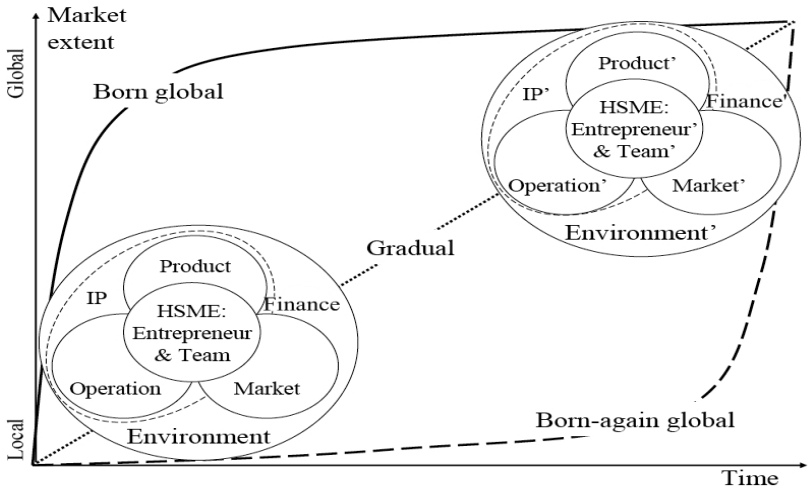

Figure 1. Trajectories of KSME internationalization

Source: developed by the authors

Luostarinen and Gabrielsson (2004) have demonstrated that the BG behaviour is not limited to technology companies. BGs may build their business on technology, design, services, know-how, systems or combinations of these categories. Characteristic to BGs is that their product and operation patterns and POM-strategy on international markets differ significantly from conventional (non-born-global) companies (ibid).

We have extended the POM-strategy model with determinants found important in International Entrepreneurship research on BGs. These factors are environment, finance, and IP. Environment is both enabler and enforcer of BG behaviour. The environment is an enabler of accelerated internationalisation due to new communication technologies allowing cheaper and more convenient communication over long distances, information availability, cheaper travelling, more unified legislation, relative acceptance of globalising businesses, and doing business with foreign companies. The environment is also an enforcer of internationalisation through limited or non-existing local demand (especially for high-tech products and services), windows of opportunity, and access to best set of resources (labour, manufacturing capabilities, materials, R&D know-how, etc). Environment is also related to financing. At different times investors see potential in different sectors, which create opportunities for one type of companies and not to others.

Becoming global depends strongly on KSME's capability to attract venture capital (VC) companies to invest into BG. Very important issue in terms of VC attractiveness is IP portfolio of the business. Therefore it is common practice that a company's technological reputation is one of the underlying considerations in the design of their IP portfolios. Still it should be noted that venture capitalists are not interested only in quantity of IP. Value and quality is even more important (e.g. whether a patent protects a minor improvement or a breakthrough core technology). Chesbrough (2003) has correctly described the interrelation of technology and business models by saying that "technology by itself has no inherent value; that value only arises when it is commercialized through a business model". Extended POM-strategy model covers main blocks of business model and allow describing both value creation and capture of KSME in competitive environment.

Resources alone are not sufficient for describing and understanding accelerated internationalisation. KSMEs have to compete with multinational corporations, which have much more resources than small and medium sized companies. One possible approach for KSMEs to succeed is to leverage their resources and utilise entrepreneurial learning. Such leverage effect is somewhat different from the original meaning of leverage.

Leverage of resources, incl. intangible resources, was first seen as competitive advantage of multinational companies (MNC) (Hamel, Prahalad, 1993), because they could effectively replicate their business model in different geographical regions and leverage their investments into knowledge and competences. This phenomenon sometimes known also as "McDonalds approach" (Winter, Szulanski, 2001) creates disproportionately strong advantage potential for global corporation before local company, especially in knowledge-intensive spheres regarded as "new economy" (Mets, 2003). Due to advances in information technology and decreasing costs of communication in some sectors KSME can use similar geographical leverage as MNC. The more important leverage effect for KSME might come from ability to leverage their existing knowledge through combining it with other knowledge domains. Such integration might lead to globally competitive products or services, which will become replicable over different geographical regions. For example, SME producing printed maps combined over several years their knowledge about cartography and design with Geographic Information Systems (GIS), later developed competences on Location-based Services (LBS) and is now providing unique LBS middleware and over 10 LBS applications globally (Mets, 2008). Only adding the LBS knowledge domain to their existing knowledge allowed the company to initiate rapid internationalisation to global markets. Without their prior knowledge domains LBS would not have had such significant impact to the competitiveness of the company.

KSMEs are interested in exploiting their proprietary knowledge to maximum extent (*inter alia* to commercialize their products in many countries). Since the core component

of their products is knowledge, steps made for protecting the existing knowledge-base are inevitable. This can be achieved through the utilization of national IP regimes. National character of the intellectual property systems (the principle of territoriality) is, however, an important issue, which should not be ignored by KSMEs.

Characteristics of intellectual property rights (IPR) can have three types of impact on KSME. IPR can be a barrier to internationalisation, it can be a blocker for constraining competitors ability to leverage, and it can support the market and knowledge leverage (see table 1). Different authors have categorised or labelled the role of IPR differently, but the above mentioned three impact categories can be identified (Pilinkus, Boguslauskas, 2005).

Table 1

Characteristics and impacts of IPR

Characteristic or impact of IPR	Comment
Barrier	
Territorial nature of intellectual property	Patent protection especially in many countries can be too costly for KSME
The extent of IP rights and limitations are not unified globally	It is essential to have a good understanding of IP regulations in different countries
Company has to enforce its rights itself	Identification of infringement and enforcement in different regions can be too costly for KSME
Blocker	
Protection of core technology	Can decrease competitors' ability to utilize the protected technology
Blocking competition development	Can decrease competitors ability to leverage, but IPR in itself does not eliminate infringing
Distracting competition	Can mislead competitors
Leverage	
Facilitates product launch to new markets	IP protection in a foreign country decreases risks of investing and also forces realisation of opportunities in a timeframe created by IP legislation
Ability to licence and gain royalties	Licensing can boost rapidly incomes and global presence of KSME or be a core of the business model
Gaining access to other technology through cross-licensing	Can allow integrating new knowledge domains and leveraging existing ones
Assuring freedom to operate	Can allow integrating new knowledge domains and leveraging existing on specific markets
Increasing technological image	Can increase credibility of the company as a partner and can speed up the building of partner network
Attracting and convincing investors and joint venture partners	Can support financing necessary to leveraging geographically or integrating new knowledge domains for knowledge leverage

Source: developed by the authors

Despite international and regional initiatives to harmonize the legal framework for IP in different countries, intellectual property systems remain "products" of national legal systems embedded in the local legal cultures and their effect is usually confined to the territory of a state. The territorial nature has very practical implications for a KSME. Firstly, a product protected in one country does not necessarily enjoy protection in another. Therefore a KSME has to protect (*e.g.,* to patent) its product in all countries where it is doing business. Secondly, the extent of IP rights and limitations are not necessarily the same in different countries. Thirdly, the existence of IP (*e.g.,* copyright, patent) does not guarantee that the rights of a KSME are not infringed. It is up to a KSME to enforce its rights. This task is more complicated if done in many jurisdictions. This problem is acknowledged by the EU Commission which admits that "[e]nforcement of IPR remains a major problem at international level" (COM, 2007). Consequently, difficulties relating to enforcement could constitute a real challenge to a KSME with limited resources. KSME should be aware of these issues in a very early stage: when operating on the market it can be too late to decide on IP strategy. In addition to barriers KSME should be well aware of opportunities and possible leverage effects IP can offer. The faster KSME identifies opportunities created by IP and learns how to realise them, the higher are the chances for successful internationalisation. This leads to issues of opportunity recognition and entrepreneurial learning.

Effective recognition of opportunities is considered one the most important outcomes of entrepreneurial learning as an experiential process (see Politis, 2005; Corbett, 2005). The learning can be organizational; the "learning organization" is the concept used to describe an organization's ability to manage change (see for example Senge, 1990). From the perspective of entrepreneurial learning described by Politis (2005), it is more or less an individual process. Organizational learning of SME's in terms of an entrepreneur's capacity to learn and to integrate the working team remains the leading factor; and entrepreneurial learning is mostly an action-learning process (Deakins et al, 2000). As a matter of fact, it is possible and also necessary to learn how to utilize IP. Development of organizational capabilities to manage IP is a *condition sine qua non* for globalization of a KSME.

In conclusion, company strategy (POM-model) and management behavioural patterns (e.g. opportunity identification and realisation) match better to general understanding of rapid globalization process than formal criteria. IP can be both barrier and leverage for KSME, and requires from companies entrepreneurial learning the same way as do markets and technology. Therefore there is a need to better understand the content of core competence(s) and their interaction in creating long-run competitive advantage hard to copy by competitors on the market.

Empirical research and methodology

Empirical research is based on the process theory and market-knowledge leverage framework of globalization of KSMEs as discussed in the first sections of the paper. The

approach is especially, focusing on the role of knowledge (including knowledge protected in some form of IP), which is the basis for product as well as operations development in reaching global market. Mapping IP impact on knowledge-market development in internationalization of KSMEs can give basic understanding for further strategy creation by businesses as well as for public authorities in forming entrepreneurship regulations and policies. That means also the need to analyze how IP is managed in the internationalisation process? What is the timing of accumulation of necessary competences for globalization and how it is related to internationalization process - is there so called "pre-history"? Can we identify entrepreneurial learning in globalization process? How has entrepreneurship environment influenced financing of KSMEs? And what are the impact of IP on competitive advantage, business model and strategy?

Case studies were used for mapping the main factors affecting internationalization of technology intensive SMEs in the "knowledge-market" framework. Main criteria for selection of a company for case study were the following:

- Estonian origin of the company or/and tight relations to Estonia;
- The company should be relevant to a success story, i.e. it should be already global;
- The main development track of the company could be observed;
- Main part of knowledge and technology is created in Estonia;
- The companies represent technologies of different fields.

Four case companies that met the described characteristics, were selected for the study. Current case studies are based on secondary data and personal interviews. First of all, search for research publications was carried out using Google Scholar®. That gave possibility to learn the aspects researchers already covered about the case companies. Then historical facts and general overviews were collected from previous researches (Kodres, 2006; Vissak, 2007; Mets, 2008) and press (for example Kurm, 2005). After that web-pages and annual reports of the companies were studied. Patent information was mapped using search engine esp@cenet and worldwide databases of the European Patent Office (2009). First, the patent documents according to the company as applicant, and after that the documents related to involved persons were searched. Patent families were analyzed to explain the geographical range of IP protection. Priority dates of patent applications were analyzed in the timeframe of the main events, incl. product launches. The facts collected during the previous studies as well as current research were evaluated in the context of research questions. The aspects not covered before and newer trends were mapped, also some interpretations were checked in interviews.

Globalization cases of four Estonian origin knowledge-intensive companies

Cases in the current paper are presented in the Tables 2, 3, 4 and 5 structured according to the raised research questions, aspects for mapping globalization process of the KSME and important factors in that process.

Table 2

Regio – mobile positioning software company

Company name, founding data, product	Regio Firm, 1988 (state-owned); Regio AS, 1990 (private LLC), founders – Jüri Jagomägi, Rivo Noorkõiv and Madis Michelson, geographers, started with R&D services (regional studies) and postcard production; 1989, road map of Estonia
Pre-history period, important events	1992, mediation of Intergraph software; 1993, Teet Jagomägi (23) appointed the CEO after training in 3D programming in USA; implementation of the geo-information system (GIS); the first Estonian sea-map after Soviet occupation in 1940; 1994, complete digital map technology using GPS; 1998, CD-Atlas
Opportunity recognition	1999, the tender from Ericsson AB for mobile positioning software (MPS), new product which became the breakthrough for globalization
Domestic period	1988, from inception operated in the Estonian market; 1992-1993, first export sales; amount of exports was not remarkable until 2001
Internationalization period (under the trademark Reach-U)	2000, merge with the Finnish listed corporation Digital Open Network Environment OY (DONE); 2001, drastic growth of exports to one fourth of sales; 2002, bankruptcy of parent company; management buy-out of the company
Globalization period	2004, global reselling agreement with Ericsson; 2005, delivery of location based services (LBS) middleware to Saudi Arabia; 2006, North Africa; 2008, entering the market in Mexico
Marketing	Practically no (direct) costs for marketing on global market, partnering with global player
Product development	Widening the product range from post-cards and maps to GIS, digital maps and LBS; ISO 9001: 2000 quality certificate since 2006
Finance	First, founders mortgaged their homes for bank loan on very unfavourable conditions in 1993-1994. Later, in 1998 the Baltic Small Equity Fund (BSEF) became risk capital partner for Regio; 2000, merger with DONE (funding product development)
Lessons learned before globalization	Learning modern technology in USA, business development from venture capital and merging quoted company DONE
Competitive edge	Latecomer effect starting digital cartography and GIS from scratch. Learning and integrating knowledge from different technology domains: design, cartography, programming, GIS and LBS
IP portfolio and strategy	Globally used trade mark: Reach-U; utilising copyright and trademark protection and based on that licensing operations; linking to general business strategy
Global business model and strategy	B2B; partnering with global player Ericsson (piggybacking) being/creating part of telecom's value chain, leverage of new technology with traditional one, widening product complexity enabling customer tailored solutions

Source: Authors' compilation based on Mets (2008, 2009a), Reach-U (2009), Uustalo (2009)

Table 3

Skype Technologies S.A. – global VoIP company

Company name, founding data	Skype Technologies S.A., 2002, its Estonian branch in 2004, founders – Niklas Zennström (Swede) and Janus Friis (Dane) involving four Estonian programmers Ahti Heinla, Priit Kasesalu, Jaan Tallinn and Toivo Annus, promising high quality P2P phone, initial service Skype phone – free of charge
Pre-history period, important events	The founders and the primary code writers Ahti Heinla, Priit Kasesalu and Jaan Tallinn had created P2P file-sharing internet environment KaZaA, which was introduced by Dutch registered company Consumer Empowerment in March 2001 (sold to Sharman Networks; provoked scandalous court claims by copyright organizations and music publishers)
Opportunity recognition	…took place before company was founded, technological idea and business model were initiated from the former project KaZaA, sold in 2002
Domestic period	Did not exist, the product was launched in Aug. 2003
Internationalization period	Concurred with globalization
Globalization period	Aug. 2003 - Jan. 2004: 2.4 million users from 200 countries; Aug. 2004: 9 million users; Aug. 2005: 51 million users; April 2006: 100 million users; June 2007: 196 million users; Apr. 2008: 308 million users; Feb. 2009: 405 million users
Marketing	The global final customers found practically without any marketing costs
Product development	July 2003: provisional US patent application "P2P telephone system"; Aug. 2003: First public beta version released; 2004: conference calling, SkypeOut Global (calls into landlines and mobile networks); Apr. 2005: SkypeIn and Skype Voicemail; Dec. 2005: video calling; Jan. 2006: wireless mobile telephone; Feb. 2009: full-screen video calling; Wide range of compatible equipment and software designed and produced by partners worldwide
Finance	Sept. 2002: investment from Draper Investment Company (USA) of Steve Jürvetson, investor with Estonian roots; Sept.-Nov. 2005: acquisition by the American Internet auction site eBay for approx. $2.6 billion
Lessons learned	Reaching the market, the team has intensively expanded complexity of the product: Skype
Competitive edge	No limits worldwide using Internet environment, global connection without extra charge
IP portfolio and strategy	About 30 patent families, started from the main product, widening functional range of product, system and method (incl. combinations); protecting market position
Business model, strategy	P2P/B2C, collaborating and competing with (big) telecoms

Source: Authors' compilation based on Thomann (2006), Leibowitz, Ripeanu & Wirzbicki (2003), Yovanof & Hazapis (2008), Skype (2009), Landler(2005)

Table 4

Asper Biotech – small global biotech company

Company name, founding data, initial product	Asper Biotech AS, 1999, founders – prof. Andres Metspalu and Jaanus Pikani, former CEO of University Clinics, genotyping service and package (instrumentation, software and bioinformatics solution) for identifying genetic components of human disease, mostly customers of R&D field
Pre-history period, important events	1996-1999, prof. Metspalu worked in the universities in France and USA working out a particular genotyping technology
Opportunity recognition	…took place before company was founded, technological idea and the initial business model were generated from the founder's experience; opening of different funding sources
Domestic period	Practically did not exist
Internationalization period	2001, the first international revenues were generated; results of the first project were published in top journals *Nature* and *PNAS* for reference
Globalization period	2001-2002, local representative agreements were signed with partners in Japan, USA, Norway and Italy; 2003-2004, focus turned on direct contacts and shifted from products to services; 2009: clients in more than 40 countries
Marketing	Quite intensive advertising in special journals complimented with research publications in the beginning. Direct marketing (1000 - 10000 institutions/companies worldwide) partly based on personal contacts of the professor
Product development	Started from wider (complex) product range (technology platform, methodology, equipment, analysis) offer, focus turned to concrete DNA tests' and diagnostics' services; ISO 9001: 2000 quality certificate, since 2000
Finance	Involving risk capital investment for product and technology development from the very beginning: US origin SEAF fund in 2000, later BSEF; EU FP6 funding of several projects
Lessons learned	Low efficiency of partnering with local players in global niche market; selling complicated product needs expensive support system; most effective was replacing analysis' product sale with the analysis' services; splitting the business by moving instrumentation, software and technology platform development into the KSME Genorama with the same owners
Competitive edge	Competence-based world-wide recognized analysis' methodology; founder's personal worldwide scientific contacts; (comparatively) low cost knowledge intensive service
IP portfolio and strategy	One patent, several patents of related persons, research publications; partnering with global players (Stanford University) in IP protection and licensing; protecting operational freedom on markets
Business model, strategy	From B2B2C to B2C; creating new markets by focusing on (high competence) different specialized services for different segments: genotyping for special global niches

Source: Authors' compilation based on Kask (2009), Leego (2009), Kodres (2006), AS Asper Biotech (2001-2007), Asper Biotech (2009), Genorama (2009)

Table 5

Icosagen – becoming global biotech company

Company name, founding data, initial product	Icosagen (until March 2009, Quattromed) AS Group, 1999; a spin-off of Tartu University, founders – four university researchers leaded by professor Mart Ustav, medical molecular diagnostics; main customers: Estonian hospitals
Pre-history period, important events	High level results of university research
Opportunity recognition	…based on IP and took place before company was founded, technological idea and the initial business model were generated according to the founder's vision
Domestic period	In initial stage small share of export; active growth on Estonian market
Internationalization period	Sales to neighbouring markets in smaller share since 2000; Sept. 2002, involving Finnish biotech company FIT

	Biotech as shareholder (of 22.4 % of shares) and collaboration partner
Globalization period	2008, the American Society for Testing and Materials (ASTM International) (www.astm.org) adopted a new standard D7247 "Standard Test Method for Immunological Measurement of Four Principal Allergenic Proteins in Natural Rubber and Products Derived from Latex" that bases on Icosagen's FITkit® technology (acquired from FIT Biotech in 2005); 2009, sale of QMCF Technology (production of biologically active substances) licences to global pharmacies
Marketing	Gradual entering local market starting from private clinics
Product development	2004, ISO 15189 standard "Medical laboratories: Particular requirements for quality and competence"; ISO 9001: 2000 quality certificate, since 2007
Finance	Loan from Estonian Innovation Fund, 1999; R&D and export support from Enterprise Estonia; Sept 03, 2008, sales 75% stake of subsidiary Quattromed HTI Laborid OÜ along with the Quattromed trade mark to BaltCap, the leading private equity investor in the Baltic States.
Lessons learned	High tech product development is highly expensive; hardly manageable combination of wide product/service portfolio on small market with smaller number of high tech products on global market
Competitive edge	Research-based analysis' methodology; (comparatively) low cost knowledge intensive service; strong growth-orientation
IP portfolio and strategy	Start-up phase based on licensed university research; afterward four patent families; three trade marks; one international standard based on technology belonging to the Icosagen Group; about 10 license-purchase: protecting market share as well operational freedom on some markets; sales of IP
Business model, strategy	B2B; Local market oriented business merged in 2006 and sold to financial investor in 2008; transition from service to IP business

Source: Authors' compilation based on Leego (2009), Mets (2009b), Vissak (2007), Quattromed AS (2001-2007), Quattromed (2009), Icosagen (2009),Ustav (2009)

Main findings

Following general understanding from former researches, Estonia corresponds to the environments of small open economies' context of BG KSMEs being even remarkably smaller than Finland or Sweden covered by several authors earlier (Luostarinen, Gabrielsson, 2004). Since 1992 the Estonian government has practiced a liberal economic policy, and has opened the Estonian market to foreign goods and capital. That policy has helped to attract foreign investments, which fostered to overcome backwardness inherited from Soviet occupation. Because of liberal but also comparatively poor economy Estonia has not supported neither technology-based nor any start-ups as strongly as neighbouring Western countries have done. Therefore the main survival condition for companies has been the balance between costs and revenues, which did not give the chance to invest enough into new technology development. This is a part of explanation of "long journey" of Regio, founded in 1988, to global market as presented in Figure 2.

Before internationalization Regio had already quite a wide range of products of different technology domains (design, cartography, GIS and software).

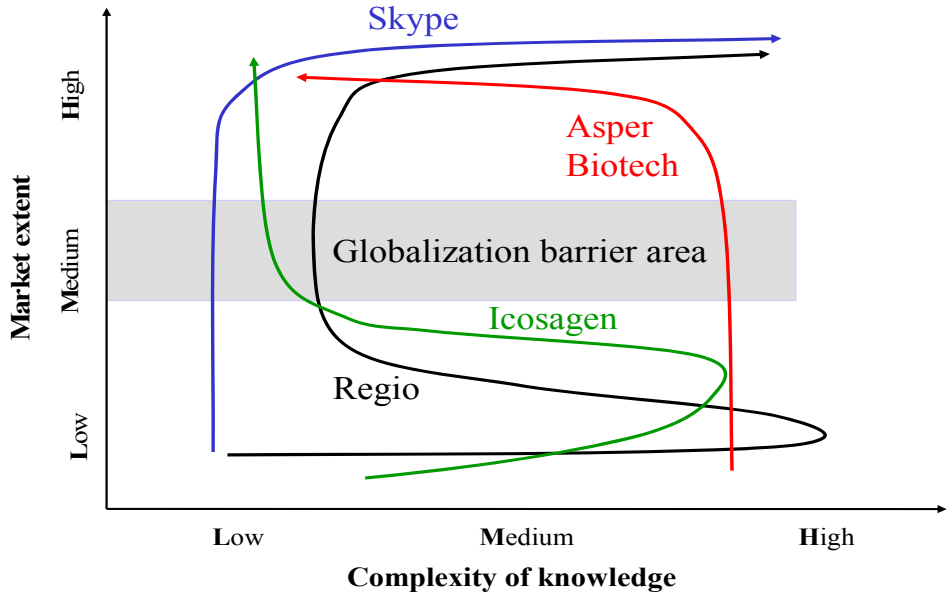

Figure 2. Product knowledge-market trajectories of globalizing KSMEs

Source: developed by the authors

Due to the lack of resources, product development was hindered for several years in the mid of the 1990s. Later, in 1998 the Baltic Small Equity Fund (BSEF) became risk capital partner for Regio, but even that was not enough. More possibilities were created through the merger with DONE. Global breakthrough succeeded first with one

product only – location based services (LBS) provided as a part of value chain of global player Ericsson since 2004. Spreading worldwide LBS service afterward has enabled to compliment global product with the elements of its traditional and new products leveraging complex knowledge across global markets. The process in "knowledge-market" framework is described with S-shape curve. Due to the nature of Regio's software solutions the company has not made any steps towards patenting. The IP protection has been achieved through secret know-how, copyright and trademark protection as well as trough the business model being integral part of bigger value chain. Reliance on secret know-how has made the personnel management and motivation a crucial issue for the company.

Skype represents another development trajectory, where globalization starts from one concrete product and after global breakthrough it is leveraged with wide range of improvements and additional functions growing knowledge complexity of the product. The trajectory (see Figure 2) seems to be very relevant to classical process of moving from "high product" to "high system" business, which could be described with the Γ-curve. The knowledge accumulation for VoIP-company was strongly supported by "pre-history" of technology and business competences developed in KaZaA project. The same important was also an international team, its visionary ideas, technological skills and capability to attract VC at the very early stage. Although some experts guess that in technological meaning Skype did not change too much in ICT world (Landler, 2005), main was clever way for "putting together bits and pieces". The "peer-to-peer" (P2P) technology concept and business model of the Skype has found being disruptive innovation (Yovanof, Hazapis, 2008) completely changing global market of telecommunication. In case of Skype, IPR have played a crucial role right from the beginning. Development patent portfolio and evaluating acquisition of other companies and their IP portfolios has become a cornerstone of Skype business.

The case of Asper Biotech is an example of contrary development of product on the market. The beginning was also quite classical stage of knowledge accumulation. Professor initiating the KSME was very active also in business development and finding the funding. Using already improved entrepreneurship environment in Estonia in the beginning of 21st century the founders succeeded to involve remarkable resources for product development from different risk funds and European Union framework program (FP). Complexity of the product range and accompanying services was quite high from the beginning. Asper Biotech started global offering from inception. It was supported by advertising, research publications and personal contacts of Prof. Metspalu. It became clearer in the learning process of market development that in specific business with very small shipments and mediation of genotyping services "business-to-business-to-client" (B2B2C) model with local partners could not be efficient. As a result direct sales ("business-to-client" – B2C model) to final customers were implemented. The most complicated part of product range – technology platform with complementary methodology and software needed another commercialization approach: therefore it was moved into another business Genorama with its specific strategy. As a result, a complex system-offer was replaced with less complex product for the client in the global niche market. In the "knowledge-market" axis the process could be described with the rotated L-curve. Besides, the company has found that they may be still at the very beginning of customary market creation for gene test and diagnostics of which market need should be facilitated. Although Asper started with a patented technology, the company has seen little value on expanding their own patent portfolio. More emphasis has been made on developing trademarks and services based on former protected technology.

Somewhat similar is the development pattern of another biotech company Icosagen, which started as a university spin-off, but its trajectory is influenced much by high-level competence-base, local service business-oriented growth with smaller share of international transactions during several years. Intensive product development, license deals and patenting ensured the real breakthrough with standardizing their FITkit® technology in specific field globally. Selling local market oriented medical diagnostics subsidiary with the wide product range in 2008 to VC created a new situation for the company – now R&D and services could be more focused on the development of highly efficient QMCF technology and IP trade as well on services implementing the FITkit® technology. This is not clear yet about leverage potential of global breakthrough with other related technology/ knowledge domains, therefore the development trajectory is described with lower half of S-curve.

Similarly to Skype, Icosagen has heavily utilised IP protection. Icosagen has patented and protected trademarks of their solutions FITkit®, E2Tag, and QMCF. Even more, Icosagen has invested their funds and efforts in standardising their technology. In 2008 ASTM International (www.astm.org) adopted a new standard for test method that bases on Icosagen's FITkit® technology.

Table 6 summarises the IP management of four case companies. For all companies obtaining IP rights or not obtaining them has been a barrier to overcome in different ways. Patenting is costly for companies in early stages. In case of software, the best strategy can be the utilisation of copyright and trade secret protection, but the protection can be even more efficient, if supported by the business model (as in case of Regio, label: bus-model). Asper and Icosagen have used their connections with academic institutions for covering research and patenting costs (label: acad-patent). Skype, Asper and Icosagen have used patenting also for either blocking their competition or guaranteeing freedom to operate for themselves. Skype among them enjoyed early stage VC support at embryonic stage before patenting (label: VC&patent). All four case companies gained VC funding, but in different stages and for different purposes. Icosagen used during its initial years the connections with the University of Tartu for funding R&D and covering infrastructure costs (label: early stage acad-fund). In later growth stage the company found financial investors and exited its local market oriented medical diagnostics branch (label: exiting). In case of Regio the VC investors were engaged several years after the founding for new product development (label: VC for NPD). The funding was gained due to favourable (VC) market conditions, and despite the lack of protected IP in form of patents.

Tabel 6

Strategy of IP management in internationalisation of KSME

IP impact / KSME	Barrier: solution	Blocker	Financial leverage	Knowledge/Market leverage
Regio	Bus-model	Bus-model	VC for NPD	Additional products
Skype	VC&patent	IP&Bus-model	Early stage VC	Additional products
Asper	Acad-patent	IP&Bus-model	Early stage VC	Simplification of product
Icosagen	Acad-patent	IP&Bus-model, standard	Early stage acad-fund, exiting	Parallel products, standard

Note: Shaded area – higher priority of protection of IP for KSME

Source: developed by the authors

Only two companies out of four have used their patents to leverage their knowledge domains or market penetration. Protected patent portfolio has allowed Skype to advance to different markets and increase the number of services provided additionally to the main product on these markets. Icosagen has been able to standardise their patent protected technology, which is both heavy blocker, but also creates leverage effects for Icosagen technology.

Discussion and conclusions

On the example of four different knowledge-market trajectories' case studies of completely or partly Estonian-origin KSMEs in the field of ICT and biotechnology some generalizations and conclusions can be made.

Appearance of the "born global" phenomenon in company's behaviour presumes knowledge and experience accumulation – i.e. entrepreneurial learning period, which is leading to (global) business (breakthrough) opportunity recognition. This competence accumulation period can take place before formal company founding as well as in the framework of already functioning businesses.

Global breakthrough, which can happen mostly in a quite narrow field, is strongly supported by IP strategy, which forms an integrated component of business strategy. Broad patent portfolio is not necessary for breakthrough, but it can be created being already global to protect own growing marked share and widen product portfolio (Skype). The software developer being owner of small part of value chain of the strategic partner and combining hardly replicable competences, can manage its own IP using copyright protection (Regio). Characteristic to the companies studied is a single/small domain global breakthrough. Only Asper Biotech seems to be exception, but it was not reasonable to hold its initial product range and business model, and the company moved into smaller domain area (see Figure 2).

Usually BG KSMEs focus on global niche market, but they can also challenge the whole industry. It seems that partly the aspect depends on the maturity of the industry. Skype is a good example of going to wide market from the inception. Asper Biotech sees a potential for moving from a niche product/service into wide customer market only now, when the general doctors community is more widely accepting genetic testing as a diagnostics tool.

Icosagen is an example of how to change the business focus from routine, wide-range laboratory service to more focused breakthrough field with IP protected business. In the knowledge-market trajectory similarity between the companies of different sectors (see Regio and Icosagen), which is depending mostly on the market focus as well as on the founders' vision at inception can be found. Further process could be called Learned Global.

BGs have usually relatively low resources for marketing, but not only, there is a lack of resources for anything. But this can be not disturbing to global breakthrough as seen on the example of Skype. Clever business model, protected IP and free of charge basic service can create absolutely new approach in the industry. Technology innovation means also innovation in the market and human behaviour, which can finally lead to social innovation.

Moving from a single product/knowledge domain to a "high system" products is not the absolute rule. Market can cause the contrary processes, i.e. simplifying complexity of the product and its IP protection. For SME the focus on the concrete technology and product creates preconditions for global breakthrough, but is not the guarantee for leverage of all accumulated competences globally. It depends on "happy" combination of product development and IP, allied partnerships and market, and business model linking all these factors together.

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Tõnis Mets, Kalev Kaarna, Aleksei Kelli

Intelektinė nuosavybė – mažos šalies smulkiojo ir vidutinio verslo įmonių žinių intensyvios globalizacijos svertas ar trukdis

Santrauka

Nors yra daugybė mokslinių straipsnių apie sparčios internacionalizacijos problemą, teorijų apie bendrą tarptautinį antrepreneriškumą nėra daug. Mažai dėmesio buvo kreipiama į intelektinę nuosavybę (IN) ir jos strategiją.

Šio straipsnio tikslas – pateikti, koks IN vaidmuo internacionalizacijos procese. Smulkiojo ir vidutinio verslo įmonės daro įtaką žinioms ir kitiems resursams tam, kad sparčiai internacionalizuotų ir įgytų konkurencinį pranašumą globalioje rinkoje. Įtraukiamos tokios rinkos, technologijų žinios ir naujos sritys, kai žinios tampa vertingesnės nei atskirų žinojimo sričių suma. Toks poveikis nėra atsitiktinis, tam reikalingi sprendimai apie intelektualinę nuosavybę, t. y. apsaugos, įgijimo ir perdavimo aspektai.

Straipsnio tikslas yra ištirti intelektinės nuosavybės vaidmenį procese, kai smulkiojo ir vidutinio verslo įmonės tampa globalių technologijų ir intensyvų žinių objektais.

Tyrimo objektas yra IN vaidmuo smulkiojo ir vidutinio verslo įmonių internacionalizavimo procese. Autoriai teigia, kad IN poveikis globalizacijai gali būti trejopas. IN gali būti internacionalizacijos trukdis, ji gali stabdyti konkurencinį gebėjimą daryti įtaką, taip pat ji gali remti rinkos ir žinių įtaka.

Tyrimo metodas yra ilgalaikė keturių Estijos kompanijų studijos. Analizė paremta POM strategijos modeliu, proceso teorija ir rinkos žinių struktūra bei įtaka smulkiojo ir vidutinio verslo įmonių globalizacijos procesui.

Šio tyrimo pagrindinis kompanijos pasirinkimo kriterijus buvo šis: estiška kompanijos kilmė ir glaudūs ryšiai su Estija; kompanija turi būti globali; turi būti dideli jos plėtojimosi požymiai, pagrindinė žinių ir technologijų dalis turėtų būti sukurta Estijoje, kompanijų technologijos turėtų atstovauti įvairioms sritims. Šiam tyrimui atlikti buvo pasirinktos keturios kompanijos: „Regio" (programinės įrangos kompanija), „Skype Technologies" (globali kopmpanija), „Asper Biotech" (smulkiojo verslo kompanija) ir „Icosagen" (smulkiojo verslo biotechnikos kompanija).

Tyrimai rėmėsi antriniais duomenimis ir asmeniniais interviu. Buvo tiriamai šios srities moksliniai darbai, tyrimai atlikti įvairiose kompanijose, ištirti istoriniai faktai ir įvairūs požiūriai. Taip pat buvo tiriamos internetinės svetainės, kompanijų ataskaitos, patentų informacija ir dokumentacija, taip pat su tuo susijusių asmenų darbas. Patentų taikymo datos buvo tiriamos pagrindinių įvykių struktūroje. Daugelis surinktų duomenų ir faktų bei dabartinis tyrimas buvo vertinami šio tyrimo problemų kontekste. Buvo registruojamos naujos kryptys, tikrinamos interpretacijos ir interviu.

Mokslinis naujumas. Tyrimo rezultatai padeda geriau suprasti strateginius veiksmus, kurių gali imtis „naujos ekonomikos“ kompanijos savo internacionalizacijos procese. Straipsnyje nurodomi galimi sunkumai, su kuriais susiduria smulkiojo ir vidutinio verslo įmonės žinių valdymo procese, taip pat pabrėžiamos galimybės pasinaudoti intelektine nuosavybe kaip svertu. Analizė išryškina įvairias strategijas, kurios padeda įveikti IN trukdžius ir panaudoti IN kompanijos internacionalizacijos procese.

Sunkumų iškyla tuomet, kai visos kompanijos įgyja IN teises ir net tuomet, kai jų neturi. Patentai kompanijoms kainuoja jau pirminėse stadijose. Programinės įrangos atveju geriausia strategija yra platinimo teisių panaudojimas ir paslapčių apsauga (pvz., kompanijos „Regio“ pavyzdys). „Skype“, „Asper“ ir „Icosagen“ taip pat pasinaudojo patentine teise. Visos keturios kompanijos gavo finansavimą. „Regio“ gavo finansavimą nepaisant to, kad ji stokojo IN apsaugos.

Dvi kompanijos iš keturių pasinaudojo patentinėmis teisėmis, kad padarytų įtaką žinių sritims arba rinkos užkariavimui. Dėl apsaugotos patentinės teisės „Skype“ iškilo įvairiose rinkose ir gausino patarnavimus. „Icosagen“ sugebėjo standartizuoti savo patentų apsaugos technologiją. Tai buvo ir savotiškas trukdis ir poveikio efektą turinti aspektas.

Pasirodžius ką tik „gimusiam globaliniam“ reiškiniui, kompanijos turi kaupti žinias ir patirtį. Tai yra antreprenerystės mokymosi laikotarpis, kuris skatin globalų verslą ir proveržio galimybės pripažinimą. Šis kompetencijos kaupimo laikotarpis gali atsirasti dar prieš formalųjį kompanijos įsikūrimą, taip pat ir jau veikiančiame versle.

Globalus proveržis, kuris gali būti visai siauroje srityje, yra smarkiai remiamas intelektinės nuosavybės strategijos, kuri yra sudedamoji integruotos verslo strategijos dalis. Proveržiui nereikia didelio patentų portfelio, bet jį galima sukurti ir apsaugoti augant akcijoms ir didinant produkto portfelį („Skype“). Būdamas mažos vertės grandinės savininkas, programinės įrangos kūrėjas, ir kurdamas sunkiai kopijuojamas kompetencijas, gali valdyti savo IN pasinaudodamas kopijavimo draudimo apsauga („Regio“). Tirtoms kompanijoms yra būdingas mažos aplinkos globalus proveržis. Tiktai „Asper Biotech“, atrodo, yra išimtis, tačiau nebuvo protinga išlaikyti savo pradinio produkto apimties ir verslo modelio. Kompanija pasitraukė į mažesnę sferą.

Paprastai smulkiojo ir vidutinio verslo įmonės sutelkia dėmesį į globalios nišos rinką, tačiau jos gali mesti iššūkį ir visai pramonei. Atrodo, kad šis aspektas iš dalies priklauso nuo pramonės brandumo.

„Icosagen“ yra pavyzdys, kaip verslo dėmesį nuo rutininių, didelio masto laboratorinių paslaugų nukreipti į labiau sutelktą proveržio sritį su IN apsaugos verslu. Žinių – rinkos trajektorijoje galima pastebėti pranašumą tarp įvairių sektorių kompanijų („Regio“ ir „Icosagen“), o tai daugiausia priklauso nuo rinkos sutelkto dėmesio, taip pat nuo įkūrėjo pradinės vizijos. Tolesnį procesą galima būtų pavadinti suvokta globalizacija.

Proveržiui paprastai trūksta rinkos išteklių, be to, resursų trūksta viskam. Tačiau tai neturėtų neraminti globalaus proveržio proceso („Skype“ pavyzdys). Protingas verslo modelis, IN apsauga ir nemokami pagrindiniai patarnavimai gali sukurti visiškai naują požiūrį į pramonę. Technologinės naujovės reiškia ir rinkos bei žmonių elgesio naujienas, kurios galiausiai gali teikti socialines naujoves. Ėjimas nuo atskiros produkto ar žinių srities prie „aukštos sistemos“ produktų nėra absoliuti norma. Rinka gali sukelti priešingus procesus, t. y. supaprastinti produkto ir IN apsaugą. Dėmesio sutelkimas į konkrečias technologijas ir produktą padeda smulkiojo ir vidutinio verslo įmonėms susikurti globalaus proveržio prielaidas, tačiau negarantuoja sutelktos globalios kompetencijos. Tai priklauso nuo sėkmingo produkto kūrimo, IN, partnerystės ir rinkos derinimo, o ypač nuo to, kad verslo modelis teisingai sujungtų visus šiuos veiksnius.

Raktažodžiai: *sparti internacionalizacija, tarptautinė antreprenerystė, žinių svertas, intelektinės nuosavybės teisės.*

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