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International Entrepreneurship Review

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# Quadrants of invention: Individual patent applications as unutilized resource of innovative capacity

**Irina Ervits**

**ABSTRACT**

**Objective:** This paper emphasizes the importance of isolating individual invention from organizational inventors such as private companies or universities. It is an explorative study of the cross-county levels of individual patenting as an indicator of innovative capacity. Innovative capacity at the national level is linked to economic development. Thus, we investigate the relationship between different types of patent applications and GDP per capita in a sample of developed and developing economies.

**Research Design & Methods:** We screened 600,000 Patent Cooperation Treaty (PCT) applications for three years (2013-2015) using a unique selection procedure able to separate different types of filings.

**Findings:** Countries with higher levels of individual patenting tend to have lower levels of economic development. Economic progress is driven by corporate or other forms of organizational inventors and their inventions have a better chance of transitioning into innovation. At the macro level, individual patenting vis-à-vis patents filed by organizations reflects unutilized innovative potential rather than innovative output.

**Contribution & Value Added:** For the first time we demonstrate that high levels of individual patenting are more characteristic of developing rather than developed economies. The percentage of individual patent applications is an important indicator of national innovative capacity.

| | |
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## INTRODUCTION

This paper uses an innovative selection procedure to isolate individual patent applications – applications filed by individuals rather than organizations - in the World Intellectual Property Organization (WIPO) patent database. We looked at over 600,000 internationally-oriented Patent Cooperation Treaty (PCT) applications for three years (2013-2015). This is the first time when PCT statistics are used for country-level comparisons with regard to individual patent data. We take a new approach to patent data analysis by looking at the relationship between different groups of patent applications and economic output. The link between individual patenting and GDP is, of course, not direct, since there are several macro, meso and micro conditions in between that determine to what extent different categories of applications generate economic output. The micro prerequisites include individual characteristics of an inventor indicating her ability to commercially realize her invention. Meso- and macro-level prerequisites concern the environmental circumstances, including the quality of institutions or the availability of a support network, which determine the successful realization of an invention and its transformation into an innovative product, process or any other form of output.

Analyzing the cases of great inventions in the nineteenth and the beginning of the twentieth centuries, Jewkes *et al*. (1958) stated that "the industrial laboratory does not appear to be a particularly favorable environment for inducing invention" (Jewkes *et al*., 1958, p. 132). Jewkes *et al*. (1958) believed that it is individual creativity, intuition and thirst for knowledge that drive technological progress, and, thus, they make a case against the institutionalization of invention. The socio-economic environment within which invention takes place, however, has changed dramatically since the beginning of the twentieth century. As Khan and Sokoloff (2004) note, circumstances changed as technology evolved and the world industrialized. As such, formal training in science became increasingly important for making contributions to technological development, and the cost of pursuing inventions rose (Khan and Sokoloff, 2004) – in other words, the act of lonely invention transitioned into a corporate lab. Today where invention takes place or who initiates it, an unaffiliated inventor or an inventor working at a university or a firm, might be symptomatic of its economic utility. Admittedly there is a growing need in the innovation system and ecosystem literature to pay more attention to the nature of actors, public and private organizations, involved in innovation process (Mazzucato, 2015; 2018). This paper stresses the importance of understanding the economic effect of patent applications filed by individuals.

Patenting by firms has been naturally prioritized in business studies and economics, but recently university patents have attracted more attention in terms of historical developments (Czarnitzki *et al*., 2011; Mowery & Sampat, 2001), or their economic impact (Fabrizio, 2007), or co-invention networks connecting universities, research institutes and firms (Almeida *et al*., 2011; Perri *et al*., 2017;). Individual patenting activity has received relatively little attention with the notable exceptions of Amesse *et al*. (1991), Braunerhjelm and Svensson (2010), Dahlin *et al*. (2004), Singh and Fleming (2010), Weick and Eakin (2005). This paper stresses the importance of isolating individuals as patenting actors vis-à-vis other types of inventors and tracing their economic effect on the macro level, which, to our knowledge, has not been done before.

When counts of patents are being used as an indicator of innovative output, the question emerges whether individual filings are comparable to the commercialization or diffusion potential of company applications or filings by other types of inventors. We suggest using the percentage of individual patent applications vis-à-vis other types of filings as an important indicator of national innovative capacity or, to be precise, a lack thereof. The reason to question the economic or technological utility of individual patents is the conceptual and practical difference between invention and innovation (Fagerberg, 2013). Invention, an act of identifying a novel idea and may be materializing it in the form of a patent, is the initial stage of the innovation process. The consequent innovation/commercialization stage is vital for extracting economic value from good ideas. While the role of an individual inventor in conceptualizing this new idea is important, her contribution to its practical realization is unclear. Thus, there is a higher chance that unaffiliated patent applications might not reach the stage of commercialization or become innovation compared to their corporate counterparts. This is not to say that individual patent filings are necessarily inferior in technological potential or not novel, but simply because the entrepreneurial impetus, organizational support or necessary infrastructure that a firm offers might be lacking in the case of a "lonely" inventor. Furthermore, individual patent applications are especially sensitive to the availability of macro and meso prerequisites, which are lacking in developing economies or emerging markets. If, for example, at macro level, institutional infrastructure creates a discouraging business climate for an act of entrepreneurship or there is little venture capital available, then fewer inventions are turned into innovations and then commercialized.

**Research Goals**

This paper has exploratory goals to understand the dynamics of individual patenting across countries. We use international patent applications[1] filed through the Patent Cooperation Treaty (PCT) of the World Intellectual Property Organization (WIPO) patent database as a measurement of inventive activity on the macro level. The basis of our analysis is the ability to separate individual patent applications from organizational patents in the sample of over 600,000 PCT applications for the years 2013, 2014 and 2015. By "organizational patent application" we mean applications filed by companies, government agencies, research institutes and universities. Invention can turn into innovation provided that some micro, meso and macro environmental conditions are met. And then innovation translates into economic development. National innovative capacity and economic development are closely interlinked. We look at the relationship between different types of patent applications (reflecting, we believe, different potential for commercialization) and GDP per capita in a sample of developed and developing economies.

[1] It should be noted that there is a difference between a patent application and a granted patent. Under the PCT system, national authorities of countries where property rights are sought grant these rights. WIPO publishes patent applications after an International Searching Authority (ISA) screens the application with regard to its novelty, inventiveness and industrial applicability, following which it produces a written opinion (or 18 months after the application date) (WIPO, 2015a). For the purposes of this paper, however, the most important characteristic of these applications is not their quality with regard to patentability; this paper is concerned with sources of patenting activity at the national level.

## LITERATURE REVIEW

### Invention and Innovation

Pinchot (1985) in his book dedicated to the phenomenon of "intrapreneurship" or an act of innovative entrepreneurship within the confines of a corporation or any type of organization, including government agencies, summarized the distinction between invention and innovation.

> Innovation does not mean invention. Invention is the act of genius in creating a new concept for a potentially useful new device or service. In innovation, that is just the beginning. When the invention is done, the second half of innovation begins, turning the new idea into a business success. This second step may be called implementation, commercial development, new venture creation, or any of a host of other names; it is as essential to innovation as thinking of the idea in the first place (Pinchot, 1985, p. 11).

Invention is, therefore, the first stage of the innovation process. Similarly, in King *et al*. (1994, p. 140), innovation is defined as a process that involves moving through three overlapping stages, invention, innovation and diffusion. The division into separate stages goes back to Schumpeter, who differentiated between the processes of invention and innovation. In keeping with his definition, as recounted in Dosi and Nelson (2013), invention concerns the original development of some novel product or process, while innovation entails its application and economic exploitation. Diffusion implies its usage by others, including consumers (Dosi & Nelson, 2013). According to Dosi and Nelson (2013, p. 30), invention is suggestive of "unexploited potential for technological progress," while "innovation and diffusion hint at the economically motivated efforts aimed at the incorporation of technological advances into economically exploitable products and processes." Even though *The Oslo Manual,* the manual for conducting surveys on the innovative behavior of firms, by the Organization for Economic Co-operation and Development (OECD), does not stress the division into different phases of the innovation process,[2] it nevertheless emphasizes the practical side of innovation (supposedly vis-à-vis invention), which involves the "utilization of new knowledge or a new use of existing knowledge" (OECD & Eurostat, 2005, p. 35).

The distinction between invention and innovation goes back to Schumpeter who has consistently stressed the distinction between an "inventor" and an "entrepreneur" or innovator (Ruttan, 1959). According to Schumpeter (1947, p. 152), the inventor produces ideas and the entrepreneur "gets things done," which may or may not imply a new scientific contribution. In addition, "getting things done" is a critical part of capitalist reality (Schumpeter, 1947, p. 152). Invention and innovation are produced by different sets of incentives and social processes. Innovation is closely linked to the act of entrepreneurship, it is a driver of economic change in a capitalistic society and a reflector of business behavior (Schumpeter, 1939). He viewed entrepreneurial activity as a third factor of production, next to labor and land (Hagedoorn, 1996), which is in line with the argument made later

[2] After all, *The Oslo Manual* (OECD & Eurostat, 2005) focuses on innovation at the firm level, so the invention stage is implied and the distinction between the two is of little relevance to the authors of the manual or its potential users.

by Romer (1986, 1990) about the endogenous role of innovation in productivity and economic growth. Schumpeter introduced the concept of "new combinations" as the essence of innovation, and they "refer to the introduction of a new product or a new quality of a product, a new method of production, a new market, a new source of supply of raw materials or half-manufactured goods, and finally implementing the new organization of any industry" (Hagedoorn, 1996, pp. 885-886).

The context in which innovation takes place is important. Schumpeter´s comments on the nature of innovation inspired the literature on technological regimes, which explores the industrial contexts of innovation, differentiating between the Schumpeter Mark I and Mark II patterns of innovation, as proposed in Dosi *et al.* (1995). Schumpeter Mark I industries are characterized by dynamic environments of "creative destruction", where innovations are generated by small entrepreneurial firms. Schumpeter Mark II industries are regarded as stable environments, where innovations are generated by large established firms (Malebra & Orsenigo, 1995, 1997). The term "Schumpeter Mark I" refers to the so-called early view of innovation advanced by Schumpeter in *The Theory of Economic Development* (1911), in that innovation is driven mainly by the entrepreneur, and "Schumpeter Mark II" – to his later conclusion in *Capitalism, Socialism and Democracy* (1942), namely that innovation can be exercised within large corporations or concentrated industry clusters (Fontana *et al*., 2012). This distinction lies at the heart of the well-known "Schumpeterian hypothesis" – the relationship between industrial concentration/firm size and innovation (Marsili & Verspagen, 2002), which has been empirically tested. Castellacci (2007), for instance, finds that Schumpeter Mark II sectors are characterized by higher rates of productivity. Granstrand and Alaenge (1995) conclude that large corporations (Schumpeter Mark II) have dominated in introducing innovations in almost all industrial sectors and in all observed periods in Sweden. This argument brings us back to the goals of this project to explore the economic effects of different types of patent applications, which serve as proxies of invention and reflect different organizational contexts. Specifically we are interested in the effects of individual patenting vis-à-vis other types of patent applicants.

**Economic Effects of Individual Patents**

For Schumpeter (1939, 1942, 1947), the functions of an inventor and innovator/entrepreneur, and the two corresponding processes, were quite distinct. An inventor invents things, while an entrepreneur (who can be an inventor or not) has the specific social and economic function of turning inventions into innovation, which ultimately drives economic growth (Schumpeter, 1939). The distinction between invention and innovation, inspired by Schumpeter, is important, because it goes to the heart of the debate about the economic benefits of individual patents. Trajtenberg (2002) questions the ability of individual or "unassigned" patents to contribute to the national economy. Singh and Fleming (2010), Braunerhjelm and Svensson (2010) and Dahlin *et al.* (2004) assessed the economic value of patents generated by individuals without organizational backing and came to similar conclusions. These findings confirm the assertions that individual inventors might lack the organizational support and profit-oriented drive of an entrepreneurial entity, be it a small start-up or a corporation. Without the institutional backing of a larger company being able to attract venture capital or contributing its own funds to R&D (or even a government agency financing technological development for public use),

the fate of invention might not find economic realization, especially today, when innovation is associated strongly with high capital investments.

The private sector is granted a special role in the market economy to drive technological change (OECD & Eurostat, 1996). Private enterprises turn new ideas into functional forms and commercialize them, therefore fulfilling the entrepreneurial function, according to Schumpeter. In a broader, evolutionary sense, Schumpeter made an argument that "the creative response of entrepreneurs and entrepreneurial innovation are the primary determinants of economic change," and without this social and economic function capitalism would stagnate (Frank, 1998, p. 513). In a later period, the image of a heroic individual entrepreneur in Schumpeter's writings was replaced by the postulation that large corporate R&D laboratories would undertake an entrepreneurial function in the process of innovation – the inspiration for Schumpeter Mark II innovation pattern. Ultimately, the role of a lonely inventor, as separated from the function of an entrepreneur, plays a marginal role in economic development (even though it might have meaningful social or cultural implications or inspire an innovation effort performed by somebody else).

Thus, the chances of successful innovation are determined by different forms of organizational support, a private firm (large or small), especially in free market economies, or government agencies and state-owned enterprises or universities. Large corporations usually have more resources to dedicate to innovative activities, while small business relies more on venture capital. Even though government-funded research institutes and universities might be focusing more on fundamental rather than applied research, they also enjoy government funding and extensive connections to the private sector, which makes the development and application-driven conceptualization of new technology more feasible (and its commercialization) than in a scenario of a single inventor. Therefore, this research endeavour is driven by an assumption that even at the macro level we should be able to see different economic effects of patenting depending on who files for patent protection. Economically advanced countries should have higher percentage of private sector filings. While the patenting record of less developed economies might be skewed more toward individual applications implying on one hand, the creative potential of its population but, on the other hand, fewer prospects of commercial realization of these patents. If that is the case, then the proportion of individual patenting must be treated as an important indicator of national innovative capacity and should be properly accounted for in various innovation rankings and indices.

## MATERIAL AND METHODS

This paper looks at the relationship between different types of patent applications and GDP per capita in a sample of developed and developing economies. The basis of our analysis is the unique categorization procedure of separating individual patent applications from organizational patents in the sample of over 600,000 PCT applications for the years 2013, 2014 and 2015. This is the first time when PCT statistics are used for country-level comparisons with regard to individual patent data.

**Data Sources**

This paper follows a long tradition of using patent statistics as a measure of inventive activity (Comanor & Scherer, 1969; Griliches, 1990; Griliches & Schmookler, 1963; Mueller, 1966; Scherer, 1965; Schmookler, 1966; Schmookler & Brownlee, 1962).[3] A patent satisfies the minimum requirement of invention with regard to its practical orientation and novelty being acknowledged by the national patent office (Griliches, 1990). Patents have been used as a proxy of innovation, for instance to investigate the link between innovation and national competitiveness (Pavitt & Soete, 1980; Scherer, 1992; Sood & DuBois, 1995) or as an output indicator of corporate R&D activities (Aitken & Harrison 1994; Cantwell & Janne, 1999; Cantwell & Piscitello, 2005; Frost, 2001; Zanfei, 2000). *The Oslo Manual* treats patents as a "method for maintaining and increasing competitiveness of innovations" (OECD and Eurostat, 1996, p. 58). The conversation about the use of patent data as a measure of innovation, as well as methodological implications of this data source, culminated in Jaffe and Trajtenberg (2002). Today, it is often assumed that patent data can be utilized as one of the measures of innovation (Bradford University School of Management [BUSM], 2009) alongside expenditure on research and development (R&D), scientific publications, personnel engaged in R&D, numbers of science graduates per capita or high-technology exports.

WIPO is a United Nations (UN) agency that monitors the global system of intellectual property (IP) protection. The choice of PCT applications is dictated by four reasons. First, the PCT application procedure is standardized across all now 152 member countries, with the objective of enabling simultaneous patenting in multiple jurisdictions instead of filing a separate application in each country. So, a PCT application is an internationally-oriented application. Standardized applications are filed with a national (country of residence of the applicant) or regional patent office or directly with WIPO (WIPO, 2015a). The standardization of the PCT procedure warrants quality homogenization and consistency, as the same formal requirements apply to all applicants regardless of nationality.

Secondly, applicants pay a standard set of international fees to initiate their application, and WIPO provides fee reductions to applicants from developing countries (WIPO, 2015a). At a later stage of the application process, the so-called national stage, some national or regional patent-granting authorities also provide fee reductions to individuals, universities, not-for-profit research institutes and small- and medium-sized enterprises (SMEs) (WIPO, 2015a, 2015b). This system of fee reductions has an equalizing effect and encourages a diverse range of applicants to apply. Despite the fact that large multinational corporations like Huawei, Panasonic or Samsung have been consistently top PCT applicants (as per WIPO Statistics Database[4]), filing thousands of applications annually, the PCT procedure is deemed to be especially attractive to internationalizing SMEs (WIPO, 2015a, 2015b). Thus, fee reductions for non-corporate inventors diversify the PCT application pool and ensure a high level of individual filings across the

[3] The limitations of patent data as a measure of invention are well known. Not all novel ideas are patentable, as the quality of patent applications differs significantly. Alternative indicators like R&D expenditure or scientific publications have been utilized. Surveys at the firm level also serve as a source of data on innovative effort.

[4] Please see details at PATENTSCOPE, https://patentscope.wipo.int/search/de/search.jsf. Accessed April 2018.

board, which might not be the case in some national IP jurisdictions, where corporations dominate.

The third reason for choosing PCT is the practical matter of data availability, at least for the years 2013, 2014, and 2015. The WIPO patent database, PATENTSCOPE, provides an opportunity, which was essential for this paper, to download lists of all PCT applications published in a particular year. The lists provide detailed descriptions of patent applications, including information about the applying body and where the application was filed (based on the two-letter country code assigned to the application). The final reason is a purely intuitive assumption that internationally-oriented PCT applications imply a certain level of confidence by an applicant about the prospects of her idea abroad, which in turn might represent an indirect measure of quality. The intention of internationalization imposes quality expectations that might be more demanding than with domestic patenting. For example, for Russian inventors it is easier to obtain a domestic patent rather than an international alternative, because domestic requirements are less stringent than requirements abroad (Gianella & Tompson, 2007).

**Categorization Procedures**

This paper looked at all PCT applications published on PATENTSCOPE in 2013, 2014 and 2015. PATENTSCOPE assigns a two-letter code to an application based on where the patent was filed. Applications with the two-letter code "EP" stand for those filed with the European Patent Organization (EPO),[5] and the code "IB" corresponds to patents applied for through the International Bureau of WIPO (WIPO, 2016). Since applications in the database can be at different processing stages, all duplicate application numbers were removed to distil the list to the 299,530 applications under investigation.[6] PCT applications go through the stages of assessment, amendments, corrections, etc. with each additional change being recorded and published.[7]

On PATENTSCOPE, a patent application mentions three categories of individuals or organizations: applicants, inventors and agents. Applicants file patent applications, and there can be more than one applicant. When a patent is granted, applicants retain IP rights for the invention (WIPO, 2015c). Inventors are those who conceived and conceptualized the invention described in the patent application (sometimes an applicant and an inventor are the same person). Agents provide legal and technical support to applicants, but this paper is concerned only with applicants. When an application was filed

[5] Currently, there are 38 member states of European Patent Organization (EPO), EU members, Albania, Croatia, Macedonia, Iceland, Liechtenstein, Monaco, Norway, San Marino, Serbia, Switzerland and Turkey. The list is available here: https://www.epo.org/about-us/foundation/member-states.html. In many cases, the country where the application was filed coincides with the *country of residence of the first-named applicant,* for example when a French company applies via the domestic patent office. However, many European companies apply through EPO. Using the two-letter code as a national identification criterion has, however, its limitations. It does not help separate domestic applications from foreign country subsidiaries. An applying company might be a subsidiary or a separate division of a larger company located in a different country. Internationalization of R&D activities has become widespread practice especially among large multinational corporations (MNEs). As Griliches (1990) notes, firm diversification and internationalization strategies, as well as mergers, create technical problems in using patent data (p. 1668).

[6] 96,197 filings in 2013, 103,018 – in 2014, 100,315 – in 2015.

[7] Please see details at the WIPO website, http://www.wipo.int/patentscope/en/data/kind_codes.html. Accessed in March 2018.

by an individual or a group of individuals (as applicants), it was classified as an "individual application." When an application was filed by a company, it was correspondingly termed a "company application." In the same manner, applications from government agencies, research centers and universities were grouped into a separate category. We used the regular expression technique when an algorithm written in the Perl script language grouped 299,530 PCT applications from 92 countries[8] for three years (2013, 2014, and 2015) into three categories, 1. Companies; 2. Government, universities, and research centers; 3. Individuals.

The selection procedure was based on keywords in Table 1. In the process of scanning for errors we also identified additional key words, so the key word list grew organically. For example, company names like "Progress, Inc." would be placed in the "company applications" folder. The selection process is essentially a process of extraction. First, based on specific keywords, the group of government and academic applicants was isolated. Then, from the remaining filings the companies were removed and formed a separate group. The remaining filings contained "individual applications". Then, we scanned manually the group of individual applications and removed any company or government or academic application and placed them into the appropriate files. Then, a random sample of 1000 individual applications was selected and a sampling error of five per cent was identified. Of course, this selection method prioritizes efficiency over accuracy, which, we believe, is a necessary compromise when dealing with such a large number of filings. The alternative would be to go through each application manually.

**Table 1. Criteria used to classify PCT 2013-2015 applications into four categories**

| Individual | Name of an individual as the first applicant[9] |
|---|---|
| Government, university and research institute/center | Keywords, "government", "agency", "ministry", "consiglio", "council", "federal", "national", "nazional", "European",[10] "secretary", "uniwers", "univers", "instytut", "institut", "academ"[11], "college", "school", "ecole","politecnico" |
| Company | Name of a company, also with help of key words, "company", "incorporated", "limited", "incorporée", "limitée","corporation" and abbreviations, Ltd., LLC., L.L.C., LC, L.C., Inc., Co., Corp., S.p.A., L.L.P., R.L.L.P., LLP, RLLP,[12] |

[8] 87 countries and 5 groups of countries, International Bureau of WIPO, European Patent Organization (EPO), African Regional Intellectual Property Organization (ARIPO), African Intellectual Property Organization (OAPI), Eurasian Patent Organization (EAPO).

[9] This group contained remaining PCT filings after removing company, government and academic applications. The group of individual applicants was manually scanned for errors.

[10] We tested the appropriateness of using keywords like "national" for "federal" for this category. In many cases, the names of private companies contained these two words, especially in the USA. We preselected the filings based on these key words but then we sorted them out manually and placed into the appropriate group. The word "European" applied mostly to the institutions of the European Union. The word "secretary" applied to various public offices, including the administration of the US Secretary of State. The word "state", however, was found to be a poor indicator of government affiliation.

[11] "Univers" was used to capture foreign words for a university like "université", "universidad", "universität", etc.; "institut" – "institute", "instituto"; "academ" – "academy", "academic", "academia", "academie".

[12] Companies Incorporated, General Corporate Services, Inc., Corporation, LLC, and Fictitious Name Requirements, https://companiesinc.com/start-a-business/corporation/corporation-llc-fictitious-name-requirements Accessed 9 March, 2018.

| Individual | Name of an individual as the first applicant[9] |
|---|---|
| | GmbH, AG, UG, KGaA,[13] Ltée,[14] S.A.R.F., SARF[15] and the list of business entities in 50 countries[16] |

Source: own authorship.

## RESULTS AND DISCUSSION

### Different Categories of PCT Filings and GDP

We looked at the relationship between the three categories of PCT applications and GDP per capita in 92 countries for 2013-2015. The GDP data come from the World Bank and the International Monetary Fund. We used the GDP per capita for 2015 and 2016 (in current US$, accessed April 2018) from the World Bank.[17] The GDP data for 2017 (in current US$, accessed May 2018) are from the IMF.[18] We use a two-year time lag for the GDP data based on the assumption that the effects of the inventive activity on GDP should take time to materialize. We took a two year period as a somewhat arbitrary measure and because PCT applications are published and become public no later than 18 months since the filing.

Table 2 presents the results of the Tukey post-hoc test.[19] The test shows differences in the group means. In 2013, individual patent applications "contributed" on average less than 5,027 US$ per capita to GDP than company applications and less than 3,595 US$ than government and university applications. In 2014, the indirect contribution of individual PCT applications vis-à-vis company and government/university on average was less than 6,234 US$ and less than 5,458 US$ respectively. All of these differences are statistically significant at the 0.01 level, supporting the assumption that individual invention in emerging markets and developing economies, which have lower GDP than developed countries, has a lower probability of transitioning into the innovation and commercialization stage. This transition is conditioned by a number of meso and macro prerequisites, which are frequently lacking in those countries.

[13] Deditoor, Kapitalgesellschaft – Was ist eine Kapitalgesellschaft? https://debitoor.de/lexikon/kapitalgesellschaft. Accessed 8 March, 2018.

[14] "Ltée" is the equivalent of "Ltd." in French. See at Government of Canada, Bilingual Names, https://www.ic.gc.ca/eic/site/cd-dgc.nsf/eng/cs04538.html. Accessed 8 March, 2018.

[15] Desroches Mongeo Aavocats, Quelle Est La Différence Entre Une Compagnie « Inc » Ou « Ltée », https://desrochesmongeonavocats.com/quelle-est-la-difference-entre-une-compagnie-inc-ou-ltee/. Accessed 8 March, 2018.

[16] We used the article "The List of Business Entities" from Wikipedia to identify the abbreviations for for-profit business entities in 50 jurisdictions in addition to the abbreviations listed in Table 1 from the US, Germany and Canada. See at https://en.wikipedia.org/wiki/List_of_business_entities#Spain. Accessed 10 March, 2018.

[17] Please see details at the World Bank Data, https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2016&start=2015. Accessed in April 2018.

[18] Please see details at the IMF, http://www.imf.org/external/datamapper/NGDPDPC@WEO/OEMDC/ADVEC/WEOWORLD. Accessed in May, 2018.

[19] This test is suitable because "the type of patent applicant" is a categorical variable.

**Table 2. Results of Tukey post-hoc test for three categories of PCT applications and GDP per capita (current US$, 2018) for 92 countries,[20] 2013-2015**

| X | Y | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| Category of PCT applicant | | Mean Difference GDP per capita, 2015 (X-Y) | Mean Difference GDP per capita 2016 (X-Y) | Mean Difference GDP per capita 2017 (X-Y) |
| Individual | Company | -5,072.29* | -6,234.15* | -5,489.11* |
| | Government/university | -3,595.28* | -5,458.29* | -4,845.84* |
| Company | Individual | 5,072.29* | 6,234.15* | 5,489.11* |
| | Government/university | 1,477.01* | 775.86* | 643.27* |
| Government/university | Individual | 3,595.28* | 5,458.29* | 4,845.84* |
| | Company | -1,477.01* | -775.86* | -643.27* |

* The mean difference is significant at the 0.01 level.

Source: own authorship based on data from WIPO Statistics Database, the World Bank and the IMF.

### Micro, Meso and Macro Prerequisites

Individual patenting has a smaller probability of being commercially realized in developing countries due to a number of lacking meso and macro-level prerequisites. The model of macro, meso and micro conditions for the commercial realization of individual inventions is presented in Figure 1 below. At the macro level, the availability of venture capital is a critical condition to turn invention into innovation and then diffuse it. The necessary entrepreneurial infrastructure that connects those who possess financial resources with those who generate ideas is, indeed, a logical prerequisite for the economic realization of those ideas. The inefficiencies of the local venture capital infrastructure in developing economies or emerging markets hinder the ability of isolated inventors and small businesses to commercially realize their inventions (Gianella & Tompson, 2007). Another important prerequisite of innovation is the overall conduciveness of the business environment. Such factors as laws protecting property rights and intellectual property (IP) rights in particular, efficient tax system, absence of corruption and mechanisms of contract enforcement create conducive environment for innovation and commercialization of inventions. And when these institutional prerequisites are lacking, then innovation and commercial realization of invention becomes a risky undertaking especially for individual inventors and small businesses, including start-ups initiated by individual inventors to promote their inventions. It has been ascertained that SMEs (vis-à-vis larger business) in institutionally-challenged countries are less inclined to pursue innovation, due to high risks associated with deficits in the IP rights protection system or high levels of corruption (Zhu *et al*., 2011). Government support can also take form of government programs, subsidies and various kinds of initiatives, including financing schemes targeting specific industries or types of innovative firms such as SMEs or exporting businesses.

[20] 87 countries and 5 groups of countries, International Bureau of WIPO, European Patent Organization (EPO), African Regional Intellectual Property Organization (ARIPO), African Intellectual Property Organization (OAPI), Eurasian Patent Organization (EAPO).

To sum up, because of the lack of commercialization potential of individual patent applications due to lacking macro-level prerequisites in developing economies or emerging markets, their economic effects on GDP might be limited. The macro-level conditions for successful realization of invention are summarized in Figure 1.

At the meso level (also see Figure 1), industrial clusters or geographical concentrations of interconnected companies and institutions in a particular field or industry (Porter, 1998) are important enhancers of the innovation activity. Technological clusters like Silicon Valley facilitate learning, exchange of information, economies of scale in R&D via high concentrations of capable suppliers and human capital, partnerships, alliances and other forms of synergetic activities boosted by face-to-face interactions. The availability to venture capital infrastructure in places like Silicon Valley helps aspiring inventors become entrepreneurs and realize their ideas themselves. There is also a market for ideas with big players like Google licensing or buying promising technology. The ability to tap into this regional network that offers various resources increases the probability of successful realization of inventions, be it individual inventors or large corporations. Another important meso-level factor is the ability to join a networking group, benefit from mentorship or work in cooperation with other inventors (Kim *et al.*, 2016). This ability is somewhat related to the concept of industrial clusters, but does not have to be necessarily realized in a regional hub or within one industry. These networking structures take forms of professional associations, clubs, social groups, even Internet communities and, thus, can be inter-industry or have national membership, the main condition being that they enable or empower aspiring inventors to become entrepreneurs.

An act of entrepreneurship or the process of transformation of ideas into tangible outputs like products or services and then their commercialization normally takes place in some form of an organizational setting. An act of individual entrepreneurship is, of course, possible and there are precedents like Hewlett Packard or Apple, which are the example of highly successful businesses that started in a garage. However, sooner or later an act of a lonely entrepreneur becomes more socially (she is joint by other people) and institutionally embedded. This is, of course, provided that our inventor is an entrepreneur or wants to realize her idea with the help of an entrepreneur. If not, then her options are limited to selling or licensing her technology. Also, at the micro level much depends on the individual characteristics of an inventor, her entrepreneurial potential, which could be tied to her socio-economic status, education and experience. Plus, the nature of technology can determine its success as well (please see Figure 1 below for the summary of micro-level conditions).

Of course, based on our data, we cannot reach the conclusion that individual patenting leads to economic backwardness. The relationship might be working in the other direction, more economically advanced countries have a better venture capital infrastructure, better institutional environment or simply more internationally-oriented firms engaged in innovation. Regardless of the direction of the relationship, the link is there and can be visualized by the pattern that we called “quadrants of invention”.

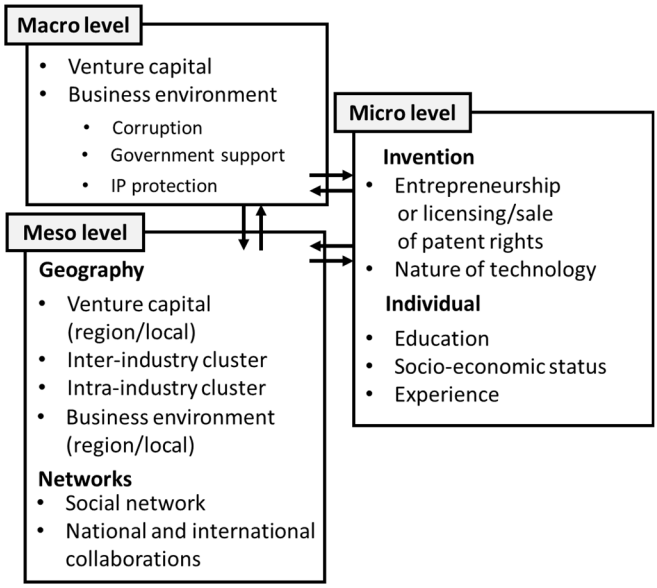


**Figure 1. Factors affecting commercial potential of individual PCT applications**
Source: own authorship.

## Quadrants of Invention

The association between GDP per capita and the percentage of individual applications from the total number of applications in each country for 36 countries and two groups of countries[21] is plotted in Figure 2 (PCT data for 2013), Figure 3 (PCT data for 2014) and Figure 4 (PCT data for 2015).[22] The countries are divided into three categories or quadrants, based on GDP per capita and intensity of individual invention. The patterns are clear, plausible and consistent throughout the three years. The way data are distributed cannot be coincidental and demonstrates that countries with lower GDP per capita tend to produce more individual patent applications. This observation embodies the fundamental divide, grounded in the writings of Schumpeter, between invention and innovation. Innovation presupposes a practical and economically exploitable realization of an idea expressed in a patent application by a company (including an entrepreneur-driven start-up) or, to a lesser extent, as we ascertained above, a government agency or a research institute or university, and should lead to higher levels of productivity and economic development. Plus, in developing economies and emerging markets certain macro and meso conditions that help turn invention into innovation are not fulfilled.

Quadrant 1 in the left top corner is occupied by countries that share high levels of GDP per capita and low levels of individual patent applications (under 20 percent). In 2013, they

[21] The two groups of countries are the International Bureau of WIPO with the "IB" code assigned to a patent application and the European Patent Organization (EPO) members – with the "EP" code.
[22] After summarizing patent application data for different categories of PCT applications (for 92 countries and groups of countries), the list was then shortened to 38 units, with a significant number of patent applications in at least one category (n>50).

include Switzerland, Norway, US, Australia, Singapore, Denmark, Sweden and IB. "IB" stands for International Bureau of WIPO.[23] In 2014, the group contains Switzerland, Norway, US, Denmark, Sweden, Singapore, IB, Australia, Netherlands, Austria, Finland, Canada and Great Britain. In 2015, – Switzerland, Norway, US, Singapore, Denmark, Australia, Sweden and IB. This outcome is expected – more institutionally developed countries are in a better capacity to generate income from invention.

The lower-left quadrant – Quadrant 2 – is occupied by countries that have less than 50 per cent of individual applications from the total. In 2013, the list includes (along the X axis) Japan, EP[24], Finland, France, Great Britain, China, Malaysia, South Korea, Israel, Austria, Canada, Portugal, Germany, New Zealand, Czech Republic, Poland, India, Italy, Slovenia, Spain, Hungary, Brazil and Romania. It is interesting to note that Malaysia, China, Brazil and India, emerging markets due to high economic growth rates, are grouped together with the new post-2004 EU members Poland, Hungary, Czech Republic and Slovenia. In 2014, – Japan, EP, France, Malaysia, South Korea, China, Israel, Czech Republic, Poland, India, Italy, Portugal, Slovenia, Spain, Brazil, Hungary and Turkey. In 2015, – Japan, EP, Finland, France, Netherlands, Malaysia, Great Britain, Germany, Slovenia, China, South Korea, Canada, Israel, India, Austria, New Zealand, Poland, Italy, Czech Republic, Portugal, Romania, Spain, Turkey, Brazil, Hungary.

Quadrant 3 has just a few occupants. The countries in the third quadrant have high levels of individual patenting (percentage of individual PCT applications is higher than by company and government/university applications combined) and comparatively low levels of economic development (GDP per capita is roughly at the 20,000 US$ or below). In 2013, the group contains Russia, Turkey, Mexico, South Africa, Greece and Ukraine. In 2014, – Romania, Russia, Mexico, South Africa, Ukraine and Greece. In 2015, – Russia, South Africa, Mexico, Ukraine and Greece.

The fact that there are no countries in the upper-right quadrant, confirms the incompatibility of high levels of individual patent activity and high levels of economic development. This supports assumptions in Schumpeter about the significance of innovation, in that it is able to develop and exploit economically inventions undertaken by the private sector. Innovation is essentially an act of entrepreneurship. It implies practically-oriented conceptualization, development, implementation of an invention, be it new product, process, etc., with the aim of profit maximization. Profit maximization is an ultimate motivation of a private enterprise. Thus, the type of patent application or whether it is an individual inventor or a commercially-oriented enterprise seems to be an important factor in achieving higher levels of economic development. This relationship is not direct, however. There are specific conditions at the micro (individual characteristics of an inventor and her readiness to commercially realize an invention herself); meso (industrial clusters of innovative activity and embeddedness in social networks); and macro level (business-friendly institutions and venture capital infrastructure). If these conditions are met (not necessarily all of them simultaneously, but at least some serendipitous combination), then invention

[23] GDP per capita for "IB" applications were calculated as the average for the highest GDP per capita among the WIPO members (Monaco) and the lowest (Burundi).

**[24]** "EP" stands for the patent application filed with the European Patent Organization (EPO). EP GDP per capita here was calculated as an average for EPO members.

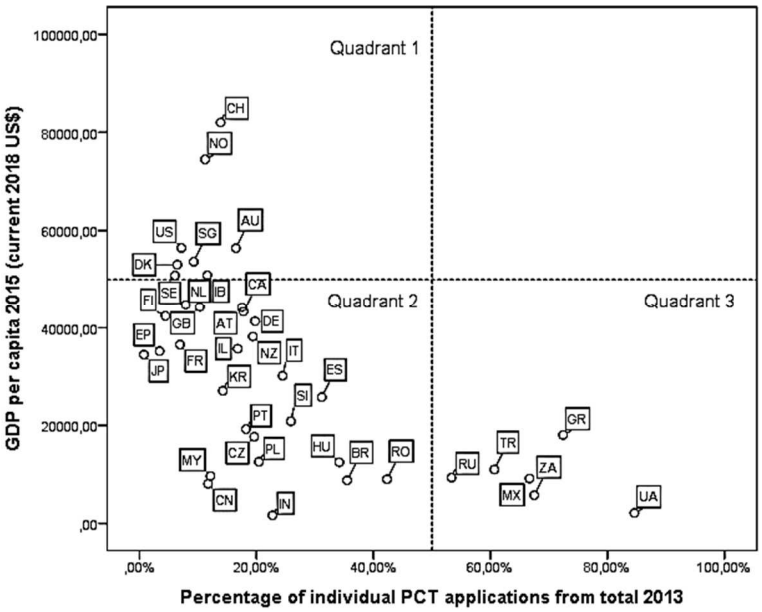


**Figure 2. Relationship between GDP per capita 2015 (current US$, 2018) and percentage of individual PCT patent applications (2013)**

Source: own authorship based on data from WIPO Statistics Database and the World Bank.

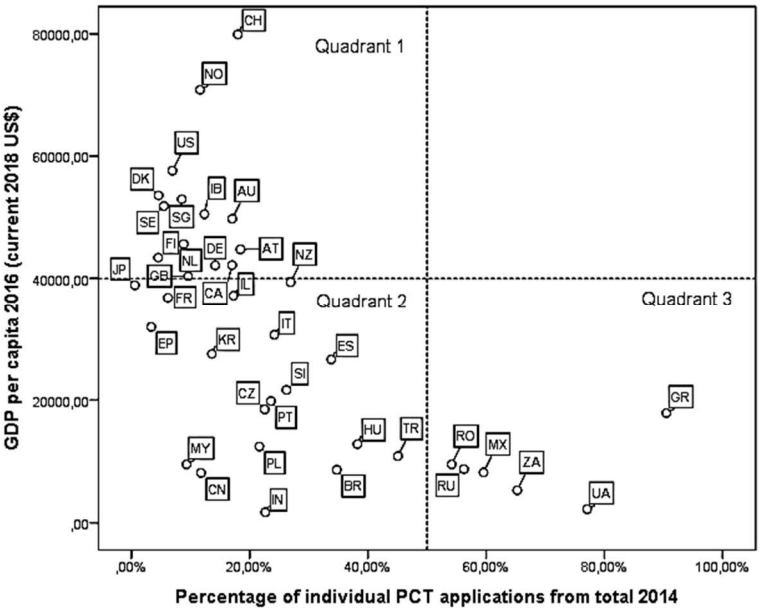


**Figure 3. Relationship between GDP per capita 2016 (current US$, 2018) and percentage of individual PCT patent applications (2014)**

Source: own authorship based on data from WIPO Statistics Database and the World Bank.

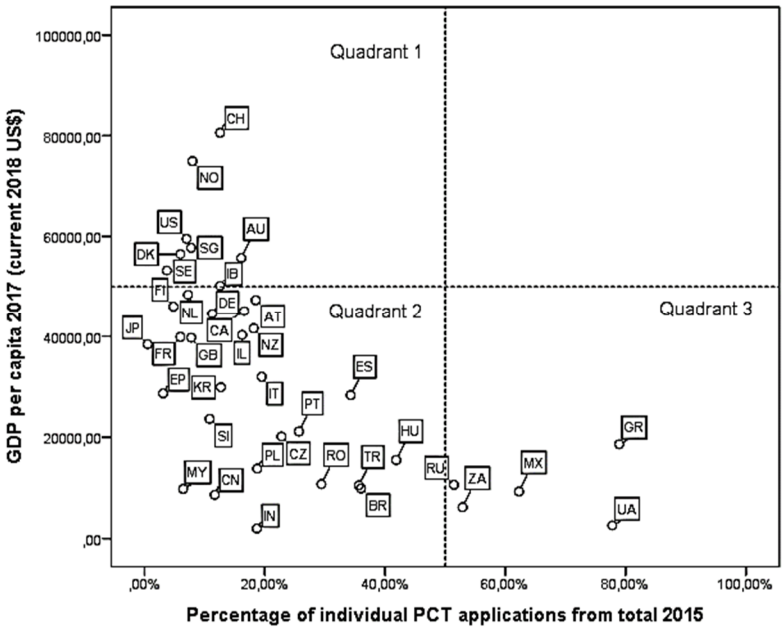


**Figure 4. Relationship between GDP per capita 2017 (current US$, 2018) and percentage of individual PCT patent applications (2015)**

Source: own authorship based on data from WIPO Statistics Database and the IMF.

can turn into innovation and bring economic results. In the case of the countries in the third quadrant, namely Russia, South Africa, Mexico, Greece, and Ukraine, this serendipitous combination of prerequisites is not materializing due to the nature of patenting (high percentage of individual applications and, hence, lack of corporate/government/academic backing) and due to the inability to meet macro and meso conditions.

## CONCLUSIONS

The paper explored the sample of roughly 600,000 PCT applications for three years (2013-2015). We introduce the concept of "quadrants of invention" reflecting the relationship between the percentage of individual PCT applications and GDP per capita. Quadrants of invention present a clear picture of countries being divided into three separate groups. Quadrant 3 countries produce more individual patent applications as a percentage of the total number of filings.

The results of the Tukey post-hoc test show that there are variations in the group "contributions" to GDP, with company applications "contributing" the most. Our results indicate a link between the three different categories of PCT applications and GDP, but the relationship is not direct. The process of transitioning from invention into innovation and commercialization depends on a number of conditions. The specific factors playing a role in the economic realization of invention are institutions and availability of venture capital

(macro), industrial clusters and embeddedness in social network (meso), and, finally, individual potential to commercially realize an invention (micro). Who files a patent application is important for its future realization. Economic progress is driven by corporate or other forms of organizational inventors because these inventions are backed up by organizational resources and, thus, have a better chance of transitioning into innovation and then being diffused. This argument takes us back to the insights provided by Schumpeter on the nature of the innovation process. Invention, an act of creativity, according to Schumpeter, should be separated conceptually from the process of innovation, as innovation is associated closely with an act of entrepreneurship or the economic realization of inventive ideas and designs. This act of entrepreneurship, i.e. the ability to "get things done" or realize patents economically, is what differentiates organizationally-based or –backed innovation (either a start-up being able to find venture capital or a multinational company, or even a government-funded research institute) from lonely invention.

The three quadrants of invention are the result of the association between GDP per capita and the percentage of international patent applications by individuals. These quadrants demonstrate that individual internationally-oriented invention is more characteristic of developing economies or emerging markets like Russia or Mexico, whilst developed countries with higher levels of economic development, measured by GDP per capita**,** do not tend to produce similar proportions of individual patent applications. Thus, when comparting inventive output of countries, the percentage of individual patenting could serve as an important indicator of the future economic utility of these inventions. Who files an application matters. Using the total number of applications that a country produces as an indicator does not capture the differences in their commercialization potential.

The limitation of this project is its explorative and descriptive nature. Future research can look into the reasons behind high levels of individual patenting in such countries as Russia, Ukraine or Mexico. There is a number of possible explanations. First, since PCT patents are essentially international patents then high percentage of individual patenting might signal something similar to brain drain – individuals seeking market opportunities for their ideas abroad – with one difference that they do not physically leave their country. Their inventive effort is internationally-oriented because the opportunities to commercialize their ideas at home are limited due to deficient business infrastructure, corruption or draconian regulations. However, Ervits & Zmuda (2018), after analyzing cross-national PCT patenting, conclude that poor institutions do not necessarily drive small businesses to file an international patent application. Poor institutions translate into fewer filings by small businesses. Griliches proposed that low real wages spur individual patenting in developing economies because patenting offers income alternatives (1990), for example, in the form of royalties from licensing. This assumption can be empirically tested.

To sum up, for the first time we demonstrate that high levels of individual patenting are more characteristic of developing rather than developed economies. The fact that individual patent applications originate in developing economies or emerging markets implies lower chances of their commercial realization due to the lack of macro and meso prerequisites. The paper suggests using the percentage of individual patent applications vis-à-vis other categories of inventor filings as an important indicator of national innovative capacity. An entrepreneurial effort exercised in some form of organization (preferably a profit-driven organization) is what differentiates innovation from an act of invention.

Seen through this light, high levels of individual patenting serve as an indicator of potentially unutilized innovative capacity rather than innovative output. In other words, the cross-country levels of individual patenting create a more realistic picture when utilized as a separate assessment criterion of innovative capacity. This conclusion has policy implications with regard to specific measures on the macro and meso levels that can help commercially realize the potential of individual inventions, for instance, enhancement of industrial clusters or overall improvement of institutional conditions. The transformation of invention into innovation does not happen automatically and requires a conscious and concentrated entrepreneurial effort that can, however, be assisted by appropriate business and institutional infrastructure.

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# Can internally generated FDI impact export performance? The study on Indonesia in the years 1980-2018

**Cheng Wen Lee, Agus Fernando**

**ABSTRACT**

**Objective:** As part of a developing country, Indonesia is concerned with issues related to investment inflows and trade liberalization. The objective this study is to examine whether or not inward foreign direct investment (FDI) influence to export performance in Indonesia over the time period 1980-2018.

**Research Design & Methods:** We apply Augmented Dickey-Fuller and Phillip-Perron unit root test to check the stationarity. The autoregressive distributed lag (ARDL)-bound test is applied to check co-integration existence.

**Findings:** Results present that the variables are stationary at first differences I(1). The ARDL bound testing co-integration approach confirms that there is long-run relationship between considered variables. The findings also indicate the significant positive impacts of FDI on exports in long run and in the short run. The result of the Granger causality test confirms that there is a unidirectional causal relationship existing between the variables where export has a Granger cause to FDI. Results of stability test suggest that there is structural stability in the residuals of the equation of exports.

**Contribution & Value Added:** FDI does not work uniformly in all sectors, and policymakers should understand the difference and identify their sector-wise policies relating with FDI. The law and order should also be maintained, which is the essential part to attract foreign investors. At this stage, we can also set the direction of future research, that is, the sector-wise study should be done on the relationship between FDI and exports.

**Article type:** research paper

**Keywords:** FDI; Export; ARDL; Cointegration, Long-run

**JEL codes:** C22,F21,P45

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## INTRODUCTION

The impact of globalization on increasing foreign direct investment and international trade flows have occurred significantly over the past decade.The value of FDI inward stock has increased from USD 2,081.29 billion in 1990 to USD 24,983.21 billion in 2015 (UNCTAD, 2016). This increase continues, in 2017 the value of inward stock FDI was USD 32,624 billion and in October 2018 the value was USD 32,272 billion (UNCTAD, 2019). Along with this, more than 45 percent of the global FDI flows targeted developing countries and transition economies over 2005-2015 (UNCTAD, 2016). Likewisein the world exports of merchandise trade have increased by 20 percent in value terms since 2008. The value of world merchandise exports was USD 19.48 trillion in 2018, up from USD 17.33 trillion in 2017, partly due to higher oil prices. The value of world commercial services exports grew by 8 percent in 2018, reaching USD 5.77 trillion, up from USD 5.36 trillion in 2017(WTO, 2019).

Foreign direct investment (FDI) is considered as a major source to promote economic growth, which enhances technology, trade expansion, employment opportunities and incorporation of global market. The importance of foreign direct investment on export for developing countries is an extensively highly research subject in academics. The increased FDI inflows may however influence exports differently across host developing countries, depending on the relative strength of the country-specific factors (Sgard, 2001; Smarzynska, 2003). Some researches argued that the FDI foster exports of host countries by the transfer of technology, facilitating access to wider foreign markets, accumulating domestic capital for exports, providing training for the local work force and upgrading management and technical skills. (Blake & Pain, 1994; Cabral, 1995; Chaisrisawatsuk & Chaisrisawatsuk, 2007; Clausing, 2000; Lall, 2000; Lipsey & Weiss, 1981; Prasanna, 2010; Zhang & Felmingham, 2001). On the other hand, sometimes it is suggested that FDI may transfer technology that is incorporate or low level for the host country's factor proportions, decrease or replace domestic investment and savings, target the host country's domestic market and result not increase exports and the expansion of domestic firms that might become exporters (Barrios *et al*., 2003; Fukunishi,2010; Jeon, 1992; Ruane & Julie, 2004; Svensson, 1996).

For developing countries as host country, FDI helps them to improve its export performance. FDI makes a positive impact on the host country's export competitiveness by increasing the efficiency degree and product quality standards. Furthermore, FDI provides the host country with better access to foreign markets. Also, where the foreign investment has been made with the specific intention of sourcing parts/components (or even final products) from the host country to take advantage of low-cost conditions (e.g., low wages), FDI contributes to exports directly (Sethi & Sucharita, 2013).

As a part of developing country, Indonesia was concerned with issues pertaining to foreign investment inflow and trade liberalization. FDI inflow to Indonesia is expected to be able to increase productivity which will ultimately have an impact on the increase in national income in the form of the Gross Domestic Product (GDP) as well as in the form of increased exports. In other words, in order to improve his performance in international trade, investment is absolutely necessary. In addition, it is also necessary to build industrial development and infrastructure construction to boost the competitiveness of national production.

Indonesia has been successful in attracting a significant amount of FDI. In 2018, FDI investment in Indonesia reached USD 21 billion, an increase from 2017 (+6.8%) (UNCTAD,

2019), and based on the data from the Investment Coordinating Board (BKPM), FDI levels grew to USD 13 billion in the second quarter of 2019, mainly in electricity, gas and water, transportation and telecommunication.

FDI plays an essential role that boost the export performance of developing economies (Blake & Pain, 1994; Davaakhuu *et al*., 2014; Jiang *et al*., 2013; Ozawa, 1992; Pain & Wakelin, 1998; Shahbaz & Rahman, 2012; Sun & Parikh, 2001). The Greenfield FDI, in particular, can complement local investment and can thus add to the production capacity of the host country.

According to Central Bureau Statistic of Indonesia (2018), Indonesia's total exported goods represent 5.2% of its overall Gross Domestic Product for 2018 (USD 3.495 trillion valued in Purchasing Power Parity). That 5.2% for exports to overall GDP in PPP for 2018 compares to 6.7% for 2014, seeming to indicate a relatively decreasing reliance on products sold on international markets for Indonesia's total economic performance.

Indonesia has generous natural resources, including crude oil, natural gas, tin, copper, and gold. Its key imports include machinery and equipment, chemicals, fuels, and foodstuffs. Major exports include oil and gas, electrical appliances, plywood, rubber, and textiles.

Indonesia shipped USD 180.2 billion worth of goods around the globe in 2018. That dollar amount reflects a 2.4% gain since 2014 and a 6.8% uptick from 2017 to 2018. From a continental perspective, almost three-quarters (72%) of Indonesian exports by value were delivered to fellow Asian countries. Another 11.3% were sold to North American importers closely trailed by European customers at 10.6%. Smaller percentages were shipped to Africa (2.6%), Australia and other Oceania importers (2%), and Latin America (1.5%) excluding Mexico but including the Caribbean.

Based on the aforementioned explain, the aim of this article is to examine whether or not FDI has made any significant contribution to Indonesia's export performance. Indonesia is the fourth largest country in the world and the first largest in South-East Asia in terms of population. Therefore, it is an ideal economy for multinational firms to start their operations in order to supply their products to an economy with such a teeming population. Indonesia has made significant progress in macroeconomic performance with the help of inward FDI. The question is whether FDI is correlated with aggregate exports in Indonesia. This study examines this by using time series annual data of Indonesia over the period from 1980 to 2018 and by applying more rigorous econometric techniques such as Augmented Dickey-Fuller and Phillip-Perron unit root test to check the stationarity and the autoregressive distributed lag (ARDL)-bound test to check co-integration existence. This research will provide some policy implications related to FDI-export relationship for developing economies like Indonesia. The remaining part of this article is organized into five sections including introduction. The second section presents the review of the literature. The third section discusses the methodology: data sources, econometric tools and empirical model of the study. The fourth section presents the empirical analysis and results. The fifth section presents the summary, conclusion and policy implication of the study.

## LITERATURE REVIEW

Numerous studies have contributed on the FDI-export interrelationship. Helpman (1984) found that there is a significant impact of foreign direct investment on the export of host countries. His summarize that FDI increases or decreases the export from the host county

when it has vertical investment, that means the foreign firms invest abroad to produce intermediate input that will be used in final production in their home country. Dunning (1970) stated the relationship between FDI by international trade is complementary to each other. This view is also supported by other researchers such as Kojima (1973); Lipsey, BlomstromandKulchycky (1988); Pain and Wakelin (1998).

The positive impact of FDI on exports has been observed in several developed countries (Dritsaki *et al*., 2004; Lipsey *et al*., 1988; Pfaffermayer, 1994, 1996; Yamawaki, 1991). Among developing countries, Graham (2004) noted that in 1978, China enacted the Law on Chinese-Foreign Joint Ventures with the twin objective of massive technology up-gradation as well as export promotion. Inline that Zhang (2005) observed that the export-augmenting effect of FDI in China has been stronger in the case of labor-intensive industries. A similar conclusion has been drawn by several other studies as well (Gu *et al*., 2008; Liu *et al*., 2002; Zhang & Song, 2000).

The interrelationship between FDI and export has been observed in other countries as well. FDI flows in Turkey has positively affected its exports (Alıcı&Ucal, 2003; Vural&Zortuk, 2011). Johnson (2006) has shown that the export-platform FDI has played a significant role in the East Asian economies. Several studies have observed the presence of a similar relationship in various ASEAN countries (Mithani *et al*., 2008; Tambunlertchai, 2009). Bhatt (2010) noted that FDI inflow in New Zealand in the previous year positively influences exports of the current year. Athukorala (2002) has reported that in Vietnam FDI inflows increasingly targeted export-oriented projects since the late nineties. Xuan and Xing (2008) found that a 1 percent increase in FDI can be expected to give rise to a 0.13 percent increase in exports. De Mello Jr and Fukasaku (2000) revealed in their study the impact of FDI on trade in Southeast Asia and Latin America have a positive impact of FDI on trade is stronger in trade-oriented economies.

Research on other continents also notes a positive interrelationship FDI on exports. The evidence on the positive influence of FDI on export is also been noted in other continents. Using data in12 Central and Eastern European (CEE) economies, Kutan and Vukšić (2007) found that FDI has contributed significantly to their domestic supply capacity, which in turn has enhanced their export volume. Njong (2008) has a similar conclusion on the spillover effect of FDI in Cameroon. Olayiwola and Okodua (2013) found that FDI positively influences the non-oil exports in Nigeria.

Some of the literature has argued that factors other than FDI (e.g. GDP, resources, human capital) might play a greater role in the determination of export flows in the long run. As a result, the relationship between FDI and exports can be weak. Considering the interrelationship between the two series in several developing countries spread across Asia (India, Malaysia, Pakistan, and Thailand) and Latin America (Chile and Mexico), Miankhel, Thangavelu, and Kalijaran (2009) noted that the interrelationship and causality pattern differ in South and East Asia from the one prevailing in Latin America. In particular, in Latin America long run exports rather affect FDI inflows. The analysis acknowledged the role played by external economies of scale, facilitated by clustering of firms (i.e., SEZ). The analysis by Falk and Hake (2008) on EU countries also revealed that exports influence FDI but the reverse is not true. In a different note, Ancharaz (2003) has noted that while FDI may promote export, the same bear limited influences on export competitiveness.

In other hands, the other of the literature reports that the FDI-export relationship may not necessarily be positive (Jeon, 1992). Svensson (1996) found that the foreign production of Swedish firms generally bears a negative relationship with the home country's exports. The lack of export spillover from MNC operation in Spain and Ireland have also been reported (Barrios *et al*, 2003; Ruane & Sutherland, 2004). A weak FDI-export relationship in Kenya has been reported by Fukunishi (2010), which argues that internal constraints (e.g. credit constraint) prohibit local entities from reaching the efficient scale for exporting abroad. The analysis of Türkan (2006) on US data reveals a marginally negative relationship between FDI flows and trade in final products. Negative relationship between FDI and exports has been detected in India as well (Chakraborty *et al*., 2016; Mohanty & Sethi, 2019).

By using firm-level data in the Mexico Ramirez (2000); Griffiths and Sapsford (2004) showed the rapid growth of both FDI and trade, the effects of FDI on exports and imports have not been extensively explored.

The interrelationship between FDI and export in Indonesia reveals a mixed picture. A number of empirical studies have noted a positive relationship between FDI on Export (Antoni, 2008; Mahadika *et al*., 2017; Rahmaddi& Ichihashi, 2013). Some studies also reported causality from export to FDI inflows, but not in the reverse direction (Albahi, 2016).

## DATA AND METHODOLOGY

### Data

In this study, annual time series data of Indonesia have been used from 1980 to 2018. Data of exports, FDI, exchange rate, gross domestic product (GDP), and gross fixed capital formation are gathered from World Bank (2019), IMF (2019) and Central Bank of Indonesia (2019). We have chosen this time period since the database for the variables taken into account is available. In empirical estimations, all the variables were used in logarithmic form.

**Table 1. Description of variables**

| Variables | Symbol | Measurement | Source |
|---|---|---|---|
| Dependent Variable Export | LEXI | Export Goods and Services (current USD) | World Bank |
| Independent Variables Foreign Direct Investment | LFDI | FDI Inward Stock (current USD) | IMF |
| Exchange Rate | LRER | Annual Average (USD to IDR) | Central Bank Indonesia |
| Physical Capital | LGFCF | Gross Fix Capital Formation (current USD) | World Bank |
| Gross Domestic Product | LGDP | Gross Domestic Product (current USD) | World Bank |

Source: own study.

### Methodology: Unit Root Test

In this study, annual time series data of Indonesia have been used from 1980 to 2018. Data of exports, FDI, exchange rate, gross domestic product (GDP), and gross fixed capital formation are gathered from World Bank (2019), IMF (2019) and Central Bank of Indonesia (2019). We have chosen this time period since the database for the variables

taken into account is available. In empirical estimations, all the variables were used in logarithmic form.

$$\Delta y = \delta y_{t-1} + \sum_{i=1}^{p} \beta_1 \Delta y_{t-1} + \mu_t \quad (1)$$

$$\Delta y_t = \alpha_0 + \delta y_{t-1} + \sum_{i=1}^{p} \beta_1 \Delta y_{t-1} + \mu_t \quad (2)$$

$$\Delta y_t = \alpha_0 + \delta y_{t-1} + \alpha_2 t + \sum_{i=1}^{p} \beta_1 \Delta y_{t-1} + \mu_t \quad (3)$$

The MacKinnon (1991) tabulated appropriate critical values for each of the three models. If the ADF statistic value is greater than the critical value in absolute terms then the null hypothesis of a unit root will be rejected and it is concluded that $y_t$ is a stationary process.

Philip and Perron (1988) developed a generalization of the ADF test procedure that allows for fairly mild assumptions concerning the distribution of errors. The test regression for the PP test is the AR(1) process which is expressed as follows;

$$\Delta y_{t-1} = \alpha_0 + \delta y_{t-1} + \varepsilon_t \quad (4)$$

The PP test corrects for the t-statistic of the coefficient $\delta$ from the AR(1) regression to account for the serial correlation in $\varepsilon_t$. Therefore, the Phillips-Perron (PP) test is a modification of the ADF test where it takes into account the less restrictive nature of the error process. The MacKinnon (1991) critical values are applicable for the PP test. The PP test is robust to general forms of heteroskedasticity in the error term and it can be used without specifying a lag length for the regression.

**Cointegration Test**

Next, the cointegration test based on bounds testing procedure is used to test empirically the long-run relationship between the variables of interest. This test is fairly simple to use as compared with other cointegration methods because it allows the cointegration relationship to be estimated by OLS after determining the lag order in the model. The ARDL cointegration approach has numerous advantages in comparison with other cointegration methods such as Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990) procedures. Besides, ARDL bounds testing approach is considered to be more robust and appropriate when dealing with small sample data. The ARDL (p,q) model can be expressed as follows:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \beta_1 x_{t-1} + \sum_{i=1}^{p} \delta \Delta y_{t-i} + \sum_{i=1}^{q} \theta \Delta x_{t-j} + \varepsilon_t \quad (5)$$

Alternatively, the equation (5) can be specified as (6):

$$\begin{aligned} \Delta LEXP_t = {} & \beta_0 + \beta_1 \sum_{i=1}^{p} \Delta LEXP_{t-1} + \beta_2 \sum_{i=1}^{p} \Delta LFDI_{t-1} + \beta_3 \sum_{i=1}^{p} \Delta LRER_{t-1} + \\ & \beta_4 \sum_{i=1}^{p} \Delta LGFCF_{t-1} + \beta_5 \sum_{i=1}^{p} \Delta LGDP_{t-1} + \gamma_1 LEXP_{t-1} + \gamma_2 LFDI_{t-1} + \\ & \gamma_3 LRER_{t-1} + \gamma_4 LGFCF_{t-1} + \gamma_5 LGDP_{t-1} + \mu_t \end{aligned} \quad (6)$$

where $\beta_0$ is constant and $\mu_t$ is a white noise error term, the error correction dynamics is denoted by summation sign, while the second part of the equation corresponds to the long-run relationship. The null hypothesis of the cointegration is ($H_0 = \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0$). The null hypothesis of no cointegration is rejected, if the calculated F-test statistics exceeds the upper critical bound value. If the long-run relationship between FDI and export performance is found, then we estimate the long-run coefficients. The following model is used to estimate the long-run coefficients:

$$\Delta LEXP_t = \tau_0 + \tau_1 \sum_{i=1}^{p} LEXP_{t-1} + \tau_2 \sum_{i=1}^{p} LFDI_{t-1} + \tau_3 \sum_{i=1}^{p} LRER_{t-1} + \tau_4 \sum_{i=1}^{p} LGFCF_{t-1} + \tau_5 \sum_{i=1}^{p} LGDP_{t-1} + \mu_t \quad (7)$$

We can estimate the short-run coefficients by employing the following model:

$$\Delta LEXP_t = \varphi_0 + \varphi_1 \sum_{i=1}^{p} \Delta LEXP_{t-1} + \varphi_2 \sum_{i=1}^{p} \Delta LFDI_{t-1} + \varphi_3 \sum_{i=1}^{p} \Delta LRER_{t-1} + \varphi_4 \sum_{i=1}^{p} \Delta LGFCF_{t-1} + \varphi_5 \sum_{i=1}^{p} \Delta LGDP_{t-1} + nECM + \mu_t \quad (8)$$

The error correction model (ECM) shows the speed of adjustment needed to restore the long-run equilibrium following a short-run shock. The $n$ is the coefficient of error correction term in the model that indicates the speed of adjustment.

### Causality Analysis

The direction of causality between dependent variable and independent variables is analyzed by Granger (1969) causality test. We determine the causality analysis of our export performance model selected lag. Jones (1989) favors the ad hoc selection method for lag length in Granger causality test over some of other statistical methods to determine optimal lag. The equation of Granger causality model is given as follows:

$$Y = \sum_{i=1}^{t} \alpha_i X_{t-1} + \sum_{i=1}^{t} \beta_i Y_{t-1} + \varepsilon \quad (9)$$

$$Y = \sum_{i=1}^{t} \lambda_i X_{t-1} + \sum_{i=1}^{t} \delta_i Y_{t-1} + \epsilon \quad (10)$$

It is assumed that $\epsilon$ and $\varepsilon$ are uncorrelated.

## RESULT ANALYSIS

### Unit Root Test Results

This study uses the ADF and Phillips-Peron tests to check the stationary existences of the time-series variables. The result of unit root test is presented in Table 2.

**Table 2. The list of estimated models**

| Variable | ADF Test | | | | PP Test | | | |
|---|---|---|---|---|---|---|---|---|
| | Constant | | Constant and Trend | | Constant | | Constant and Trend | |
| | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) |
| LEXP | -0.150017 (0.9363) | -2.478086 (0.3365) | -5.255704 (0.0001)*** | -5.204617 (0.0008)*** | -0.195927 (0.9304) | 2.600761 (0.2822) | -5.255704 (0.0001)*** | -5.214394 (0.0007)*** |
| LFDI | -0.884854 (0.7819) | -2.907224 (0.1719) | -3.668113 (0.0089)*** | -3.608816 (0.0427)** | -0.278497 (0.9188) | -2.059198 (0.5511) | -3.368192 (0.0187)** | -3.288548 (0.0839)* |
| LRER | -3.521424 (0.0127)** | -5.648969 (0.0002)*** | -10.20120 (0.0000)*** | -10.09008 (0.0000)*** | -3.367968 (0.0186)** | -5.644041 (0.0002)*** | -22.31684 (0.0001)*** | -26.87558 (0.0000)*** |
| LGFCF | -0.165347 (0.9344) | -2.107865 (0.5246) | -4.759225 (0.0004)*** | -4.738476 (0.0027)*** | -0.298742 (0.9158) | -1.818109 (0.6761) | -4.767206 (0.0004)*** | -4.745275 (0.0026)*** |
| LGDP | -0.263212 (0.9211) | -2.118378 (0.5194) | -6.28670 (0.0000)*** | -6.290653 (0.0000)*** | -0.241992 (0.9241) | -2.135100 (0.5105) | -6.292862 (0.0000)*** | -6.29204 (0.0000)** |

Significant codes: '***significant at level 0.001, '**' significant at level 0.05, '*' significant level at 0.1
Source: own calculations in Eviews 10.

Table 2 shows the unit root test results. The unit root tests reported are for both level and first differenced series of LEXP, LFDI,LGFCF and LGDP for hypothesis of non-stationarity, but for exchange rate, is stationary at level I(0). At levels when LEXP, LFDI, LGFCF and LGDP

variables are used at first difference, it becomes stationary at I(1). Consequently, as time-series data are stationary at first difference, the series follow stochastic trends and therefore can be co-integrated as well. Therefore, it can be concluded that the variables are integrated of order one I(1), indicating a possible long-run co-integrating relation among them.

### Lag Length Selection

ARDL method for co-integration is used to estimate the long-run relationship between FDI and export performance. The first step is to determine the optimal lag length of the model. ARDL method for co-integration is used to estimate the long-run relationship between FDI and export performance. The first step is to determine the optimal lag length of the model. Figure1. shows the result of the optimal lag length of the model using Akaike Criterion (AIC). The optimal lag length selected are 1,3,2,0,2. These results are obtained by looking at the Akaike Information Criterion (AIC) criteria which show the lag length that produces the best model.

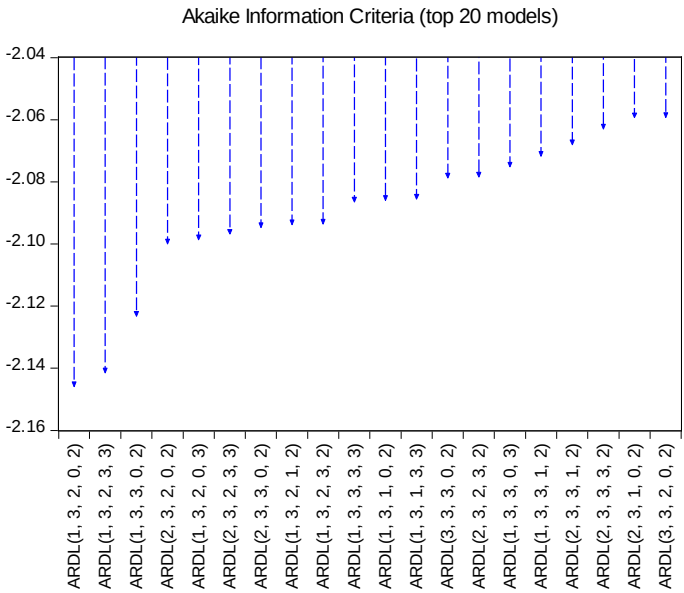


**Figure 1. Lag Length Selection**
Source: own study from Eviews 10.

### Cointegration Test

The next stage is cointegration testing on the model. Pesaran and Shin (1999) suggest that the cointegration test aims to determine whether the variables are not stationary cointegrated or not. The cointegration test used in this study uses the Bound Test approach. In this approach, cointegration can be seen from the F-statistic value with the critical value that has been compiled by Pesaran and Pesaran (1997). There are two asymptotic critical boundary values to test cointegration when the independent variable is integrated at I (d) where ($0 \leq d \leq 1$). The lowest value (lower bound) assumes an integrated regressor at I (0) while the highest value (upper bound) assumes an integrated regressor at I (1).

If the F-statistic value is below the lower bound value, it can be concluded that cointegration does not exist. If the F-statistic value is above the upper bound value, it can be concluded that cointegration exists. However, if the F-statistic is between the lower bound and upper bound values, then the result is inconclusive. Cointegration test results using the bound test approach can be seen in Table 3. Below.

**Table 3. Bound Test for Cointegration**

| Test Statitistic | Value | K |
|---|---|---|
| F Statitistic | 3.953558 | 4 |
| Significance | Critical Value Bonds | |
| | I(0) Bound | I(1) Bound |
| 10% | 2.45 | 3.05 |
| 5% | 2.86 | 3.28 |
| 2.5% | 3.25 | 3.41 |
| 1% | 3.74 | 3.92 |

Source: own computation in Eviews 10.

Cointegration test results based on the bound test approach in Table 4 above shows the F-statistic value of 3.953558. This F statistic value is greater than the highest value (upper bound) at 99% confidence interval, which means there is cointegration of the variables in the model being tested so that there is a short-term to long-term balance in these variables. If the F-statistic value is greater than the highest value (upper bound), then there is cointegration of the variables in the model being tested, which means there is a short-term to long-term balance in these variables.

**ARDL Model Estimation Results**

After having the valid evidence of long-run relationship between FDI and export performance, we applied the ARDL method to estimate the long-run and short-run coefficients. Table 4. shows the results long-run estimations. The estimated coefficients of the long-run relationship are significant for all variables. We can see that in the long-run term equation LFDI has involved a new boost in LEXP, meaning this variable has a positive significant impact on export at 5% and 10%. With the coefficient 0.17, a 1% increase in FDI will cause export to increase by 0.17 in the long run. Likewise for GDP, coefficient 0.99 means a 1% increase GDP will cause export to increase by 0.99 in the long run. In addition, the coefficient of exchange rate and capital (GFCF) implies that a 1% decrease in exchange rate and capital will raise the export to 0.06 and 0.78 in the long-run. The following model is used to check the short-run relationship among the considered variables with the different lag length:

The results of the short-run dynamic coefficients associated with the long-run relationship obtained from equation (11) are given in Table 5. In the short-run, FDI, exchange rate, capital and GDP are significant at the 5% and 10% level and has an important impact of export. The error correction coefficient is negative (-0.30), as required, and is significant at 1% confidence level, so indicates that any deviation from the long-run equilibrium between variables is corrected about 30% for each year. Finally, the diagnostics tests do not shown any problem.

**Table 4. Estimation of long run Coefficient**

| Variables | Coefficient | Std.Error | t-Statistic | Prob |
|---|---|---|---|---|
| C | 13.37401 | 4.212988 | 3.174471 | 0.0042*** |
| LEXP(-1) | -0.301801 | 0.134549 | -2.243061 | 0.0348** |
| LFDI (-1) | 0.175898 | 0.054785 | 3.210707 | 0.0039*** |
| LRER(-1) | -0.060006 | 0.026961 | -2.225640 | 0.0361** |
| LGFCF | -0.783295 | 0.265850 | -2.946382 | 0.0072*** |
| LGDP(-1) | 0.9888875 | 0.428242 | 2.309150 | 0.0303** |

Significant codes: *** significant at level 0.01. ** significant at level 0.05, * significant level at 0.1
Source: own calculation in Eviews 10.

**Table 5 Estimation of short run Coefficient**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 13.37401 | 2.769992 | 4.828177 | 0.0001*** |
| D(LFDI) | 0.140944 | 0.056262 | 2.505147 | 0.0198** |
| D(LFDI(-1)) | 0.121305 | 0.051090 | 2.374349 | 0.0263** |
| D(LFDI(-2)) | -0.150513 | 0.047565 | -3.164363 | 0.0043*** |
| D(LRER) | -0.042553 | 0.013018 | -3.268773 | 0.0034*** |
| D(LRER(-1)) | -0.024784 | 0.012622 | -1.963571 | 0.0618* |
| D(LGDP) | 1.192632 | 0.186657 | 6.389435 | 0.0000*** |
| D(LGDP(-1)) | 0.355306 | 0.069719 | 5.096232 | 0.0000*** |
| ECM(-1)* | -0.301801 | 0.062650 | -4.817226 | 0.0001*** |

Significant codes: *** significant at level 0.01. ** significant at level 0.05, * significant level at 0.1
Source: own calculation in Eviews 10.

### Diagnostic Test and Stability Test

Various diagnostic tests were conducted to confirm the efficiency of the model, as shown in Table 6. The results show that the model is free from serial correlation, functional form, heteroskedasticity problems and is normally distributed (All p_values are greater than critical values of 0.05).

**Table 6 Estimation of short run Coefficient**

| Statistic | | Prob Value |
|---|---|---|
| Serial Corelation Test (LM Test) | F_Statistic: 0.639589 | 0.5984 |
| Normality Test | JarqueBera: 1.469180 | 0.479702 |
| Heteroskedasticity(Breuch-Pagan-Godfrey) | F Statistic: 0.444003 | 0.9271 |

Source: own calculation in Eviews 10.

In addition, based on cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares ofrecursive residuals (CUSUM of squares). The cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMQ) test are applied to assess parameter stability (Pesaran&Pesaran, 1997). Figures 3 and 4 plot the results for both tests. The results indicate the absence of any instability of the coefficients because the plot of CUSUM and CUSUMQ statistic fall inside the critical bands of the 5% confidence interval of parameter stability.

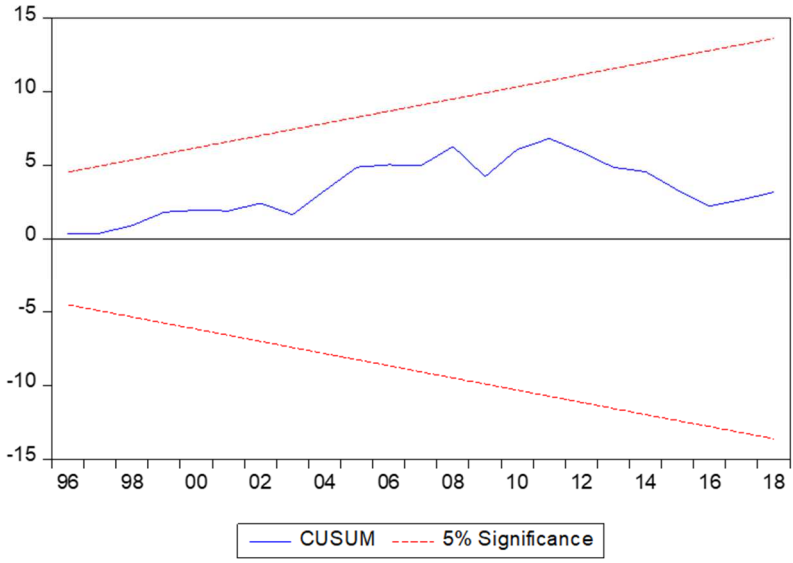


**Figure 2. CUSUM Test**
Source: own study from Eviews 10.

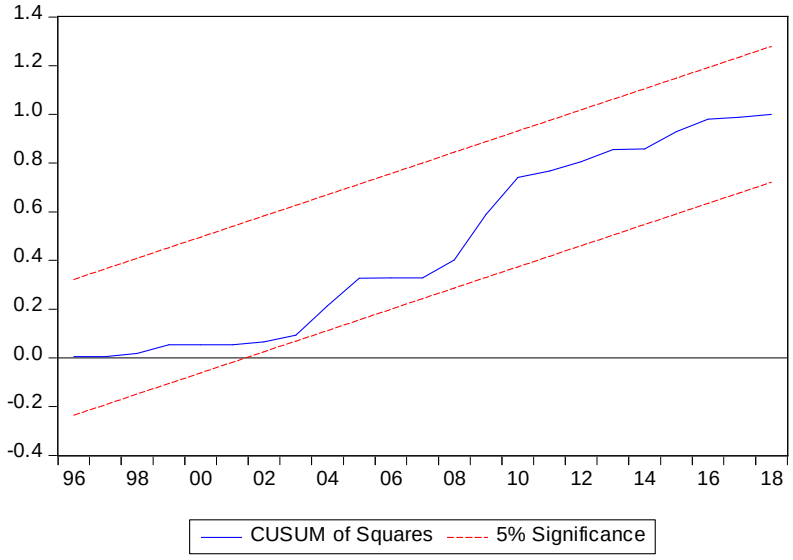


**Figure 3. CUSUM Square Test**
Source: on study from Eviews 10.

### Causality Result

The results of the short-run Granger causality test are shown in Table 10. We see that there is a unidirectional causality relation between export and foreign direct investment with direction from exports and FDI.

**Table 7 Granger Causality Results**

| Null Hypothesis | Direction of Causality | F-Statistic | P-Value |
|---|---|---|---|
| LEXP does not Granger Cause LFDI | LEXP → LFDI | 4.37940 | 0.0116 |
| LGFCF does not Granger Cause LFDI | LGFCF → LFDI | 8.82055 | 0.0003*** |

Significant codes: *** significant at level 0.01. ** significant at level 0.05, * significant level at 0.1.
Source: own calculation in Eviews 10.

## CONCLUSIONS AND POLICY IMPLICATIONS

This study contributes to the recent empirical literature of inward FDI-export nexus. This study finds that ARDL-bound testing co-integration approach confirms that there is long-run relationship between considered variables. Results indicate that there is a positive and significant impact of FDI on exports in long run and the short run. From th eGranger causality test, it is found that there is a unidirectional relationship exists between export and FDI. This implies that inflow of FDI in Indonesia is growing market size determined by high population and economic growth (horizontal FDI).

The result findings presented in this paper have policy implications for Indonesia. For policy-makers who aim to achieve economic growth through export upgrading, policies attracting FDI flows will be effective since the presence and activities of MNCs in host economies potentially lead to capabilities transfer to local firms (Balasubramanyam & Salisu (2001). Moreover, adopting a policy that fosters an environment to promote capabilities transfer and developing will strengthen the positive impacts of FDI on export increasing. Mandating worker training, requiring joint ventures, and local content requirements are examples of policies that can adopt in Indonesia. However, policymakers should keep in mind that FDI may bring a negative consequence on the diversification level of the export sector as the entrance and activity of MNCs might negatively influence domestic producers of lower-productive goods. If policymakers would like to avoid a temporary increase in unemployment rate, they should incorporate policies that encourage MNCs and other domestic firms to hire laid off workers in low-productive domestic industries.

## LIMITATION AND SUGGESTED AREA FOR FUTURE RESEARCH

There are some limitations to this paper and we suggest directions of future research. First, this paper uses the data of export-based on World Bank Data in all goods and services. Therefore, it would be important to recheck the relationship between FDI and export diversification by using different data in each sector.

Secondly, this study makes no reference to how the effects of FDI might differ according to the use and source. Considering the source and destination of FDI can be important as previous studies show that FDI from different sources will have different impacts (Banga, 2006), and that FDI has different impacts in different industries (Lall, 2000). Therefore, the use of more disaggregated data on FDI, if it were available, would improve this study.

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# A review on dynamic capacities in strategic management

**James O. Ayegba, Zhou Lu Lin**

**ABSTRACT**

**Objective:** The essence of strategic management in every enterprise is targeted at creating value and adding competitive advantage for food and beverage enterprise. In the rapidly changing and complex environment, dynamic capacities play an important role in achieving and sustaining competitive advantage. The main aim of this article is to identify the nature and components of dynamic capacities that have significant effect on strategic management.

**Research Design & Methods:** The research method is based on both theoretical and empirical review of literature. The theoretical review of literature is focusing on dynamic capacities and strategic management.

**Findings:** From the empirical review, it was revealed that dynamic capacities and strategic management are very associated as they are embedded in each other. Also, the organizations should take cognizance of innovation and efficient decision making which are revealed to be critical dynamic capacities that do enhance value creation and competitive advantage (strategic management). The aftermath of this is the inevitability of organizational profit.

**Contribution & Value Added:** The organizations should focus on product innovation and efficient decision making to enhance value creation and competitive advantage over their competitors. Future studies may examine the performance of dynamic capacities on enterprise in a technology turbulent situation vis-à-vis the proposition of happenings in the Industry 5.0.

| | |
|---|---|
| **Article type:** | research paper |
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## INTRODUCTION

With the changing dynamics towards the knowledge-based economy, competition in many of the enterprises has become more intense. Several enterprises are espousing different dynamics for marketing to enhance their competitiveness and keep them thriving into the unforeseeable future. Dynamic capacity is the enterprise's ability to methodically solve the challenges of associated with the capacity to predict strengths or opportunities and threats, and be positive about its in-house factors for the purpose of establishing efficient market decisions to transform its resource base.

This concept was at first originated by (Teece, Pisano, & Change, 1994) and was additionally explored by Teece *et al.* (1997),where emphasis was made that an enterprise's competitive advantage in a dynamic environment rests on the enterprises' stock of organizational capacities which makes it possible to deliver a constant stream of innovative products and services to customers (Ouyang *et al.*, 2016). Dynamic capacities the development of the company's organizational capacities by changing its resource underlying base (Eisenhardt & Martin, 2000). Both organizational and dynamic capacities can be called organizational routines, but with different outcomes. Organizational capacities enable services and goods production, whereas dynamic capacities enable development and renewal of organizational capacities.

In view of this, this present study aimed at identifying the nature of dynamic capacities that have significant effect on strategic management based on the review of scholastic studies. It is believed that food and beverage companies in Lagos Nigeria are target of this research. The research method is based on both theoretical and empirical review of literature. The theoretical review of literature focused on dynamic capacities and strategic management.

## LITERATURE REVIEW AND THEORY DEVELOPMENT

### Dynamic Capacity (DC)

The DC concept has been defined in many different ways in various studies. These definitions range from DCs as the ability to meet changes in the external environment (Eisenhardt and Martin, 2000; Lee *et al.*, 2002; Teece *et al.*, 1997; Zahra & George, 2002), DCs as the ability to achieve superior performance (Griffith & Harvey, 2001; Gavrea *et al.*, 2011; Zollo & Winter, 2002), DCs as processes (Eisenhardt &Martin, 2000), and DCs as the ability to create market change (Eisenhardt & Martin, 2000; Marsh & Stock, 2003).

Dynamic capacities (DCs) were developed in order to provide a framework to understand how enterprises achieve and sustain competitive advantage when faced with rapidly changing environmental conditions(Barney & Clark, 2007; Vanella *et al.*, 2013).It was a framework to inform managerial practice and build theory on enterprise performance, (Teece *et al.*, 1997). Interest in research on dynamic capacities has created a study focus on the processes within an enterprise that are aimed at developing and renewing its resource bases (Di Stefano *et al.*, 2010 Teece, 2012; Teece *et al.*, 1997; Wong, 2013).

The key implication of the concept of dynamic capacities is that enterprises are competing not only in terms of their ability to activate and exploit their existing resources and organizational capacities, but also in terms of their ability to renew and develop

them. In today dynamic markets, competitive advantage rests on the ability of an enterprise to renew the capacities and constantly develop, that form the basis for products and services offered (C. H. Lin *et al.*, 2008)Dynamic capacities are enterprise assets that are intangible, which involve identifiable and specific processes, stable and learned patterns of organizational routines and collective activities (Ambrosini & Bowman, 2009; Di Stefano & Verona, 2010; Eisenhardt & Martin, 2000).

**Strategies Embedded in Dynamic Capacities**

Dynamic capacities are adopted as an enterprise exhibits her character of adapting, renewing, reconfiguring and re-creating resources and core capacities to respond to changing business environments (Wang &Ahmed, 2007). New strategies emerge with the combination of those resources and capacities (Eisenhardt & Martin, 2000). These ultimately facilitate the creation of resources that are valuable, rare, inimitable and no substitutable in competing with others. Dynamic capacities thus address a fundamental question of how an enterprise improved performance and builds advantage in a competitive market place (Teece, 2007). (Soriano *et al.*, 2011) state that "dynamic capacities are necessary for identifying practices and business transformation that develop those capacities."(Wilden *et al.*, 2007)Invariably, capability possession, deployment, and upgrading are important for the success of organizations (Luo & Saltzman, 2000; Silva & Araújo, 2016).

Teece (2011) proposed the adoption of dynamic capacities framework to help managers lead their enterprises in highly competitive global markets. This functional and useful framework is universal enough to provide guidance in a variety of situations. It is aimed at providing the intellectual structure for both theoretical and applied analysis of strategic management and other concerns of business managers. Dynamic capacities are directed towards aligning the organization with the environment and strategic change (Zahra *et al.*, 2006). They are further seen as the enterprises' capacities to: sense and shape opportunities, seize opportunities, redeploy and reconfigure (create, extend and modify) their resource base (Teece, 2007). Shaping and sensing opportunities and threats involves searching, scanning and exploration activities across technologies and markets (Teece, 2011; K. Z. Zhou & Wu, 2010).

This obliges the organization to maintain close relationships with customers, suppliers and RandD partners, and to observe best practices in the industry. Seizing opportunities entail the evaluation of existing and emerging capacities, gaining access to investments in relevant designs and technologies that are likely to achieve marketplace acceptance which focuses on taking advantage of opportunities for value creation and competitive advantage (Harreld, *et al.*, 2007; Teece, 2007; Zhuang *et al.*, 2006). The enterprise's capacity to recombine resources and operating capacities reconfigures the resource base which will enable the enterprise to grow, and markets and technologies also to change (,Rothaermel & Hess, 2007; Teece, 2007).

It is the alignment of the assets of the enterprise to achieve the best fit, in order for strategy to be aligned with structure for effectiveness. This is depicted in the Figure 1.

Teece's (2012) framework of dynamic capacities identifies several universal megatrends that influence the contemporary business enterprises operating in hyper competitive environments. This is against the backdrop of the traditional economic mode where competitive advantage is predicated on economies of scale and scope. Other basis for competitive advantage not related to economies of scale is the generation, ownership and

management of intangible assets. According to him, the idea of intangible assets has risen to overshadow economies of scale in importance as an enabling factor for organizations to exert a competitive edge and sustain a successful position. Intangible assets characterize the ideas and overall intellectual capacity and resource of an enterprise which is utilized to run its business and have a competitive edge. Contrasted with tangible assets which are physical, intangible assets are the ideological tools strategically deployed by managers to enhance its operation and remain competitive (Kihara *et al.*, 2016).

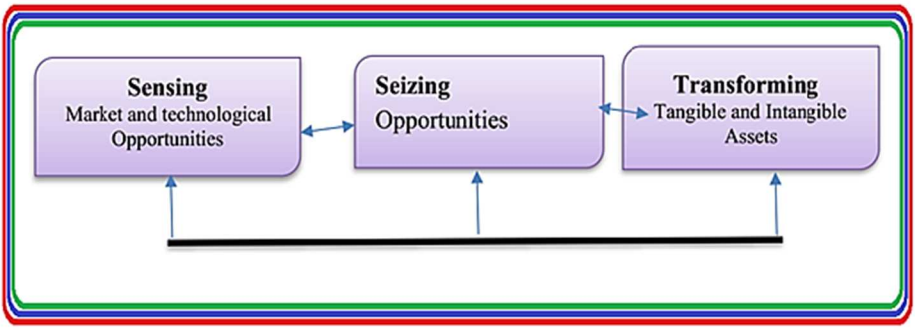


**Figure 1. Dynamic capacity**
Source: Teece (2007).

Teece (2012) stresses intangible assets as a very powerful class of assets with strong implication for establishing and maintaining competitive edge at the level of the enterprise. He identifies several features of intangible assets as hard to build; difficult to manage; difficult to be traded or transferred; costly to transfer and difficult to specify in a contrast. The implications of these features are that intangible assets are more difficult to procure and access than tangible assets. He further identifies two major classes of intangible assets as technological know-how and business model. He further said that these intangible assets ought not to be used alone but combined with other assets and resources for optimal benefits to the organization.

Since of themselves they are not sufficient to yield value, but combined with other intangible assets or physical assets, they are merged as product to yield value for the customer. On this basis, Teece concludes that ownership of resources or the control of complementary assets is necessary for competitive success. As dynamic capability enhances competition, the comprehensive view of the business environment enables enterprises to survive and achieve their potentials.

Teece *et al.* (2007) identified that the attainment of sustainable competitive advantage is a function of enterprise's processes, positions and paths. Dynamic capacities are often characterized as idiosyncratic and unique processes that emerge from individual enterprises with path-dependent histories (Teece *et al.*, 1997). They are identified as complicated routines comprising a variety of processes (Prommarat*et al.*, 2015). They further argued that the competitive advantage of companies lies within their managerial and organizational processes, shaped by specific paths and positions available to them.

Eisenhardt and Martin (2000) perceived dynamic capacities as basically processes in terms of strategic or organizational routines through which enterprises reconfigure their

resources to respond to or create market change. As dynamic capacities enable the enterprise to match its internal strengths with external opportunities through the change of internal resources, they ensure long-term advantages (Teece, 2007). Enterprises that lack dynamic capacities accrue only short-term benefits from their current resource configuration, which may fail to meet market requirements in the future. Dynamic capacities are at the top of many scholars' research agenda owing to the increasing importance of dynamic market environments in the real world (Daniel & Wilson, 2003; Salvato, 2003; Zott, 2003).

## MATERIAL AND METHODS

The research method of this study is based on both empirical analysis of literature. It is pertinent to note that the theoretical review of literature focused on dynamic capacities and strategic management.

### Empirical Literature Analysis

Earlier research approaches, like the resource-based view (Barney, 1991; Penrose & Penrose, 1958), propose matching external organizational opportunities and threats with the internal resources of the company to identify opportunities and risks that will shape unique selling positions. The essence of DCs lies in the emphasis on capacity to renew competencies and to strategically manage internal and external organizational skills, routines and resources as the origin of competitive advantage in changing business environments (Banjongprasert, 2013). Driven by turbulent competition from the 1990s, various enterprises have attempted to identify the approach that drives competitive advantage in line with dynamic markets which is captured in the notion of DCs, it is believed to provide sustainable and superior enterprise performance (Banjongprasert, 2013).

Various literatures reviewed disclose an emerging pattern of what dynamic capacities really are. They are mostly seen as path dependent and intentional processes that are the result of the managerial decision making that has the goal of creating, expanding, or changing enterprise's resource configurations with the intention of achieving a particular end result (Eisenhardt & Martin, 2000). Though DC and RBV are both sharing the same assumptions, DCs is seen different in two main ways; firstly, RBV being static in nature, is insensitive to the environmental change while DCs is concerned with the changing environment. Secondly, RBV theory's focus is on the best way of utilizing the enterprise's resources bundle, unlike DCs that is focusing on the best way to integrate, renew, reconfigure and recreate the resources bundle. It is against this backdrop that Teece *et al.* (1997), from the RBV perspective, an enterprise that create wealth through the selection of rational alternative among the potential set of resource bundle.

On the contrary DCs is designed to create wealth for the enterprises operating under rapid technological change environments with the objective of sustaining competitive advantage by changing the resource base. Dynamism can be defined as the dynamic heterogeneity that characterizes the organizational environment (Pratono *et al.*, 2016). This is manifested by the amount of change in technologies, customer preferences and modes of competition in the enterprise's principle industries (Miller & Singh, 1994). Environmental context can be important to the analysis of resources and performance as diverse environments entail different valuations of resources (Penrose, 1959). Moreo-

ver, Teece and associates (Teece *et al.*, 1997) expound the meaning of dynamic capacities and their importance for achieving competitive advantage in shifting environments. It is suggested that dynamic capacities are ineffective at providing a basis for sustainable competitive advantage Eisenhardt and Martin (2000). Thus, competitive advantage for the potential for lies in the use of dynamic capacities to create enterprise-specific functional competences that contribute to that advantage.

Researchers accept the existence of several hierarchical levels of dynamic capacities and their multidimensional aspect (Ambrosini & Bowman, 2009;Eisenhardt & Martin, 2000; Govender *et al.*, 2002; Teece *et al.*, 1997; Winter, 2003; Zahra *et al.*, 2006). The three (3) capacities levels that are prominent are the higher order capacities, first-order capacities, and zero-order capacities. The zero-order capacities used in the day-to-day processes and operations of enterprises and are often referred to as operational or substantive capacities (Coff & economics, 2003; Helfat*et al.*, 2007; Wang *et al.*, 2006; Zahra *et al.*, 2006; Zaidi *et al.*, 2011).

In this study, the zero-order capacities identified as enterprise's operations constitute the resource base of the company, together with the resource bundles that the company controls or may access easily (Ambrosini & Bowman, 2009). These capacities are sought to act in equilibrium as they do not involve any change in how the enterprise operates (Helfatet *et al.*, 2007), they comprise enterprise's operations, such as manufacturing, marketing, or logistics, and define the ways in which the company makes its living without changing any of its existing procedures. For example, the preparation of an annual marketing plan for an existing product constitutes an operational capability. In contrast, the first-order capacities involve changes in ways the company works and interacts with the markets (Winter, 2003).

The first-order capacities modify the elements of the enterprise's operations and enable the introduction of changes in day-to-day activities through deployment and reconfigurations of existing enterprise's assets, that is, the resource base (Collis, 1994; Helfat*et al.*, 2007; Winter, 2003). The first-order capacities are seen as the leveraging dynamic capacities. While the higher-order dynamic capacities have the ability of modifying and regenerating the leveraging capacities to induce deliberate and targeted change in the way a company makes its strategy (Ambrosini & Bowman, 2009; Winter, 2003; Zahra *et al.*, 2006; Zott, 2003). As the first-order capacities build on the existing resource base, the higher-order capacities are applied in the objective of the extension and the renewal of the resource base. For instance, Winter (2003) calls them game-changing capacities and refers to them as deliberate investments in organizational learning.

They play important roles in sensing and seizing new opportunities and in search and selection of new resources to incorporate them in the resource base of the company. They allow for indirect renewal and enhancement of the enterprise's resource base and without them the leveraging capacities (deploying the existing and available resource base) bear the risk of becoming core rigidities of the company (Ambrosini & Bowman, 2009). The higher-order capacities manifest through the company's learning practices directed towards the development of innovation in its strategic marketing for a swifter recognition of new market opportunities. It equally manifest through the organizational learning and external knowledge absorption (Ambrosini & Bowman, 2009; Cohen & Levinthal, 1990;

Winter, 2003; Zahra *et al.*, 2005), creating network-based opportunities though the relational capability (Capaldo, 2007; Kale & Singh, 2007)), and developing decision-making processes through dynamic managerial capacities (Adner & Helfat, 2003; Winter, 2003) and reside within the company's structure.

Regarding the components of DCs, Wang and Ahmed (2007) identified three component factors which reflect the common features of DC's across enterprises, that is, the absorptive capability and innovative capacity, adaptive capacity. Wang and Ahmed (2007) defined them all. Absorptive capability is the ability to identify and apply external information for commercial means (Cohen & Levinthal, 1990). The enterprises with higher absorptive capability are well able to learn from partners and transform learned knowledge into competences (Chou, 2005; Gavrea *et al.*, 2011). He further sees innovative capacity as a "enterprises' ability to develop new products or markets".

The argument is that these factors explain the confusion behind how resources and capacities can be used to sustain long term enterprise performance (Wang & Ahmed, 2007). Additional contributions discuss enablers and antecedents of dynamic capacities. Ambrosini and Bowman (2009) discuss internal factors and external factors as inhibitors and drivers for dynamic capacity.(Talaja & Horizons, 2013) on the other hand, identified four(4) basic elements of dynamic capacities as new product development capacity, market disruptiveness capacity, new process development capacity, and idea generation capacity.

Idea generation capacity can be explained as the development of new and future ideas for entrepreneurial endeavours. Market disruptiveness capacity refers to the behavior of companies in the context of aggressiveness and persistence in introducing innovation to the market. It indicates the extent to which the company creates the dynamism of the market. New product development capacity is related to the development of new products and services, the quality of new products and services and the variety of new products and services in relation to the largest competitors. New process development capacity refers to the performance of innovation adaptation and process of tackling existing processes with new technology. New product development capability and new process development capacity from the classes made by McKelvie and Davidson (2009) can be seen as parts of innovative capacity considering the definitions from the main authors (Miller & Cardinal, 1994; Wang & Ahmed, 2007).

Ambrosini and Bowman (2009) opined that external factors such as the nature of the market and the enterprises' history for example determine the enterprises' ability to react to market fluctuations. While the internal factors such as managerial behaviour, social capital and trust for example determine the organizations ability to develop DC's. (Eriksson, 2014)also argued that the creation of DCs rests on internal and external antecedents. Internal antecedents; structural and social, and external antecedents; environmental, networks and relationships influence the organization ability to develop and sustain DCs (Eriksson, 2014). There is a large variety of available reviews that explains the variables of the DC. DCs consist of several classes of factors that can help determine an enterprise's distinctive competencies. These factors are processes, positions and paths and they can be considered as the main variables for the theory. Essentially these factors explain the enterprise's DCs and the sources of competitive advantage (Brandenburger *et al.*, 1996; Teece *et al.*, 1997).

Teece *et al.* (1997) explained in their work that DC are processes shaped by paths and positions, and those processes include integration and co-ordination, learning and reconfiguration. While paths and positions are the external and internal forces enabling and constraining DC. The internal position relates to the company's assets which includes; its stock of technological, financial, complementary, reputational, and structural assets. The external position refers to the enterprise vice versa its institutional environment and its markets. Teece *et al.* (1997) explain that the company's position will have a bearing on the company's strategic standing and how competitive advantage could be gained. Processes, positions and paths are the main variables of dynamic capacities, they are subsequently discussed further.

Processes describe of doing things in the enterprise. They comprise three roles (Teece *et al.*, 1997) the first role; coordination/integration is considered a static concept and it presents the idea that managers are in charge of coordinating and integrating activities within the enterprise (Teece *et al.*, 1997). The degree to which internal coordination and integration is effective and efficient can explain the difference between an enterprise's failure and success. Evidence shows that the way in which production is organized and managed can determine the differences in enterprise competences (Teece *et al.*, 1997). An example could be Japanese manufacturing companies like Toyota, which are able to maintain competitive positions in global market places through excellent managerial and production practices such as total quality management (Andersen, 2001; Phan *et al.*, 2011).

The second role; learning, is considered to be a dynamic concept and represents a process by which experimentation and repetition aids things to be done better and more quickly (Teece *et al.*, 1997). Learning involves individual skills and it is organizational and the organizational knowledge brings about learning resides in new patterns of interactions that represents successful solutions to particular problems (Teece *et al.*, 1997). The concept of DC's as coordinative management process provides potential for inter-organizational learning. Collaborations and partnerships can be a driver for organizational learning, enabling the recognition of dysfunctional routines as espoused by researchers (Teece *et al.*, 1997). Ambrosini and Martin (2000) further stated that "learning mechanisms, such as repeated practice guides the evolution of DCs because it helps gain a deeper understanding of processes and thus helps develop more effective routines"(Ambrosini *et al.*, 2009, p.29-49).

The third role is the reconfiguration and transformation, presents the enterprise's ability to be aware of the need to reconfigure the enterprises' asset structure, and the ability to transform internal and external assets (Teece *et al.*, 1997). Organizations need to observe markets constantly to detect progressions in technologies and they need to be willing to adapt these progressions in order to achieve best practices (Teece *et al.*, 1997). Karim (2006), found that "organizational structure reconfiguration was a DC because it enables business units to recombine their resources and to adapt to environmental changes, such as changes in customer demand" (El Gizawi, 2014, p. 289).

Paths refer to the alternatives that are strategically available to the organization, its history and path dependencies. Path dependencies explain that where an enterprises' future lies are a function of its current position and its history. The technological opportunities that an enterprise has depend on how fast the industry is evolving and how fast scientific breakthroughs are being made(Teece *et al.*, 1997).

It can be said that these three variables combined comprise the core model of DCs (Teece *et al.*, 1997). The three factors aid the ability to react to market fluctuations

appropriately and efficiently so as to use resources most efficiently in order to outperform competition. In essence, this can be considered as the main hypothesis of the theory as also stated by(Latif *et al.*, 2018), that DCs have a positive impact on competitive advantage.

The argument behind this idea is that these factors can only provide competitive advantage if they are based on a collection of routines, skills and complementary assets that are difficult to imitate and replicate. The ease of imitation can determine the sustainability of competitive advantage. As discussed earlier, usually these enterprise specific assets cannot be bought, implying that they are embedded within enterprises which limit imitation, making it unique to an enterprise; it enables the enterprise to achieve a competitiveness (Ahmad, Othman, & Lazim, 2014; Teece *et al.*, 1997).

Eisenhardt and Martin (2000) posit that dynamic capability processes comprise specific and identifiable routines which have been researched widely. They suggested several processes that are used as examples of dynamic capacities, such as product development, which combines various skills in cross-functional teams; strategic decision making, which entails pooling of diverse business, functional and personal expertise; and alliance and acquisitions routines, which comprises new resources, before and after acquisition routines and many others. In order to study in an integrated way, the impact of DC on company performance it is useful to abstract from specific processes and routines and to consider broader composite dimensions.

Coordination processes interface and connect single routines through communication, task assignment, scheduling and other related activities. According to Teece *et al.* (1997) the lack of efficient coordinating and combining of different tasks and resources may explain why apparently changes technology have obvious effects on incumbent company and competitive positions in the market. Capability to learn can be conceived of as a main means of attaining renewal strategically. Renewal necessitates organizations to explore and learn new ways while at the same time exploit what they have already learned(Zhou *et al.*, 2020).

Learning is an essential process which through experimentation and repetition leads to the better and quicker resolution of specific problems and at the same time enables the company to see new opportunities in production. Learning processes are multi-level and dynamic (Teece *et al.*, 1997). Although innovative ideas and insight may occur to individuals, but with individually generated knowledge shared within the organization's context, it will be institutionalized as an organizational artefact.

Dynamic capacities have also been found to be an important part in the product innovations and advanced uses of technology in different organizations. It can be realized that the focuses of dynamic capability on the changing needs of both the company as well as its customers and prepares an enterprise accordingly to face the challenges encountered due to the changing business environment. In other words, the concepts of DC help enterprises to adapt to the changes in the business environment. When dynamic capacities (DC) are involved in product technological and innovation changes, the enterprises also get assisted through the solutions available to technical problems and implementation of new processes and techniques (Afuah, 2002; Shylesh *et al.*, 2010;Zhang, 2007)

The greater need and importance of dynamic capacities arise owing to the constant changes that are prevailing in the business environment. Marketing capacities have been

found to have a great positive influence on the economic performance of an organization in the global market.(K.-W. Lin & Huang, 2012) conducted a study on the significance of the dynamic capacities as observed in relation to company performances, enterprise networking and accomplishments of objectives and goals, it may be drawn as a conclusion that DC have a major role to play in the organizational management where the managers and leaders are facilitated in their decision making towards organizational success.

DC can be observed as focusing on various aspects of an enterprise dealing with technological advances and product innovations, handling and facing challenges from the changing business environment as well as improving the performance of the enterprise as a whole. The development of different propositions also reflects the increasing importance of dynamic capacities in organizations that managers are integrating in their strategic management practices all the more from before.

## FINDINGS

Following basic characteristics of the dynamic capacities stand out: dynamic capacities are enterprise-specific, which means solutions to enterprise issues are purposefully carried out by human activity. The solutions are created inside the enterprise, built rather than bought in the market. DCs can be acquired over time on the basis of experience, investments made and knowledge accumulated.

This way, the enterprise is able to react in a timely fashion to the new opportunities and threats arising from the environment and also create external and internal change. Managing the dynamics of the competitive advantage (updating, safeguarding, creation and if needed, dismantle of existing competitive advantage) is realized through resource base modification. This has effect on company performance indirectly, but the impact is not often positive. It is can likewise affect enterprise's performance negatively providing that dynamic capacities have been inadequately developed. Its direct impact on the company's economic performance as their creation, usage generates expenditure and development.

Therefore, in order to achieve the organizational targets, DC should be identified whereas benefits, forecast and collectable costs shall be compared and evaluated; dynamic capacities are unique and inimitable of any business entity or organization. Uniqueness arises from element combination. We can then say that in the key characteristics of organizations DC demonstrate similarities and specifics in terms of details; dynamic capacities seem to be vibrant in turbulent environment though they tend to develop in response to various circumstances, not just environmental changes. They ensure the long-term survival of the company and its progress(Eliasson *et al.*, 2006).

## CONCLUSIONS

The concept of DCs has gained popularity among scholars in the strategic management field. The main objective of DCs is not just to achieve competitive advantage but most importantly is to sustain the competitive advantage under challenging environment. It is a high order-capability usually in the form of intangible (processes / skills / routines / capacities) assets. The intangible processes/skill/routines/capacities can only be the

source of DCs when they are valuable, rarely available in the market, difficult-to-duplicate by competitors, and non-substitutable that grows from path dependency and heterogeneity between enterprises.

The field of strategic management is essentially concerned with how enterprises generate and sustain competitive advantage, while the dynamic capacity perspective emphasizes on improving the capacity of organizations facing rapidly changing environment to create new resources, renew its mix resource. It acknowledges that "the beliefs about organizational evolution and its top management team are fundamental in developing dynamic capacities". With respect to the policy implication, the organizations should focus on product innovation and efficient decision making to enhance value creation and competitive advantage over their competitors. Future studies may examine the performance of dynamic capacities on enterprise in a technology turbulent situation vis-à-vis the proposition of happenings in the Industry 5.0.

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# Factories Europe, Asia, and North America as the main production centres in the 21st century

**Aleksandra Nacewska-Twardowska**

**ABSTRACT**

**Objective:** The paper aims to present how the relations between countries in global value chains (GVC) changed at the beginning of the 21st century.

**Research Design & Methods:** For this purpose, we propose two approaches. The first focuses on presenting data in the form of a matrix of trade flows in domestic value added in intermediate products. The second is related to analyzing the GVC indicator (GVC participation).The analysis uses data from the OECD and WTO Trade in Value Added databases.

**Findings:** The global economy still is not unified. I indicate the existence of 3 major supply chain blocks, which can be called Factories: Factory Europe, Factory Asia, and Factory North America. In the trade of intermediate products, the primary relationships are inter-regional rather than intra-regional. Some countries act as hubs. Germany and the US play the role of regional supply hubs, while China assumes the role of the world supply hub, becoming the largest exporter and importer in GVC activities.

**Contribution & Value Added:** The use of export data in value-added terms instead of gross export data indicates significant differences in the description of world economy trade relations.

**Article type:** research paper

**Keywords:** global value chains (GVC); Factories; major supply chain blocks; gross exports; value-added exports; TiVA

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## INTRODUCTION

Technological progress, along with the fragmentation of production, has led to increased links between economies. As a result, since the end of the 20th century, financial and commercial connections between countries around the world have increased faster than ever before. Economic liberalization, as promoted by major economies and international organizations, favored these changes. The increase in transport possibilities and distance production management meant that, due to price differences in raw material and labor costs, interest in materials and semi-finished products from other countries increased. The effect of these changes has shaped the world economy.

However, the world economy is not stable. The above adjustments are taking place at an ever-faster pace, and, as a result, financial and economic connections between countries are constantly changing. Individual countries adapt their internal policies to the requirements of a transforming world and, in turn, influence other countries. This dynamic structure is continually shifting. In such conditions, individual countries and regions change their position and how they participate in the global economy.

The paper aims to present how the relations between countries in global value chains (GVC) transformed at the beginning of the 21st century. In the literature, one can often find the view that the increase in trade links led to the formation of a unified economy. The analysis of trade data suggests, however, that the global economy consists of trade and production blocks in which individual entities cooperate (see, for example, Baldwin, 2008; Baldwin & Lopez-Gonzales, 2015; Behar & Freund, 2011; Inomata, 2017; Li *et al.*, 2019; Miroudot &Nordstrom, 2019). These trade and production blocks are often called supply chain blocks, and they are also known as Factories.

Analysis of data covering trade exchange shows how relations within and between Factories are shaped. This issue has become particularly interesting in the context of new ways of presenting trade data. Flows of value added in imports and exports make it possible to indicate the real impact of the share of individual countries in exports. This is particularly important in the context of production fragmentation and the occurrence of the 'double counting' of trade.

This paper argues that despite increasing production and trade interdependencies between countries around the world, most trade connections still exist among countries in the direct vicinity. These countries create factories that are connected by regional supply hubs. The analysis of real trade connections is achievable with the use of data on value added trade. The analysis shows how relationships in GVCs are shaped. In this paper, I propose two research methods to look into the relationships within and between Factories. The first focuses on presenting data in the form of a matrix of trade flows in domestic value added in intermediate products. The second is related to analyzing the GVC indicator (GVC participation). The analysis uses data from the OECD and WTO Trade in Value Added databases. Due to the availability of data, the study will be limited to 2005-2015.

The rest of the paper is organized as follows. The next section, entitled Material and Methods, presents fundamental information about GVCs and the trade in value added. This is followed by Results and Discussion, which is divided into two parts: Major supply chains within regions, and Changes in links between Factories. The former describes relationships within the three largest Factories. It presents data on intra-block trade in

2005 and 2015, which makes it possible to show the changes that took place in economic relations within the blocks at the beginning of the 21st century. The second part illustrates the changes that occurred during the same period in relationships between blocks. The final section presents conclusions.

## MATERIAL AND METHODS

### Global value chains

Due to the fragmentation in world production, world trade is increasingly linked to global production chains. Global production chains can be defined as all activities that enterprises must perform to create a product. The concept of production chains defined in this way can be combined with the concept of global value chains. In the first decade of the 21st century, researchers agreed that the terms global commodity chains, value chains, value systems, production networks, and value networks, describe similar conceptions (Gereffi *et al*., 2001).

The activities undertaken within the framework of value chains should include the concept phase as well as all activities that make it possible to deliver the product to the final recipient (De Backer& Miroudt, 2013). Value chains also include all activities connected with the final good after delivery to the final consumer. Automotive corporations are an easy to understand example. In addition to delivering ready-made vehicles, they also provide repair and maintenance services through cooperating dealers. Thus, a typical value chain does not end with simple sales, but it also includes after-sales services. It consists of many activities: design, production, marketing, distribution, and finally, support for the customer.

The globality of the phenomenon is connected with the spread of production between many countries. According to the World Trade Organization, global value chains define the combined production of goods or services in at least two countries (World Trade Organization [WTO], 2014). Simultaneously the term 'value' is combined with adding product value in subsequent production phases.

Due to value layers being added, the problem of correctly presenting and measuring international trade has arisen. Increasingly, in the global economy, we are dealing with a combination of exports with earlier imports. If you want to export, you must first import. The introduction of many stages of production has led to one product being repeatedly exported and imported in various production states. The result is the double-counting of trade. This phenomenon is presented in a simplified way in Figure 1.

Figure 1 presents the production diagram of a product in six different economies. During production in the subsequent countries, new value layers are added to the product. Some of them are the result of domestic production. Some, however, are materials, semi-finished products, or services that first had to be imported in advance. Formed in this way, the global value chain allows the production of a finished product. The schema analysis makes it possible to show the main problem related to the double-counting of exports in traditional trade statistics. In this approach, the global export related to the manufactured product is 210, when, in fact, the export of value added generated in all countries is 100.As a consequence, traditional trade statistics overestimated world trade more than twice.

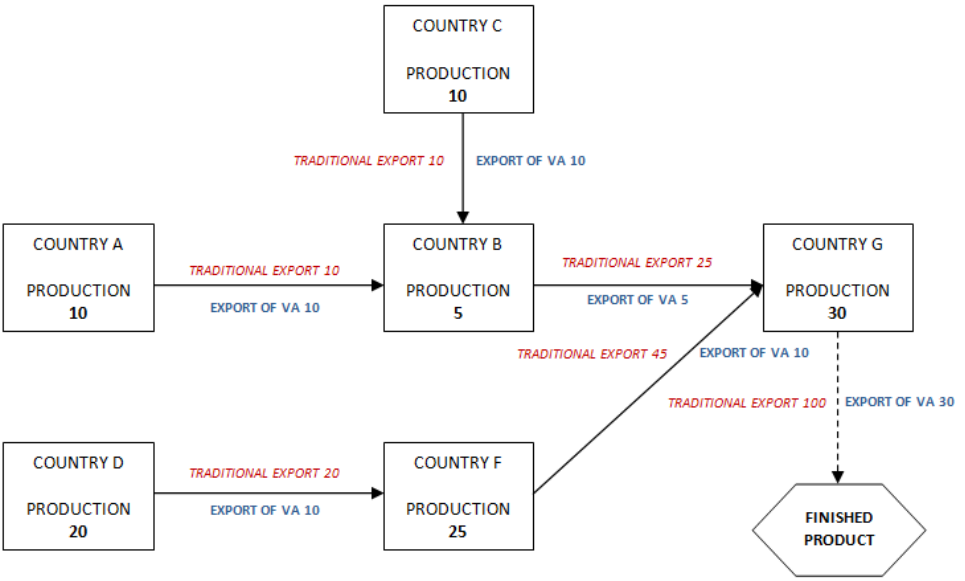



**Figure 1. An example of a global value chain**
Source: own elaboration.

## Value added trade

Analyzing trade in terms of added value shows the real links between economies more accurately. It allows us to specify how much value added generated in a given country goes to another country (Ambroziak, 2018a). The problem, however, lies in the statistical data. It is necessary to use international input-output tables, which are very difficult to construct. The input-output approach of trade flows in value-added terms was described by, inter alia, Koopman *et al*. (2010), Stehrer *et al*. (2012), Folfas (2016), and Ambroziak (2018b). The OECD and WTO presented a conceptual framework for tracking value-added at the beginning of the 21st century. It is possible to decompose any particular product with value V*p* into the value added generated in country *i* such that the total value of:

$$V^p = \sum_i \ VA_i^p \qquad (1)$$

This simple formula becomes more complicated when aggregating up for a group of products or the whole economy. As a result, it is necessary to use data that has been aggregated to some extent. However ,the use of the international input-output table makes it possible to decompose gross trade into value added components (Figure 2).

Figure 2 presents the division of gross export (measured traditionally) for parts related to value added trading: FVA – foreign value added content of exports, and DVA – domestic value added. Value added produced and exported by the reporting country is divided into three fractions (Organisation for Economic Co-operation and Development [OECD], 2016):

– Domestic value added sent to the consumer economy corresponds to the domestic value added embodied either in the final or intermediate goods or services that are directly consumed by the importing economy.

– Domestic value added sent to third economies represents the domestic value added contained in intermediates (goods or services) exported to a first economy that re-exports them to a third economy as embodied in other goods or services.
– Domestic value added re-imported in the economy outlines the domestic value added of exported intermediates or inputs that are sent back to the economy of origin as embodied in other intermediates and used to produce exports.

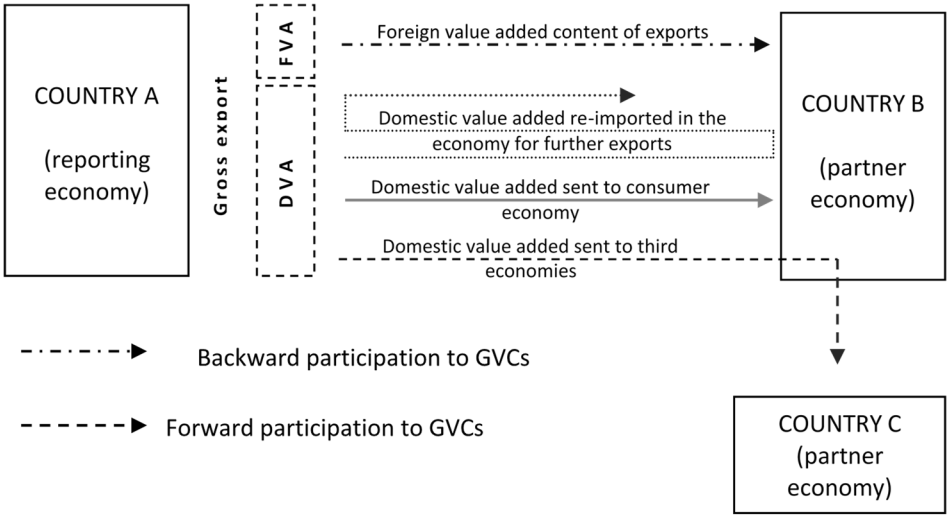



**Figure 2. Division of gross exports into domestic and foreign value added components along with links up and down the supply chain**
Source: own elaboration based on (OECD, 2016).

## RESULTS AND DISCUSSION

### Major supply chains within regions

The concept of global value chains assumes the creation of links between countries that are not necessarily located geographically close. Research on trade relations, however, indicates the functioning of three regional blocks in which links between countries are inter-regional rather than intra-regional (Johnson & Noguera, 2012). These regions can be called Factories and, as Baldwin and Lopez-Gonzales (2015) write, we can distinguish:

– Factory Asia,
– Factory Europe,
– Factory North America.

It is possible to indicate these Factories by presenting trade links in matrix form. Each element of the matrix represents the links between the two countries. To analyze GVC-related exports, it is necessary to separate the value of domestic value added in intermediate goods and services from a country's gross exports. This makes it possible to show the share of a country's exports that consist of domestic value added that is

destined for further production within direct partners' economies – either to meet the partners' final demands or to be embodied in exports by direct partners (OECD, 2019).

Each element of the matrix (Tables1 and 2) shows the domestic value added in gross exports of intermediate products exported by source country (the nation row) to partner country (the nation column) as a share of total world value added in gross exports of intermediate products. To indicate the most important relationships, I have zeroed out any bilateral flows that are less than 0.01% of the share in the global trade of value added in intermediate products. The rows and columns in the matrix are arranged to reflect regions: European Union along with the European Economic Area, then Asia and North America. Finally, there are countries from South America and Africa.

**Factory Europe**

In the upper left corner of the matrices in Tables 1 and 2, a rectangle with European Union countries is presented along with the European Economic Area countries. Analyzing the relationships of the countries in rows, the countries with the largest share in the export of intermediate products are Germany and France. However, their share in the export of domestic value added in intermediate products in Europe globally decreased between2005 and 2015. A similar trend can be seen in other countries in the region. Poland and the Czech Republic stand out against this tendency, significantly increasing their share in the export of domestic value added in intermediate products to Germany.

Analyzing the countries by column shows which ones mostly import foreign value added in intermediate products. In the case of Factory Europe, Germany is such a country. It is the largest export market of domestic value added in intermediate products for other European countries. Analyzing the position of Germany in a broader context, it can be pointed out that it is a country in Europe that acquires the most intermediate products for internal production. To sum up Factory Europe, inter-regional relations prevail.

**Factory Asia**

Interesting changes have taken place inside Factory Asia. It is represented by a rectangle in the middle of the matrix in Tables 1 and 2. Analyzing source countries of domestic value added in intermediate products, there is a noticeable decrease in the importance of Japan as an exporter for South Korea, Taiwan, and Thailand. Over the past 10 years, China's exports have increased significantly to India and South Korea. At the same time, almost all countries increased their exports of domestic value added in intermediate products to China.

Japan's share as a recipient country of exports from other Factory Asia countries also decreased in the analyzed period. The most significant increase in the share was noticeable in China, but also in India and South Korea. Summarizing the changes in Factory Asia, the shift in inter-regional trade from Japan to China is noticeable.

**North America**

In the North America Factory, the leading trade partner in domestic value added in intermediate products is the USA. On the one hand, it is the largest exporter of domestic value added intermediate products to Canada and Mexico. At the same time, both Canada and Mexico mainly export domestic value added of intermediate products to the USA. At the beginning of the 21st century, there was a decrease in inter-regional trade, but still, Factory Asia is the region that internally cooperates the most (Tables 1 and 2).

**Table 1. Domestic value added in gross exports of intermediate products as a share of total world value added in gross exports of intermediate products in selected countries[1] in2005**

| | AUT | BEL | FRA | DEU | IRL | ITA | NLD | PRT | ESP | SWE | GBR | CHE | CHN | IND | KOR | JPN | TWN | THA | AUS | CAN | MEX | USA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUT | | | | 0.81 | | | | | | | | | | | | | | | | | | |
| BEL | | | 0.34 | 0.26 | | | 0.17 | | | | 0.14 | | | | | | | | | | | |
| CZE | | | | 0.37 | | | | | | | | | | | | | | | | | | |
| DNK | | | | | | | | | | 0.15 | | | | | | | | | | | | |
| FRA | | 0.12 | | 0.59 | | 0.45 | | | 0.34 | | 0.36 | | | | | | | | | | | 0.34 |
| DEU | 0.16 | | 0.60 | | | 0.44 | 0.12 | | 0.15 | | 0.36 | 0.18 | | | | | | | | | | 1.02 |
| HUN | | | | 0.19 | | | | | | | | | | | | | | | | | | |
| IRL | | | | | | | | | | | 0.23 | | | | | | | | | | | 0.40 |
| ITA | | | 0.49 | 0.40 | | | | | 0.17 | | 0.17 | | | | | | | | | | | 0.38 |
| NLD | | 0.26 | 0.11 | 0.62 | | | | | | | 0.20 | | | | | | | | | | | 0.20 |
| POL | | | | 0.46 | | | | | | | | | | | | | | | | | | |
| PRT | | | | | | | | | 0.22 | | | | | | | | | | | | | |
| ESP | | | 0.43 | 0.20 | | 0.13 | | 0.12 | | | 0.22 | | | | | | | | | | | |
| SWE | | | | 0.12 | | | | | | | | | | | | | | | | | | 0.18 |
| GBR | | | 0.27 | 0.51 | 0.18 | 0.13 | | | 0.12 | | | | | | | | | | | | | 1.35 |
| NOR | | | 0.22 | 0.11 | | | | | | | 0.74 | | | | | | | | | | | 0.12 |
| CHE | | | | 0.41 | | | | | | | | | | | | | | | | | | 0.15 |
| ISR | | | | | | | | | | | | | | | | | | | | | | 0.26 |
| RUS | | | | 0.14 | | 0.12 | | | | | | | 0.17 | | | | | | | | | 0.18 |
| CHN | | | | | | | | | | | | | | | 0.27 | 0.89 | | | | | | 3.79 |
| HKG | | | | | | | | | | | | | 0.35 | | | | | | | | | |
| IND | | | | | | | | | | | | | | | | | | | | | | 0.51 |
| IDN | | | | | | | | | | | | | | | | 0.42 | | | | | | 0.11 |
| KAZ | | | | | | | | | | | | | | | | | | | | | | |
| KOR | | | | | | | | | | | | | 1.91 | | | 0.19 | | | | | | 0.60 |
| MYS | | | | | | | | | | | | | 0.18 | | | | | | | | | 0.20 |
| JPN | | | | | | | | | | | | | 1.70 | | 0.61 | | 0.40 | 0.10 | | | | 3.11 |
| PHL | | | | | | | | | | | | | | | | | | | | | | |
| SAU | | | | | | | | | | | | | 0.11 | 0.54 | 0.16 | 0.43 | | | | | | 1.05 |
| SGP | | | | | | | | | | | | | 0.11 | | | | | | | | | |
| TWN | | | | | | | | | | | | | 2.16 | | | 0.11 | | | | | | 0.38 |
| THA | | | | | | | | | | | | | 0.13 | | | 0.13 | | | | | | 0.18 |
| VNM | | | | | | | | | | | | | | | | | | | | | | |
| AUS | | | | | | | | | | | | | | | | | | | | | | |
| NZL | | | | | | | | | | | | | | | | | | | 0.10 | | | |
| CAN | | | | | | | | | | | | | | | | | | | | | | 22.41 |
| MEX | | | | | | | | | | | | | | | | | | | | | | 9.71 |
| USA | | | 0.12 | 0.25 | | | | | | | 0.30 | | 0.26 | | 0.19 | 0.67 | | | | 2.83 | 1.30 | |
| BRA | | | | | | | | | | | | | | | | | | | | | | 0.70 |
| CHL | | | | | | | | | | | | | 0.10 | | | | | | | | | 0.12 |
| COL | | | | | | | | | | | | | | | | | | | | | | 0.60 |
| PER | | | | | | | | | | | | | | | | | | | | | | 0.22 |
| ZAF | | | | | | | | | | | | | | | | | | | | | | |

Source: own elaboration based on TiVA Database (OECD, 2020).

[1] Explanation of acronyms: AUT – Austria; BEL – Belgium; CZE – Czech Republic; DNK – Denmark; FRA – France; DEU – Germany; HUN – Hungary; IRL – Ireland; ITA – Italy; NLD – Netherlands; POL – Poland; PRT – Portugal; ESP – Spain; SWE – Sweden; GBR – United Kingdom; NOR – Norway; CHE – Switzerland; ISR – Israel; RUS – Russian Federation; CHN – China (People's Republic of); HKG – Hong Kong (China); IND – India; IDN – Indonesia; KAZ – Kazakhstan; KOR – Korea; MYS – Malaysia; JPN – Japan; PHL – Philippines; SAU – Saudi Arabia; SGP – Singapore; TWN – Chinese Taipei; THA – Thailand; VNM – Viet Nam; AUS – Australia; NZL – New Zealand; CAN – Canada; MEX –Mexico; USA – United States; BRA – Brazil; CHL – Chile; COL – Colombia; PER – Peru; ZAF – South Africa.

**Table 2. Domestic value added in gross exports of intermediate products as a share of total world value added in gross exports of intermediate products in selected countries in 2015**

| | AUT | BEL | FRA | DEU | IRL | ITA | NLD | PRT | ESP | SWE | GBR | CHE | CHN | IND | KOR | JPN | TWN | THA | AUS | CAN | MEX | USA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUT | | | | 0.68 | | | | | | | | | | | | | | | | | | |
| BEL | | | 0.26 | 0.21 | | | 0.14 | | | | | | | | | | | | | | | |
| CZE | | | | 0.39 | | | | | | | | | | | | | | | | | | |
| DNK | | | | | | | | | | | | | | | | | | | | | | |
| FRA | | 0.12 | | 0.49 | | 0.16 | | | 0.14 | | 0.22 | | 0.16 | | | | | | | | | 0.20 |
| DEU | 0.12 | | 0.45 | | | 0.16 | | | | | 0.29 | 0.16 | 0.53 | | | | | | | | | 0.71 |
| HUN | | | | 0.17 | | | | | | | | | | | | | | | | | | |
| IRL | | | | | | | | | | | 0.20 | | | | | | | | | | | 0.34 |
| ITA | | | 0.21 | 0.29 | | | | | | | | | | | | | | | | | | 0.26 |
| NLD | | 0.15 | | 0.52 | | | | | | | | | | | | | | | | | | 0.11 |
| POL | | | | 0.56 | | | | | | | | | | | | | | | | | | |
| PRT | | | | | | | | | 0.12 | | | | | | | | | | | | | |
| ESP | | | 0.29 | 0.17 | | | | | | | 0.12 | | | | | | | | | | | |
| SWE | | | | | | | | | | | | | | | | | | | | | | |
| GBR | | | 0.20 | 0.31 | 0.18 | | | | | | | | | | | | | | | | | 0.86 |
| NOR | | | | 0.21 | | | | | | | 0.33 | | | | | | | | | | | |
| CHE | | | | 0.37 | | | | | | | | | | | | | | | | | | 0.26 |
| ISR | | | | | | | | | | | | | | | | | | | | | | 0.34 |
| RUS | | | | 0.23 | | 0.22 | | | | | | | 0.53 | | | | | | | | | 0.11 |
| CHN | | | | 0.14 | | | | | | | | | | 0.19 | 0.49 | 0.75 | | | | | 0.18 | 6.15 |
| HKG | | | | | | | | | | | | | 0.33 | | | | | | | | | |
| IND | | | | | | | | | | | | | 0.12 | | | | | | | | | 0.89 |
| IDN | | | | | | | | | | | | | 0.32 | 0.15 | | 0.19 | | | | | | |
| KAZ | | | | | | | | | | | | | 0.14 | | | | | | | | | |
| KOR | | | | | | | | | | | | | 4.49 | | | | | | | | | 0.44 |
| MYS | | | | | | | | | | | | | 0.71 | | | | | | | | | |
| JPN | | | | | | | | | | | | | 2.64 | | 0.25 | | 0.13 | | | | | 1.21 |
| PHL | | | | | | | | | | | | | 0.35 | | | | | | | | | 0.10 |
| SAU | | | | | | | | | | | | | 0.76 | 0.24 | 0.19 | | 0.11 | | | | | 0.45 |
| SGP | | | | | | | | | | | | | 0.29 | | | | | | | | | |
| TWN | | | | | | | | | | | | | 4.09 | | | | | | | | | 0.18 |
| THA | | | | | | | | | | | | | 0.51 | | | | | | | | | 0.13 |
| VNM | | | | | | | | | | | | | 0.19 | | | | | | | | | 0.14 |
| AUS | | | | | | | | | | | | | 2.64 | | | 0.39 | | | | | | |
| NZL | | | | | | | | | | | | | 0.11 | | | | | | | | | |
| CAN | | | | | | | | | | | | | 0.20 | | | | | | | | | 14.52 |
| MEX | | | | | | | | | | | | | | | | | | | | | | 7.64 |
| USA | | | 0.11 | 0.22 | 0.11 | | | | | | 0.20 | | 1.91 | | 0.18 | 0.35 | | | | 2.11 | 1.18 | |
| BRA | | | | | | | | | | | | | 0.80 | | | | | | | | | 0.40 |
| CHL | | | | | | | | | | | | | 0.55 | | | | | | | | | |
| COL | | | | | | | | | | | | | | | | | | | | | | 0.54 |
| PER | | | | | | | | | | | | | 0.25 | | | | | | | | | |
| ZAF | | | | | | | | | | | | | 0.32 | | | | | | | | | |

Source: own elaboration based on TiVA Database (OECD, 2020).

### Changes in links between Factories

The changes that have occurred in the export of domestic value added in intermediate products between 2005 and 2015 are also presented in Table 3. The matrix cells in which there is a decrease in shares between 2005 and 2015 are marked in red; an increase is

marked in green. Countries with the largest number of connections between different regions are the USA, China, and Germany. They are regional supply hubs that are responsible for intra-regional trade in domestic value added in intermediate products.

The beginning of the 21st century is characterized primarily by the growing importance of China as the leading centre to which other countries export their semi-finished products. From Factory Europe, the main exporter is Germany and then France; from Factory North America, it is the USA and, to a lesser extent, Canada. In addition to China, several countries from South America (Brazil, Chile, Peru) and also South Africa, Australia, and New Zealand export domestic value added in intermediary products.

Between 2005 and 2015, the USA reduced the share of domestic value added imports in intermediate products from most partners, with the exception of Switzerland, Israel, China, India, the Philippines, and Vietnam. At the same time, as an exporter of domestic value added in intermediate products, the US's share also fell. An increase appeared only in trade with China and Ireland. This demonstrates the relative decline in the importance of the US in global value chains.

In Factory Europe, Germany is primarily associated with other Factories. As an exporter of domestic value added in intermediate products, it trades mainly with China and the United States. However, it should be emphasized that trade with the latter decreased at the beginning of the 21st century. In Europe in 2015, in addition to Germany, the United Kingdom, Ireland, Italy, Switzerland, and France had trade relations above 0.1% in the global trade of domestic value added in intermediate products from the USA. However, in the analyzed period, the share of these countries in intra-regional trade decreased significantly.

The second approach to present links within and between Factories is to analyze the GVC participation index of countries in inter- and intra-regional trade. Fundamental indicators were introduced by Koopman *et al*. (2010) and the United Nations Conference on Trade and Development (UNCTAD, 2013). They proposed a general GVC participation index:

$$GVC_{participation} = \frac{FVA+IDVA}{Export_{gross}} \tag{2}$$

It is the sum of foreign value added in exports and indirect domestic value added in relation to gross exports. The larger the indicator, the higher the country's share in the global value chain.

In connection with extending international input-output tables, it is now possible to use the information on domestic value added in intermediate products instead of indirect domestic value added. This approach makes it possible to capture all links within the GVC more accurately:

$$GVC_{participation} = \frac{FVA+DVA_{intermediate\ products}}{Export_{gross}} \tag{3}$$

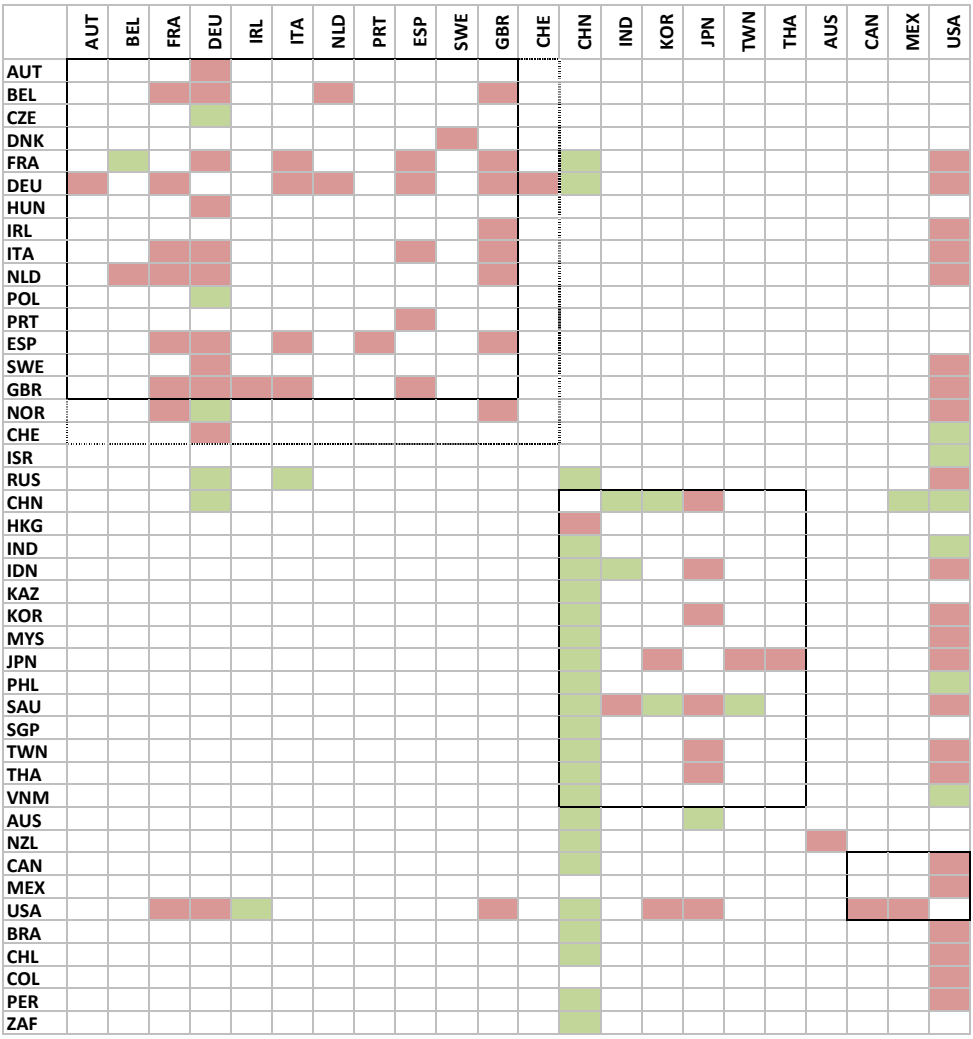
where (OECD, 2019):

$$Export_{gross} = \sum_{\mathrm{p}} \mathrm{EXGR}_{\mathrm{c,i,p}} \tag{4}$$

Country *c*'s total gross exports for industry *I* are directly calculated from the OECD's annual Inter-Country Input-Output tables by summing the exports of intermediate goods and services and the exports of final demand goods and services.

$$\mathrm{FVA}_{\mathrm{c,i}} = V_c B_c EXGR_{c,i} \tag{5}$$

**Table 3. Change in domestic value added in gross exports of intermediate products as a share of total world value added in gross exports of intermediate products in selected countries between 2005 and 2015**




Notes: The matrix cells in which there is a decrease in the years 2005-2015 are marked in red; an increase is marked in green. Countries from Figures3 and 4 are analyzed.
Source: own elaboration based on TiVA Database (OECD, 2020).

The foreign value added content of gross exports captures the value of imported intermediate goods and services that are embodied in a domestic industry's exports.

$$\mathrm{DVA}_{\mathrm{c,i,p}} = V_c B_{c,c} EXGR_{c,i,p} \tag{6}$$

The domestic value added content of exports, by industry *i* in country/region *c* to partner country/region *p*, represents the exported value added that has been generated anywhere in the domestic economy.

For:

V - value added to output ratio, where $v_i^p = w_i^p / x_i^p$ is the ratio of value added to gross output by industry *i* in country *p*;

B - Leontief inverse, or "output multipliers", $B = (I - A)^{-1}$, where the element $bijps$ shows the direct and indirect requirements of inputs from industry *i* in country *p* for the production of one unit of output for demand by industry *j* in country *s*.

Figure 3 presents changes in Factories and their participation by geographic region in three major supply chain blocks and the rest of the world (ROW). The decomposition across regions in each Factory is represented by two bars for the years 2005 and 2015.

**Factory Europe**

Among all the analyzed supply chain blocks, Factory Europe is characterized by the largest share of inter-regional trade in total GVC participation. However, this share decreased by almost 10% in the analyzed period. As a result, the importance of inter-regional trade with Factory Asia and ROW increased, while the importance of Factory North America remained unchanged.

**Factory Asia**

Although Factory Asia had the most intra-regional trade in total GVC participation in 2005, the importance of other regions dropped slightly in 2015. The decrease in links under GVC can be seen primarily in relation to Factory North America and Factory Europe.

**Factory North America**

As in the case of Europe, in Factory North America, the share of inter-regional trade in total GVC participation decreased. At the same time, the relationship between America and Europe decreased. However, the links between GVC and Factory Asia and ROW became more important (relative growth of approximately 51% and 43% in 2015, respectively, compared to 2005).

## CONCLUSIONS

In this paper, I presented how world production changed and influenced global production chains at the beginning of the 21st century. To illustrate this change, I used data on domestic value added in intermediate products. Thanks to the presentation of data in the matrix, in which countries have been geographically arranged, three main production centers – Factories – can be distinguished.

Analyzing the data indicates that international trade in intermediate products is primarily inter-regional, not global. Most intermediate product trading takes place inside major supply chain blocks (Factories). With the spread of economic integration in the region, inter-regional GVC connections intensify. In Europe and North America, however, there is a noticeable trend in the increasing internationalization of production chains, because the share of inter-regional exchange had decreased in 2015 compared to 2005. The opposite trend is true in Asia, where inter-regional trade increased slightly.

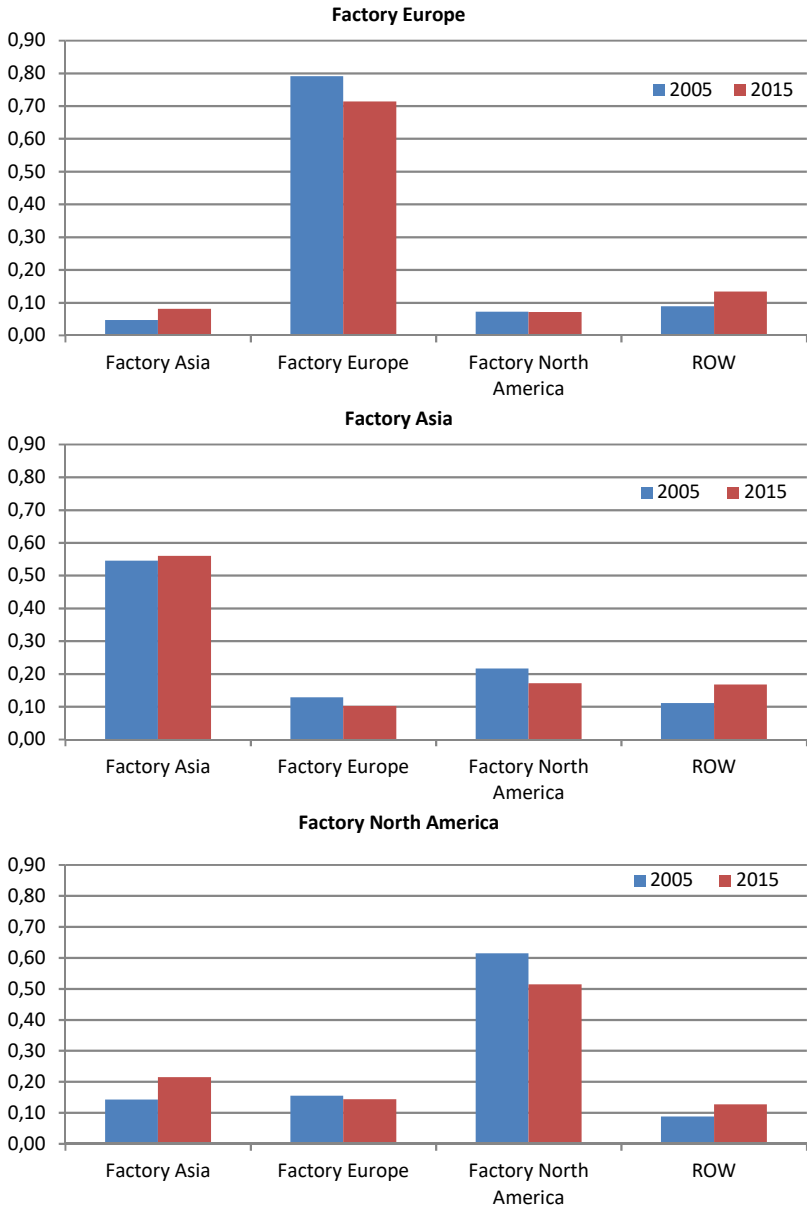



**Figure 3. Share of intra-and inter-regional GVC participation in 2005 and 2015**
Source: own elaboration based on (OECD, 2016).

Individual Factories participate in global value chains through regional supply hubs. In Europe and North America, they are Germany and the USA, respectively. In Asia, China currently plays a major role. In the analyzed period, China became the most significant partner in intra- and inter-regional domestic value added trade in intermediate products.

Its role has grown not only in Asia, but it can be said that it is becoming a world supply hub.

The research is limited by access to statistical data. On the one hand, it should be remembered that the international input-output tables are generalized to some extent. On the other hand, geographical and, above all, temporal coverage prevents ongoing analysis. Further work on analyzing global production chains can be carried out in different directions. First of all, when newer statistics appear, it would be possible to check whether trends from 2005-2015 persist. Secondly, the participation and position of individual countries in the GVC is worth examining. And in the context of current changes in the global economy, such as the trade war between China and the US, or the COVID-19 pandemic, it might be interesting to see how global value chains are evolving. Has China maintained its position as a world supply hub?

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# When the successor becomes the true leader of a family business?

**Alicja Hadryś-Nowak**

**ABSTRACT**

**Objective:** The aim of presented paper is to try to answer to the questions: what are the factors that facilitate or inhibit the process of becoming the leader for international family business, and what are the major successor's characteristics enabling successor to be a true leader of international family business?

**Research Design & Methods:** The in-depth interview method was used.

**Findings:** Successor's characteristics such as: integrity, commitment to the family and family business, ability to command the respect of the personnel, decisiveness and interpersonal skills, proved to be relevant.

**Contribution & Value Added:** With the study, author aim to contribute to a better understanding of factors connected with successor's passage from manager to leader in international family business. the successors need to feel responsibility for the family. Secondly, he/she should has the deciding power in some part of the business. As case study shows, conflicts and interactions between family members, when well-managed, might be source of new ideas and solutions. Next to qualifications and constant learning and improving skills, there is also a need for being open minded and ready to change.

| | |
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| **Keywords:** | succession process; successor; family business; business transfers; generational change |
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## INTRODUCTION

Leadership succession is a significant challenge for all family businesses. Despite this many family businesses do not have clear plans nor systematic processes for implementation trans-generational change (Fang *et al.*, 2015). Some family business owners believe that succession is natural process and successors became leaders naturally. If that was it, then

more than 30% would survive the first generation, around 15% would survive to the third generation, and more than 3% would survive to the fourth generation (Vera & Dean, 2005). Although, research has been dedicated to family business succession and preparing successors, there is still no in depth research showing the path needed to cross from successor to be a true leader in family firm. The idea that a family business succession can have an impact on the financial structure and performance of a firm should be no surprise given that a business transfer is one of the most important and critical events in the life cycle of family firm. It is therefore important to study business transfers. This can lead to more insights into best practices regarding how to carry out a succession and on the way in which the business is expected to change because of the transition event. Martin and Lumpkin (2004) find that in successive generations entrepreneurial orientation tends to diminish and give way to family orientation, as stability and inheritance concerns become the business's principal drivers. Central in the succession process is that the management of the family business end up in the hands of a competent and well-motivated successor. Succession process has the potential to disrupt and even to destroy successful businesses, irrespective of their financial or market power (Bozer *et al.*, 2017) but in some cases a succession, particularly when an successor is involved, can lead a family business to new markets, new ways of acting and thinking (Graves & Thomas., 2008; Ibrahim *et al.*, 2001; Menendez-Requejo, 2005). Assuming the topic of succession is one of the most critical challenges in the family business literature, this paper attempts to address the factors that act as driving forces for the successor to become a leader of international family businesses. The following research questions are posted:

**RQ1:** What are the factors that facilitate or inhibit the process of becoming the leader for international family business?

**RQ2:** What are the major successor's characteristics enabling successor to be a true leader of international family business?

Succession planning has scope for the personal approach especially exploring people's stories and narratives and case histories. Working with individuals or small groups in an in-depth interview is the type of research needed in this area. That is why a qualitative approach was used.

## LITERATURE REVIEW

Author selected agency and stewardship theory as the theoretical framework. The conceptual domain of agency theory is one of the dominant organisational theory perspectives applied in current family business research (Chrisman *et al.*, 2010, 2010). According to agency theory (Jensen & Meckling, 1976), agency costs generally arise due to individuals' self-interest and decision making based on rational thinking and oriented toward own preferences. With more people involved in decision-making, such as through the separation of ownership and management, agency costs occur due to different preferences and information asymmetries between the owner (principal) and the employed management (agent) (Jensen & Meckling, 1976). In other words, agents take decisions based on their individual preferences (e.g., short-term, financial gains) instead of the owners' preferences (e.g., long-term, sustainable development). For this research, the principal-principal approach was used. This constellation also raises problems determining who is responsible

and has the power to control and make decisions (Morck, & Yeung, 2003). In family firms, this situation can additionally be complicated by the emotional and relational attitudes of the involved family members (Gómez-Mejia *et al.*, 2007; Schulze *et al.*, 2003), which can eventually lead to a suboptimal economic outcome overall (Shukla *et al.*, 2014). To delimit agency theory from other theoretical approaches, an often opposed and more collectivistic theory from the economic literature is stewardship theory (Davis *et al.*, 1997). The stewardship perspective addresses the behaviour of controlling family firm owners that behave as far seeing stewards and are guided by superior organisational goals (Sharma, 2004). Several authors discuss the applicability of agency theory in comparison to stewardship theory in family firms and argue that both theories contribute important insights to the knowledge about family firms (Chrisman *et al.*, 2007; Corbetta, & Salvato, 2004; Eddleston, & Kellermanns, 2007; Kraus, Märk, & Peters, 2011; Le Breton-Miller, Miller & Lester, 2011). Stewardship theory states that the agents ("stewards") behave socially, in a self-actualizing manner and with an attitude postulating psychological ownership (Pierce *et al.*, 2001). It recognizes that many family leaders are loyal stewards of their firms, contributing to firm performance through citizenship behaviors (Drakopoulou *et al.*, 2015. Banalieva and Eddleston (2011) believe that kinship, a shared family name, and common history promote a shared identity that allows family leaders to build an enduring reputation and social capital that can be passed from one generation to the next. Presented case study will show that at the beginning of their career path, successors may act as an agent in family business. However, to become true leaders transformation to "stewards" is needed. Author will try to capture factors needed to this passage from agent to steward.

Succession is a key determinant of generational continuity. However, succession is not just a step of passing the baton, but instead it is a process that develops over several stages that evolve over time and, in some cases, begin even before the successor enters the business (Handler, 1994). Given the importance of continuity in the family business, the succession process has drawn the attention of researchers who have tried to identify those variables driving an effective succession. It has been predominantly studied through the lens of single organizational source, such as incumbents, successors, and nonfamily employees (Decker *et al.*, 2017). The succession process encompasses a number of factors which are usually associated with both the predecessor and successor. Due to the purpose of the article, issues relating mainly to the successor will be discussed. Among these factors, quality, harmony of family relations, organizational culture and succession planning have been emphasized in relevant literature. After a qualitative study with 32 family businesses, Handler (1994) found that mutual respect and a common vision between the founder and successor are very important components of an effective succession. Several authors also stress the importance of personal and professional realization of family members (Dunn, 1995). Existing research on the impact of a succession on the performance of a family firm is still inconclusive. Some authors argue, that performance is lower of next-generation family firms, others come to opposite conclusions. Moving from one generation to another, means goal change, which can result in stagnation. First generation family firms are more business oriented than are later generation firms, which are more family oriented, and firms with a business orientation have a higher capacity to grow (Dunn, 1995; Cromie *et al.*, 1995; Reid *et al.*, 1999). Similarly, Martin and Lumpkin (2004) find that in successive generations entrepreneurial orientation tends to diminish and give way to family orientation, as stability

and inheritance concerns become the business's principal drivers. Davis and Harveston (I998, 1999) further show that the "generational shadow" cast by the founder is much greater than the generational shadow cast by subsequent generations. They state that the transition between the founder and the second generation can often be seen as the most difficult and turbulent one. Lately, business literature has increased its interest in the way of top managers play an essential role in shaping organizational outcomes (Carpenter at all.,2004; Hambrick & Mason, 1984; Loane, Bell, & McNaughton, 2007). According to Hambrick (2007) the best way to understand why organizations do and/or perform the things they do, it is fundamental to consider the biases and dispositions of their most powerful actors – their top executives. The base of these assumptions is on the upper echelons theory proposed by Hambrick and Mason (1984). It is based on the idea that managerial characteristics can be a useful measure to predict organizational outcomes. This theory argues that executives act on the basis of their personalized interpretations of the strategic situations they face, influenced by their cognitive base and their values. It indicates a person's values, skills, knowledge base and information processing abilities influences the decision-making process (Hambrick, 2007). Overall, based on the above literature, the negative effect of succession on firm performance is expected to occur unless the successor is a true family business leader not only appointed manager.

Successors strongly supported the notion that early exposure to the family business had a positive effect on their commitment to adopt a leadership role (e.g. Klein *et al.*, 2005). Internal exposure was a greater benefit for them than working outside the family business, because it facilitated idiosyncratic family-business knowledge transfer. All successors highlighted higher education as potentially beneficial to succession, especially if that education was relevant to the business (see Morris *et al.*, 1997). Both successors and incumbents acknowledged that established protocols, formalized structures, and family culture helped nurture a successful succession (e.g. Cabrera-Suárez *et al.*, 2001). Successors also noted the importance of an accepting, open, transparent communication structure between the incumbent and themselves. However, successor and incumbent perceptions of the value of consistent, formalized structures differed significantly. Successors viewed these characteristics as potential barriers to establishing a leadership style and culture and a hurdle for a successful succession. Additionally, unlike incumbents, who viewed nonfamily members' influence as a possible dilution of the FBS characteristics (Ensley & Pearson, 2005), successors placed importance on the influence of nonfamily employees in the succession process and viewed their contributions as making a positive impact on their succession.

As this study was conducted in Poland, some specificities of this institutional context need to be pointed out. The Polish context is very interesting because with the collapse of the old regime in 1989, the outburst of entrepreneurship resulted in the creation of numerous family businesses which became the backbone of the blossoming free-market economy (Bednarz *et al.*, 2017; Campbell & Jerzemowska, 2017). In 1989 the system changed and private business became legal which resulted in setting up private enterprises at a massive scale. It was the period when many family-owned businesses came into being. A vast majority is still operating and in good condition. Within the framework of these studies the distribution of family-owned businesses in Poland was checked. The majority of them are the micro firms which have been operating locally for some 10-20 years,

whose owner is a man, and which have no separate management board within their organizational structure. These firms operate in the wholesale and retail sector as well as in the industry ("Family Business is a brand", IBR 2017). Ownership in Poland plays a special role in business, and it can be a factor stimulating the internationalization of firms (Wach, 2017). In family businesses the family ownership plays a crucial role.

Most of Polish family businesses are still in the first generation phase, so called 'founder stage". The first succession process is happening and there is no tradition for family business succession.

## MATERIAL AND METHODS

In line with recent calls form more qualitative, explorative research on business development processes (Davidsson *et al.*, 2010; Doern, 2009), a qualitative method was chosen for this study. The data was generated through in-depth, semi structured, open-ended interview with successor, CEO of medium family business (second generation). Interview lasted over 3 hours. This qualitative study is the result of previous quantitative studies conducted by the author (ex. Hadryś-Nowak, 2018; Więcek-Janka & Hadryś-Nowak, 2016). Interview was more as a story told by the successor supplemented by answers to additional questions made by the author. The interview was divided into two parts. First part corresponded to the question Q1: What are the factors that facilitate or inhibit the process of becoming the leader for international family business? The second part corresponded to the question Q2: What are the major successor's characteristics enabling successor to be a true leader of international family business? Instead of undertaking the interviews, the author gathered non-participant observations and archival documents, such as: contracts, websites, protocols, strategy book, ISO handbook, CSR Report etc. The author assisted during family and business meetings (ex. in Ślesin, Poland, 2018-03-06). The selection of the analysed company and its successor was made based on relations built during previous projects.

## RESULTS AND DISCUSSION

### Presentation of the company

**The company:** HORTIMEX PLUS Sp. z o.o. Spółka Komandytowa
**Founder:** Tomasz Kowalewski (Father), owns 65% of the company
**Successor, current CEO:** Mateusz Kowalewski, owns 35% of the company

Nowadays, Hortimex is a specialised company that is a platform for the exchange of goods, know-how, and experience between the worldwide producers of food ingredients and the Polish ones. For about 30 years they have been providing food producers in Poland with technological consultancy in the creation of new food products and the selection of the finest ingredients and the best solutions. Hortimex is a family company. That is why they rely on trustworthy business relationships, which are beneficial for every party to a deal. They help producers of food ingredients by:

- assistance in entering the Polish market;
- sales & distribution of food ingredients to food producers in the whole country;
- development & improvement of business relationships with producers.

Hortimex also help food producers by:

- consultancy in developing unique and appealing recipes for food products;
- search for desirable ingredients among products offered by foreign producers;
- supply of tested, natural, and appealing food ingredients to food production facilities.

Hortimex's customers value them most for:

1. Effectiveness. Thanks to their experience they have been gaining for almost 30 years they know how to effectively convince food producers in Poland to try and use new ingredients.
2. Flexibility. Each of their customers can be sure that they efficiently tailor their services to individual preferences, plans, and expectations. Flexibility is their middle name.
3. Promptness. In times of intense competition it is essential to carry out a project promptly. They know that. That is why they act skilfully and timely.

Mission of the company:

> *„We rely on the education of the food production market and professional consultancy in it. We believe that together we will be able to improve the quality of the Polish food production market as well as to create a friendly, healthy, and cost-effective market. In fact, we are all consumers*".
>
> "We would like to see better and better products on the shop shelves – more delicious, more aromatic, and more healthy and functional. Therefore, we help Polish companies introduce new food products to the market and worldwide producers of food ingredients present their semi-finished products to Polish producers".

How the story begins…

> "*Hortimex is a family business managed by the second generation of owners. Founded in 1988 by my parents, Lucyna and Tomasz Kowalewski, for many years it was built and managed in the spirit of broadly understood responsibility. Both, me and my father who managed the company were very serious to liabilities to contractors, employees, local community and other stakeholders. The years 2009-2013 are the period of succession in company management. We worked it out then and we implemented the management system strategic and first structured strategy for the company, which we called 'Hortimex 2015'. In addition to obvious business activities it assumed continuation and strengthening values that helped in building enterprise development*".

**Table 1. Scale of activities**

| Criteria | 2014 | 2015 | 2016 |
|---|---|---|---|
| **Employees** | 30 | 32 | 30 |
| **Turnover (net, PLN)** | 46 645 040,32 | 61 563 795,08 | 62 747 612,28 |
| **Capitalization from a perspective own contribution (%)** | 1,7 | 1,7 | 2,1 |
| **Assets** | 14 206 197,69 | 16 309 660,59 | 16 767 725,87 |
| **Shareholders** | Tomasz J. Kowalewski, Mateusz Kowalewski, Spółka Plus | Tomasz J. Kowalewski, Mateusz Kowalewski, Spółka Plus | Tomasz J. Kowalewski, Mateusz Kowalewski, Spółka Plus |
| **Value** | 1 204 898,13 | 2 484 487,00 | 2 726 732,53 |
| **Countries** | Austria, Belgium, China, France, Spain, the Netherlands, India, Ireland, Canada, Lithuania, Germany, Norway, Poland, Turkey, Hungary, Great Britain, Italy | Austria, Belgium, China, France, Spain, the Netherlands, India, Ireland, Canada, Lithuania, Germany, Norway, Poland, Turkey, Hungary, Great Britain, Italy | Austria, Belgium, China, France, Spain, the Netherlands, India, Ireland, Canada, Lithuania, Germany, Norway, Poland, United States United States, Turkey, Hungary, Great Britain, Italy |

Source: own study.

**Values & HR Policy**

The Hortimex team is small and quite well integrated. The team composition is shaped primarily on the participants' compliance with the company's culture. Competences, however very important, they are not the only one, but one of the employee evaluation criteria. Managers are significantly involved in the communication process and shaping attitudes. Therefore, we decided that it is not there the need to create additional structures or channels of communication, dedicated to the responsible person proceedings. Rules of conduct are shaped by Quality Policy, management areas policies and individual procedures (under the ISO 9001: 2008 system). The owners decided to open debate about values and attitudes. During several workshops in which the whole company was involved, they selected five essential values that recognized the most important. They are: responsibility, openness, respect, honesty and trust. As far as they anticipate the possibility expanding or modifying it. Reported by the team as important, it became the subject of a workshop, which took place in October 2016. As a consequence, it was formulated document ”Rules of giving and receiving gifts in business relationships”.

> *“If we want to answer what decided our position, I think that it is a mix of many factors. However, I have the certainty that it is decisive that we do a lot of things differently”(*employee statement).

> *“What is the key in our activities? Why is it worth working together and relations with our partners and recipients are essential for us? Is Hortimex just a company or something more? I chose nine features and values that are fundamental to us. They represent development directions and areas that we care about especially.*

*They are an internal code of conduct. However, it is not a secret what drives us to the first element"* (Mateusz about values)

**Clarity**

"Our actions, both for our recipients and partners (suppliers), have clearly defined rules. We run an open policy with companies that cooperate with us. It helps in building trust and free relationships. These in turn help to resolve contentious issues that may arise in a way that does not leave any of the parties with a sense of loss. We communicate the terms and conditions in a clear manner. At the time of any problems, we always strive for dialogue and solution. Transparency gives you clear rules on which we will work and is a clear point in defining our common goals".

**Responsibility**

"We understand it not only in the context of social responsibility so popular for several years. Despite the implementation of the CSR strategy, the responsibility in our understanding is much more. For years, Hortimex has been providing information on nutrition as well as food additives and ingredients. It is extremely important for us that we provide data from independent organizations, not just our opinions. Our publications include guidelines of the European Food Safety Authority. We also work with universities in Poland and work for the benefit of consumers' awareness".

**Punctuality**

Fast, cheap, good. "We know that it is not possible to fulfil all three obligations. In our business, we always try to fulfil our obligations well. We also define the deadline for implementation. This does not only apply to the logistics of the products supplied, but also to information, trials and joint work on recipes. For us, this is an extremely important element. By combining product design, work on prototypes, we often involve several partners and key service providers. Specifying deadlines is a priority. Timeliness is a plan that we always design accordingly for projects and commitments".

Thanks to the knowledge of technologists, partners and cooperation with scientific and research institutions, proposing solutions is core of Hortimex work. Hortimex attach great importance to provide information. The new proposals are always the most important element for customers. Hortimex want to show not just products or solutions, but what one can achieve and how to achieve this. Technology has been the basis of Hortimex activity for many years. *"We have now expanded our consultancy to the whole range of food production".* Aspects related to production technology are currently only a part of Hortimex offer. A secure supply chain is their key competence. It does not apply only to the shipment and delivery of goods, but also to secure storage. The timeliness of our deliveries is high. *"We obtained this by clearly defining the procedures related to shipping and accepting the goods. The principle is one, we do not promise until we are not sure".*

**Effectiveness**

The goal of all obligations and relationships with partners is to effectively implement their value propositions. Hortimex partners are producers of ingredients and food additives. On the basis of products, they propose solutions that can be of considerable value

to customers. Hortimex help meet partners' goals. Provide customers in Poland with continuous access to new solutions.

**Flexibility**

Hortimex offer addressed to partners and recipients is flexible. Hortimex operates in a certain framework, therefore the offer has border points. However, we do not have a template according to which. Each of the 18 partners requires a slightly different approach.

**Speed**

The implementations must be characterized by appropriate dynamics. Hortimex establish cooperation with new partners at a specific time. This requires proper concentration and intensification of activities. For recipients, this means that the proposals Hortimex present will be implemented in the short term.

> *"Nine features and values define a certain framework. Is this a description of Hortimex? No, it's just part of what our company is. It is impossible to describe the emotions and satisfaction that appear in our work."* (Successors statement).

**Clients**

The two most important stakeholder groups Hortimex are ingredients producers usually located outside Poland, and food producers located in Poland. For producers of food ingredients Hortimex is a channel to reach clients in Poland. Companies that decide for exclusive, long-term cooperation they can count on focus on their business goals, professional service and most importantly – full service transparency. It gives you a sense of control on the processes of product implementation on Polish market. Regular reporting, joint visits at the clients, current information exchange and understanding cultural differences between Poland and partner's country of origin build long-term relationships and contribute for business development. *"We are loyally fulfilling your duties, expecting in return the same".*

**What customers say about Hortimex?**

Jacques Maman, Marketing Manager, Tan Nisasta.

> "*From the beginning of the relationship we are experiencing a perfect business experience cooperation at all its levels. We meet at the company's headquarters in Konin, and we also visit clients throughout Poland with the Hortimex team. The sales results are huge, we have increased our market share in Poland more than 60%. When we opened ours another factory, Omnia Nisasta, we decided that Hortimex will also be distributed the products of this company*".

## CONCLUSIONS

Mateusz's journey in family business started in 1994 when he stopped his studies because he realized that the one he had chosen where not suitable for him. His father, Tomasz, said that if he did not want to learn he must start to work. Mateusz did not know what he want to do in his life so the family business was a kind of natural choice, just for the beginning of his professional life. He started with simple things. Because Mateusz was the only one who spoke English, he started to use "yellow pages" to gain new contacts and potential clients.

*"That time it was easy…I just put our contact details on web site and in few days someone always contacted us. Now the competition is much bigger"* Mateusz says.

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In 1996, Mateusz started to work as sales representative. In 90's, there was a big demand for Hortimex's products (mainly food additives) Mateusz results were very impressive. In 2001, his father, appointed him to be a Sales Director. He realized that sales and purchasing departments were completely unorganized and not integrated, he started to introduce changes to optimize work of this two departments. He created so called "product teams" where two employees, one from sales and other from purchasing, started to work together. He though that he was responsible for some aspects of family business but in fact his father still decided about everything. To gain some power and respect Mateusz started to behave like his father: *"…I was autocratic and I had impersonal approach…".* Between 2006 and 2009, Mateusz did well, but from the time perspective, he said that he was more like an administrator of the company than a manager. Year 2009 was very difficult for the family, because Mateusz's mother died. His father got ill. He was forced to take the position of CEO of the company. Mateusz realized that*"…I had no vision what to do next…".* Hortimex was in stable position but the problem was that from few years they had no new clients, no new suppliers or partners and the turnover was not improving. Mateusz felt that to grow the company need to change. He started to look for the inspiration. He started to read business books, attend business meetings etc. After years he admitted that he really regret that he stopped studies: " *I felt as I opened the open door…It was frustrating…".* On one of business meetings, as an exercise, he was asked to write a letter for himself from the future. He left the meeting with empty page... From one side it was disaster but from the other: *"…It was like a discovery…*" Mateusz said. Few days later he sated in his office in front of this white page and he thought that maybe he will ask the employees to do the same but according to Hortimex? This was the beginning of his big mental change from autocratic manager to transformational leader. In 2011 he asked external business advisors for help in formulating business strategy. Those advisors asked *"unconfortable"* questions that forced Mateusz and his team to change the way they think about Hortimex. In few months they created "Hortimex 2015 Strategy". Mateusz calls it: *"a vision for a succession time…"*. They transformed business from a wholesaler of food additives to the platform of exchange the knowledge between suppliers of additives and food producers. Meanwhile there was a conflict between Mateusz's father and his wife. Firstly Mateusz tried to be as a mediator. But the conflict intensified. Mateusz decided to quit family business. It was the first time in his life that he defied his father. But with help of the external mediator they they have resolved the conflict. Going back to business, in years 2010-2018, Hortimex, doubled its partners. In 2012 they introduced several corporate governance mechanism and tools, that Mateusz's father could withdraw from the business without feeling lost. Mateusz is proud of what happened, but he is most happy that employees are satisfied and motivated. Taking into account the above considerations, it is possible to refer Mateusz characteristics to the successor's competencies followed by an assessment of their use in the process of succession proposed by Więcek-Janka and Hadryś-Nowak (2016). (Table no 2)

**Table 2. List of successor competences vs successor at Hortimex**

| Education | acquired qualifications related to the family business industry | Yes/No |
|---|---|---|
| Knowledge of ethics | practical application of the principles of social coexistence on equal terms. | Yes |
| Diligence | willingness to bear additional burdens and perseverance in carrying out activities | yes |
| Apprenticeship in the profes-sion | experiences built in a family business at various positions | yes |
| Experience | business experience | Yes, at family business |
| Creativity | ability to create something new | Yes, implement-ing in family business new tools and proce-dures, change the previous business model |
| Communicative-ness | the ability to clearly express thoughts in a way that is under-standable to the interlocutor | Yes, looking for the best pracit-ices in communi-cating with the team |
| Organizational skills | dealing with the organization of own and other people's activi-tie | Yes |
| Intelligence | the ability to perceive, analyze and adapt to changes in the en-vironment | yes |
| Knowledge of the market | the practical ability to assess market opportunities and threats in the context of running a family business | yes |
| Innovativeness | using creativity in transforming opportunities into new ideas and putting them into practice | yes |
| Accuracy | the ability to scrupulously analyze phenomena, draw conclu-sions along with their practical application | yes |
| Entrepreneur-ship | a personality trait characterized by openness to changes and the search for opportunities | yes |
| Independence | trait of a person who does not seek help | yes |
| Commitment | taking active and emotional participation in the implementa-tion of tasks | yes |
| Stress re-sistance | way of coping with difficult situations | yes |
| Firmness | personality trait associated with tenacity | yes |
| Ambition | striving for a goal, the desire to stand out and strive for success | yes |
| Motivation | conscious willingness to undertake specific tasks | yes |
| Courage | attitude to defend one's own arguments (challenges) | yes |

Source: own elaboration based on Więcek-Janka and Hadryś-Nowak (2016).

As we can see from list of successor competences vs successor at Hortimex most of them is suitable for Mateusz. Education is the only the only “element” that does not match

to the list of successor's competences. Taking into consideration the results of succession process at Hortimex it seems that education, if the rest of the competencies is present, is not that important. Mateusz gained the business education not before joining the family business but during succession.

Mateusz Kowalewski believes that at the very beginning the family should agree on the catalog of values and indicate those that are important to it. It means that business family should start with creating a family order, appoint a family council that will create a constitution: a set of rules for a business family. Mateusz's family didn't do it because they didn't know they could. Only years later they understand certain matters and values that are important and on which they agree and on which they may disagree. They have left the latter in the private sphere and they are not discussed at the family level. They stick to what is important and what binds family together. The decoding of these values in the family is the key to successful succession. It is difficult and it does not happen by itself. Sometimes it is necessary to call in people from the outside who will help not go into dead ends. Kowalewski points out that in his case knowledge succession took place from the very beginning of his work in Hortimex. There is no person in Hortimex today who would know more about the company than Mateusz. However, the succession of power was exemplary for Hortimex. After the conflict, they understood that if his father was able to trust him, he should guarantee him independence and not interfere in day-to-day management. On the other hand, as a manager, Mateusz should treat him not as my dad, but as an owner who wants to know what is going on in the organization without having to look into the nooks and crannies. They have created strategic management tools: a supervisory board led by Mateusz father as the ownership body, as well as a clear vision, formulated mission, strategy, management, control and budgeting systems. Mateusz call his father when he has a dilemma. He needs it and Mateusz also need his support at critical moments. For example, they had several offers to sell the company. The father, who is the majority owner, left these decisions to Mateusz. He trusts Mateusz, but in the company, they have developed tools that allow Mateusz's father to fire me without harming the business. It would probably be quite a shock to the team, but the company is structured in such a way that anyone else can sit in this chair and lead it. Having a sense of a certain uniqueness and value that family bring to the company, they know that they are substitutable.

With the study, author aim to contribute to a better understanding of factors connected with successor's passage from manager to leader in international family business. This endeavor has practical relevance, as many family businesses never embark succession process, and one possible reason is that many family firms do not manage to overcome the challenges of succession. Some practical implications can be derived from the results. Firstly, the successors need to feel responsibility for the family. Secondly, he/she should has the deciding power in some part of the business. As case study shows, conflicts and interactions between family members, when well-managed, might be source of new ideas and solutions. Next to qualifications and constant learning and improving skills, there is also a need for being open minded and ready to change.

The aim of the study was to identify factors that act as driving forces for the successor to become a leader of international family businesses. Based on Mateusz example the following characteristics are considered important for successor: integrity, commitment to

the family and family business, ability to command the respect of the personnel, decisiveness and interpersonal skills and of course some luck. Firstly, there are the leadership qualities, which every manager must have, whereby it is important that the successor be a *visionary* entrepreneur. Secondly come management skills. However, even more is expected from the future leaders of family businesses. Thirdly, they must demonstrate commitment and respect for the family. Just as important as the competence is the *motivation* of the successor. Successions work out a great deal better when the candidate-successor has a strong desire to lead the family business and also finds this a fascinating challenge. Moreover, the successor must have had the freedom to *choose* to join the family business. Once officially designated as successor, the representative of the next generation is confronted with a new challenge. He must prove himself as the new leader. This does not always go smoothly, because the successor generally finds himself in the phase of succession where he shares the management of the family business with the incumbent leader. The great challenge for the successor is to strike a proper balance between continuity of the management on the one hand and innovation/change on the other. Such change obviously entails a risk of conflicts with the incumbent leader. Some people believe that crises are unavoidable. Yet only a minority of successors achieve credibility by resolutely innovating. Frequently it is more successful not to make all-too sudden changes, but to introduce innovations around an axis of continuity. In this way, the family network – which is based on trust – remains intact, and the successor will also run into less resistance from the incumbent leader. Mateusz admitted that in his path to leadership, above mentioned, there were some important things. Firstly he always felt responsible for the family, especially his wife and children. Secondly, unfortunately but this is true, his mother death was very important to understand this responsibility. Thirdly, when he acted against his father, choosing his wife. This gave him a lot of self-confidence and feeling that he is able to manage things on his own. Mateusz also thinks that this was also a signal for his father to see a leader in him. Last but not least, the openness for external help and support.

A limitation of this study could be seen in its single-country focus on Poland. Also, one could argue that the single-case is a limitation of this study. While this leads to a lack of generalizability of findings in statistical sense, the qualitative approach chosen allowed to explore in depth the transition from being manager to leader. The research highlights the important role of family and business dynamics in this transition from „agent" to „steward". Yet, further research is needed to test the findings for larger samples, possibly in relation to different contingency factors.

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# Changing role of middle income economies in contemporary international trade: comparative analysis

**Marcin Gryczka**

**ABSTRACT**

**Objective:** The purpose of this paper is to analyze selected international trade indicators, and then to verify, if assumption of growing importance of middle income economies (according to the World Bank classification) can be justified.

**Research Design & Methods:** Article consists of two main parts. In the former some shifts in international merchandise trade in 1995-2018 have been analyzed. In the latter the assessment of selected trade indicators has been included, with particular regard to those, which could be utilized as a basis for verification of growing importance of middle income countries in international trade.

**Findings:** Between 1995 and 2018 there was a noticeable improvement of middle income countries' share in global merchandise trade, and their competitive advantage improved dramatically. As confirmed by RCA index analysis, middle income economies improved significantly in all manufactures, and was particularly high in labour-intensive and resource-intensive manufactures, as well as in low-skill and technology-intensive manufactures.

**Contribution & Value Added:** Analyses concerning economy groupings are still relatively rare, especially in Polish economic literature. Therefore the presented research can be perceived as a quite fresh approach in this field. Finally, usage of wide collection of trade indicators for verification of middle income economies' international significance should also be treated as a strength of presented paper.

| | |
|---|---|
| **Article type:** | research paper |
| **Keywords:** | developing countries; middle income economies; international trade; trade structure; trade indicators |
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## INTRODUCTION

In recent decades there was a noticeable geopolitical shift in global economy, i.e. growing importance of so called newly industrialized, especially Asian economies. Despite the global protectionism awakening, integration process slowdown (and even its reversion in case of NAFTA), increasing economic imbalance and social inequality, as well as urgent climate change related problems, another developing countries have strived to catch up not only leading Asian economies, but some of developed ones as well. The main purpose of this paper is to analyze selected international trade indicators, and then to verify, if assumption of growing importance of middle income economies (according to the World Bank classification) can be justified. Research covers the years 1995-2018, where applicable, and utilized data have been derived from different statistical sources, like the United Nations Conference on Trade and Development (UNCTAD), World Bank, and WTO databases. In the article selected methods of descriptive statistics (like analyses of trend, composition, and dynamics), as well as some statistical measures, like international division of labor engagement, trade coverage, revealed comparative advantage (RCA) and concentration indices have been employed. The low and lower middle income economies are the primary subjects to be investigated, and selected high income countries and groups are used in some cases for comparative purposes only.

## LITERATURE REVIEW

According to the United Nations, there is no established convention for the designation, if given country or area should be included either in "developed" or "developing" territory group. The terms "developed" and "developing" are intended mostly for statistical convenience and do not necessarily express a judgement about the stage reached by a particular country or area in the development process (UNSD, 2019). Moreover, it should be explicitly stressed, that so called developing countries are very diversified, if we took into consideration for example GDP per capita, infrastructure development, world trade achievements, poverty and education inequities and so on.

Nevertheless, one of developing country definitions says, that this is a country with a less developed industrial base and a low Human Development Index (HDI) relative to other countries (O'Sullivan & Sheffrin, 2003). One could expand this definition by adding relatively low GDP per capita in such countries, but this short description will not be universally agreed upon. Naturally, meant in this manner developing countries tend to have some common features, like low levels of access to safe drinking water, sanitation and hygiene, energy poverty, high levels of pollution, poor infrastructure (especially ICT infrastructure), low education levels, high rate of corruption, high "climate vulnerability" and its negative implications (Bruckner, 2012; Fischer *et al.*, 2002; Mertz *et al.*, 2009).

It's worthy to mention the most important and perceptible difference between "developed" and "developing" countries. The former are usually considered as quite rich, especially with respect to their gross domestic product per capita, well equipped with physical and human capital, characterized by solid socio-political systems, and most of all – located at the top of world's most innovative economies (Cornell University *et al.*, 2019).

Therefore their current development stage can be perceived as quite static – they are simply leaders motivated, first and foremost, to defend the status quo.

**Table 1. World Bank classification for selected years in 1990-2018**

| Income group | Gross National Product (GNP) per capita(in USD) | | | |
|---|---|---|---|---|
| | 1990 | 2000 | 2010 | 2018 |
| Low income | <= 545 | <= 760 | <= 975 | <= 1,025 |
| Lower middle income | 546-2,200 | 761-3,030 | 976-3,855 | 1,026-3,995 |
| Upper middle income | 2,201-6,000 | 3,031-9,360 | 3,856-11,905 | 3,996-12,375 |
| High income | > 6,000 | > 9,360 | > 11,905 | > 12,375 |

Source: World Bank 2020a.

For that reason same years ago the World Bank decided to no longer distinguish between "developed" and "developing" countries in the presentation of its data, considering the two-category distinction obsolete. Instead, this international organization divides countries into four groups based on one clear criterion, i.e. gross national income per capita.[1] Although this classification had been internally used for analytical purposes since late eighties of 20th century, only very recently it has turned into World Bank official standpoint (Prydz& Wadhwa, 2019). It should be therefore added, that GNI per capita thresholds are verified and amended every year (see Table 1).

Growing importance of middle income economies, especially China and other Asian economies, was reflected in the literature on the subject mainly in two recent decades. In addition to the research concerning comparative advantage and global trade shifts of those countries (Hanson, 2012; Sposiat al., 2018), some analysis of the factors driving their economic growth can also be found (Su& Yao, 2016).Another noticeable area of interest is so called middle-income trap, the phenomenon where rapidly growing economies stagnate at middle-income levels and fail to transform into a high-income economy, and its causal analysis (Bulmanat *et al.*, 2016; Felipe *et al.*, 2014; Griffith,2011).

## MATERIAL AND METHODS

Statistical data used in the paper generally cover the period 1995-2018, where available. Results of the conducted research have been presented using mainly composition and dynamics analyses. Moreover, in the latter part of the paper, based on the definitions and methodology presented in the literature (Nakonieczna-Kisiel, 2010; UNCTAD, 2020), the following indicators have been utilized:

- average export rate,
- international division of labor engagement index,
- trade coverage (TC) index,
- revealed comparative advantage (RCA) index,
- product concentration index (Herfindahl-Hirschmann Index),

[1] In FY02, a change in terminology was made to be in line with the 1993 System of National Accounts (SNA); the definition of GNI per capita remains the same as the previously used gross national product (GNP) per capita (World Bank, 2020b).

– intra-industry trade index (Grubel-Lloyd Index).

**Shifts in international merchandise trade in 1995-2018**

Predominance of high income, particularly so called "Golden Triad" (the USA, European Union, and Japan), and some upper middle income countries (like BRICS, but especially China) in the contemporary world economy is unquestionable, although even these economies has to face some serious globalization-related challenges (Department of Economic and Social Affairs, 2013; Ghosh 1996). Some of them are issues connected with climate change, growing power of transnational corporations and conflicts of interest between corporations and the state (with changing role of the latter). Advanced internationalization of production leads to creation of extensive supply chains, increasing thereby the overall risks for many stakeholders. Problems related to long and sophisticated supply chains can be predominant especially now, in times of ongoing trade wars and regional political instability (Dicken, 2011; VanGrasstek, 2013).

According to the latest World Trade Organization data, developing economies outperformed or equaled the performance of developed economies in world trade in most of the past ten years, which in turn led to their 44% share in world merchandise trade in 2018.[2] On the other hand, at the same time the top ten traders in merchandise trade accounted for a little over half of the world's total trade (WTO, 2019). Of course, looking only on those data a straightforward conclusion of still unquestionable predominance of developed countries could be drawn. Nonetheless, it's worthy to mention that only in 2005-2015 the share of developing economies in merchandise exports increased from 33 to 42 percent (WTO, 2016), and this was despite the negative consequences of 2008-2009 financial crisis for the global economy. Moreover, since 2011 developing economies' exports to other developing economies had surpassed its exports to developed economies, and "South-South" trade represented an estimated US$ 4.28 trillion or 52% of total developing economies' exports in 2018 (WTO, 2019).

Clear confirmation of those trends can be found in Figure 1. Between 1995 and 2005 merchandise combined share of middle income economy groups was almost the same (in imports) or was increasing in slow pace (in exports). By the end of first decade of XXI century merchandise trade share of economies in question grew by more than 10 percentage points, both in exports and in imports. As a result in 2018 lower middle and upper middle income economy groups were responsible for more than one third of global merchandise trade. It should be also considered that mostly BRICS countries, especially China, were the main source of upper middle economies advancements in that respect.

Between 1995 and 2018 there were visible changes in merchandise trade matrix, which have been presented in Table 2. In period under scrutiny lower middle and upper middle income countries significantly strengthened their bilateral exports, which in turn led to shrinking share of high income economies in their merchandise exports (by almost 15 percentage points). On the other hand, upper middle income economies increased their share in high income economies exports by ten percentage points.

[2] World Trade Organization still uses quite "blurred" distinction between developed and developing countries, not taking into consideration World Bank classification based on income ranges.

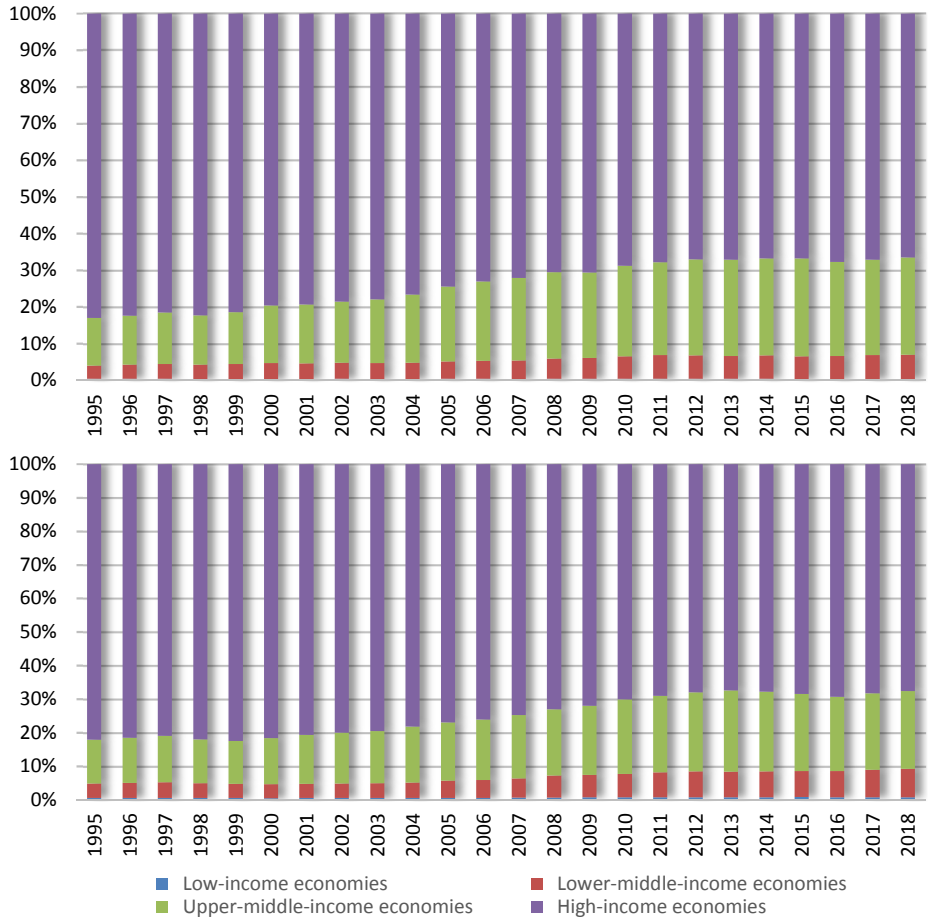


**Figure 1. Merchandise trade shares in 1995-2018 (exports – upper chart, imports – lower chart)**
Source: UNCTAD database (2020).

As concerns merchandise imports matrix, importance of upper middle income economies, measured as a share in given economy group's imports, increased not only in both middle income groups, but in high income economies as well. In other words, in last 25 years there were at least two noticeable shifts in merchandise trade matrix – growing export and import shares especially of upper middle income economies, and decreasing shares of high income economies in all partner groups.

Looking at the merchandise export matrix by degree of manufacturing (see Table 3), it can be noted that in real terms lower middle income economies increased their exports to the highest extent in medium-skill and technology-intensive manufactures (inside this group and to high income economies) and high-skill and technology-intensive manufactures (to upper middle income economies). As regards upper middle income group, the evident advancements can be observed in all merchandise groups, with the only decline in labor-intensive and resource-intensive manufactures' exports to high income economies (by almost 30 percent).

**Table 2. Merchandise trade matrix in 1995 and 2018 (percentage)**

| Partner / Economy group | 1995 | | | | | 2018 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LI | LMI | UMI | HI | Total | LI | LMI | UMI | HI | Total |
| | Exports | | | | | | | | | |
| LI | 3.8 | 9.6 | 18.1 | 68.5 | 100.0 | 8.2 | 21.7 | 22.2 | 47.9 | 100.0 |
| LMI | 1.8 | 6.9 | 14.4 | 76.9 | 100.0 | 2.6 | 13.1 | 24.4 | 59.9 | 100.0 |
| UMI | 1.0 | 6.4 | 12.3 | 80.3 | 100.0 | 1.2 | 12.8 | 19.4 | 66.7 | 100.0 |
| HI | 0.5 | 4.3 | 12.7 | 82.5 | 100.0 | 0.5 | 7.0 | 22.7 | 69.8 | 100.0 |
| | Imports | | | | | | | | | |
| LI | 1.9 | 14.0 | 24.1 | 60.0 | 100.0 | 3.6 | 23.7 | 34.1 | 38.6 | 100.0 |
| LMI | 0.7 | 5.7 | 19.2 | 74.4 | 100.0 | 0.9 | 10.3 | 36.7 | 52.1 | 100.0 |
| UMI | 0.5 | 4.7 | 13.2 | 81.5 | 100.0 | 0.5 | 9.1 | 27.0 | 63.4 | 100.0 |
| HI | 0.4 | 4.1 | 15.2 | 80.3 | 100.0 | 0.3 | 6.5 | 29.2 | 64.1 | 100.0 |

LI – low-income economies; LMI – lower-middle-income economies;
UMI – upper-middle-income economies; HI – high-income economies.
Source: own calculations based on UNCTAD database (2020).

**Table 3. Changes in merchandise export matrix between 1995 and 2018, by degree of manufacturing**

| Partner / Economy group | 1995=100, constant 2018 US$ | | | | Respective index ratios | | | |
|---|---|---|---|---|---|---|---|---|
| | LI | LMI | UMI | HI | LI | LMI | UMI | HI |
| | Labor-intensive and resource-intensive manufactures | | | | | | | |
| LI | 37 | 21 | 8 | 7 | 1.0 | 0.4 | 0.0 | 0.1 |
| LMI | 54 | 87 | 84 | 41 | 2.6 | 1.0 | 0.2 | 0.2 |
| UMI | 166 | 354 | 190 | 72 | 21.1 | 4.2 | 1.0 | 0.5 |
| HI | 96 | 173 | 145 | 107 | 12.9 | 4.2 | 2.0 | 1.0 |
| | Low-skill and technology-intensive manufactures | | | | | | | |
| LI | 49 | 29 | 22 | 4 | 1.0 | 0.4 | 0.1 | 0.1 |
| LMI | 68 | 120 | 37 | 89 | 2.4 | 1.0 | 0.2 | 0.4 |
| UMI | 182 | 237 | 143 | 109 | 8.4 | 6.4 | 1.0 | 0.4 |
| HI | 58 | 215 | 243 | 170 | 14.5 | 2.4 | 2.2 | 1.0 |
| | Medium-skill and technology-intensive manufactures | | | | | | | |
| LI | 43 | 19 | 14 | 14 | 1.0 | 0.2 | 0.1 | 0.1 |
| LMI | 111 | 148 | 108 | 131 | 5.9 | 1.0 | 0.3 | 0.6 |
| UMI | 178 | 331 | 296 | 162 | 12.9 | 3.1 | 1.0 | 0.5 |
| HI | 155 | 224 | 307 | 168 | 10.8 | 1.7 | 1.9 | 1.0 |
| | High-skill and technology-intensive manufactures | | | | | | | |
| LI | 23 | 18 | 8 | 12 | 1.0 | 0.2 | 0.1 | 0.0 |
| LMI | 111 | 103 | 187 | 110 | 6.3 | 1.0 | 0.5 | 0.3 |
| UMI | 147 | 361 | 251 | 143 | 19.2 | 1.9 | 1.0 | 0.3 |
| HI | 298 | 389 | 452 | 176 | 24.5 | 3.5 | 3.2 | 1.0 |

Source: own calculations based on UNCTAD database (2020).

The right part of Table 2 contains the index ratios, which have been calculated as quotient of merchandise export changes for economy group and its respective partner. The

higher ratio value, the higher given economy group's export rate in comparison with respective partner exports change. It's quite obvious than middle and high income economies have high ratio values for merchandise exports to low income countries. On the contrary, with the higher degree of manufacturing high economies advantage is not so explicit – the ratio values concerning high income countries exports to lower and upper middle income countries are in the range between 2 and 4, the highest in labor-intensive and resource-intensive manufactures (high income countries exports to lower middle income economies) and high-skill and technology-intensive manufactures (high income countries exports to lower and upper middle income economies).

## The importance of middle income countries in international trade: analysis of selected indicators

The role of middle income countries in international trade can be analyzed on the basis of different indicators, but due to paper limitations only selected ones have been included herein. The first is average export rate, presented in Figure 2 for 1995-2018. Except the low income economies, for which the export rate values were the lowest and have presented noticeably downward trend since 2005, this indicator values for middle and high income economies were quite similar. Moreover, in 2000-2008 difference between high income and upper middle income economies was the highest, in favor of the latter. In last decade such difference was really small and for both country groups average export rate varied between 0.2 and 0.25.

International division of labor engagement index is a general measure of industrial production specialization degree of given country, which in turn can be understood as an extent of its participation in international trade. The lower this measure value, the smaller country's engagement in international division of labor and participation in international trade. Data presented in Figure 3 show that in period under scrutiny only high income economies were steadily increasing their engagement in international division of labor, especially in last decade, when the indicator value grew from 1.2 in 2007 to 1.8 in 2017. In contrast to them, in last twenty years engagement index value for low income economies decreased more than twofold, from 1.8 to 0.7, which could be caused by their persisting specialization mostly in primary commodities production and exports. And again, amongst middle income economies the upper middle income ones have shown evident upward trend – more than twofold growth (from 0.5 to more than 1.0) in the period considered.

Trade coverage indices for primary commodities and merchandise by degree of manufacturing have been presented in Table 4. Values greater than 1 mean that particular economy group has gained competitive advantage against abroad. In 1995 low and middle income countries had competitive advantage in primary commodities and labor-intensive and resource-intensive manufactures. On the other hand, high income countries achieved such advantage in all groups of skill and technology-intensive manufactures.

After more than two decades situation has changed dramatically. First of all, low and high income economy groups recorded the indicator decline in trade of almost all goods. Moreover, they retained tiny competitive advantage in terms of trade coverage only in trade of primary commodities and high-skill and technology-intensive manufactures, respectively. Lower middle income economies' competitive advantage worsened for primary commodities and labor-intensive and resource-intensive manufactures, but was slightly better for skill and technology-intensive manufactures. Upper middle income economies

improved in all goods but primary commodities, and their competitive advantage increased especially in labor-intensive and resource-intensive manufactures, but also to a large degree in low- and medium-skill and technology-intensive manufactures.

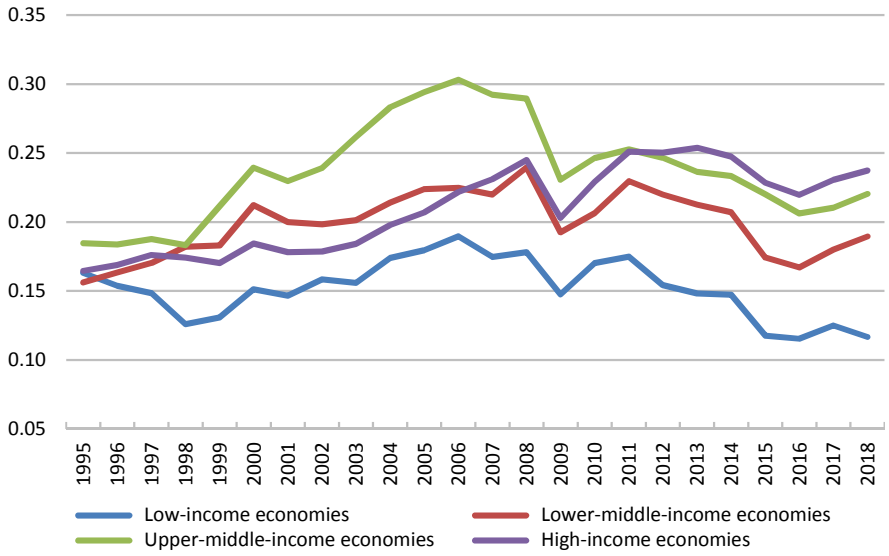


**Figure 2. Average export rates in 1995-2018**
Source: own calculations based on UNCTAD database (2020).

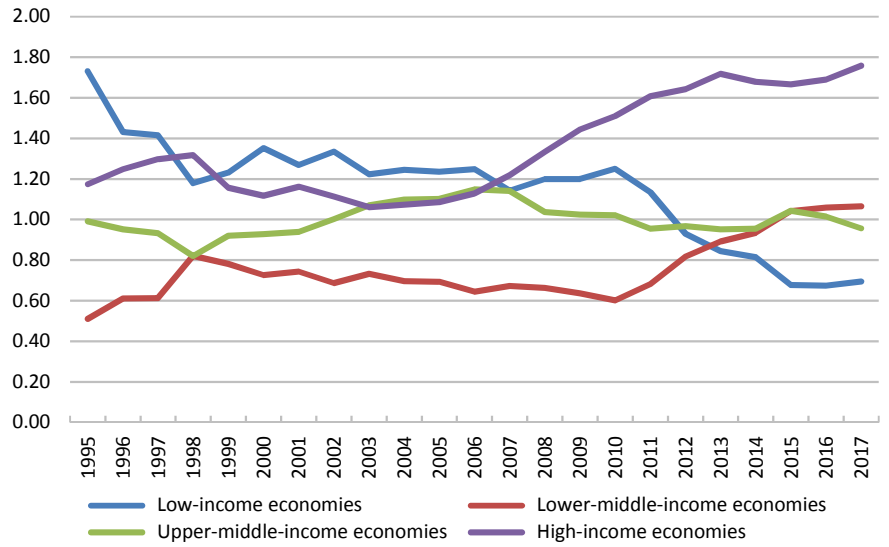


**Figure 3. International division of labor engagement index in 1995-2018**
Source: own calculations based on UNCTAD database (2020).

**Table 4. Trade coverage indices in 1995 and 2018**

| Product groups / Economy groups | Primary commodities | Labor-intensive and resource-intensive manufactures | Low-skill and technology-intensive manufactures | Medium-skill and technology-intensive manufactures | High-skill and technology-intensive manufactures |
|---|---|---|---|---|---|
| | 1995 | | | | |
| LI | 1.77 | 0.48 | 0.19 | 0.06 | 0.21 |
| LMI | 1.32 | 2.33 | 0.50 | 0.18 | 0.38 |
| UMI | 1.66 | 1.75 | 0.94 | 0.51 | 0.68 |
| HI | 0.82 | 0.86 | 1.10 | 1.13 | 1.05 |
| | 2018 | | | | |
| LI | 1.01 | 0.27 | 0.12 | 0.07 | 0.12 |
| LMI | 0.89 | 1.87 | 0.57 | 0.43 | 0.57 |
| UMI | 0.96 | 2.75 | 1.61 | 1.18 | 0.92 |
| HI | 0.96 | 0.65 | 0.95 | 0.99 | 1.01 |

Source: own calculations based on UNCTAD database (2020).

**Table 5. Changes of revealed comparative advantage (RCA) index between 1995 and 2018**

| Product groups / Economy groups | Primary commodities | Labor-intensive and resource-intensive manufactures | Low-skill and technology-intensive manufactures | Medium-skill and technology-intensive manufactures | High-skill and technology-intensive manufactures |
|---|---|---|---|---|---|
| | 1995 | | | | |
| LI | 3.45 | 0.64 | 0.44 | 0.08 | 0.18 |
| LMI | 2.11 | 2.10 | 0.70 | 0.20 | 0.34 |
| UMI | 1.64 | 1.37 | 1.07 | 0.56 | 0.70 |
| HI | 0.84 | 0.89 | 1.00 | 1.11 | 1.08 |
| | 2018 | | | | |
| LI | 2.94 (↓) | 0.64 | 0.40 (↓) | 0.12 (↑) | 0.18 |
| LMI | 1.57 (↓) | 2.21 (↑) | 0.87 (↑) | 0.45 (↑) | 0.65 (↑) |
| UMI | 1.02 (↓) | 1.48 (↑) | 1.20 (↑) | 0.93 (↑) | 0.89 (↑) |
| HI | 0.93 (↑) | 0.69 (↓) | 0.93 (↓) | 1.09 (↓) | 1.08 |

Arrow in parenthesis shows change direction between 1995 and 2018.
Source: own calculations based on UNCTAD database (2020).

Confirmation of such trends can be found in Table 5, where changes of RCA index have been presented. In comparison with 1995 results, low-income economies' comparative advantage has been retained only for primary commodities. High income countries' comparative advantage diminished for nearly all goods, and values slightly higher than 1 for medium- and high-skill and technology-intensive manufactures cannot be considered as a success. Revealed comparative advantage of middle income economies improved significantly in all manufactures, and was especially high in labor-intensive and resource-intensive manufactures (both lower and upper income countries), as well as in low-skill and technology-intensive manufactures (upper middle income economies). It is possible that administrative restrictions in the area of trade relations with overseas, such as potential

and effective trade wars between the US, China and the EU, as well as problems with new trade agreement implementation (like Trans-Pacific Partnership) have led to middle income economies RCA deterioration (Gryczka, 2020; Żołądkiewicz, 2017).

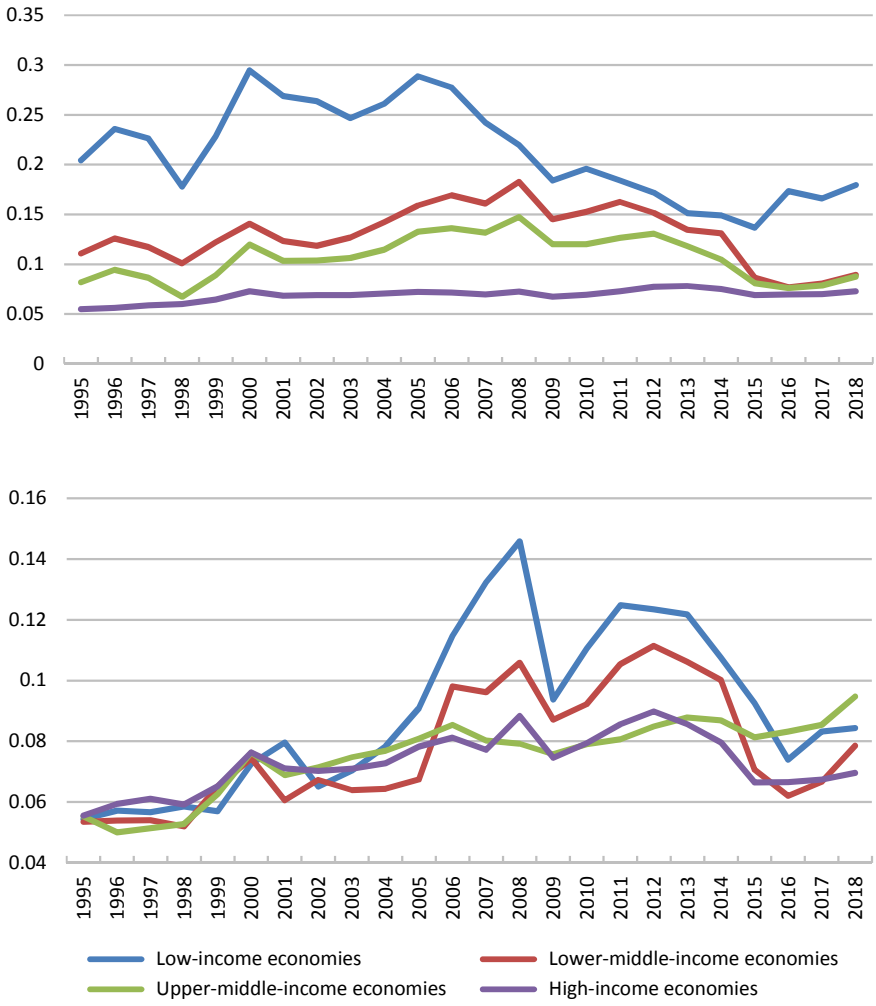


**Figure 4. Product concentration indices (product HHI) of exports (upper chart) and imports (lower chart) in 1995-2018**
Source: UNCTAD database (2020).

Concentration index, also named Herfindahl-Hirschmann Index, has been presented in Figure 4. This index value closer to 1 indicates a country's exports or imports are highly concentrated on a few products (on the contrary, values closer to 0 reflect exports or imports are more homogeneously distributed among a series of products). In 1995-2018 low income economies had the highest HHI values of exports, but they never crossed the level

of 0.3. Actually, in last decade product HHI of exports for low and middle income economies were gradually decreasing, reaching in case of middle income countries values very close to those of high income economies.

Product concentration indices of imports for all economy groups were relatively low in period under scrutiny, and followed the same pattern. The major distinctions were visible mostly in 2005-2015 period, but recent values between 0.06 and 0.09 should be treated as a quite obvious proof of homogenous import distribution among the products.

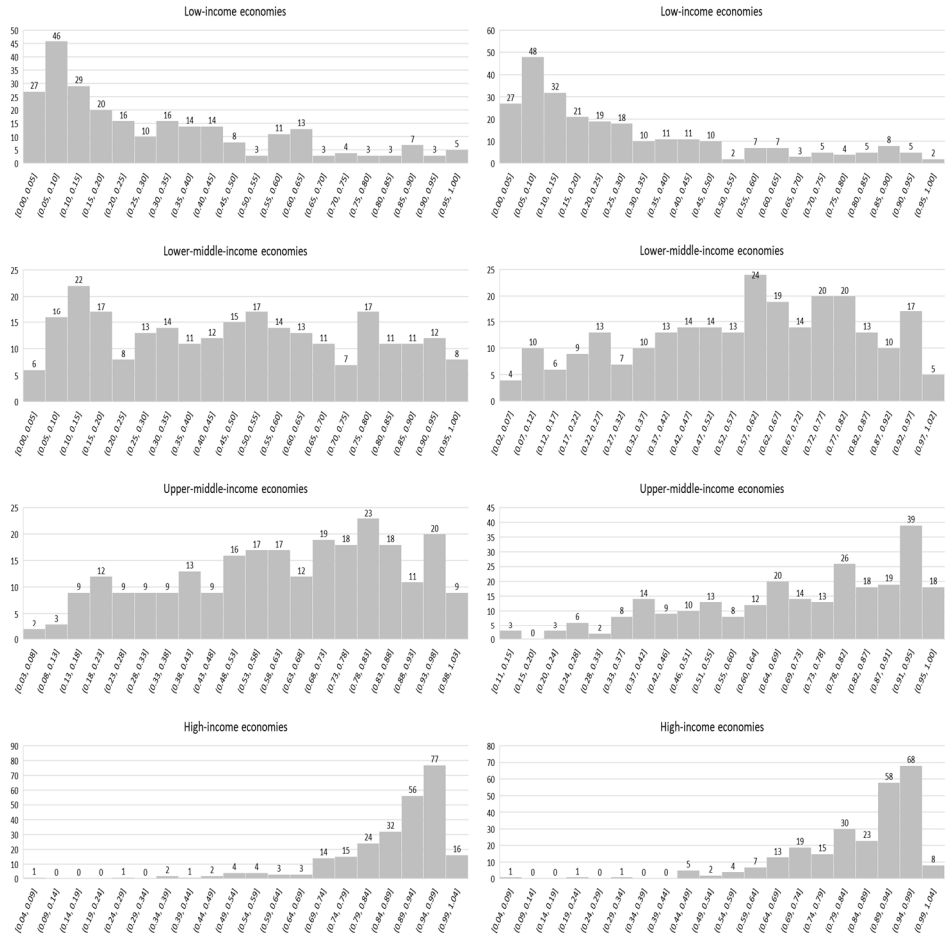


**Figure 5. Distribution of intra-industry trade (IIT) index values in 1995 (left charts) and 2018 (right charts)**

Source: own calculations based on UNCTAD database (2020).

Values of intra-industry trade index (IIT) for particular economy groups have been presented in Figure 5. This measure, also called Grubel-Lloyd Index, can range from 0 to 1, and IIT=0 means that there is no intra-industry trade, only inter-industry one. The closer IIT to 1,

the higher share of intra-industry trade in global overseas turnover of given country or industry. In 1995 there was mostly inter-industry trade in most of products traded by low income and lower middle income economies (i.e. IIT values lower than 0.5). The situation didn't change considerably in 2018 for low income economies, but there was an improvement for lower middle income countries, which IIT for majority of products increased to 0.6-0.9.

As concerns upper middle income countries, there was the most visible shift from inter-industry to intra-industry trade. IIT distribution was quite uniform in 1995, but after two decades IIT values for more than a half of products were in range from 0.8 to 1.0. It could be expected that distribution for high income economies remained almost the same, but substantial number of products in range 0.6-0.8 implies that their foreign trade is less intra-industry in nature than in the recent past.

## CONCLUSIONS

On the basis of conducted research the following final conclusions can be formulated:

1. Between 1995 and 2018 there was a noticeable improvement of middle income countries' share in global merchandise trade. This was mostly attributed to the recent economic achievements of BRICS countries, especially China, and of upper middle income economies in general. These economies have intensified merchandise trade among themselves and with high income group, and also increased their exports in all merchandise groups, especially in low- and medium-skill and technology-intensive manufactures.
2. Although in 1995-2018 high income countries' engagement in international division of labor was still high and indisputable, the competitive advantage of middle income economies improved dramatically. Upper middle income economies increased their competitive advantage especially in labor-intensive and resource-intensive manufactures, but also in low- and medium-skill and technology-intensive manufactures.
3. High income countries' comparative advantage measured by RCA index diminished for nearly all goods. On the other hand, middle income economies improved significantly in all manufactures, and their RCA values were particularly high in labor-intensive and resource-intensive manufactures, as well as in low-skill and technology-intensive manufactures.
4. Positive trends concerning middle income countries have been also proved by respective Herfindahl-Hirschmann Index and Grubel-Lloyd Index changes. Especially in last decade product HHI of exports for countries in question reached levels very close to those of high income economies, which meant their exports was much more homogeneous than a few decades ago. Another important feature of upper middle income countries was growing number of products with high ITT values, indicating their transition to intra-industry trade.

Recommendations and implications: Taking into consideration contemporary global problems, namely coronavirus pandemic, many significant negative effects can be expected to occur not only in 2020, but also in the years to come. One of severe consequences could be shortening and re-orientation of global supply chains. In this respect weakening role of China as a "global factory" can be perceived, but alternatively other middle income economies, i.e. non-Asian ones, can possibly benefit from this situation, if manufacturing were transferred closer to the final consumer markets. On the other hand,

pandemic-related shifts in global economy and international trade can result, among others, in foreign direct investment decline and trade protectionism boost, thereby impeding the process of catching up with developed, high income countries.

Research limitations: Lack of long term statistical data can be perceived as the main limitation of the further research. Moreover, some socio-economic indicators are based on the surveys, so it's quite obvious that such data are unobtainable especially for low and lower middle income economies.

Suggestions for further research are as follows: The analysis of middle income economies' developments in the context of post-COVID19 global economy should play a predominant role in the further investigations. Green energy revolution, sustainable growth, demography-related issues, climate change implications for middle income countries and their involvement in the Fourth Industrial Revolution (Industry 4.0) are another interesting areas for future research.

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