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INTANGIBLE CAPITAL INVESTMENT AND CORPORATE PRESENCE IN GLOBAL VALUE CHAINS IN SLOVENIA

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Abstract

Firm inclusion into global value chains is apart from the immediate effect on the demand important also in the long run due to other effects, such as opening up of new markets, technology and knowledge transfer etc. Innovations at large (product and process innovations, organizational, market and marketing innovations), knowledge accumulation, as well as strengthening of corporate capabilities and competencies, represent a major part of investment into intangible or knowledge-based capital. The latter can enhance productivity growth by as much as a third. This paper studies the position of Slovenian companies, based on the Business Environment and Enterprise Performance Survey database by the EBRD (panels IV and V) to assess the differences in the accumulation of intangible capital between the companies that are active in global markets and those that are not. The results show that the observed differences are most pronounced in computerized information component of intangible capital, while differences in innovative property and investment into strengthening economic competencies are not as large. These results partially reflect the recent economic crisis as well as the impact of the service sectors.

Keywords: *intangible capital, knowledge-based capital, export-led growth, global value chains*

1. INTRODUCTION

Economic growth and development has largely relied on the export-led paradigm at least since the second World War. A number of successful catch-up economies, such as Japan, Korea, Singapore, Hong Kong, as well as more recent European examples (Czech R., Slovakia, Estonia and other) speak in favour of the supremacy of the export-led over import-substitution paradigm. For example, Palley (2011) mentions that there are three groups of arguments that support the export-led paradigm. The first relies on HOS theorem, comparative advantages stream in the literature. The second, the political-economy argument, speaks in favour of domestic competition development, and controlling for domestic-rent seeking. The last segment concerns the most discussed benefits, which refer to promotion of production, technology and knowledge transfer, diffusion, productivity, employment and income growth. Stiglitz and Greenwald (2014),

in their analysis of industrial policy and successful examples of national development plans similarly speak in favour of export promotion policies and support the thesis that exposure to foreign markets stimulates technological development, knowledge transfer and has beneficial trickle-down effects.

Participation in exports or trade often implies that companies are taking part in global value chains. Global value chains (GVCs) represent the contemporary structure of world production, where firms source parts, components and services globally and also sell their products worldwide so that today, most goods are "made in the world" instead of a particular country (WB, 2017). Today's production processes are most often coordinated by transnational corporations (TNCs) with broad networks of affiliates, different business partners and suppliers (UNCTAD, 2013). According to the UNCTAD 2013 World Investment report, the benefits of corporate participation in global value chains contributes to increasing domestic value added, participation of domestic firms in global economy, helps create more and better jobs, contributes to income growth, stimulates industrial restructuring, technological and knowledge transfer and technological development and has other positive impacts on economic development.

From the perspective of emerging economies, GVCs are primarily interesting due to their possible impact on technology and knowledge transfer. Today, innovation represents one of the pillars of growth in developed as well as developing countries. Similarly, this is true also for human capital, knowledge, in particular specific skills, as well as the benefits arising from the ability to process and interpret different information and use them to corporate benefit. In the literature, these elements are merged under the term "intangible capital" (IC), which was defined first by Corrado et al. (2005, later published in 2009). Later, the OECD terminology labelled the intangible capital as knowledge-based capital (KBC) (e.g. OECD, 2013). IC or KBC comprises (1) computerized information (computer software, computerized databases), (2) innovative property (science and engineering R&D, mineral exploration, copyrights and licenses, other product development, design, etc.), (3) economic competencies (brand equity, firm-specific human capital, organizational structure). In a recent paper prepared for the European Commission, Thum-Thysen et al. estimate that in the period 1995- 2013, in eight out of 14 EU countries in the sample, intangible assets contribute already more to productivity growth than tangible capital (Thum-Thysen et al., 2017, p 17). Moreover, findings by Chen et al. (2017) underscore the importance of intangible assets in generating value in global value chain production: the income share for all products[1] (manufactured and sold worldwide from 2000 to 2014) accruing to intangibles averaged more than 30 percent throughout this period, almost double the share for tangibles.

Empirical research confirmed that intangible capital positively impacts productivity and growth at macro and micro level (Corrado et al., 2005, 2009, 2012, VanArk et al., 2009, Miyagawa et al., 2010, Prašnikar, ed., 2010, Prašnikar et al., 2012, Prašnikar and Knežević Cvelbar, 2012, Prašnikar et al., 2016 for Balkan, Thum-Thysen et al., 2017 for EU-15).

As the evidence suggests, intangible capital is important for both the developed as well as developing countries. According to OECD (2013) and UNCTAD (2013) the participation in GVCs can stimulate firms upgrading, productivity, technological development, skills strengthening and has other benefits. But the literature admits that the benefits are not automatic but are also related to existing capabilities (related also to intangible capital) in firms. An improved position in GVCs, which implies more benefits for the domestic economy, is linked to the ability of the firm for product and process upgrading, the two being directly linked to innovative capital as part of intangibles. The next option is functional upgrading, which is primarily linked to firms' capabilities, R&D, as well as marketing, etc., allowing them to become a more important/notable part of the GVCs. Finally, chain upgrading, which is linked to participating in other, or shifting locus to other activities, is again related primarily to intangible capital in firms. In sum, intangible capital

[1] Chen et al. (2017) assembled macroeconomic data on value-added shares in 19 manufacturing product groups spanning 43 economies plus one rest-of-the-world region, which together captured around one-quarter of global output.

represents a strategic resource and a source of potential superior capabilities relative to rival firms (OECD, 2013, p. 229). On the other hand, the existing knowledge-based capital also represents the absorption ability of the firm, implying that firms, which are higher in value chains, also have a stronger potential for further improvement.

The purpose of this paper is to investigate the characteristics of intangible capital in Slovenia, conditional of firms' position in global value chains. To do so, we rely on the EBRD and World Bank joint project Business Environment and Enterprise Performance Survey data set. The survey data allows us to investigate the following: (1) what are the general characteristics of investment in intangible capital in Slovenian companies, (2) do the exporting companies invest more intensely into different components of intangible capital, and (3) is there a systematic relationship between intangible capital and intensity of the inclusion into global trade flows.

This paper makes several original contributions to the literature: (1) it is the first paper that investigates the link between global value chains and intangible capital in accordance with the prevailing Corrado et al. (2005) and OECD (2012) definition and shows that the difference are in many aspects not pronounced, which is a result that indicates that the domestic-based sectors are catching up, (2) it is the first paper that investigates the link between global value chains and intangible capital in Slovenia, (4) it shows that not all components of intangible capital are equally linked to GVCs position, (5) it shows that in Slovenia significant differences exist among firms, including in intangible capital. As such the paper contributes to the debates that link the productivity studies, trade, innovation and open innovation and management literature (primarily resource-based view of the firm). It stresses the importance of the intangible capital for firm performance. Consequently, it stresses that the inclusion of firms into global value chains can stimulate learning, innovation, technological restructuring and in the end run – firm performance, but that the link is not automatic.

The paper comprises 5 chapters. Following this introduction, first, the theoretical background provides the linkages between exporting and presence in GVC and intangible capital accumulation with special focus also on the specific impact of GVC and exporting on IC's components. Hypotheses are developed. This is followed by presentation of methodology and data. The results are presented in the fourth section. Last, discussion and conclusion with challenges for future work are provided.

2. LITERATURE REVIEW

Continuous economic progress in developed economies, such as the US, Japan and EU15, as well as efficient catch-up process in upper-middle-income countries, such as Slovenia, largely depends on knowledge-based growth. According to OECD (2013) for example, especially the innovation has become central, not just for developed, but also for the catch-up economies, where it is particularly important that companies realize that innovation is not just high-tech, but that it is important also to implement other types of innovation in order to develop and sustain learning capabilities. The innovation largely depends on learning and absorption capacities of firms, where human capital, competencies and capabilities matter most. These are also part of firms' knowledge capital.

2.1 Intangible and Knowledge-based capital

Intangible capital (IC) or knowledge based capital (KBC) is built by investments that are neither solid nor "physical", such as machinery, buildings (Baldwin et al., 2012). OECD (2013) defined knowledge-based capital as (1) computerized information (software and databases), (2) innovative property (design, patents, copyrights, design, trademarks) and (3) economic competencies (including brand-equity, firm specific human capital, networks of people and institutions, and organizational know-how) which overall increase firm performance. The OECD (2013) definition of knowledge-based capital is completely aligned with the Corrado et al. (2005) definition of intangible capital.

Despite the intangible nature of knowledge-based capital, the investments into the different components of intangible capital represent a significant share of total investment and in some countries

are comparable in size to the tangible investments. For example, Baldwin et al. (2009) reports that in Canada the intangible investment reached 66% of the value invested into tangible investment. According to Corrado et al. (2012) and VanArk et al. (2009) intangible investments in the US and Europe range between 5 and 13% GDP, with the highest in UK, US and Japan. The structure of intangible investments differs between countries, but in general, informational capital investments are lowest, while often innovative capital investments prevail, but especially in the UK, they are comparable to investments into economic competencies. But importantly, as the OECD (2013) notices, in the past decade or since mid-1990s on, primarily the investments into other, non-innovation-related categories. According to INTAN-Invest (2017), the shares of investments into economic competencies (as % GDP) in most sample EU countries significantly surpass those into innovative property (the figures are 3.2% vs 2.6% GDP for EU14 and 3.1% vs 2.2% for the four new member states included in the sample), while computer software plays a minor role (1.3% in EU14 and 11% in the four new member states). The notable exceptions are the Scandinavian countries, Germany and Ireland, where innovative property is the main intangible component (as a result of the high propensity for investing in R&D). In contrast, in the US, the roles of innovative property and economic competencies as the main drivers of intangible capital accumulation are very similar (3.5% and 3.7%, respectively).

2.2 Intangible investment and performance

Intangible investments are important because they significantly contribute to productivity growth. Corrado et al. (2009) results suggest that intangible capital contributes from 25% to 30% to overall productivity growth, similarly is found also by Baldwin et al. (2012) who show that in the period between 1976 and 2000 intangible capital contributed between 0.2 and 0.3 percentage points to overall productivity growth. In 2012 study of the growth characteristics across Europe and the US, Corrado et al. (2012) find that intangible capital in the 14 investigated countries (selection of the EU and US) on average contributed 19.9% to overall productivity growth, significantly less than multifactor productivity growth (42%) or tangibles growth (27%). But on the other hand in the US in the period between 1996 and 2007 intangibles contributed 33.7% to total productivity growth. And there are also significant differences between the analysed EU countries.

In the less developed EU countries (Czech, Slovenia) (Table 1) the share of the labour productivity growth "caused" by intangible capital deepening is lowest, in Slovenia even below 10%. The contribution was highest in Denmark, Italy, Spain, where it reached over 30%. Partially, this results from the structure of the economy (services vs. manufacturing) as well as the restructuring of the whole economies towards a more knowledge-based economy.

2.3 Exporting, global value chains and intangible capital

IC comprises three main components - informational capital, innovative property and economic competencies. The literature shows that all three can benefit from exposure to foreign influences, increased competition and knowledge transfer. Regarding informational capital, at the moment there is no direct theoretical linkage between software and databases and export, but the literature does show that export is related to internal firm factors, informational aspects among others (for example Radojevic et al., 2014, Katsikeas and Morgan, 1994). Firms, which are more involved in international flows, usually have better access to information, which are often perceived as an important obstacle to exporting, which is particularly important for SMEs as well as companies at large, especially when considering penetrating foreign markets for the first time (OECD, 2009, UNIDO, 2006). Research in open, export-led economies of Slovenia, BiH and Albania also confirmed that it is important to have the "relational capital", which is an extension to the standard definition of intangible capital and involves information and knowledge as well as networking and established relations (it would be placed somewhere between information capital and economic competencies) (Prašnikar, ed., 2010, Prašnikar et al., eds., 2012, Prašnikar and Knežević Cvelbar, 2012). Bridgman (2013) links information about and size of

Table 1. Contributions to the growth of output per hour, 1995 to 2007, in %

	Labour productivity growth	Total capital deepening	Tangible	Intangible	Labour	MFP	Share of intangible in %
Austria	2.4	0.8	0.3	0.5	0.2	1.4	20.83
Belgium	1.8	0.7	0.2	0.5	0.1	0.9	27.78
Czech	4.2	2.4	1.9	0.5	0.3	1.5	11.90
Denmark	1.4	1.2	0.7	0.5	0.2	-0.1	35.71
Finland	3.8	0.9	0.2	0.7	0.2	2.6	18.42
France	1.9	1	0.4	0.6	0.4	0.4	31.58
Germany	1.7	1	0.7	0.3	0	0.7	17.65
Ireland	3.8	1.4	0.8	0.6	0.1	2.2	15.79
Italy	0.6	0.7	0.5	0.2	0.2	-0.4	33.33
Netherlands	2.3	0.9	0.4	0.5	0.4	1	21.74
Slovenia	5.3	1.7	1.2	0.5	0.7	2.8	9.43
Spain	0.8	1	0.7	0.3	0.5	-0.6	37.50
Sweden	3.7	1.9	1.1	0.8	0.3	1.4	21.62
UK	2.9	1.5	0.8	0.7	0.4	1.1	24.14
US	2.7	1.7	0.8	0.9	0.2	0.8	33.33

Source: Corrado et al., 2012, p. 35.

markets to the choice of export mode and therefore confirms the linkage existence. And primarily, the basic exporting literature stresses the importance of information and success in exports, where of course backward loop is also present (US Department of Commerce, 2009).

Innovative property components and exports are closely related, which has been well documented by the literature. First of all, export exposes companies to wider markets and more competition (Stevens et al., 2015, Melitz and Ottawiano, 2007, European Commission, 2016). Steinwender (2015) links technical change to trade, clearly relating productivity growth and competition, where trade stimulates innovation, R&D, patenting as well as eases access to technologies and their transfer. Similarly is argued also by Dahlman (2007), who stresses the access to knowledge, its transfer, adaptation and growth and own development based on the transfer. This argument is also in line with the open innovation strand of literature (Chesbrough, 2003, Chesbrough et al., 2013, Chesbrough and Brunswicker, 2006), which focuses on inward and outward flows that stimulate innovation. Export-stimulated and competition-stimulated activities are primarily positive, since they are an inward flow of knowledge, which can positively impact firm level innovation. These arguments are also in line with the Stiglitz and Greenwald (2014) perspective of industrial policy and the role of export-promotion policies as well as a number of documented examples. In general, a number of positive linkages between (open) innovation and exporting have been identified. Lopez-Bazo and Motellon (2013) confirm the linkage for Spain, but also show that despite the linkage, also other factors, such as regionally specific factor matter in determining the strength of the linkage. Seker (2011) stresses that any involvement in trade, not just exports, is important as it stimulates learning and innovation and firm performance while Damijan and Kostevc (2015) find a positive link between exporting and innovation in Slovenian

firms while recently, Aghion et al. (2018) show in a model of innovation with heterogeneous firms that a positive export shock should raise innovation more for more productive firms.

Economic competencies comprise brand equity, firm specific human capital and organizational characteristics. Export has been positively linked to all three, either directly, indirectly, causality running from exports to economic competencies, vice versa or the link is endogenous. Following the resource-based view, branding represents an important advantage in exports (Anholt, 2005, Spyropoulou et al., 2011) and therefore represents an important consideration for firms and even countries (WTO, 2000, IES, 2013). Human capital represents an important channel of absorption as well as means of exporting. First of all, the lack of suitable human capital is perceived as an important obstacle to trade (EC, 2015, OECD, 2009), but it is on the other hand an important channel of transferring benefits (Forbes and Wield, 2000, Prašnikar et al., 2017, Ito and Tanaka, 2013, Minin et al., 2016). According to the resource-based view, learning, which is stimulated through exposure to foreign knowledge, technologies, organizational solutions will be transferred more easily, adapted and used to strengthen own competencies and capabilities.

3. METHODOLOGY

3.1 Sample and data analysis

The sample comprised 451 firms. On average, these firms had quite a long tradition, those in the BEEPS IV round were established on average in 1985, while those from BEEPS V in 1992. In total, small firms (5-20 employees) represented 50% of the sample, medium around 29%, while large firms (with 100 or more employees) represented around 20%. The majority of the large firms were in private domestic ownership (88% in 2009 and 93% in 2012), while foreign ownership represented in 2009 7%, in 2012 4% of ownership structure on average.

The companies in both years were predominantly from the manufacturing sector (in total a third of companies), primarily plastic and rubber, metal, machinery and equipment, non-metallic mineral, automotive and electronics. Retail in total represented 29%, transport 4.5%, and construction 13% of the sampled firms. In general, the companies are largely dependent on their key product, which represented in both years above 70% of sales, between 72 and 74%. In manufacturing the number of competitors the companies face with regards to their main product was 8.5, while in trade on average a company faced 11.5 competitors and in services 9.9. The competition was strongest in construction, where the firms reported on average facing 16 competitors.

In BEEPS IV round the companies on average, directly or indirectly exported around 24 % of products, while in round V the importance of the domestic sales in the grew, the export share in total sales was 16%. The exporters have on average a long experience in exporting, around 12-16 years on average.

From the perspective of this research it is important also to understand the basic differences between services and manufacturing. The sample was divided into several industrial groups: manufacturing, services, construction, retail and wholesale trade, tourism, transport and IT. Manufacturing is the most export oriented, in the 2009 round (IV), a manufacturing firm exported around 45% of product on average (directly just below 40%). By 2012 (round V) the share declined to about a third, but is still significantly larger. Besides manufacturing, transport is also very export oriented, exporting directly or indirectly similarly as manufacturing. Interestingly, during the crisis transport became more export oriented, the share of export increased from a third to 45%. Other industries are significantly less export oriented, the share being below 10%.

3.2 Operationalization and measure validation

Following the theoretical discussions and the findings of other authors, there is indication that the presence of companies in global value chains and in trade would be stimulative to their innovation and learning. Of course, the relationship is also sector-specific, as well as dependent on specific time period and sample. Our research will be guided by the following research questions:

Table 2. Descriptive statistics

		BEEPS round	
Industry	**Variable**	**BEEPS IV**	**BEEPS V**
Manufacturing	% of sales related to most important product	67.35	77.02
	National sales (% of total)	55.78	66.02
	Indirect exports (% of total sales)	5.52	4.32
	Direct exports (% of total sales)	38.70	29.66
Construction	% of sales related to most important product	85.57	69.76
	National sales (% of total)	93.05	90.38
	Indirect exports (% of total sales)	0.05	0.94
	Direct exports (% of total sales)	6.90	8.69
Other services	% of sales related to most important product	76.88	94.75
	National sales (% of total)	97.88	94.13
	Indirect exports (% of total sales)	1.38	0.00
	Direct exports (% of total sales)	0.75	5.88
Trade	% of sales related to most important product	73.63	64.06
	National sales (% of total)	90.41	94.41
	Indirect exports (% of total sales)	2.31	0.04
	Direct exports (% of total sales)	7.28	5.56
Tourism	% of sales related to most important product	82.08	75.55
	National sales (% of total)	79.69	100.00
	Indirect exports (% of total sales)	11.62	0.00
	Direct exports (% of total sales)	8.69	0.00
Transport	% of sales related to most important product	85.12	85.31
	National sales (% of total)	71.94	54.23
	Indirect exports (% of total sales)	3.12	0.77
	Direct exports (% of total sales)	24.94	45.00
IT	% of sales related to most important product	71.67	100.00
	National sales (% of total)	90.00	70.00
	Indirect exports (% of total sales)		
	Direct exports (% of total sales)	10.00	30.00

Data: BEEPS IV, V.

1. What are the characteristics of firms that trade?
   a. What is the structure of the Slovenian economy with regards to the intensity of trade?
   b. What is the sectoral structure of trade and what are the target markets?
   c. Do companies that are B2B or B2C prevail in trade?
2. What is the relationship between the involvement in trade and the intangible capital?
   a. Informational capital
   b. Innovative capital
   c. Economic competencies

Our study relies on the Business environment and enterprise performance survey (BEEPS) , which has been conducted by the EBRD and the World Bank since 2002 (repeated in 2005, 2008, 2012 and 2015). The aim of the study was to analyse the impact of business environment on firm performance. BEEPS is a firm-level survey, in which the managers are asked to evaluate different aspects of business environment (access to finance, labour market, regulation, infrastructure, corruption, crime and other) and answer questions from different aspects of firm performance (human capital, trade, innovation, etc.).

In 2008, the survey methodology changed. The samples from different countries comprise primarily manufacturing (excluding extraction), retail and another group, which covers different services (wholesale, hotels, restaurants, transport, storage, communications, IT). Firms in the survey must have at least 5 employees.

This paper will rely on the panel dataset that originally covers firms in 2008 and 2012, which in total incorporates over 25 thousand companies from transition countries. The focus of our research is Slovenia where the dataset comprises 451 firms, 271 from round IV and 175 from round V of the survey.

According to the Corrado et al. (2009) definition of intangibles, intangibles comprise the following: (1) computerized information, (2) innovative capital and (3) economic competencies. In detail, the definition of each of the intangibles components comprises the following (Corrado et al., 2006):

1. Computerized information
   - Computer software
   - Computerized databases
2. Innovative property
   - Science and engineering R&D (costs of new products and new production processes, usually leading to a patent or license)
   - Mineral exploration (spending for the acquisition of new reserves)
   - Copyright and license costs (spending for the development of entertainment and artistic originals, usually leading to a copyright or license)
   - Other product development, design, and research expenses (not necessarily leading to a patent or copyright)
3. Economic competencies
   - Brand equity (advertising expenditures and market research for the development of brands and trademarks)
   - Firm-specific human capital (costs of developing workforce skills, i.e., on-the-job training and tuition payments for job-related education)
   - Organizational structure (costs of organizational change and development; company formation expenses)

4. RESULTS

Tables 3-5 and 6 summarize the construction of variables based on the EBRD BEEPS data that follows the definition of intangibles.

Computerized information. The data on the use of informational capital in the data was assessed based on the use of the computers and the availability and mode of use of internet (Table 3).

In the BEEPS countries, 76% of firms reported to have high speed internet, in Slovenia over 95%. In BEEPS countries, 88% of companies use email to communicate with clients, in Slovenia over 98%, on average 69% use internet to purchase (interestingly in Slovenia 65%), 63% delivered services (in Slovenia 70%) and 65% used internet to develop ideas and do research (in Slovenia only 56%). But in Slovenia, 61% of workers were reported to use computer regularly, which was the highest in the sample.

In Slovenia, there are some difference in the use or intensity of use of internet and computers between exporters and non-exporters. But the internet is used primarily in communication and less in delivering services. In these two aspects, the exporters slightly dominate. But if firms are grouped into 3 groups, then the direct exporters use IT less than the other two groups. This might be explained by the fact that in exports, manufacturing firms dominate more, while in non-exporting services are stronger.

Innovation activity. Slovenian companies are in general innovation intense. Based on the BEEPS data, several aspects were investigated (Table 4). In general, transition countries report that they introduced 7.2 significantly improved or new products or

Table 3. Computerized information

		Non-exporter	Exporter	Non-exporter	Indirect exporter	Direct exporter
2009	Does the firm have a high-speed, broadband internet connection on its premises?	96.77	100	98.04	90.91	100
	Do you currently communicate with your clients or suppliers via email	98.37	100	98.06	100	100
	Do you use internet to make purchases for this establishment	63.79	65.71	60.42	80	65.71
	Do you use internet to deliver services	69.49	71.43	65.31	90	71.43
	Do you use internet to do research and develop ideas	59.65	55.88	56.25	77.78	55.88
	What % of employees uses computers	61	50.35	62.75	54	50.35
2012	Does the firm have a high-speed, broadband internet connection on its premises?	93.75	94.5	93.55	100	94.94
	Do you currently communicate with your clients or suppliers via email	95.83	100	95.7	100	100
	What % of employees uses computers	66.88	68.68	68.4	36.5	68.68

Data: BEEPS IV, V.

Table 4. Innovation intensity of exporters and non-exporters

		Non-exporter	Exporter	Non-exporter	Indirect exporter	Direct exporter
2009	Number of new or significantly improved products	4.56	12.10	3.46	9.33	12.10
	New/improved product new to international markets (% of "yes" answers)	24.50	20.50	23.08	40	50.47
	% of annual sales contributed by new/improved product	20.07	16.62	19.82	21	16.62
2012	Number of new or significantly improved products	11.50	10.50	11.58	10	10.5
	New/improved product new to international markets (% of "yes" answers)	20.93	53.24	18.7	37.76	53.24
	% of annual sales contributed by new/improved product	23.83	22.28	25.06	3	22.28

Data: BEEPS IV, V.

services. Slovenian firms on average (over both panel rounds) reported 10.2. In 2009, the firms reported on average 9.5 significantly improved or new products, which accounted for 17.7% of total sales, while in 2012 the number increased to 10.9 and contributed 23% to total sales. The increased innovation activity is consistent with the plans to overcome the crisis as expressed in the study by Prašnikar et al. (2009), when companies intended primarily to either find new markets or focus on new products to improve competitive position in existing markets.

If companies are divided further by their export activity to exporters (those reporting direct exports) and non-exporters (all other), it is evident that exporters were in the crisis period (2009 panel) significantly more innovation driven, although new products contributed less to their sales than in non-exporters. Interestingly, the non-exporters report that their novelties are in fact global novelties more commonly than exporters during the crisis. By 2012 the situation significantly changed. The innovation activity of non-exporters has significantly increased, while for exporters it remained strong. Primarily this is evident in the "quality" of innovation as more than half of firms report that their products were new also to global markets.

The role of external competitive pressure becomes even more evident if the companies are divided to non-exporters, indirect exporters (no direct exports, but indirectly present) and direct exporters. In the 2009, the non-exporters on average offered just below 3.5 new products in the past 3 years, while the indirect exporters offered 10 and the direct exporters 12. The innovation activity of non-exporters did in fact intensify by 2012, when they surpassed the rest. But the "quality" of innovation is significantly weaker as in both periods a much larger share of innovations were also new to international markets. It is also evident that the competitive pressure along the value chain must be strong also for the indirect exporters, which is consistent with the anecdotal evidence and case studies of companies that cooperate strongly with their domestic suppliers. Only total quality management along the value chain will ensure competitiveness in the long run (e.g. the tradition in Japanese manufacturing, which has been studied intensely by others, e.g. Corwin and Puckett, 2009).

Economic competencies. According to Corrado et al. (2005, 2009) definition of intangible capital, economic competencies comprise 3 segments: (1) brand equity, firm specific human capital and organizational structure. The economic competencies analysis will be based on the variable structure from BEEPS, which is primarily based on human resources and organizational characteristics and less on branding (no suitable variables). The firms in 2009 employed 119 full-time permanent workers on average, while in 2012 the number dropped to 106. Besides the full-time employees, the firms employed also roughly 3.6% of full-time temporary workers, while in 2009 the full-time temporary workers represented 6.5% of employees. The crisis caused the firms to decrease the number of workers. Since the temporary workers are less protected by legislation, these were also the first to be laid off.

Generally, firms were quite satisfied with the quality of their employees. Overall, in both studied periods, 10.64 % of firms reported that inadequately educated labour force is a major or very severe obstacle, 14% believed it is a moderate obstacle, while 54.1% reported this not to be an obstacle. There are significant differences among industries. In manufacturing, tourism and transport, problems are more pronounced. For example, in transport 15% of companies reported lack of educated labour to be a major obstacle, while in manufacturing, 11% of employers reported lack of suitably educated workforce to be a very severe or major obstacle and in tourism 9%. In 2009, the situation was different. At that time, the lack of workers was most pronounced in construction and manufacturing. Given that the survey was conducted over a longer period of time, the construction decline was not yet fully revealed. These results are consistent with the data reported by the Employment service of Slovenia (2015), which clearly indicates that lack of workers in some fields was a problem. These were primarily specialized professions in manufacturing (metal workers), drivers, workers in tourism (cooks), etc.

On average in 2009 companies had 9.6 % of employees with a university degree, while in 2012, the percentage dropped to 7.9 %. In 2009 59.4 % of companies had formal training programmes for their employees, while in 2012, the percentage

dropped to 44%. In both years companies report roughly 44% of production workers to receive training and roughly 39% of non-production workers (data available just for 2012).

On average, exporters were larger, employing 160 employees compared to non-exporters with 70 employees. If indirect exporters are observed as a separate category, it is evident that firms that are involved in exporting are larger. This pattern is clearly evident primarily in manufacturing, where small, domestic oriented firms on average have 26 employees, while indirect and direct exporters are on average 5 times larger. The difference is more pronounced only in transport, where exporting firms were 10 times larger than non-exporters (there were no indirect exporters in the sample). In trade, for example, domestic-market oriented firms were larger by some 40%, but this again can be understood due to the differences within the sector. The import-export firms and representative offices are often small, while the retail trade in domestic market is on the other hand conducted by large store-chains.

On average, the exporters had a more educated labour force, the share of those with a university degree was clearly higher (Table 5). The difference is significant – the non-exporters had about half of the percentage of university-trained of that, reported by exporters. In exporters the focus in internal training is on enhancing the skills of production workers, while the non-exporters dominate in terms of investment into non-production workers. This pattern is again expected, since the non-exporters are more service-oriented and have a focus, which is not production per se. In the manufacturing sector the educated and trained workers are a source of competitive advantage, which was supported also by Prašnikar et al. (2012 and 2016).

Intangible capital. To relate the intangible capital to exporters, a variable "intangible capital" was prepared. The variable was structured so that all 3 components of intangible capital were accounted for. Table 6 summarizes the composition of the variable. To avoid problems of scaling, the variables with 0 (No) and (1) value were taken as base. These prevail in the questionnaire in any case. To obtain a summary measure, the values of components were added together.

To obtain the "Labour market" variable, which aims at describing the general quality of HRM, two

Table 5. Characteristics of human resources in BEEPS surveys

		2 groups		3 groups		
		Non-exporter	Exporter	Non-exporter	Indirect exporter*	Direct exporter
2009	Number of full-time employees	69.3	159.3	67.5	78.8	159.3
	% of workers with university degree	7.01	11.7	6.55	9.3	11.7
	% of full-time permanent production employees that received training	42.5	44.45	42.5	42.6	44.45
	% of full-time permanent non-production employees that received training	47.1	37.9	61.2	28.3	37.8
2012	Number of full-time employees	129.9	77.8	132.8	42	77.8
	% of workers with university degree	5.6	10.8	5.7	2.7	10.8
	% of full-time permanent production employees that received training	43	54.7	51.25	10	54.7
	% of full-time permanent non-production employees that received training	58	37.1	50	90*	37.1

**Sample only 3 firms in 2012, 20 firms in 2009.*
Data: BEEPS IV, V.

Table 6. Construction of variables describing the "intangibles"

IC component	Question	
Computerized information		*(0-2)*
	At the present time does this establishment have its own web-site?	(Yes (1)/No (0))
	At the present time does this establishment use email to communicate with clients or suppliers?	(Yes (1)/No (0))
Innovative property		*(0-4)*
Product innovation	During the last 3 years has this establishment introduced new or significantly improved products or services	(Yes (1)/No (0))
Process innovation	During the last 3 years has this establishment introduced new or significantly improved methods for the production or supply of products or services	(Yes/No)
Organizational innovation	During the last 3 years has this establishment introduced new or significantly improved organizational or management practices or structures?	(Yes/No)
Marketing innovation	During the last 3 years has this establishment introduced new or significantly improved marketing methods?	(Yes/No)
Economic competencies		*Poor quality (0) to Very good (5)*
	Over the last fiscal year did this establishment have formal training programs for its permanent full-time employees?	(Yes (1) /No (0))
	Labour_market*	4 (best) – 0(worst)
	Are labour regulations an obstacle to the current operations of this establishment?	(No (0), Very severe obstacle (4))
	To what degree is an inadequately educated labour force an obstacle to the current operations of this establishment?	(No (0), Very severe obstacle (4))

Data: BEEPS IV, V.

questions were used, one dealing with regulation and one with education. The answers to both questions were averaged and then, to change the scale to 0 being worst and 4 being best, the value was subtracted from 4.

Firms' performance was evaluated based on standard indicators: sales, value added, costs. The variables from the BEEPS dataset were adjusted to describe also the changes. The average surveyed firm in Slovenia that was included in the 2009 sample, was established in 1985, had at start-up 61 employees and the manager on average had 18 years of experience in the sector. The firms, surveyed in 2012 round were on average established in 1992, had at start 22 employees, while the current manager today on average has 21 years of experience in the sector. In 2009 41.3% of interviewed firms had an international quality certification, while in the 2012 round 58% of firms had international quality certificate.

Overall, the firms between 2009 and 2012 significantly changed their capacity utilization. Due to the crisis, the capacity utilization fell from 80.9% to 71.6% on average. In non-exporters in 2009, capacity utilization was 78%, just below the 81.6% that the exporters reported. By 2012, in both groups, capacity utilization declined by about 9 percentage points.

The companies reported on average selling 341 thousand euros per employee in 2009 and 407 in 2012, while three years earlier, in 2006 and 2009 companies reported selling 32.9 and 23.7 % less, respectively.

4.1 The relationship between the accumulation of intangible capital and export-orientation

The descriptive statistics of the components of intangible capital in firms in some cases show a very systematic advantage of exporters, while in other cases (e.g. training) the differences are small or barely noticeable. In what follows, the following research question will be answered: What is the relationship between the involvement in trade and the intangible capital?

a. Informational capital

b. Innovative capital

c. Economic competencies

To answer these research question, several methodologies will be employed, starting with t-tests between the groups.

The results in Table 7 show that generally, when observing components of intangible capital, exporters are performing better and the differences are also in many cases significant. First, regarding the computerized information, on average (CI variable) the exporters are performing better. Although both groups largely use email as well as have own web pages, the exporters are more active in both and differences are in both cases also significant.

Table 7. Components of intangible capital and the significance of differences between the groups

	Non-exporter	Exporter	t-test sig
Computerized information			
Web page	0.817	0.905	0.0034
E-mail	0.973	0.994	0.0055
CI	0.895	0.953	0.0006
Innovative property			
Product	0.557	0.663	0.0100
Product (novelty in markets)**	0.931	0.848	0.0025
Process	0.420	0.513	0.0242
Organizational	0.484	0.569	0.0356
Marketing	0.529	0.577	0.1537
Innovation	1.991	2.323	0.0216
Economic competencies			
Regulation*	1.246	1.226	0.4230
Education*	0.798	0.861	0.2709
Labour market combined	1.046	1.036	0.4051
Training	0.456	0.525	0.1318
HRM	3.653	3.475	0.9290

Data: EBRD BEEPS IV and V data.

** Scale 0-4, 0 implies no obstacle, 4 major obstacle. In this case value for t-test shows the results that exporter generally observe that either regulation or education is more of an obstacle. Otherwise, one-sided test is used, exporter > importer.*

*** t-test value for importer>exporter. Variable was not included into calculation of intangible capital, since it is not a core group of innovation, but provides additional information.*

Regarding innovative property, the differences are also significant between exporters and non-exporters, if all types of innovation are observed combined (innovation variable). Exporters also perform significantly better with regards to product, process and organizational innovation, while in marketing innovation the differences are not significant, although on average the performance of exporters is better. Interestingly, from the perspective of innovation, firms that do not export outperformed exporting firms from the perspective of being active in introducing market novelties. Regarding economic competencies, the differences are not significant in any of the analysed aspects. In terms of training, the exporters do invest more, but the differences are not significant.

To see whether exporters are indeed more active in accumulating intangible capital and its components, matching was performed. Matching was initially performed on the intangibles variable at large and subsequently also at the level of intangibles components.

Matching was conducted using the propensity score matching method. The propensity score matching relies on the definition of the propensity score, which is defined according to the literature (Rosenbaum and Rubin, 1983) the probability "of treatment assignment conditional on observed baseline covariates: $e_i = Pr(Z_i = 1 | X_i)$. For propensity score matching, pairs of data are usually formed, one being treated and the other one not, but both of them sharing a similar propensity score. The propensity score itself is estimated using a sort of logistic regression, followed by an estimate based on the regression model. Other methods are also used to estimate the propensity score, such as partitioning, bagging etc.. Based on the propensity score, treated and non-treated groups are compared. In this paper, the nearest neighbour matching is used, which identifies two subjects that are closest (have minimum distance). Based on comparison average treatment effect is calculated for the treated (ATT) or average treatment effect at the population level (ATE).

To identify whether the exporters invest more into intangible capital at large and its components, a two step approach was used. Initially, propensity score was estimated. The dependent variable was exports (company being an exporter (value 1) or not (value 0). The propensity to export was estimated, based on company performance (sales per employee today and three years ago), industry categories, company size[2] (micro, small, medium and large), ownership (private domestic ownership was included), the possession of international quality certificates and survey dummy (BEEPS IV and V).

The choice of variables was guided by two factors. First, theoretical considerations about the variables that impact export propensity. Second, the availability or choice of variables in the BEEPS data. Sera et al. (2012) show for Portugal and UK that company size, industry as well as firm competencies matter, which is also confirmed by Parish and Freeman (2011). Bodin et al. (2015) stress ownership and the importance of foreign ownership in developing countries, which is understandable due to firm's motivation to exploit factor and cost advantages. Mittelsteadt et al. (2006) stress the importance of location, firm size and industry. Besides these, we also included the survey dummy to differentiate between external (crisis) elements that more more or less pronounced in 2009 and 2012. To capture the effects of productivity (as stressed by Damijan and Kostevc, 2015) and size, we added also the sales per employee (data on value added could be calculated from answers to different questions, but result had many outliers and missing variables).

In the second stage the treatment effects were calculated to find whether the intangibles also have an impact on exporters. The results are mixed. Overall, the intangibles variable impact is not significant. The components of intangible capital were studied consequently separately. Table 8 presents the results.

Generally, matching results do not confirm that there is a significant difference between exporters and non-exporters in the accumulation of intangible capital. Although it might be expected that stronger

[2] Regarding size, question a6a from BEEPS data was used. The questionnaire divides companies into following categories: micro companies (<5 employees), small (5<employees<=19), medium (20<employees<=99) and large (>=100).

intangible capital is a driver of productivity, and competitiveness would also contribute to a firm being more likely to export, the results for Slovenia do not confirm this. The matching process could not identify matching firms for the innovation variable at large, but we were able to conduct matching for the components of intangible capital as well as variable on training.

Three components are highly significant. First, the computerized information. Generally, those that have more informational capital in general (variable informational capital) are more likely to be exporters, the treatment effect is positive and highly significant. The exporters are also more likely those who use emails to communicate with clients and suppliers. These results are quite expected. Regarding web pages, nowadays the majority of firms have web-pages (statistical data is unavailable, but anecdotal evidence confirms that web is extremely important), therefore the results are expected. On the other hand, the exporters are much more active in using email to communicate, which again was expected. First, due to the fact that this lowers transaction costs, represents a new distribution channel and improves quality of service (Visser, 2007, Thompson and Yu, 2005, Prašnikar, ed., 2010 for Slovenia and informational capital). Second, the literature also showed that e-trade also stimulates exports or represents a new exporting mode, that also allows small business to enter foreign markets at manageable costs (Yong et al., 2011, ITC, 2016). Therefore, considering e-communication and having a web-page in combination (in our case that implies higher informational capital) might stimulate companies to use also e-commerce as penetration method, and increasing exports or testing unknown markets (Deloitte, 2014).

Regarding innovative property, the differences of the intangible capital components are not explaining the differences in the propensity to export or not. Generally it might be expected that firms that are more innovative and invest more into R&D are also more productive (Hanley and Monreal-Perez, 2011, Ganotakis and Love, 2009, Brati and Felice, 2010).

Table 8. Matching results (exporter=1)

	N treated	N control	ATT	std. err.	T value
Informational capital					
IT	386	3	0.476***	0.025	18.673
Web page	389	56	0.038	0.112	0.335
Email	445	6	0.537***	0.024	22.679
Innovation					
Product innovation	276	121	0.025	0.086	0.291
Process innovation	211	130	0.024	0.086	0.276
Organizational innovation	238	125	0.035	0.085	0.414
Product innovation also novelty in market	400	48	-0.214***	0.096	-2.245
Marketing innovation	250	123	-0.001	0.085	-0.015
Economic competencies					
Labour regulation	112	91	0.127**	0.082	1.536
Labour education	92	116	-0.069	0.093	-0.741
Labour obstacle	88	40	0.014	0.109	0.131
Training	137	86	0.109	0.119	0.921

Data: EBRD BEEPS IV and V data.

But it is on the other hand true that the impact of innovative property on exports or exports on innovation depends largely on firm motivation. It might hold that companies with a stable position within global value chains and producing low-value products for exports have less motivation to be innovative, since their position is more secure than the position of companies not incorporated in global value chains. On the other hand, being part of GVC offers more learning and technology, knowledge transfer opportunities, opportunities to expand to new markets (market/marketing innovation) (e.g. European Commission, 2013). In Slovenia, according to the results, the differences are not significant and we cannot confirm that firms with more innovative capital have a higher exporting propensity. Interestingly, companies that introduced novelties (product innovation) which were new to the market, are more likely to be non-exporters. This could be understood in relation to the fact that many service companies were very active in establishing their market position in the analysed period and that innovation was stressed also as a crisis exit strategy (besides search for new markets, Prašnikar and Cirman, 2008).

The economic competencies were also not able to explain the propensity to export. Training was more pronounced (but insignificant), while the perception of labour regulation (being a more pronounced obstacle) had some explanatory power. In general both exporting and non-exporting firms perceived labour market situation as an obstacle.

The question we have initially posed tried to relate involvement into GVC (trade) with the firm's intangible capital. Initial results, testing just for the accumulated differences in IC between exporters and non-exporters, show that differences exist. But once the exports is initially controlled for other standard variables that explain exports, the treatment effect of the intangible capital is minor in the analyzed sample.

5. DISCUSSION AND CONCLUSION

Intangible capital or knowledge-based capital is considered in the literature to be one of the major promoters of productivity, growth and development. The intangible capital itself comprises several components and they are all positively linked in theory (either at large or separately) to trade and exporting. IC improves productivity, eases access to global markets (more innovative, quality products), enhances learning and knowledge transfer due to better absorption abilities, stimulates new market entry and easies it as well (accumulated brand capital, knowledge, competencies and capabilities, organizational structure etc.).

The analysis presented in this paper aimed at investigating the impact of accumulated IC on firms' export propensity. Although the t-tests showed some significant differences between exporters and non-exporters, once these are controlled for other factors, only a poor relationship between the variables of interest can be found. Primarily, the results show that it is important to invest in ITC. Generally, other results are not so highly significant, but can be explained both by the crisis (which primarily hit the exporters) as well as sample structure (quite a large share of service companies, which are intensifying their efforts to establish their market position).

Interestingly, innovative property does not explain the differences in the propensity to exports, although this is expected in the literature and also the comparison between the groups shows that the exporters are significantly more innovative. The inability to confirm the propensity to exports with innovation could be explained by the comparative importance of other factors, actual inclination of a sub-sample of exporters to be primarily "doing business as usually", the nature of the sample or other (e.g. sectoral) characteristics of the exporting firms' sample. Besides the aforementioned aspects, further points can be made. The result contradicts the experience of other studies for Slovenia, where innovation is related to exports (e.g. in Prašnikar, 2012). Another consideration is the methodology used – here the propensity to exports was explained by innovation (or not), while the opposite could also be true and is also supported in the literature. Similarly, also the relationship with the economic competencies is not systematic such as expected by the literature. Consequently, further study of exports in relation to intangible innovative capital is needed.

The results nonetheless do reveal some important facts, which also provide several implications for firms' management in order to succeed either in the domestic or international markets. First, the literature shows that it is important to invest in intangible capital. Investing into innovative capital, brands, firm-specific human capital, etc., increases the competitiveness of the firm, which can compete more on a quality basis with a better and more established (branded) product. This ensures higher value added per employee due to higher profit margins and allows also higher employee compensation, supporting their motivation, loyalty and productivity, which spurs a positive loops in the firms.

Although the sample did not confirm that the propensity to exports is explained by innovation and economic competencies, that does not necessarily mean that the link does not exists. A number of studies (as mentioned) have confirmed the importance of innovation for exporting and vice versa as well. First, our result reflects the sample as the crisis period, when exporters were highly pressured with low demand, which hampered their general investment abilities (more computerised information could also be a result of the attempted cuts in costs). But in order to be competitive, firms need to be innovative and most successful Slovenian exporters are also developmental suppliers to major European firms. Although the results do not show that innovation explains the propensity to exports, they do show that there is a significant difference in the intensity of innovation in favour of exporters. Therefore, the results do provide implications for management – innovation is important, but causality could go also both ways.

The research was limited in several ways. One is the aforementioned sample structure with a focus on manufacturing - as shown in results from other analyses (e.g. (Prašnikar, 2010) (Prašnikar, Redek, & Koman, 2017), (Redek, Čater, Čater, Černe, and Koman, 2018)), it is primarily Slovenian manufacturing that is investing a lot into new technologies and is highly innovative to be able to compete in the global markets. At the moment, these companies, many from the automotive, metal, electrical, chemical and pharmaceutical sectors are also at the forefront of digitalization and implementation of other technologies from Industry 4.0. It is primarily also these technologies, including digitalization, which could (as potential for future research) also conceptually extend the existing definition of intangible capital, partially as part of computerized information, partially due to their impact on (process and product) innovation. Namely, these technologies significantly contribute to enhanced efficiency, but at least some are intangible in nature (e.g. big data analysis, e-commerce models, etc.).

Second limitation also stems from the data. The available variables were in some cases not best suited for this analysis. For informational capital, there was no data about software or databases and the variables we could use are just an approximation. Second, the economic competencies analysis was also very limited and instead of having branding, investment into firm-specific human capital and firm competencies, information was limited and thus the analysis focused on training and general labour market. Last, the sample size was relatively small, primarily due to having missing data, which limited the opportunities to perform matching of firms in some cases. Therefore, we know that the analysis could provide richer conclusions if done on a different dataset.

But the analysis is nonetheless important from the perspective of the future analysis. Besides the link of intangible capital to new technologies, understanding the importance of intangible capital is highly important from policy and firm perspective. To stimulate the accumulation of intangible capital, it would be important to understand the awareness of the problem among Slovenian firms, primarily among decision-makers as well as any obstacles in deciding for such investments. Therefore such an analysis could be complemented by a firm-level survey. Second, a comparative, cross-country study would also be relevant, both from the level of intangible capital, contribution to productivity, importance of involvement in global value chains but primarily also from the managerial perspective. From policy perspective, an extensive micro-level analysis on firm-level data would represent a reliable tool for preparing suitable measures as well as addressing management with suitable incentives.

EXTENDED SUMMARY / IZVLEČEK

Vključitev podjetja v globalne vrednostne verige je pomembno ne le zaradi takojšnjega učinka na povpraševanje, pač pa tudi zaradi drugih dolgoročnih učinkov, kot so odpiranje novih trgov, prenosa tehnologije in znanja, itd. Inovacije (inovacije proizvodov in procesov, organizacijske, tržne in marketinške inovacije), kopičenje znanja ter krepitev zmogljivosti in sposobnosti podjetja, predstavljajo velik del naložb v neopredmeten ali na znanju temelječ kapital. Slednji lahko poveča rast produktivnosti za kar tretjino. Članek raziskuje položaj slovenskih podjetij s ciljem ugotavljanja razlik v kopičenju neopredmetenega kapitala med podjetji, ki so dejavna na globalnih trgih, in tistimi, ki niso. Analiza temelji na bazi podatkov EBRD (panela IV in V), raziskav o poslovnem okolju in uspešnosti podjetji. Rezultati kažejo, da so ugotovljene razlike najbolj izrazite v računalniško informacijski komponenti neopredmetenega kapitala, medtem ko razlike v inovativni lastnini in naložb za krepitev gospodarskih kompetenc niso tako velike. Ti rezultati delno odražajo tako nedavno gospodarsko krizo, kot tudi vpliv storitvenih panog.

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