

SMEs' Needs for Intellectual Property: Harry Potter's Magic or Systematic Education Support?

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Abstract

Objectives: Horizon 2020 focuses on turning scientific breakthroughs into innovative products that provide opportunities for business and also for the wider society. The rationale behind this is that "Europe's future economic growth and the employment of its citizens will depend on innovation in products, services and business models". This paper summarizes the key findings of the literature and survey results on the SMEs needs for intellectual property protection focussing on three issues: first, it reviews the drivers of the process - what SMEs need to increase their innovative activities. Secondly, we discuss preliminary research findings on the effects of the intellectual property on the European Union countries. Thirdly, the survey about SMEs educational needs and intellectual property rights took place in the early 2013 and consisted of a schematic and comprehensive analysis of the needs of SMEs across Republic of Croatia. Finally, it analyses the impacts of formal and informal ways of ideas protection on SME internationalisation.

Prior Work: SMEs needs and intellectual property processes differ considerably across sectors and countries. Firms in the same industry operate with a (mostly) similar knowledge base and have to solve similar problems in the innovation process. These intersectional differences shape innovative behaviour of firms to a considerable degree, resulting in vast differences between sectors in SMEs success and achieved innovation indicators. A second important level for the analysis of drivers is the industrial sector of the firm. The industry matters in two ways: on the one hand, there are large differences between sectors in terms of IP needs, and sectors with high shares of R&D also tend to be technologically intensive.

Approach: We approach the issue by the ECEA Leonardo de Vinci. The Transfer of Innovation 'Stimulating Learning for Ideas to Market' (SLIM) project pursues the following steps: A literature review on the relevant literature was conducted within SCOPUS data bases. Existing training materials were also gathered in the framework of the LLL Leonardo SLIM project to determine current training trends and availability and recognition of missing information through two steps survey among SMEs in the Republic of Croatia.

Results: In the first step the SMEs' educational needs and formal and informal ways of ideas' protection were identified from the literature and the sample. Micro and small business comprise more intellectual property rights and informal protection modes than medium-sized businesses. Industry sectors with the most intellectual property rights included manufacturing, services and information technology. Then the SMEs ranked the educational needs. In-house communication, technology usage and opportunity evaluation are perceived as the most important, while intellectual property evaluation, protection and transactions and national innovation systems are less relevant. This constituted vital data which was not already analysed on the needs and preferences of SMEs with regard to intellectual property training. The subsequent step showed the significant correlations of secrecy with sales and exports on one side, and patents and industrial designs with sales and exports on the other side. Finally, a regression analysis showed that the informal ways of ideas protection only positively influence sales from new products and services, while the intellectual property rights are significant positive predictors of both sales and exports indicating a measure of businesses' internationalisation.

Value: There are important organisational culture barriers with this target group, such as the emphasis on the need to publish and an unstable / unavailable IP budget. The integration of IP tools into curricula is an important step to improving the use of IP tools by future researchers. There is an indisputable case for integrating IP as an R&D output and increasing the valuation of IP for academic promotion.

Keywords: intellectual property rights, patents, secrecy, internationalisation, SME, Croatia

Is small still beautiful?

Undoubtedly, entrepreneurship has become a critical and interesting issue in the last few years. A deep recession has shaken the world once again and innovation through entrepreneurship may be a key to help economies achieve sustainable growth. Entrepreneurs and innovators, as well as creatively-driven management of private or public businesses, are fundamental vehicles of corporate development (OECD 2009, Wilson, 2012, Cable, 2010) and small business are an integral part of all market economies (Taylor, 2001). These statements can arguably be found in all national and European Union strategies as an extension of the British economist Schumacher's (1973) arguments published in a highly influential book: "Small is Beautiful". Fifty years after facing the biggest recession since 1930s and with more than 23 million small businesses in the EU heavily competing to achieve market success, we ask ourselves: Is small still beautiful?

SMEs currently represent 99.8% of European non-financial companies, and account for 57.4 % of the turnover and 58.7% of the value added (Vervenne, 2009). These small firms are able to quickly respond to customer demands and changing market needs by meeting them with up-to date technologies. Introducing new technologies and new products is a crucial condition for surviving in the global market, not just for large competitive businesses from developed countries but also for small transition countries, multinationals and small businesses. Competitive exports of new products lead to growth in global markets while consolidating domestic market positions (Rammer and Schmiele, 2008. Alegre and Chiva, 2013). Becoming a global player rests on the ability to attract competitive funding, which is evaluated by the existing export experience and protection of knowledge. Hence, businesses' intellectual property portfolio, its quantity, quality and value, become key tools in venture capital considerations (Mets, Kaarna and Kelli, 2010) and possible predictors of business success at domestic and international markets. This is especially the case in the new European Union member country such as Croatia, which faces challenges of developing entrepreneurial spirit that rest on innovative products and processes, on a national and international level.

Several studies underline the gap between the supply and demand of knowledge, both in quantity and relevance, often resulting in a deficit of business skills and competences Business skills need to be enhanced in order to develop product and process innovation, better utilization of capacity, skill development and a generally improved business performance (Morgan and Katsikeas, 1997 in Ruzzier, Hisrich, and Antoncic, 2006), especially relating to individual learning (Andersson, 2000, Ruzzier, Hisrich, and Antoncic, 2006).

This study aims to identify businesses' innovation activity, evident in their formal and informal idea protection methods, and success in domestic and international markets, and link them to their educational needs necessary to achieve sustainable domestic and international market success.

Does innovation lead to international success?

Globalisation processes for SMEs range from trade, international investment, participation in strategic alliances, partnerships and networking arrangements whereby they are included in array of functions from research and product development, to distribution (OECD, 2004). Yet a typical research on international entrepreneurship incorporates internationalisation activity of small businesses that start exporting (Keupp and Gassmann, 2009). Innovation is understood as an interactive process, which refers to the behaviour of enterprises in planning and implementing changes to their activities (Nauwelaers, Wintjes, 2002). Innovation is understood as introducing new economic activities, including both the introduction of innovation into the marketplace as well as entering as a new imitative competitor (Cohen, 2010; Koellinger, 2008), or as the successful implementation of creative ideas. Innovativeness requires a departure from existing technologies and practices and venture beyond the current state of the art (Dess, Lumpkin, 2005). By analysing technology as the driving force of internationalisation Ramos, Acedo and Gonzalez (2011) explain that technological intensity has a significant effect on the speed of internationalisation. Anderson, Harbi and Brahem (2012) identified three types of SMEs according to their innovation potential: innovators, potential innovators and passive imitators. They claim that global competition makes firms cut costs or adopt an entrepreneurial approach in innovative products, and so they stress that many businesses prefer innovation strategies to cost cutting.

Golovko and Valentini (2011) research on Spanish manufacturing firms over the period 1990–1999 founded evidence that innovation and export are complementary strategies for SMEs' growth.

Although various theoretical frameworks depict the SMEs internationalisation process, a knowledge-based view of the firm has proved to be a useful way to theoretically explain the internationalization process of SMEs (Penrose, 1959). The Upsalla model shows that internationalization is a process of increasing a business'

international involvement as a result of different types of learning (Johanson and Vahlne, 1977, 1990 in Ruzzier, Hisrich and Antoncic, 2006), while the innovation model considers innovation of each step of business' internationalisation process (Rogers, 1962, Gankema et al., 2000; Dachs and Pyka 2010, Dachs et al. 2013.) Moreover, the "outcome driven" approach in explanation of the scope, extent, patterns and performance implications of internationalisation should be represented by measures of internationalisation as well as "wealth creation from entrepreneurial action" (Keupp and Gassmann, 2009; Hudson et al. 2001). Hence, we pose a question, does innovation lead to better domestic and export performance, and do SMEs realise innovations' value for global success?

In this study, we firstly explore SMEs' perceptions of their educational needs. Secondly, the study distinguishes between formal and informal ideas protection methods, and links them to domestic and international success. These are measured respectively by the sales and exports of new products. Conclusions are made on the extent of appropriate perceived educational needs and necessities of education, regarding formal and informal ways of ideas protection.

Do barriers to internationalisation restrict innovation potential?

Innovating to achieve international success does not come without limitations. Since entrepreneurs are strategists who link possibilities from organizational strengths, capital structure (Jõeveer. 2013) and environmental opportunities (Ruzzier, Hisrich and Antoncic, 2006), industry characteristics (Degryse, et al, 2012) their wealth of ideas often face barriers in harnessing these innovations and bringing them to market. Hollenstein (2005) identifies several barriers of internationalisation and innovation for small businesses. By examining the OLI paradigm he realised the restrictions to the SMEs' knowledge base in ownership advantages. They are being founded on incremental innovations. He found that location advantages given in wages and regulatory frameworks are also important to SMEs. Morgan and Katsikeas (1997) identified four main sets of internal obstacles for exporting: strategic obstacles, operational obstacles, informational obstacles, and process-based obstacles.

Transition country, such as Republic of Croatia, is in a particularly complicated situation, with high expectations of its asymmetric innovation potentials, and strong inertial influences of its ideological, political, economic and religious factors. Economic, research and development structures which are formed in these countries do not achieve comparable benefits of their developed countries' counterparts. New networking structures are formed, which neither practically nor theoretically are studied but which shape some forms, which are characterised as particular and permanent, and not just transitional structures. The lack of the fundamental research in this arena open a space for "Stimulating Learning for Ideas to Market" (SLIM) project, which as a European funded Leonardo da Vinci Transfer of Innovation project that seeks to understand the contexts and needs of SMEs primarily in Croatia and secondarily in the United Kingdom and Poland.

However, Hutchinson, Quinn, Alexander and Doherty (2009) founded that these limitations did not prevent internationalisation, but rather repressed growth in the foreign market. This can be explained in the fact that both internal and external barriers to internationalisation involve a high risk for SMES which have fewer resources to cope with the adverse effects of expansion (Hutchinson et al. 2009).

Hutchinson et al. (2009) found that international growth for smaller specialist retailers is also dependent upon internal and external facilitating factors. Where internal facilitating factors rest on a global vision and entrepreneurial personality found in value creation from innovations and the informal relationships formed in foreign markets, external factors include business contacts in foreign markets and government/consultancy assistance and support. Moreover, knowledge intensive SMEs have the possibility to leverage existing knowledge and combine it with other domains leading to globally competitive and differentiated products and services (Mets, Kaarna, and Kelli, 2010), while the resource-poor SME is less able to sustain competitive threats and unfavourable macro-events in their external environments (Knight and Liesch, 2002). Acs, Anselin and Varga (2002, p. 1069) define three aspects of the innovative process that create value added and generate knowledge resources: R&D expenditures, an intermediate output in the number of inventions which have been patented and a direct innovative output. Additionally, by forming strong brand identities (Hutchinson et al., 2009) informal and formal ways of ideas protection signal marketing value to customers, suggest novelty of technology and potential for future earnings to investors and creditors, and attract promising personnel, enhance employee moral (Vervenne, 2009).

In order to define resource rich and poor SMEs and depict high-quality resources, our paper focuses on informal and formal ways of ideas protection which rest upon formal and informal methods of intellectual property rights protection.

Formal intellectual property protection methods

Patents have become the most common measure of innovation output. Similarly, patent claims have been used to account for the scope of patent protection (Giuri, et al. 2007). Patents also have shortcomings. They relate only to certain types of inventions, and there are vast differences across firms, industries and countries in the precision with which patents measure innovation output (Giuri, et al. 2007). Hence, aside from patents, business tends to use trademarks more often than patents, copyrights, industrial design and database rights. All of the given formal intellectual property protection methods enable exercising rights and are subject to complex procedures related to filing applications, maintaining, and litigation if the violation of applicants' rights occurs within the time period and geographic location of its enforcement. What is nature of innovation, where they come from, how various firm types and sizes, regional economic development of firm location influenced frequency of innovation are some of still existed questions.

Keupp and Gassmann (2009) identified 5 articles, which analysed intellectual property rights as measures of innovation and the source of entrepreneurial international competitive advantage.

Huges and Mina (2010) based their research on Rogers et al. results (2007a and 2007b) showed that small firms are less likely to use patents as a means of protecting their investment than other means such as confidentiality, secrecy or time to market.

Macdonald et al. (2003) investigated the ways in which small- and medium-sized enterprises (SMEs) make use of the patent system in 1996. The sample included 687 manufacturing SMEs in the United Kingdom and 218 UK SMEs that had recently been granted at least one patent. Patents, supposedly designed to disseminate information about innovations as well as to protect it, have become almost the equivalent of innovation. More than the indicator of invention, the patent is the invention.

Jaffe (1986), finds, within the USA, proofed evidence that firms' patents, profits and market value are systematically related to the "technological position" of firms' research programs and technological areas themselves are associated with variations in the productivity of R&O. The results of the Tietze et al. 2007. study indicated that firms who aggressively patent were the most successful firms in terms of sales revenues and vice versa.

CIS surveys have limited European coverage, and are mostly biased towards large companies. They showed that 50% of patents are kept for internal use, 6.4% are licenced, 3% are cross-licenced, 4% are licenced and used, 18.7% are unused and serve merely to block competitors, and the remaining 17.4% are unused (Giuri, et al. 2007). Moreover small companies tend to license, cross-license and license and use more of the patents (26% are licensed compared to 10% of large companies), while large and medium-sized companies have more unused patents that serve to block competitors or just not use them than small companies (40% of patents in large companies are unused compared to 18% of small companies) (Giuri, et al. 2007). Across examined countries about 5% of patents result in creation of new companies. The greatest percentage of new companies results in (about 9.7%) the UK and (9.3%) in Spain; while the highest monetary values generated from patents resulted in sectors of chemicals and pharmaceuticals (Giuri, et al. 2007). Hence, it is necessary to learn how to utilize intellectual property, through development of organizational capabilities, and to manage it purposefully by clever business models. This either blocks competition through protection of core technology and distraction or as leverage through facilitation of product launches to new markets, abilities to licence and gain royalties, gain access to other technologies through cross-licencing, assuring freedom to operate, increase technological image and attract convincing investors and joint venture partners (Mets, Kaarna, and Kelli, 2010). In that way, they create conditions facilitating their international success.

Informal intellectual property protection methods

Olander et al. 2009 considered protection of innovations by distinguishing between the intangibles needed in innovation activities and the actual innovation outputs, and combined these considerations to the knowledge protection/sharing dilemma. However, there exist 2 intellectual property protection options for SMEs to benefit: formal and informal methods (Vervenne, 2009.)

Only 23% of service businesses have obtained some form of IPR during the past five years, and only 8% of them have acquired a patent (Päälyssaho and Kuusisto, 2011). Hence, intellectual property rights (IPRs), such

as patents, trademarks and copyrights, are often seen as irrelevant by many of these service companies (Blind et al. 2003; Päällysaho, and Kuusisto, 2011). Formal protection methods entail legal rights through registration or contract, while informal do not. Moreover, the informal and formal methods are not mutually exclusive (Päällysaho and Kuusisto, 2011). Benefits to using informal methods are that they are not static, but the drawbacks are that they do not offer permanent solutions for protection. Many of the informal protection methods seek to protect the businesses against internal risks, such as a departure of a key employee, or unfair exploitation of new ideas by competitors, while being used to govern the collaborative relationships with employees or external partners. Informal ways to protect IP are simple, easy to control and economical to use, and to some extent, they are embedded in normal working practices within the business. The most used method was secrecy, where businesses limited part of their knowledge or sensitive information to only selected employees, customers and or external partners, . Fast innovation cycles and maintaining the lead-time over competitors were also very effective methods (Päällysaho and Kuusisto, 2011). Still, informal protection practices are extremely heterogeneous, resulting in limited awareness of them among both SMEs and the wider community (Päällysaho & Kuusisto 2008). Therefore the role of informal IP protection methods has proven to be a significant field of research (see e.g. Kitching & Blackburn 1998; Miles et al. 2000; Blind et al. 2003). Päällysaho, and Kuusisto, 2011.

Systematic educational support – is there a purpose?

The Roland Berger Research Institute explored the use of the patent system in the production industries for the European Patent Office (EPO). The results showed that there exists a shortage of information among SMEs on the patent system, leading to a resulting small number of filing of patent applications and a lack of active government support to assist SMEs in the patenting process (;Almeida, et al. 2003; Burrone and Singh Jaiya, 2004). The authors of the OECD study promulgate that efficient intellectual property management requires an array of skills from the legal to the scientific which tends to be lacking in the SMEs themselves (Burrone and Singh Jaiya, 2004, p.10). They propose integrating intellectual property rights issues into the national and institutional teaching and training curricula and course material for entrepreneurs, and engineering and management students (p.12). Activities facilitating their exploitation by SMEs can be organised into five main categories: awareness-raising and training on intellectual property, technological information services, financial assistance, customized advisory services on intellectual property and assistance for intellectual property and exploitation and technology transfer (Burrone and Singh Jaiya, 2004, p.11).

Since the given resource-based models acknowledge the importance of intangible resources such as intellectual property rights for business development and growth, their ownership and dynamic ability for organizational learning imply various strategies including intellectual property valuation and management (Montgomery and Wernerfelt, 1997; Saarenketo et al. 2004., Ruzzier, Hisrich and Antoncic, 2006).

Mets, Kaarna and Kelli (2010) examined four case studies where they found that the impact of intellectual property on globalisation serves as a barrier to internationalisation, as a blocker to competitors and to support the market and knowledge leverage. Although a patent portfolio enabled one company to increase the number of services and internationalise, they stress that patenting is costly for young businesses and that using copyrights or informal methods of protection such as trade secrets can be beneficial to SMEs. Barriers for IPR for SMEs include: lack of understanding of IPRs and application procedures; fear for disclosing innovation to industry majors; cost of patent application; patent office administrative fees; patent attorney fees; industrial property consultancy; cost of maintenance: (increasing) maintenance fees; and cost of legislation after grant, i.e. defence costs to enforce patent protection against infringers. Even worse in complex industries, defending a patent can mean betting the company for an SME (Vervenne, 2009). Due to their territorial nature and non-globally unified protections, it becomes difficult for SMEs to use them.

Methodology

The instrument for the study was developed within the framework of the European Commission's 'Lifelong Learning' education and training programme Leonardo de Vinci. The Transfer of Innovation 'Stimulating Learning for Ideas to Market' (SLIM) project's goal was to identify the needs of small and medium-sized businesses in order to enable them to bring their ideas to market more effectively. An online questionnaire survey was constructed and conducted for that purpose in Croatia, Poland and the United Kingdom. This paper presents initial findings of the Croatian sample in order to provide future comparison with the responses gathered in Poland and the United Kingdom. The survey was originally written in English and translated into

Croatian. The responses were collected between May and July 2013 through the internal database of entrepreneurs obtained by the SLIM project partners and the Croatian Chamber of Commerce. 212 responses were gathered from the Croatian enterprises, whereby 205 responses belong to the small and medium-sized businesses category. Only small and medium-sized businesses' responses were used in this study.

The first section gives an overview of the types of support, training and advice identified by small businesses. It illustrates the SMEs educational needs and gaps which could be filled by educational content. The respondents were asked to evaluate the educational needs according to a Likert scale with answers ranging from 1 (not at all important) to 7 (very important). The educational needs were: evaluating business opportunity, gaining knowledge on business management principles, leadership, marketing, human resource management, commercial and company law, tax and financial regulation, technology usage, cooperation, intellectual property methods, transactions and valuation, innovation policy, national innovation system, systematic and critical thinking and in-house communication. This section should give a subjective scale of educational needs, which is consequently questioned by the statistical examination of correlations and effects of intellectual property rights on sales from new products and services and exports.

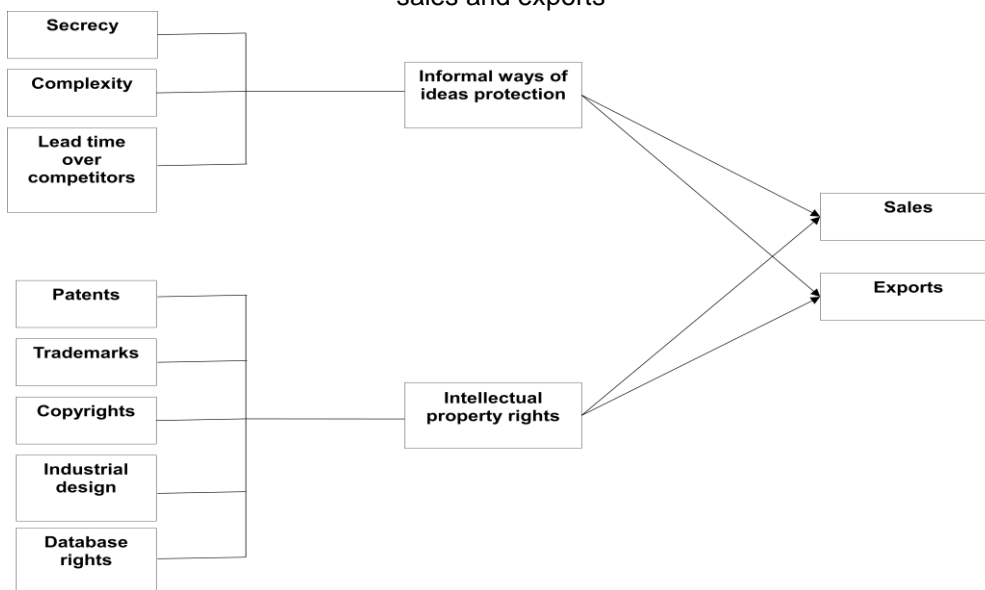
The second section deals with correlations and effects of intellectual property rights and informal ways of protecting ideas on sales from new products and services and exports. The effect of new products and services on sales portrays the effects of increased competitiveness of innovative businesses, while the effect on exports depicts its internationalisation effect.

The first proposition in this section measures the partial correlations of informal ways of ideas protection on one side and sales from new products and services and exports on the other. Since data on intellectual property rights and informal protection modes can vary between industries, especially for the high-technology sector of information technology, they were controlled for its variance. Informal ways of ideas protection included: secrecy, complexity of design and a lead-time over competitors. The respondents were asked to evaluate the importance of each informal type of protection for their business. The answers were rated on the Likert scale from 1 (not at all important) to 7 (very important). Percentage of sales from new products and services and percentage of sales from new product and services which are exports were defined in 6 categories: none, 1-10%, 11-20%, 21-50%, more than 50% and don't know.

The second proposition measured the partial correlations of intellectual property rights on one side and sales from new products and services and exports on the other, controlled for the variances between industries. Measured intellectual property rights included: patents, copyrights, trademarks, industrial design and database rights. The respondents were asked which formal actions has their business taken to protect innovation in the past 3 years. They could choose more than one answer. Both intellectual property rights and informal ways of ideas protection were tested for reliability using a Cronbach's alpha and factor analysis was performed to test whether they represent a single measure.

The third proposition analysed the affects of the intellectual property rights and informal ways of ideas protection on sales from new products and services, while the fourth proposition regressed the effects of the two predictors; intellectual property rights and informal ways of ideas protection, on exports. The ordinary least squares regression analysis was made for the third and fourth proposition. The importance of each predictor on the sales revenue and exports is made in order to provide an insight into particular effects on sales and exports. Consequently, the tested model depicts the explained and tested relationships between the variables (Graph 1).

Graph 1. Proposed model of influence of informal ways of ideas protection and intellectual property rights on sales and exports



Sample

Industries represented in the analysis are given in Table 1. The majority of the Croatian sample comprised services (24.4%), followed by manufacturing (20.5%) and information technology (11.7%). With respect to informal ways of ideas' protection, lead-time over competitors is perceived as the most important ($\mu=5.30$) and complexity as the least important. Informal methods of idea protection are rated the highest by art and communication sectors. The greatest number of intellectual property rights originates from trademarks (53) and the least from patents (17). Manufacturing, services, information technology and trade have the most trademarks. Manufacturing and information technology comprise the most copyrights and industrial design. Database rights are the most prominent in services, manufacturing and information technology sectors, while patents are mainly produced in manufacturing, services and software sectors.

Table 1. Industries

Industry	Croatia (n=205)	Percentage	Informal ways of ideas' protection			Intellectual property rights				
			Secrecy ($\mu=4.62$)	Complexity ($\mu=4.00$)	Lead-time over competitors ($\mu=5.30$)	Patents (n=17)	Trademarks (n=53)	Copyrights (n=20)	Industrial design (n=21)	Database rights (n=34)
Services	50	24.4%	4.46	4.12	5.36	3	12	2	1	14
Manufacturing	42	20.5%	4.93	3.98	5.52	9	13	5	12	6
Information technology	24	11.7%	4.92	5.13	5.83	1	9	3	3	5
Consulting	16	7.8%	4.44	3.81	5.38	0	2	1	1	1
Trade	15	7.3%	4.73	3.13	5.40	0	7	1	1	1
Entertainment/Hospitality	12	5.9%	3.75	3.75	4.00	1	0	1	0	0
Software	9	4.4%	5.11	4.11	5.00	2	3	2	0	3
Finance	7	3.4%	4.86	2.86	6.00	0	1	1	0	1
Electronics	5	2.4%	4.60	4.80	5.20	0	0	0	0	1
Energy	5	2.4%	4.80	2.60	4.40	0	1	0	0	1
Art	4	2.0%	5.75	5.00	5.75	0	1	1	0	0
Healthcare	4	2.0%	4.00	3.50	3.50	0	1	0	1	0
Nonprofit organisation	4	2.0%	2.50	1.50	3.50	1	1	2	1	0
Transport	3	1.5%	4.67	4.67	5.00	0	0	1	1	1
Construction	3	1.5%	4.33	4.33	5.67	0	1	0	0	0
Communication	2	1.0%	5.00	5.50	7.00	0	1	0	0	0

Source: Authors' calculation.

The size of businesses is represented by the number of their employees. Only small and medium sized businesses are represented in the study and were grouped in 3 categories (Table 2). 57.6% of the sample form businesses which have between 1 and 10 employees and 32.3% of the sample are represented by businesses having between 11 and 50 employees. In line with the size of the businesses in the sample, the highest portions of intellectual property rights are observed in businesses having less than 10 employees. The smallest businesses are the most representative part of the sample in their perception of informal ways of ideas' protection.

Table 2. Size of the businesses

Number of employees	Croatia (n=205) Percentage		Informal ways of ideas' protection			Intellectual property rights				
			Secrecy (μ=4.62)	Complexity (μ=4.00)	Lead-time over competitors (μ=5.30)	Patents (n=17)	Trademarks (n=53)	Copyrights (n=20)	Industrial design (n=21)	Database rights (n=34)
between 1 and 10	118	57.6%	4.61	4.08	5.42	7	29	11	9	12
between 11 and 50	66	32.2%	4.83	3.89	5.27	6	16	5	8	18
between 51 and 250	21	10.2%	4.05	3.95	4.71	4	8	4	4	4

Source: Authors' calculation.

Although due to their size, it would have been expected that many businesses are located in business incubators and science parks, only 4 businesses are located in the science park and 5 in business incubators (Table 3). Intellectual property rights and informal ways of ideas' protection follow the given pattern, as the majority of patents, trademarks, copyrights and industrial designs are not developed in any given special locations which foster entrepreneurial growth.

Table 3. Location of the business

Location	Croatia (n=205) Percentage		Informal ways of ideas' protection			Intellectual property rights			
			Secrecy (μ=4.62)	Complexity (μ=4.00)	Lead-time over competitors (μ=5.30)	Patents (n=17)	Trademarks (n=53)	Copyrights (n=20)	Industrial design (n=21)
None of these	186	90.1%	4.66	3.99	5.35	16	50	19	17
A science park	4	1.9%	4.50	4.25	4.75	0	0	0	1
A business incubator	5	2.4%	5.20	5.00	5.20	0	1	0	2
A designated government area for business development	10	4.9%	4.20	4.20	5.00	1	2	1	1

Source: Authors' calculation.

Most businesses in the sample are older than 10 years (56.1%) and only 10.2% of businesses are younger than 2 years (Table 4). The location of businesses outside of the science parks and business incubators is explained by this notion, as only young business are eligible to enter science parks and business incubators. Furthermore, businesses older than 10 year have the majority of patents (8), trademarks (35), copyrights (12), industrial designs (9) and database rights (21). They are also the most representative in the informal ways of ideas' protection: secrecy (μ=4.39), complexity (μ=3.88) and lead-time over competitors (μ=5.15),

Table 4. Age of the businesses

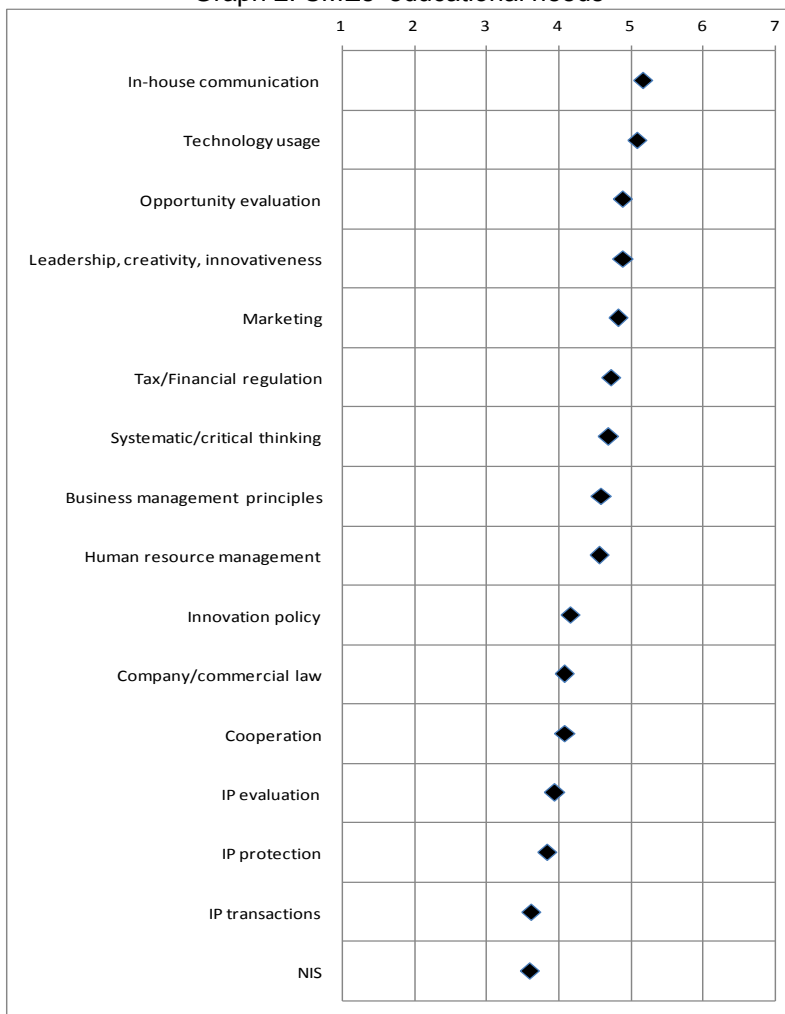
Age	Croatia (n=205) Percentage		Informal ways of ideas' protection			Intellectual property rights				
			Secrecy (μ=4.62)	Complexity (μ=4.00)	Lead-time over competitors (μ=5.30)	Patents (n=17)	Trademarks (n=53)	Copyrights (n=20)	Industrial design (n=21)	Database rights (n=34)
Less than a year	13	6.3%	5.15	4.69	5.31	1	4	1	2	0
Between 1 and 2 years	8	3.9%	4.25	3.38	4.38	1	1	1	2	1
Between 2 and 5 years	32	15.6%	5.09	4.38	5.72	4	6	3	3	6
Between 5 and 10 years	37	18.0%	4.84	3.97	5.62	3	7	3	5	6
More than 10 years	115	56.1%	4.39	3.88	5.15	8	35	12	9	21

Source: Authors' calculation.

SMEs' educational needs

Firstly, the SMEs' educational needs were examined. SMEs perceive in-house communication ($\mu=5.2$) as the most important, followed by technology usage ($\mu=5.1$), opportunity evaluation ($\mu=4.9$) and leadership, creativity and innovativeness ($\mu=4.9$). It can be noted that intellectual property evaluation ($\mu=3.9$), protection ($\mu=3.8$) and transactions ($\mu=3.6$) are among the lowest perceived educational needs (Graph 2). The low perception of intellectual property evaluation, protection and transactions as well as the importance of national innovation systems (NIS) and cooperation is questionable from the perspective of generation of profits resulting from the positive effects of employees carrying out those activities. Therefore, the propositions concerning the correlations and effects of intellectual property rights are examined in the subsequent sections.

Graph 2. SMEs' educational needs



Source: Authors' calculation.

Proposition 1. Informal ways of ideas' protection are positively correlated with sales from new products and services and exports

The correlation of informal ways of protecting ideas with sales revenue from new products and services and exports shows that secrecy is positively correlated with sales, while secrecy and complexity of design both are positively correlated with exports given a 5% level of significance (Table 5). The three types of informal idea protection exhibit the Cronbach's alpha of 0.72, where only one factor is extracted through the factor analysis. Hence, the three variables represent a valid measure of informal ideas protection. The informal ways of idea protection are positively correlated with the sales revenue from new products and services on 10% level of significance, and with exports on 5% level of significance.

Table 5. Correlations between informal ways of protecting ideas and sales and exports

	Effect on sales		Effect on export	
	Correlation coefficient	P-value*	Correlation coefficient	P-value*
Secrecy	0.14	0.04	0.15	0.04
Complexity of design	0.09	0.19	0.14	0.05
Lead time over competitors	0.09	0.22	0.05	0.50
Informal ways of ideas' protection	0.13	0.06	0.14	0.05

*Partial correlation. Controlled for industry.

Source: Authors' calculation.

Proposition 2. Intellectual property rights are positively correlated with sales from new products and services and exports

The partial correlations of intellectual property rights with sales and exports are controlled for industry differences (Table 6). Patents and industrial design have a significant positive effect on the sales revenue from the new products and services. Patents and industrial design are positively correlated with sales and patents, trademarks and industrial design are positively correlated with exports on 5% level of significance. The Cronbach's alpha test of reliability omitted the database rights and then portrayed the value of 0.5. The value is low but given the Kaiser-Meyer-Olkin test of 0.59 and Bartlett's test of sphericity (p -value is 0.00)¹, the factor analysis can be done. The factor analysis extracted only one component from the four variables: patents, trademarks, copyrights and industrial design. The component is positively correlated with sales and exports on 1% level of significance.

Table 6. Correlations between intellectual property rights and sales and exports

	Effect on sales		Effect on exports	
	Correlation coefficient	P-value*	Correlation coefficient	P-value*
Patent	0.21	0.00	0.35	0.00
Trademark	0.02	0.79	0.14	0.05
Copyright	0.05	0.50	0.10	0.15
Industrial design	0.18	0.01	0.2	0.00
Database rights	0.03	0.97	0.08	0.26
Patent, Trademark, Copyrights, Industrial design	0.17	0.01	0.31	0.00

*Partial correlation. Controlled for industry and country variances.

Source: Authors' calculation.

Proposition 3 and 4. Intellectual property rights and informal idea protection methods affect sales from new products and services and exports

Ordinary least squares regression analysis tested the dependence of sales from new products and services and exports with two predictors: informal ways of ideas' protection and intellectual property rights (patents, trademark, copyright, industrial design). The data were checked for multicollinearity, heteroskedasticity and autocorrelation. Both predictors portray a significant effect on sales revenues on the 10% level of significance, only intellectual property rights give a good indication of exports on 1% level of significance.

¹ <http://bold-ed.com/factor.pdf>

Table 7. Effect of different ways of idea protection on sales and exports

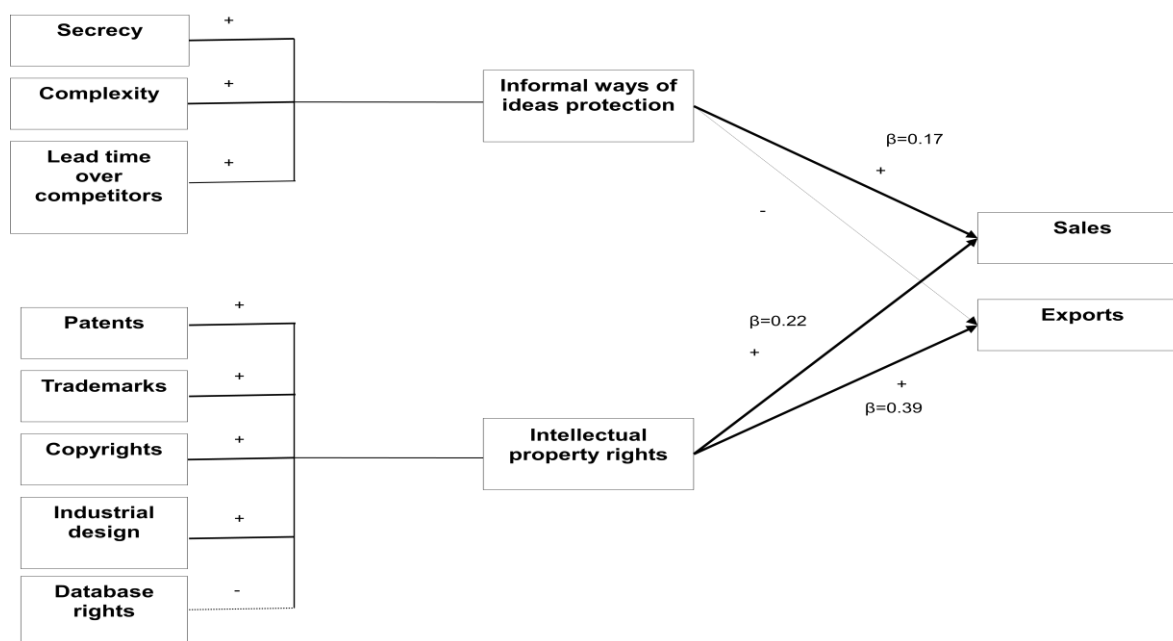
	Croatia (n=205)					
	Effect on sales			Effect on exports		
	Unstandardised coefficient	Standard error	P-value*	Unstandardised coefficient	Standard error	P-value*
Intercept	1.59	0.10	0.00	0.94	0.09	0.00
Informal ways of ideas' protection	0.17	0.10	0.10	0.11	0.09	0.20
Intellectual property rights	0.22	0.10	0.03	0.39	0.09	0.00
			0.01			0.00

* Ordinary Least Squares.

Source: Authors' calculation.

Hence, the following graphical presentations illustrates the connection between variables included in the model and depicts the importance of intellectual property rights as the most significant predictor on sales from new products and services and exports portraying a degree of business internationalisation (Graph 3).

Graph 3. The effect of informal ways of ideas' protection and IPRs on sales and exports



Source: Authors' calculation.

And the following equation models the influence of given predictors on sales from new products or services:

$$\text{Sales} = 1.59 + 0.17 \times \text{Informal protection} + 0.22 \times \text{IPR}$$

and exports as percentage of sales of new products and services:

$$\text{Exports} = 0.94 + 0.39 \times \text{IPR}$$

Conclusion

The purpose of the study was to aid higher education institutions to develop an online course to help small businesses commercialise their ideas and enhance their R&D. A goal of such course is to increase their aims to accomplish production of products and services of higher added value jointly with intellectual property rights. Given that the majority of the businesses in the sample are older than 10 years, it is supposed that the entrepreneurs are acquainted with the procedures of intellectual property valuation, protection and transaction.

Although the limitation of the study was the lack of young businesses, intellectual property rights proved to be a good predictor of internationalisation measured by percentage of exports in total sales of new products and services. The four intellectual property right variables were jointly positively correlated with both sales and exports. Particularly patents and industrial designs have the highest significant and positive correlation with sales and exports, while trademarks are positively correlated with exports. Regarding informal idea protection, positive correlations portrayed the effects of secrecy, complexity of design and lead time over competitors, whereby only secrecy had a significant effect on sales of new products and services and secrecy and complexity of design on exports. Jointly the three variables are positively significantly correlated with both sales and exports. The informal ways of idea protection, however, does not exhibit a significant effect on exports, while formal modes given in intellectual property rights do.

Greater competitiveness in the international market, from quality products at competitive prices, provides a good explanation for this phenomenon. Businesses need to be inventive and have a clear vision of progress in order to achieve the success in the international arena. Hence, they do not neglect formal procedures that are recognized in the global market to raise the value of their business and in that way become more attractive to international investors. By increasing international property rights it is aimed to increase the growth of production and services of higher added value.

Additionally, some businesses stressed the importance of informal ways of protecting their innovative ideas such as knowledge, experience and a clear vision which are not easy to protect or copy, while others compile their competitive advantage from specific industrial processes connected to a market niches. Contrary to this notion, some businesses benefit from the open access to all information and strengthen their position by increasingly cooperating and sharing resources.

This research has shed light on identification of innovation activities of small and medium-sized businesses in Croatia with focus on area of creativity and innovation they have developed with a lot of passion. It inspires us to see entrepreneurs who sometimes struggle with their projects latch on to some of the ideas, concepts and different ways of expressing thoughts that come from injecting some magic in education given by university. Education in the field of intellectual property, knowledge how to evaluate risk and opportunity, and how to use IP successfully in firms is essential step for Croatian firms in innovative endeavour.

Drahoš, 2002, Hemmert, 2004, Hobday et al. 2012; argued that while intellectual property protection can play a useful role in stimulating investment in innovation, the current system does not adequately balance this with the broader public interest in allowing the maximum number of people to use and benefit from new knowledge. In addition, promotion activities on IP have generally proved to be more effective when included in other activities seeking to meet some of the most immediate needs of SMEs, such as marketing, new product development, exporting, financing, etc. In other words, for IP to be included in the business strategy of enterprises it must also be integrated into the overall framework of business support services of those seeking to promote it. In many countries, government and non-government institutions responsible for supporting the growth of entrepreneurship and development of SMEs have begun to include intellectual property related services within their programs of support for SMEs. This is especially evident in export-promotion programmes, among others (Burrone and Singh Jaiya, 2004).

Based on theoretical and practical analysis, preliminary model was developed with aim to increase understanding of some aspects of innovative attributes in SMEs. In this research we confirmed and concluded that on one side innovation is important in small firms with innovative culture and goal to achieve new product development and continuous process improvements, sustainable development and culture of change in market search and organizational culture. On the other side results of research in this paper proved and demonstrated relations of some innovative aspects with age, size and economic regional development of firms' position. Product flexibility and personal interaction with foreign customers are additionally important strategic factors for SMEs' technological innovation in foreign markets (Nordman and Tolstoy 2011).

A continued effort is required to increase IP awareness amongst SMEs which are the source of new business growth. This needs to be combined at the same time with action to ensure that financial pressures on larger companies do not result in a decline in IP awareness for lack of expenditure on IP awareness training and IP management within companies. Attention to cost effective means of promoting and disseminating IP related advice is therefore essential (Pitkethly, 2010) which was recognised by new EU regime which "cut the cost of an EU patent by up to 80%, making it more competitive vis-a-vis the US and Japan. In December 2012 the European Parliament cut costs for small firms and tailored the regime to their needs, in a compromise deal with the Council. MEPs approved the so-called "EU patent package" (unitary patent, language regime and unified patent court). The international agreement creating a unified patent court will enter into force on 1 January 2014 (EC. Europa.11th Dec. 2012).

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