# OPTIMUM
## STUDIA EKONOMICZNE

**CONTENTS**

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# WHAT DEVELOPING COUNTRIES CAN LEARN FROM THE ASIAN EXPERIENCE: SELECTED ASPECTS OF THE SIGNIFICANCE OF OUTGROWER SCHEMES FOR ECONOMIC DEVELOPMENT[1]

**Summary**

The article provides a study of the most important literature on the rural development in Asian developing countries in terms of arrangements between a farmer and a company. The review of the theoretical aspects of outgrower schemes is the background to comparative analysis of smallholders' contract in Eastern and Southern Asian developing countries. The paper discusses the potential results of these schemes, especially in relation to the economic development. The article addresses the significance of outgrower schemes in the light of increasing welfare of participants as well as potential disadvantages and barriers.

**Key words**: outgrower schemes, Asian developing countries, food supply chains, economic development

**JEL**: Q13, Q18, O53

## 1. Introduction

Recently, product supply chains for agricultural commodity have become increasingly globalised and internationalised. The omnipresent delocalisation and fragmentation of production have not left this sector unaffected. Large food corporations and smaller firms are interested in more fragmented and diversified supply chains. Hence, they have focused on agriculture in developing countries. As a result, more smallholder farmers in the region of developing Asia (East Asia and South Asia) have begun to participate in global supply chains through applying outgrower schemes[2]. This vertical coordination

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[1] The article is the result of the research project "Theoretical, institutional and empirical conditions and premises of economic potentials synergies of African countries and Polish economy" financed by the National Science Centre, Poland [DEC-2012/07/B/HS4/00743].

[2] Fragmentation of farms has been visible in developing countries. It is worth to mention that the average size of a farm in India was 2.2 hectare in 1970, but till 2011 it was one hectare. Chinese average farm size is 0.3 acres. Following African Development Bank statistics, generally in Africa an average farm size is 1.6 hectares, in Asia 2 hectares, in Europe 27 hectares, in North America 121 hectares, in South America 67 hectares, in Australia 3340 hectares [African Development Bank Group, 2014].

is based on some popular economic theories such as: the life-cycle theory, transaction cost theory, or principal-agent theory. Generally, a number of theoretical approaches can be used to explain the linkages between growers and companies. Nevertheless, no conclusive theory or approach exist as yet [Rehber, 2007].

Arrangements between a farmer and a firm seem to be popular in many countries. Unfortunately, reliable data and information on their size in developing states still remain poor. Contrary to developed states, it is difficult to assess the size of outgrower schemes in developing world due to lack of data. In Brazil 70 per cent of poultry production, 40 per cent of pork, and 35 per cent of soybean were covered by outgrower scheme. In Mozambique all cotton and tobacco production was covered outgrower scheme in 2002 as well as in Zambia in 2006 [Sida, 2014]. In the United States outgrower scheme accounts for more than 40 per cent of food production. Sugar production via outgrower scheme accounts for 96 per cent, fruits 60 per cent, cotton 52 per cent, poultry 88 per cent, and port 61 per cent [USDA, 2014]. Contrary to developed states, it is difficult to assess the size of outgrower scheme in developing countries due to lack of appropriate data. The fact that a lot of contracts are informal makes this estimation almost impossible. There are some selected data, unfortunately the scale of outgrower scheme in Asia still has not been fully estimated. Plausibly, the proportion of agricultural production under outgrower scheme in developing countries, generally, may not exceed 15 per cent, but this remains a hypothesis [Oya, 2012]. Usually during estimation of the outgrower scheme share in agricultural production, we rely on the surveys cover the largest corporations, e.g. Nestle or PepsiCo or case studies. We leave alone smaller contract schemes between farmers and the local companies. According to "World Investment Report 2009" outgrower schemes activities by transnational corporations cover over 110 developing and transition economies [UNCTAD, 2009].

Outgrower scheme has existed for a long time. However, since the end of the 20th century it has become more important, especially in developing countries. Developments in food industry, global value chains, and the process of globalisation, consumer demands, and technology in agriculture networks of supermarkets have accelerated the changes in production contracts patterns. Expansion of various forms of institutional solutions in developing countries as well as endemic imperfect market information on prices, costs, technology, financing, etc., combined with preferential market access to the most developed countries have led to great interest in analysed arrangements.

Generally, outgrower scheme consists of two or sometimes three parts of agreement. This type of production refers to the contractual agreement between corporation (firm, integrators) and farmers (growers). These two actors are essential. Occasionally this two-sides agreement can be broaden by a third party such as schemes in different structures. Production contract may be understood as a farmer's commitment to provide an agricultural commodity of a type to the contractor. According to Glover and Kusterer, outgrower scheme or contract production can be simply defined as arrangements between a grower and a firms (exporters, processors, retail outlets, shippers) in which nontransferable contracts specify one or more conditions of marketing and production [Kusterer, Glover, 1990]. Each contract basically involves four elements: price, which is pre-agreed, required

quality, quantity or acreage (minimum/maximum) of agricultural commodity and time when the delivery should be completed [Key, Rusten, 1999][3].

The main goals of this study are: 1) to describe the advantages and limitations of outgrower schemes in Eastern and Southern Asian developing countries and 2) to discuss the Eastern and Southern Asian experiences of outgrower schemes in terms of success and failure of these solutions. The paper is empirical. The study uses secondary sources of research material. These secondary sources include: literature in the area of outgrower schemes in Asian developing countries and available databases, mostly of international organisations, such as the World Bank, FAO, and UNCTAD. The applied research method is based on the detailed analysis of available literature and information on agricultural production agreements in the Eastern and Southern Asian developing nations. The serious obstacle to deepened research is the limited knowledge on the institutional arrangements and strategies adopted both by the farmers and the corporations. In the analysis, not only literature sources, but also press releases were used.

This paper consists of two parts that refer to the main goals of the article. The first part of papers concentrates on the outgrower schemes in the light of main advantages, drawbacks, problems and limitations for farmers and firms that are committed in this arrangement, in general terms. The author decided to apply more critical approach to describe production contract results. The next section presents outgrower schemes' impact on economic development. This part is an overview of studies of outgrower schemes that were evaluated as successful for farmers and characterized by the mixed results. In the conclusions, selected recommendations for further regulation in these specific areas of agricultural production in the light of the presented drawbacks are presented and some alternative solutions to production contracts are delineated.

## 2. Outgrower schemes: risks and opportunities for their participants

Outgrower scheme plays three main roles in the economy. First, these arrangements introduce element of predictability into production process and allow allocating resources with greater responsibility. Second, outgrower scheme allows both sides of agreement to share market risks. Third, participants of outgrower scheme are more motivated to achieve high performance [Milgrom, Roberts, 1992]. Were we acting in the world with perfect information where contracts were perfectly enforceable, the agreement between farmer and firm would specify exactly the action of both participants and could ensure efficient risk sharing. Seldom (almost never) do we act in presented environment. In the real world it is impossible to specify actions so as to ensure conformity with the agreement. In this context we often observe the so-called asymmetric information which in consequence may lead to moral hazard [Hueth et al., 1999].

Despite the fact that outgrower scheme fulfills the paradigms of free market, high efficiency, and accelerated economic growth – all neoclassical postulates – it does not mean

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[3] In outgrower schemes we can usually find following provisions: the duration of the contract, the quality standards to be applied, quality control, quantity, the cultivation and raising methods required by the contractor, time of delivery, packaging, transport, price, technical assistance, procedures for paying farmers, insurance, procedures for dispute resolution [Bijman, 2008].

that this solution is perfect and without any disadvantage. On the one hand, outgrower scheme may introduce significant improvements in agricultural productivity, reduce production risk to some extent, decrease the transaction costs and rise grower's incomes. On the other hand, outgrower scheme may make weaker farmers' bargaining power and increase risks by exposure to monopolistic markets, weak contract environments, and technologies that are not familiar [Kirsten & Sartorius, 2002]. This point of view is proved by the empirical evidence that demonstrates the benefits of outgrower scheme are mixed for both: farmers and companies. This section presents critical view of outgrower scheme in general terms. This opinion may be represented by Redclift, who described transformations in agriculture in developing world using the following words: "The penetration of the South by new agricultural production technologies, marketing and outgrower scheme also severed to shift agriculture in parts of Latin America and Sub-Saharan Africa away from traditional, environmentally sustainable systems towards greater specialization and economic dependency" [Redclift, 1987].

Studies of outgrower scheme in developing countries have provided ambiguous empirical findings about the impact and offered different assessments of its role in the development process. There are studies that analyze the outgrower scheme impact regarding the stage of market development [Setboonsarng, 2008]. Some researchers perceive outgrower scheme essentially as a method adopting for shifting production risks to farmers and gaining control over growers' labour and land [Willson, 1986; Watts, 1992]. These studies have gathered a long list of negative impacts of outgrower scheme which are presented in table below (table 1). Some studies prove that even without violation of contracts, firms may use contracts to establish unequal relations with farmers [Singh, 2002]. For farmers, the increased income from outgrower scheme often proves to be short-term, due to market fluctuations [Willson, 1986; Little, Watts, 1994]. Among the most serious disadvantages of outgrower scheme is to rely on the exploitation of flexible and sometimes unpaid labour of the farming households, promotion export-orientated agriculture at the expense of subsistence agriculture and can threaten to food security [Little, Watts, 1994; Shiva, 1991]. Outgrower schemes may create negative externalities to rural communities as differentiation and disintegration [Singh, 2002]. The typical examples of environmental degradation due to outgrower scheme are overexploitation of groundwater, soil fertility decline, and pollution [Siddiqui, 1998]. Generally, outgrower scheme assumes that during negotiation meet two unequal partners. The potential farmer had lower bargaining power than agribusiness companies what indicates the possibility of being exploited by the corporations. Weaker farmers without any outside intervention have no ability to negotiate with wholesalers, processors etc. The form of these unequal positions at negotiating table very often left farmers from developing countries with two options: accepting or rejecting the offer. There are some concerns that outgrower scheme may create landlessness. There is also exclusion problem: firms may prefer to cooperate with larger farmers than smallholders [Minot, 2007].

The outgrower scheme has strong supporters. They argue that this arrangement can help to reduce market imperfections (imperfect information, price fluctuations etc.), decrease transaction costs significantly, shift technologies, knowledge and agro-services to farmers, raise incomes of both participants and promote economic development in

rural areas [Grosh 1994; Key, Runsten 1999]. In the light of literature review we can find only few examples where companies preferred to contract with smallholders or where poor, small farmers faced no barriers to entry – in Chile, Mexico, Uganda, Kenya, and Senegal [Smalley, 2013]. Leave alone the ideological and methodological struggle among economic schools and thoughts, we can notice that the proponents of outgrower scheme have stemmed mostly from the new institutional economics and the opponents: from the political economics. The table below tries to combine the advantages and the disadvantages of outgrower scheme for farmers and companies (Table 1.).

**TABLE 1.**

### Advantages and disadvantages of outgrower schemes for farmers and companies: an overview

| Advantages for a farmer | Disadvantages for a farmer |
|---|---|
| – Access to new reliable markets<br>– Ability to purchase inputs<br>– Protect against systematic loss<br>– Access to credit and financial intermediation (sometimes banks, microfinance institutions, and foundations are involved)<br>– Access to information, production and management skill transfer, new technology, agro-services (mechanization, transportation)<br>– Ability to receive inputs (seeds, fertilizer) at lower cost and extension services<br>– Risk reduction through guaranteed prices<br>– Decrease transaction cost<br>– Sometimes training for management<br>– Higher value crops introduction means higher income | – Risk of contract default<br>– Risk of monoculture<br>– Little (or lack of) bargaining power (inability to benefit from high prices)<br>– Monopsonistic markets*<br>– Traditional market linkages and traditional farming practices lost<br>– Unsuitable technology and crop incompatibility<br>– Manipulation of quotas and quality specifications<br>– Poor or no income stream in first years for some crops<br>– Indebtedness and overreliance on advances<br>– Corruption<br>– Delays in payment, inputs, or change in contract terms<br>– Loss of flexibility<br>– Rising inequality and landlessness<br>– Promotion export-orientated agriculture at the expense of subsistence agriculture and can harm food security<br>– Large-scale farmers are in favor |
| Advantages for a company | Disadvantages for a company |
| – Access to low-cost (even unpaid) labor, investment opportunities<br>– Risk reduction if outgrower schemes provides more reliable source than open-market purchase<br>– Risk reduction by eliminating responsibility for production<br>– Provision of more consistent quality than purchasing on the open market<br>– Facilitation of trade standard requirements<br>– Some crops considered more suitable for small-scale production<br>– Decrease transaction cost<br>– Political acceptability, sometimes lower fiscal burden<br>– Overcoming land limitations<br>– Promotion of farm inputs<br>– Often avoid legal responsibility for pollution | – Risk of contract default, side-selling or extra-contractual marketing<br>– Land availability constraints<br>– Social and cultural barriers<br>– Farmer discontent<br>– Advances to farmers not repaid<br>– Input diversion<br>– Internalization of support service costs<br>– Investments in land cultivation and preparation transport infrastructure wasted<br>– Staff underemployed |

\* where one buyer is purchasing the products of many producers within a certain geographical area

Source: author's own study on the basis of [Minten, et al., 2009; Reardon, et al., 2009; Birthal, et al., 2005; Setboonsarng, 2008; Eaton, Shepherd, 2001; International Livestock Research Institute, 2007; Simmons, 2002].

In the outgrower scheme, as well as in every agreement, there rules a superior principle that both participants should obey: these relationships will be efficient only when the parties of the contract realize that they are better off by engaging in them. There must be real economic benefits for both participants; so the win-win situation should be realized. These benefits should be ensured (enforced) by the sustainable political, institutional and economical institutional architecture in a given country. Not only the institutions should be advanced, but also infrastructure, banking system, regulations and laws, etc. The process of price setting mechanism and price or credit agreement should be transparent as well as the conditions of contract should be understood to both sides, especially to farmers. There is a great role of farmers' organizations (associations) supported by the qualified advisors. Absence of accessible dispute resolution mechanism for both sides is still required. In many developing countries mediation centers have not been established and even if they exist they seldom offer rapid and costless hands-on services directed to smallholders.

Similar situation is observed in terms of legal advice companies. First, most lawyers perceive outgrower scheme as something new, so there is a problem with reliable expertise and experience. Second, contracts are not standardized, so advice on various and specific arrangements may be unprofitable for lawyers because farmers are not able to pay a lot, even many smallholders cannot afford this service at all. Third, lack of clear rights and obligations of both sides of contract. For example, in Zambia, smallholders have to sign an 18-page agreement which specifies their obligations excluding their rights. The company in return, 'endeavours to arrange' certain services but there is no corresponding clause protecting farmers in case of the companies default [Baumann, 2000].

## 3. The empirics of outgrower schemes for economic development

### 3.1. The welfare impacts on farmers: general overview

The literature on the impact of outgrower schemes on the economic development is poor. The paper summarizes the findings from empirical research and literature for developed and developing states separately. Presentation of the impacts on farmers in developing countries ignores Asian developing countries, because this group will be evaluated in the next section.

In spite of the fact that developed countries have introduced outgrower schemes long before developing nations, there is a small body of literature on the influence of outgrower schemes on the economic progress or just income. Hu [2012] indicated improvement in returns to soybean and corn farmers in the United States. Unfortunately, wheat farmers did not benefit from these schemes. Ahearn et al. [2002], Key and McBride [2007] convinced us in their research that an increase in outgrower schemes led to rising the productivity. Many authors [Hennessy, 1996; Key, 2013; Martin 1997] point out that many gains from the outgrower schemes may come from the risk of reduction and lower transaction costs. Nevertheless, there are surveys indicating that farmers in developed countries perceive outgrower schemes as an instrument that limits their independence [Schulze, Spiller, Theuvsen, 2006]. Paul et al. [2004], in turn, proved

that the value of marketing and production contract were connected to greater productivity in the U.S. Key's and McBride's [2007] studies indicated that outgrower schemes in hog production led to raising productivity in the U.S.

More literature can be found in terms of outgrower schemes' impact on farmers in developing countries. Minot [2007] tried to indicate that outgrower schemes may assist smallholders in improvement in their productivity. Glover [1984] proved that outgrower schemes improve access to technology and markets. Their research included many developing countries. Olomola [2010], Ajo and Oyedele [2013] indicated that contracts farms were more efficient than non-contracts ones in Nigeria. Similar conclusions brought studies carried out by Nakano et al. [2014] in Tanzania. Many researchers have indicated connections between outgrower schemes and poverty alleviation in Africa. Minot [2011] and Adjognon [2012] have examined the general positive impact of outgrower schemes on poverty in Sub-Saharan Africa; Bolwig [2012] tested organic tropical products under outgrower schemes in Uganda; Porter and Phillips-Howard [1997] examined these contracts in Nigeria and South Africa; Minten et al. [2007] observed the technology diffusion to agriculture in Madagascar; Nsiku with Botha [2007] tested the tobacco sector in Malawi; and Vermeulen et al. [2008] examined over 60 case studies assessing the impact of African forestry on poverty reduction.

However, despite the fact that outgrower schemes can be intended to reduce poverty, this goal is not accomplished in every case and the role of contracts is limited [Salami et al., 2010; Mwambi et al., 2013; Freguin-Gresh et al., 2012]. The critics of the positive role of outgrower schemes in poverty reduction see in these arrangements the means of exploiting for minimum wages and taking control over small farms.

Generally, when we want to estimate outgrower schemes' results of economic development we can investigate the effect of these schemes on production and income. It means that we should answer following questions:

– Do outgrower schemes enhance production efficiency to non-contracted farmers?
– Is there any positive impact of outgrower schemes participation on smallholder income?

These questions can be answered using statistical and econometric methods or the performance indicators. Quite uncomplicated methods applying the indicators that evaluate the performance of the farming production. We can apply indicators that measure the influence of the outgrower schemes on the performance and compare the results to smallholders without production contract. This approach is based on the Tschirley et al. [2010] and Peltzer and Rotther [2013] methodology (Table 2.).

TABLE 2.
**Indicators for farming performance under outgrower schemes**

| Type of indicator | Measured by |
|---|---|
| Quality | Level of contamination determined by expert opinion |
| Access to credit | Provision of input credits |
|  | Provision of investment credits |
| Yield | Kilograms, liters etc. produced per ha, unit etc. |
| Pricing | Farmers share of world market price |
| Income | Net revenue of farmers |
| Price stability | Qualitative assessment |
| Environmental and social standards | Qualitative assessment |

Source: on the basic of [Tschirley, 2010; Peltzer and Rotther, 2013].

### 3.2. The welfare impacts on farmers in developing Asia

In fact, the greatest success stories in agricultural development and poverty alleviation originated from the "green revolution". This wave covered Asia, especially China and India. A series of economic reforms accompanied 'green revolution'. During these reforms we observed significant changes in Asian agriculture. Agricultural yield increases were associated with new high-yielding crop varieties (e.g. rice and wheat), irrigation technologies, and use of inorganic fertilizers and pesticides. In parallel, the countries undertook heavy investment in rural infrastructure, extension, agricultural research, credit systems for input purchases, and interventions in input and grain markets. Generally, productivity has become the main factor of agricultural development [Dorwar et al., 2004]. This study divides the results of introducing outgrower schemes in developing Asia into two categories. The first group includes cases where these contracts were success and brought improvements in incomes or/and productivity. In the second group we will find cases with mixed results.

#### 3.2.1. Successful outgrower schemes in developing Asia

Currently, outgrower schemes in developing Asia are perceived as an important tool against poverty [Hazell, et al., 2006]. There is clear empirical evidence that farmers under outgrower schemes in developing countries profit more than non-contract farmers[4]. Following some examples from developing Asia, Setboonsarng et al. [2006] examined rice contracts in Thailand, Setboonsarng [2006] carried his survey in Cambodia, Lao PDR and Myanmar on organic crops farms, IMF [2005] analyzed poultry and milk

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[4] Contract farmers in Indonesia have higher incomes as much as 100 per cent than incomes of conventional farmers [The World Bank, 2007]. The organic basmati rice production in Thailand showed that smallholder incomes of contracted farmers were between 70 per cent and 100 per cent higher compared with non-contract farmers [Sriboonchitta, Wiboonpoongse, 2008].

production in Bangladesh, Simmons et al. [2005] tested contract of poultry, seed maize, and rice in Indonesia, Singh [2006] characterized Thai and Indian agriculture, or Zhang [2012]: Chinese farming sector. Begum et al. [2012] indicated that contract smallholders were much more efficient than independent farmers in poultry sector in Bangladesh. Moreover, many studies pointed out farmers under outgrower schemes gained a higher productivity [Saigenji, Zeller, 2009; Miyatta et al., 2009].

All the above-mentioned works indicate that the outgrower scheme is implemented, inter alia, to absolutely reduce poverty. Many studies point out that the improvement in smallholders' income from outgrower schemes may come from three sources: access to market, access to technology, and access to other support, e.g. loans, subsidies, etc.

### 3.2.2. Outgrower schemes in Asia with mixed results

Despite the fact that one of the intentions of the outgrower scheme is economic growth and poverty reduction, this goal is not achieved in every case and the role of the outgrower scheme is limited [Salami, et al., 2010; Mwambi et al., 2013]. The critics of the positive role of outgrower schemes in poverty reduction see in these arrangements the means of exploiting for minimum wages and taking control over small farms.

Outgrower scheme projects have had mixed results for economic development. Success of outgrower scheme in Asia occurs for example in Vietnam where Luveco cooperates with farmers in fruits and vegetables delivery, India with PepsiCo and Nestle, in Thailand with soybean, baby corn or sweet corn, in Bangladesh with poultry for Aftab Bahumukhi Farms Ltd or cooperation of Bombay Sweets that buys potato and peanuts [Business Innovation Facility, 2012]. Zhang and Wu [2011] examined Chinese market and they indicated that where exists an open market the contract price is set by the market mechanism, the farmers under outgrower schemes do not obtain higher profits than non-contracted smallholders. Ito et al. [2012] showed that only smallholders in China may benefit from these contracts.

Nevertheless, there are many cases of outgrower schemes in Asia that can be defined neither as success nor as failure. They still have been discussed in the light of problems that the contractors should face. For example, benefits of outgrower scheme in East Java, Bali, and Lombok in Indonesia depend on farm size and other factors such as smallholder's age, education, and participation in farm groups. We can find similar conclusion in Kalamkar's [2012] study on India. Contracts increased returns to capital for the seed corn and broiler contracts, but not for the seed rice contract. All three contracts influenced the types of labor used; however, none of them influenced total farm employment [Simmons et al., 2005].

### 3.2.3. Discussion

As a whole, there is no agreement with regard to the role of outgrower schemes in promoting economic development in Southern and Eastern Asia. Empirical evidence presents ambiguous effects of outgrower schemes introduction on poverty alleviation

in the analysed regions. Usually, farmers treat participation in contract production as a diversification strategy, which multiplies the sources of income and influences income. It seems to be the main reason of the debate concerning the point of the farmer's agreements in the light of the manipulation of contracts by companies and the growing social tensions generated by this externally induced change [Carney, Watts, 1990]. The conclusion from this part of analysis is that outgrower schemes should be assessed in a regional context.

There is a serendipitous aspect of the interdependence of poverty and outgrower schemes – increasing the likelihood of poor and small farmers being included in these schemes. There are three explanations of this phenomenon. First, public schemes are more likely to welcome smallholders than private ones when there are political objectives of inclusion and poverty reduction. It is quite a popular action that governments and donors subsidise the credit available to private companies when they decide to include farmers with small holding. Second, smallholders are generally perceived as partners without bargaining power. Nevertheless, they might be able to overcome the preference for contracting with larger farmers if they lobby through farmers' cooperatives, have local authority support or are represented within the scheme's management [Rotteger, 2004]. Third, poorer farmers are better able to participate when there are low or no barriers to entry.

It is worth presenting the latest evidence of small farmers' participation in outgrower schemes. The data on the degree of smallholders' participation in production contracts suggests that poorer smallholders are often excluded. For example, there are several studies that find a strong association between asset holdings, mostly land, geographic factors (such as market access and agro-ecological zone), and participation [Barrett 2008]. Though outgrower schemes generally improves the agricultural output of participants, some studies show that outgrower scheme mostly involves the better resourced, who have previously benefitted from e.g. public support [Freguin-Gresh et al., 2012]. A more optimistic interpretation of smallholders' participation in outgrower schemes is offered by researchers from the ADB. They have demonstrated that although smallholders are likely to be excluded in dualistic agrarian economies, there are numerous exceptions to this pattern [Readon et al. 2009]. Of the 35 successful cases on outgrower schemes assessed by Prowse [2012] in his study, 54% were with smallholders, and 26% were with a combination of both small and large farms.

## 4. Conclusions

The dynamic changes in agricultural value chains, the development of outgrower schemes, the rapid rise of large multinational retailers and global agro-exporters are the phenomena of contemporary agriculture. Similarly to the 'green revolution', outgrower schemes have affected agriculture in developing countries in varying degrees. Some regions benefit from this wave; some of them are omitted by this scheme. Many empirical studies of the effect of outgrower schemes participation have struggled to establish causality. Nevertheless, there is a number of cases which indicate that national context and

domestic condition determine the success or failure of outgrower scheme. It means that it does not matter if we analyze Asian countries, but important are domestic conditions. Most of the studies suggest that in stable institutional surroundings participation in production contract may lead to higher levels of welfare and poverty reduction. Unfortunately, many poorer countries in developing Asia cannot establish stable institutional environment and cannot ensure for the smallholders positive results from outgrower schemes. Much more remains to be explored because we still know little about the role of the state in promoting contract production, the role of informal contracts in increasing welfare, or the importance of social conditions in positive results of outgrower schemes. The outgrower scheme continues to be perceived as a phenomenon which occurs in selected regions rather than a tendency in agriculture. The available data concern individual products or regions rather than countries or even continents as a whole.

This article has synthesised the findings from outgrower agreements in developing South and East Asian countries to form a conceptual framework of the determinants and dynamics of farmers' participation in production contracts. General conclusions suggest that there is a serious lack of data essential for conducting a complex comparison of the states of analysing regions. This analysis does not provide a comprehensive picture of the phenomenon of outgrower schemes in this region. However, this survey can be treated as an introduction to a complex comparative study of the Asian outgrower schemes and may spur further integrative analysis of the transformation in agriculture in developing countries, especially in Sub-Saharan Africa.

Areas for further research:
- a detailed analysis taking into account differences between various developing East and Southern Asian countries (reforms, stage of development etc.);
- a deepen overview of methods that can be useful in assessment of the relation between economic development and outgrower schemes introduction;
- impact of market volatility of agriculture products;
- understanding of the behavior and dynamics of different smallholders groups;
- long-term forecasts of price impact of farm products prices.

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# SIGNIFICANCE OF SKANDIA ACHIEVEMENTS IN THE DEVELOPMENT OF APPROACHES TO CONCEPTUALIZATION AND ASSESSMENT MODELS OF NATIONAL INTELLECTUAL CAPITAL

## Summary

A noteworthy group among the national intellectual capital conceptual approaches, allowing to an assessment of the NIC level, are methods based on a model developed by L. Edvinsson within Skandia company. The model is called "Skandia Navigator" and is the one of world's first proposal of the comprehensive measuring tool to enable for an evaluation and management of the intellectual capital.

The aim of the article is presentation of the significance of Skandia's and L. Edvinsson's achievements in development of the national intellectual capital concept. In this research paper selected conceptual models NIC are analysed, which to some extent relied on Skandia's model. The analysis was conducted paying special attention to the methodological apparatus structure and operationalization. The article is an effect of analysis main foreign literature and also aims at filling of the gap, which exists in publications about the NIC concept.

As a result of the considerations set out in this article, the following conclusions can be drawn. Skandia Navigator became an universal construction, irrespective of the size and type of the object of analysis. Edvinsson's model is constantly used as the foundation of assessment instrument in significant amount of scientific studies and reports for intellectual capital researches at the macroeconomic level. Original structure and assumptions of the method are slightly modified, but the changes depth never transform strongly Skandia prototype. This group of methods are easy to adapt and modify, what allow to adjust of the conceptualzation and methodology to the author's intentions and specific object of analysis. On the other hand, the ease of adaptation to identified conditions and applications may disclose the imperfections of the Skandia's methods. Analyzed conceptual models consists of four components in this research paper. In each of them appeared human capital. The development capital was the second, next to market and process capital, most common distincted element in NIC models. L. Edvinson's solutions (Skandia Navigator and Skandia Value Sheme) have been the pillars of many attempts of NIC assessment.

**Key words:** national intellectual capital (NIC), Skandia Navigator, Skandia Value Scheme, conceptualization of NIC, assessment NIC models.

**JEL:** 0110, 0340

## 1. Introduction

A number of proposals for the conceptualization of intellectual capital and methods of its measurement and reporting have appeared over the last few years. In most cases, new models of intellectual capital are the modification the existing "classics" [Michalczuk, 2013, pp. 87, 91] The crucial achievement, systemizing knowledge of intellectual capital was Skandia's invention of new way of reporting "the hidden value" of the organization developed by Edvinsson.

Edvinsson initially distinguished two elements of intellectual capital: human and structural, which later was divided into relations and organizational capital. The three-level structure of Edvinson's intellectual capital model permanently became part of the intellectual capital theory [Roslender, Fincham, 2004, p. 182]. Edvinsson's measuring tool has not become outdated, in spite of the changeability of conditions, the relevant progress in civilization and development, which occured in the mid 90s.

The pioneering Edvinsson's publications initiate the new approach for the evaluation of the intellectual capital with the macroeconomic prospect. Skandia Navigator became a hard core of the structure of the following NIC models and the base of the coming into existence of alternative approaches/models[1] letting the diagnosis of the intellectual capital on a national scale.

The purpose of the article is presentation of the significance of Skandia's and L. Edvinsson's achievements in development of the national intellectual capital concept. In this research paper are analysed selected conceptual models NIC, which to some extent relied on Skandia's model. The analysis was conducted at the angle of the methodological apparatus structure and operationalization. The article is an effect of an analysis of the main foreign literature and also aims at filling of the gap which exists in literature about the NIC concept.

## 2. Skandia Navigator model as the foundation of NIC concept development

The first attempt of measurement of intellectual capital at the national level based on achievements of the Swedish insurance enterprise "Skandia AFS". Within the framework of Skandia an innovative method of reporting the intellectual capital of organisation was worked out. It was a reaction to the incompleteness of traditional, financial reports in respect of information about intangible assets (so-called invisible assets) – main generator of the value of enterprises. The internal report about the state of these invisible assets of Skandia developed in 1985 [Bontis, 2000, p. 45]. This was preceded by the work of the current professor of Lund University, at that time the world's first (1991) director for intellectual capita at Skandia – Leif Edvinsson. In 1993, he developed Skandia's Value Scheme. On its basis Edvinsson with his team constructed Skandia Navigator[2] model - a tool of management and reporting of

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[1] VAIC – A. Public, ICM – Andriessen Stam, IC-dVAL – Bounfour, INTAN – Lopez Nevado Alfaro, [Labra Sanchez 2013, p. 589], NICI – Bontis [Nazari Herremans 2007, p. 600]

[2] The first public addition to the annual financial report basing on Skandia Navigator was published in 1994 - "Visualizing intellectual capital in Skandia", in 1995 officially published two supplements under

company's intellectual capital. The first practical application of it took form of the appendix to the financial annual report about intellectual capital [Ondari-Okemwa 2011, p. 140]. From that moment, hundreds of companies around the world take the action of implication intellectual capital reporting [Bontis, Serenko, 2013, p. 479], which is an way of announcement to stakeholders about intangible assets and prospects of the development.

Skandia Value Scheme organizes the both kinds of market value of the company factors – material aggregated in financial capital and intangible assets reflecting the intellectual capital. Taking into account intangible capital in the structure of value creation was aimed at filling the information gap on the value generators. Supplementing financial factors by intellectual capital reporting allowed for the visualization of it, the possibility of forming a strategic vision of the development for stakeholders, the basic competences presentation, the properties of knowledge assets and way of knowledge flows within the organization [Bontis, 2000, p. 45]. According to Edvinsson and Malone, the intellectual capital includes experience, organizational technology, relationship with clients and professional skills in order to ensure advantage over Skandia's competitors. Edvinsson expressed intellectual capital as the sum of human capital and structural [Edvinsson, Malone, 1997, pp. 11, 34-37] The first type of capital specifies a combination of knowledge, skills, innovativenes, the ability to meet the tasks by company's employees and culture, philosophy or values of the company. Second capital – structural consists of everything of organizational capability that supports employees productivity, for example: hardware, database, patents, software, organizational structure. Structural capital, unlike human, can be own and thereby traded [Bontis, 2000, p. 5] Figure 1. illustrates Skandia Value Scheme.

**FIGURE 1.**

**Skandia Value Scheme**
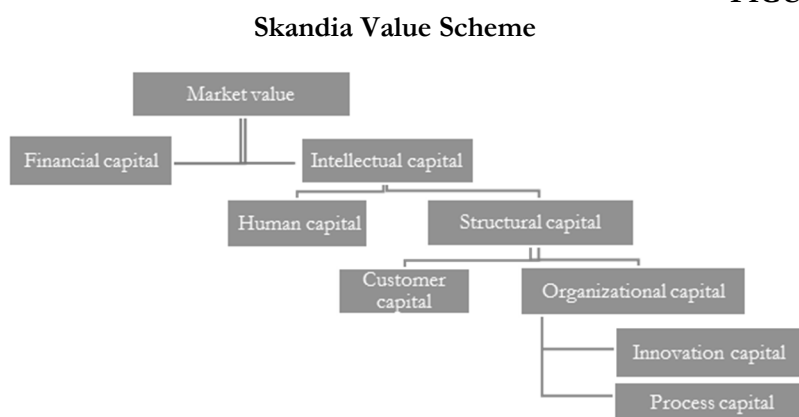


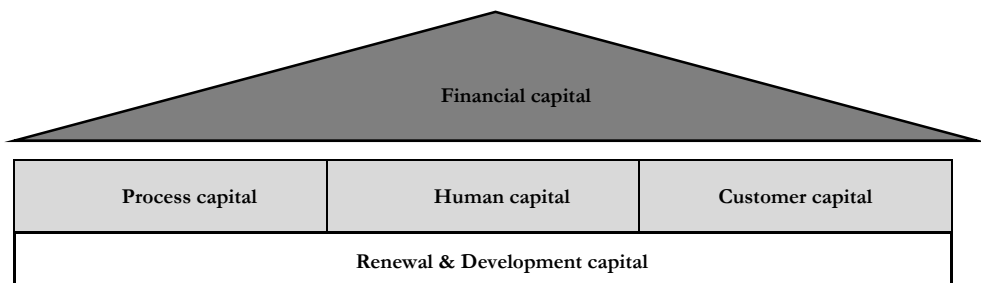Source: [Bontis, 2000, p. 46].

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the title: "Renewal and development intellectual capital" and "Value-creation process: intellectual capital". In 1996 next Skandia studies were made available: "Power of innovation: intellectual capital" and "Customer value" [Bontis, 1998, p. 74]

In Skandia Value Scheme structural capital is divided into customer capital (relationship with the company's clients) and organizational capital. Organizational capital is broken down into innovation (represents the enablers to innovatte products and proces) and process capital (relates to the procedures and routines of the company's internal process), [Marr, Schiuma, Neely, 2004, p. 556].

In 1994, on the basis of the relationship between elements of the Scheme and its classification, Edvinsson developed Skandia Navigator. This model is a comprehensive reporting tool of company value through the aggregation of the factors that create it on five areas: financial, human, customer, process, renewal and development, which are define like in Skandia Value Scheme [Bontis, 2000, p. 45]. The essence of this solution is explained with using the metaphor of a house whose roof is tangible financial dimension of value creation, created in the past. The material part of the Skandia's market value results from traditional financial statements [Marr, Schuima, Neely, 2004, p. 555]. The function of the external pillars performs prosess capital and customer capital. They surround central part of the house – human capital. Metaphorical walls and the interior compose invisible assets generating value in the present. The foundation of the house in the form of renewal and development capital generates value in the future. The last type of capital is particularly significant from the point of view of Skandia's Navigator value-added compared to the previous ones [Nazari, Herremans, 2007, p. 600]. The emergence of renewal and development capital balances information shortage of traditional reporting, concerning the possibilities of development and plans of the company. Skandia Navigator approach splits IC – as intanfible assets of comapany – into four categories: human, customer, proces and innovation capital. The visualization of Skandia Navigator presents Figure 2.

<div align="right">**FIGURE 2.**</div>

<div align="center">**Skandia Navigator – organization level**</div>



| Process capital | Human capital | Customer capital |
|---|---|---|
| Renewal & Development capital | | |

Source: [Opper, 2007, p. 11]

In Scandia Navigator human capital is defined as a sum of skills, competencies, abilities and experiences. Process capital means infrastructure support for human capital including organisational processes, procedures, technologies, sources and information flow system and intellectual property. Customer capital includes the value in the business relations with the environment: customers, suppliers, organizations [Malhotra, 2003, p. 7]. Location of human capital in the center, in the heart of the house is an expression of

the nature and importance of this kind of capital. Human capital is an activator of activities and constitutes the type of binder between the blocks, because through it comes to interacting with other components [Opper, 2007, p. 11].

The creation Skandia Navigator model is an extremely important moment and achievement in the development of intellectual capital concept. Model's taxonomy has changed the traditional approach to the factors generating the value of the company, offering the extension of the evaluation and measurement the horizon of market value. Information capacity of this tool provided a new quality of reporting, giving the ability to communicate to stakeholders about the organizational and prosess structure, external relations and development prospects. This aspect was emphasised by Edvinsson concluding that the Navigator "reinforces the dynamics of the relationship between basic areas (…) can also get an extensive reporting system that provides more information than the traditional financial statement" [*Community Intelligence Labs…*]

### 3. Transformation of Skandia's models to the national level

From a macroeconomic perspective the intellectual capital was recognised as the determinant of the wealth of the country only in the 90s of the last century [Labra, Sanchez, 2013, p. 584]. The concept of NIC emerged as a result of the transformation of intellectual capital theory from the company level. The pioneering initiative to expand the scope of the research object was making gradually in Sweden - the cradle of NIC concept.

The need of widening the scale of research on intellectual capital to the national level was determined by many reasons. The first of these was functioning of ISA (Invest in Sweden) and the establishment 1996 year was the year of innovation in Sweden. Another of them was the foundation of Skandia Future Centre by led of Edvinsson on the initiative of the government of Sweden. In Skandia Future Centre work on adapting the model Skandia Navigator to the national level has been months in the making[3]. The effects of it were presented at the First International Meeting on Visualisation and Measuring the IC of Nation in 1998 [Edvinsson, 2004, p. 157].

One of world's first reports on intellectual capital of Sweden [Rembe, 1999] applied an adopted to macroeconomic scale model of the Skandia Navigator [Lin, Edvinsson, 2011, p. 8]. Transformation was a result of the cooperation of the Swedish government with the university[4] and well as practices. Undoubtedly, the achievements of Skandia initiated progress in the approach to the NIC reporting and exposed the importance of intangible determinants of country development.

Edvinsson defines national intellectual capital as future earnings capabilities. NIC includes knowledge, wisdom, capability, experience what provide competitive advantage and determine future gowth. [Edvinsson L., Lin C. 2011, p. 3]

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[3] One previous NIC report was emerged in 1997 – „*Welfare and Security – For future generations*" (Jarehad and Stenfelt), Sweden.

[4] L. Edvinsson invited C. Stanfetl of Stockholm University and several fellow students to work on the transformation model Skandia Navigator [Edvinsson, 2004, p. 157].

Transformation of Skandia Value Scheme and Skandia Navigator from the corporate to the nation area was not a difficult task, what was confirmed by the author L. Edvinsson in the article from 2004 – "The Intellectual Capital of Nations" [Edvinsson, 2004, p. 157]. The adaptation consisted of some changes in model's nomenclature. The names of scheme elements have been changed as follows: "market value" was replaced by "the wealth of the country", "financial wealth" in place of "finance capital", in turn "customer capital" was replaced by "relations capital". The other parts remained unchanged. The visualization of Skandia Value Scheme of the nation including the structure of the national intellectual capital is presented in Figure 3 .

**FIGURE 3.**

**Skandia Value Scheme of the nation**
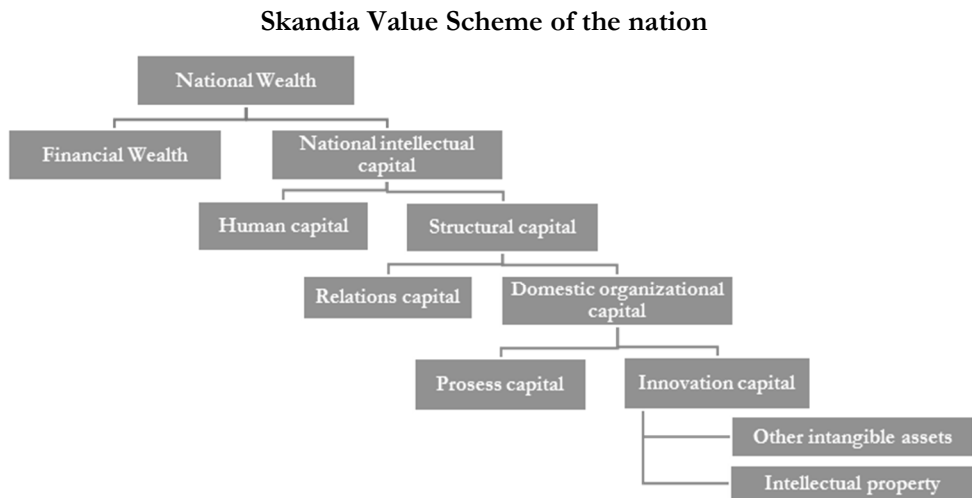


Source: [Edvinsson, 2004, p. 159].

In the Skandia Navigator model, transformed to requirements of the macroeconomic scale, five areas were singled out. Financial wealth, which is the property of the country was created in the past. Human capital is a centre of the house, invariably to the primal version. Human capital is located on one horizontal level with external relations pillar and pillar of the internal capacities and IT. Human capital interacts with the other components of national intellectual capital. The foundation of the house is future potential, including renewal, development and innovation capital. The construction of the scheme Skandia Navigator as a metaphorical home in macroeconomic perspective is shown in Figure 4.

**FIGURE 4.**
**Skandia Navigator model transformed to the national level**
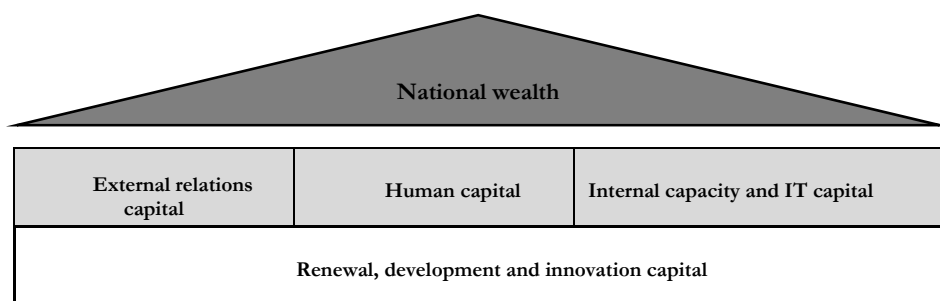


Source: [Edvinsson, 2004, p. 156]

The evaluation of the national wealth from this model point of view enables the comprehensive diagnosis of strengths and weaknesses of the examined economy. The effects of this method do not have fragmented nature/features in contrast to the standard measuring methods of the development possibilities. Skandia Navigator allows to identify value generators not only in various perspectives of wealth creation e.g. financial capital, human capital, renewal, development capital, but also with reference to the past, the present and the future time.

## 4. Diagnosis of the level of NIC – models based on Skandia methodology

Sweden is a pioneer country in the development of research on the intellectual capital concept at the macroeconomic level. A. Rembe with ISA issued one of the world's first publication as the report about the state of intellectual capital in Sweden, entitled "*Welfare and Security*" in 1999. The applied model of Swedish NIC is based on the concept of intellectual capital, which consists of four blocks: human, market, proces and renewal & development capital [Pomeda, Moreno, Rivera, Martil 2002, p. 8].

A second study of national intellectual capital was carried out in Israel by E. Pasher. The results of research published in 1999 entitled "*A look to the future: The hidden values of the Desert*". The methodology of Israel report used the intellectual capital classification from Skandia model, separating IC on human capital, market capital, processes capital, and renewal & development capital. Pasher did not only demonstrate the macroeconomic dimension of the value creation, but also expressed conclusions which showed that the advantages of small Israeli economy stuck in human resources, technical resources and modern infrastructure [Opper, 2007, p. 6]. Later, two other versions of NIC report of Israel were created. The first was prepared by E. Pasher and S. Schachar in 2004 and the other one was developed by E. Opper in 2007. The conceptual model has not changed in both of them.

Next publications using Skadnia achievements about NIC were created by N. Bontis in 2002 nad 2004, showing effects of examinations of Marseille economy and 10 Arab

countries. In these works, besides the financial capital, the national intellectual capital was divided into four components: human, market, processes, renewal capital [Bontis, 2000; Bontis, 2004]. Bontis applied financial indicators and quality methods concerning characteristics of the immaterial wealth for the measurement of the national intellectual capital [Edvinsson, Lin, 2008, p. 528]. Wider than in previous researches, the range of applied methods/indicators was the result of the author's assumptions, that intellectual capital on the macroeconomic scale should be assessed from various perspectives, for instatnce: from health, poverty or gender equality point of view [Edvinsson, Lin, 2008, p. 529]. Every indicator stayed standardized from 1 to 10 scale in one of four areas [Labra, Sanchez, 2013, p. 589].

The theoretical measurement model developed by Malhotra in 2003 relating to national knowledge assets, based also on the structure of Skandia methodology. The author followed the OECD definition which accepted that intellectual capital is a subset of intangible knowledge assets of the country. Malhotra has identified four components NIC: human, processes, market and renewal & development capital. The elements of NIC are in the same relationship to each other as in the Skandia Value Scheme [Malhotra, 2003, pp. 3, 24].

Skandia Navigator constituted a pillar of the adopted assessment method of Finland in 2005. Stahle and Pasher decided that NIC is made up of segments such as: human capital, market capital, processes capital, renewal & development capital. The measurement was conducted making use of financial variables, national measures and indicators of Finland industries [Edvinsson, Lin, 2011, p. 12].

D. Węziak built conceptual model of the national intellectual capital dividing it into the human capital, structural capital, relations capital and renewal & development capital. The author made the diagnosis of NIC level in twenty four countries of the European Union [Węziak, 2007]. She got the overall results in the form of the intellectual capital index obtained by adding individual indicators up with the subjectively established weight [Labra, Sanchez, 2013, p. 589].

In their works from 2008 (diagnosis of NIC in five Nordic countries) and 2011 from (diagnosis of NIC in 40 countries) Edvinsson and Lin adopted Edvinsson's model and supported it by Bontis's construction (2004), which was established as a result of modification of Skandia Navigator too [Seleim Bontis 2013, p. 132]. NIC was formulated as the sum of human capital, market capital, process capital and renewal capital. However, in contrast to Bontis's method, the final result of the calculation took into account the impact of the logarithm of GDP per capita in purchasing power of each country. Operationalisation was made using two types of indicators - absolute values and the qualitative ones measured by the 1-10 point scale. [Edvinsson Lin 2008, pp. 530-531]

Also in Poland an attempt of assessment the level of NIC was adopted. In 2008, a team under the leadership of M. Boni published *Report on Intellectual Capital of Poland*. To identify the intellectual capital of Poland, they borrowed taxonomy based on four components: human capital, structural capital, social capital and relations capital. In the report, Skandia Navigator was not mentioned as the initial inspiration, however, the definition of NIC in Polish methodology came from Bontis and Malhotra's thesis (they built conceptual models of the Skandia Navigator), [ZDSP 2008, p. 21]. The ingredients

of NIC clearly different from earlier examples, mainly by the occurrence of the social capital. Social capital according to Boni's methodology means "society potential in the form of the standards of conduct, trust, commitment, which constitute the support of cooperation and exchange of knowledge" [ZDSP, 2008, p. 6]. Structural capital could be treated analogously to process capital due to the similarity of definitions.

In Phusavat's, Comepa's, Sitko – Lutek's, Ooi's diagnosis of the intellectual capital of Thailand, the authors assumed that human capital, market (customer) capital, process (information) capital and innovation capital form the NIC model. The differing accent of NIC assessment at this approach was a division of organizational capital into the capital of innovation and process/information [Phusanvat al., 2012, pp. 869, 875-876]. It should also be emphasized that the structure of the organizational capital in Thailand model derives from Skandia Value Sheme. The adopted in the article definitions of these components show that the innovation capital should be explicitly interpreted with a term of the renewal & development capital.

Presented examples of conceptual NIC models are not exhausting all their spectrum[5]. They belong to the most common group, the so-called academic models[6]. Analyzed conceptual models of NIC divide intellectual capital into four components. In each of the presented conceptual models based on Skandia Navigator human capital occurs, which is a combination of knowledge, skills, innovation and the ability of the individuals, including the values, culture and philosophy of the nation. Human capital includes wisdom, experience, intuition, the ability of individuals to create value and achieve the objectives [Malhotra, 2003]. According to Bontis, in terms of macroeconomic perspective human capital is the level of citizens' competence used in the implementation of national tasks [Bontis, 2004]. Human capital is the most homogeneous component of NIC with fundamental importance. It is a kind of material not only for the creation of other NIC elements, but also the basis for obtaining benefits from them [Michalczuk, 2013, p. 105]. Other components adopt different names but very often pertain to the same area of intangible generators of value.

To sum up, the authors most often create their methodology on the basis of the concept consisting of such components as human capital, market capital, processes capital and renewal & development capital.

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[5] The subject of the authors's analysis was 13 research papers and on their base were identified conceptual approaches to NIC diagnosis.

[6] Two groups of models were distinguished in literature (models drawn up by research workers – "academic models" and models created by international organizations – "international organization models"), which are used for the evaluation of NIC. This classification arose as a result of findings among: [Harvas-Olivier, Dalmau-Porta, 2006; Alfaro et al., 2011; Lopez et al., 2011; Labra, Sanchez, 2013, p. 588]. However, the research sample does not mean, that methods of NIC assessment designed by international organizations make use of Skandia achievements. For example World Bank methodology – KAM from 2006 year bases on Skandia Navigator model [Navarro, Pena, Ruiz, 2010, p. 514].

## 5. Operationalization of selected conceptual models based on of Skandia methodology

The diagnosis of NIC requires a system of variables that allows to measure the invisible wealth of the country and to manage it. Concept models based on the Skandia Navigator are a group of relatively clear methods with a substantial degree of freedom of choice by selecting NIC indicators. Its versatility and ease of adaptation allows a big selection of measurable and immeasurable characteristics to reflect the value of the individual components. Adopted in the analyzed work classifications of national intellectual capital enabled the operationalization of models by measuring these elements. To that measurement indicators were used characterizing these segments of a different nature (financial indicators, qualitative variables, descriptions). The examples of variables expressing the value of the NIC components are presented in Table 1.

The practical application of a modified version of Skandia Navigator in Rembe's report to the assessment method of NIC for Sweden in 1999 was undoubtedly a breakthrough moment. The author used financial and descriptive indicators for the innovative measurement of the intellectual capital on a national scale [Edvinsson Lin 2008, p 528]. The results of Swedish NIC reporting took the form of consideration regarding the growth determinants foreign investment perspective in Sweden. The factors of Swedish attractiveness were located in the category of national intellectual capital. This publication also includes a proposal for a plan of the further development of Swedish intellectual capital. [Pomeda, Moreno, Rivera, Martil 2002, p. 8]

The conceptual models created by Bontis, Edvinsson and Lin are among the group of methods using the NIC benchmarking. NIC benchmarking relies on measuring the NIC level of chosen objects and comparing their results. [Januskaite, Uziene 2015, p. 163] The work of Phusavat and others also made the ranking Thailand in regard to the four neighboring economies.

The most complex measuring tool (not only for the amount of indicators, but mainly due to the multi-level construction) is Boni's model evaluating Polish NIC with the division of generations. The decomposition of national intellectual capital on generational groups (children and young people, students, adults, seniors) required building the models for each of them. Generations were characterized as appropriate and differing from each other subcategories of the Polish intellectual capital. It caused the necessity for an examination of the relationship between them to get a comprehensive and final result. The methodology used in the Polish report is an innovative tool on a global scale. The advancement of it increases the rank of the conceptual model and causes dissonance in relation to the studies research papers or others existing groups of NIC measurement methods.

TABLE 1.

## A selected characteristics(quantitative and qualitative indicators, descriptions) of the components of NIC models

| The govermmental invest in Sweden – A. Rembe, 1999 (21 categories of indicators) | | | |
|---|---|---|---|
| **Human capital** | **Market capital** | **Process capital** | **Renewal capital** |
| Standard of living, life expectancy, level of health, quality of education, the level of immigrants's education, rate of infant deaths. | Level of integrity, information about corruption, tourism, trade balance, intellectual property. | Computers with access to the Internet in %, statistics of employment and service sector. | R&D expenditures (% of GDP), the amount of start - up companies, trade marks. |
| **National Intellectual Index – NICI - N. Bontis, 2004 (26 indicators)** | | | |
| **Human capital** | **Market capital** | **Process capital** | **Renewal capital** |
| Tertiary rate per capita, primary school teachers with appropriate qualifications, tertiary students/graduates per capita, male/female grade 1 net intake (%), literacy rate. | High technology export % of GDP, patents granted by USPTO per capita, meetings hosted per capita. | Telephone lines per capita, personal computers with access to the Internet per capita, mobile phones per capita, Internet users per capita, radio receivers and television sets per capita, newspaper circulation per capita. | R&D expenditures % of GDP, ministry and university employees in R&D % of GDP, imports of books % of GDP, tertiary expeditures. |
| **„Report about intellectual capital of Poland" M. Boni, 2008 (117 indicators)** | | | |
| **Human capital** | **Structural capital** | **Social capital** | **Relations capital** |
| The potential accumulated in the Polish citizens expressing their education, skills, attitudes. | The potential accumulated in tangible infrastructure components of the national system of education and innovation – educational/ scientific/research institutions, ICT infrastructure, intellectual property. | The potential accumulated in the Polish society in the form of standards of conduct, trust and commitment. | The potential of the Polish image outside, at the integration with the global economy and its attractiveness for foreign customers. |
| **Intellectual Capital Monitor - Edvinsson, Lin, 2011 (29 indicators)** | | | |
| **Human capital** | **Market capital** | **Process capital** | **Renewal capital** |
| Skilled labor force, literacy rate, expenditures for education, the rate of student – teacher, employee training, the Internet users. | Tax system, cross-border venture, cultural openness, transparency level, the degree of globalization, the image of the country, exports of goods. | Business competition environment, government efficiency, intellectual property rights protection, availability of capital, computers users per capita, start-up companies convenience, mobile phone users. | Business expenditures on R&D, research base, R&D spending, cooperation between universities and business, the USPTO and EPO patents per capita, scientific articles. |
| **NICI – Phusavat, Comepa, Sitko-Lutek, Ooi, 2012 (20 indicators)** | | | |
| **Human capital** | **Market capital** | **Process capital** | **Innovation capital** |
| Quality of the education system, the quality of primary education, the local availability of research and training, wage flexibility, cooperation between employees and employers, employment practices for unemployment, brain drain, quality of math and science education. | Scope of market advantages, effectiveness of antitrust policy, market size, the cost of agricultural policy, the value and range of links. | Advancement of the production process, reporting standrds, quality of railway infrastructure, the availability of credit and verture capital, natural competitive advantage. | Intellectual property protection, innovation ability, business expenditure on R&D, state orders for high technology products, quality of research and scientific institutions. |

Source: authors's own work base on: [Bontis, 2004; Edvinsson, Lin, 2011; Phusavat at al., 2012; Rembe, 1999; Węziak-Białowolska, 2010; ZDSPRM, 2010].

## 6. Conclusions

The concept of national intellectual capital was established on the considerations about it in organization scale. The microeconomic perspective is the main subject of discussion on intellectual capital. The development of the knowledge-based economy caused that began to recognize also the importance of intangible assets in relation to the national economy. It proved that not only financial capital determines wealth of the country. The intellectual capital becomes increasingly a generator of value. L. Edvinson's innovative solutions (Skandia Navigator and Skandia Value Sheme) have been the pillars of many attempts of NIC assessment. As a result, Edvinsson should be regarded as the pioneer of the concept in national terms. Currently, a constant growth of the amount of new models of the NIC assessment is observed. However, amongst the broad spectrum of methods[7], considerable part of them are based on Edvinsson's achievements. Accordingly, Skandia's methodology does not lose popular over time. Models found on Skandia Navigator are relatively simple tools mesuring NIC. This group of methods are easy to adapt and modify, what allow to adjust of the conceptualzation and methodology to the author's intentions and specific object of analysis. On the other hand, the ease of adaptation to identified conditions and applications may disclose the imperfections of the Skandia's methods. The main one of them is static dimension of the obtained results of measurement, which is a consequence of the reporting orientation of Skandia [Bontis, 2000, p. 48].

Analyzed conceptual models consists of four components in this research paper. In each of them human capital appeared. Assuming the identity of capital development and renewal capital that many authors used interchangeably or replacement at the same level, it can state that developmet capital was the second, next to market and proces capital, most common distincted element in NIC models. There are four basic components of intellectual capital: human, market, processes and renewal & development capital in the ten of thirteen analized models. It necessary to note, that the convergence of the names of NIC components is inadequate to using the same definitions and indicators describing elements of NIC. Additionally, it shall be pointed out that they are characterized by the different degree of complexity. As a consequence, there is a lack of unanimity in defining, categorizing and measuring national intellectual capital. This diversity is reflected in NIC reporting limits the ability to compare NIC reports of countries, which carried out assessment of it. It is not an isolated problem. Similar observations are identified by referring to intellectual capital of organization. According to A. Brooking, P. Board and S. Jones difficulty in clarifying the concept of intellectual capital and its categorization is meaning capacity and some kind of elusiveness of it. [Brooking, Board, Jones, 1998, p. 115-125]. This fact does not diminish the importance of the intellectual capital concept, which is being tried to organize, classify the dispersed and often unaware intangible generators of the country wealth.

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[7] Next to the Skandia Navigator, other comprehensive measurement systems: Intangible Assets Monitor, Balanced Scorecard, IC-index, Technology Broker Model.

**The authors' participation in the preparation of the article**

Julita Fiedorczuk, M.A. – development of the research concept, carrying out the research, developing results, data collection and literature analysis, preparation of the introductory section (theoretical), formulation of the summary – 50%

Grażyna Michalczuk, Ph.D., Professor of the University of Białystok – development of the research concept, carrying out the research, developing results, data collection and literature analysis, preparation of the introductory section (theoretical), formulation of the summary – 50%

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# CRISIS PERIODS, CONTAGION AND INTEGRATION EFFECTS IN THE MAJOR AFRICAN EQUITY MARKETS DURING THE 2007-2009 GLOBAL FINANCIAL CRISIS[1]

### Summary

A number of studies assert that during critical events cross-market correlations change substantially. The main focus of this paper is to explicitly test two research hypotheses concerning the effect of increasing cross-market correlations in the 2007-2009 Global Financial Crisis (GFC) compared to the pre-crisis period. These hypotheses state that there was no contagion and no integration effects among the U.S., the U.K., and selected African stock markets (South Africa, Namibia, Egypt, Nigeria, Morocco and Kenya) during the GFC. The crisis periods are formally detected using a statistical method of dividing market states into bullish and bearish markets. The sample period begins in January 2003 and ends in December 2013, and it includes the 2007 U.S. subprime crisis. Obtained results indicate that there is no reason to reject both research hypotheses. Moreover, the results confirm a heterogeneity of the African equity markets in the context of the influence of the recent global crisis.

**Key words**: stock market, crisis, cross-market correlations, contagion, integration

**JEL**: C10, F36, F65, G01, G15, O55

## 1. Introduction

The aftermath of the 2007-2009 Global Financial Crisis (GFC) in the context of its influence on both developed and emerging markets in the world is currently one of the

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most active research areas. Most of the researchers stress that the crisis originated in developed countries, largely in the U.S. and the U.K. The crisis transmission through financial and especially banking channels has been very rapid and substantial. It has been amply recognized in the literature that the recent financial crisis timeline, from the U.S. perspective, was marked by the following events: (1) the increase in subprime delinquency rates in the spring of 2007, (2) the liquidity crunch in late 2007, (3) the liquidation of Bear Stearns in March 2008, and (4) the failure of Lehman Brothers in September 2008, e.g. [Brunnermeier, 2009; Bartram, Bodnar, 2009]. Claessens et al. [2010] pointed out that almost all advanced countries and most major emerging markets experienced high levels of financial stress and reduced economic activity. They found that not all economies suffered from the crisis at the same time or to the same extent. The authors recognized five groups of countries in the world based on the date they were affected by the crisis. The U.S. economy entered recession in 2008Q1, while the U.K., France and Germany entered recession in 2008Q2. In Africa, Morocco entered recession in 2008Q3 and South Africa in 2008Q4, as did most of the emerging market economies. Strict exchange control regulations in countries in Africa made direct investment and trade in toxic asset very difficult, if not impossible, and provided a buffer against the initial effects of the GFC.

The GFC sparked interest in the impact of financial contagion caused by the financial crisis. Market integration resulting from the globalization of investments is a further contributing factor to the global impact of the GFC. It is important to distinguish between the concepts of financial contagion and market integration. According to Bekaert et al. [2005] and Brière et al. [2012] both, financial contagion and market integration, have a tendency to increase cross-market correlations among markets, especially during periods of high volatility coupled with down markets. In the research, we select the following countries classified in the literature as African markets: South Africa, Namibia, Egypt, Nigeria, Morocco, and Kenya[2].

The contribution of this paper is twofold. Firstly, a formal statistical identification of crisis periods in the group of the selected African stock markets in the context of the GFC is provided by applying the Pagan and Sossounov [2003] method of dividing market states into up and down markets. The sample period begins in January 2003, and ends in December 2013. We propose October 2007 – February 2009 (17 months) as the period of the recent GFC and May 2006 – September 2007 (17 months) as the pre-crisis period, for the U.S., the U.K., and the selected African countries.

Secondly, two research hypotheses concerning the increasing cross-market correlations during the GFC for the group of markets including the U.S., the U.K. and the six selected African stock markets are explicitly tested. The first research hypothesis states that there was no contagion among the U.S., the U.K., and the six selected African equity markets during the GFC. We examine the effect of increasing cross-market correlations in the crisis period compared to the pre–crisis period in the context of

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[2] Although the Tunisian market is one of the major African equity markets, the Tunis Stock Exchange was not taking into consideration. It was closed in the periods: January 17-30, 2011 and February 28 – March 4, 2011, because of the Tunisian Revolution, also known as the Jasmine Revolution. The events in Tunisia began on December 18, 2010.

contagion, applying both a standard contemporaneous cross-market correlations and volatility-adjusted correlation coefficients proposed by Forbes and Rigobon [2002]. The similar approach was employed by Collins and Biekpe [2003b], but they measured contagion among African markets during the 1997 Asian crisis. The second hypothesis says that there was no integration effect between the six African stock markets and the equity markets of the U.S. and U.K., during the GFC. To explore this problem we employ both the Jennrich [1970] and Larntz-Perlman [1985] procedures for testing equality of correlation matrices computed over non-overlapping subsamples: the pre-crisis and crisis periods. The results do not confirm stock markets contagion and integration effects during the GFC.

The remainder of this study is organized as follows. Section 2 presents a literature review concerning the African markets included in the study, also in the context of the influence of the GFC on these markets. Section 3 specifies a methodological background of the statistical method of a formal identification of crisis periods. In Section 4, we propose a brief analysis of the evidence of increasing cross-market correlations in bear markets, in the context of contagion. Section 5 presents the issue of integration. Section 6 reports data description and empirical results in indexes in the investigated stock markets. Section 7 recalls the main findings and presents the conclusions.

## 2. Short overview of the African equity markets included in the study

It is pertinent to note that in a relatively short time, several African countries have developed equity markets. With only eight active markets in 1980, the number of African stock markets increased to eighteen by the end of 2002, and is currently twenty six [Ntim et al., 2011]. Smith et al. [2002] classified the African stock markets into four groups:

1.  South Africa – the largest and the oldest stock market in Africa;
2.  A group of medium-size markets, consisting of Egypt, Kenya, Nigeria, Morocco, Tunisia, and Zimbabwe;
3.  A group of small, but rapidly growing markets, including Namibia[3] among others;
4.  A group of the rest very small stock markets.

As Jefferis and Smith [2005] emphasized, although most African stock markets are relatively small, many have grown rapidly in recent years. The authors appointed a number of factors which have contributed to the expansion and growth of African stock markets. They mentioned e.g. economic reform programmes that have involved a reduction in the role of the state in the economy and a strengthening of the role of the private sector. This process has been accompanied by increased attention from international investors.

The study by Enisan and Olufisayo [2009] was carried out for seven Sub-Sahara African countries. The authors examined the long run and causal relationship between market development and economic growth. They found that stock market development

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[3] According to the http://www.african-exchanges.org (access 25.04.2016), the Market Capitalization of the Namibian Stock Exchange in 2012 was quite high, but it included Blue-chips from South Africa [Ntim et al., 2011].

had a significant positive long run impact on economic growth, and they argued that stock markets could help promote growth in Africa.

Kodongo and Ojah [2012] examined the nexus between real foreign exchange rates and international portfolio flows for the African region, represented by Egypt and Morocco (Northern Africa) and Nigeria and South Africa (Sub-Saharan Africa). The results suggested that international portfolio flows to African countries are characterized by high volatility and persistence. Against a background of the other markets, the South African capital market is more likely to command greater awareness of foreign investors as it exhibits the highest level of sophistication.

Asongu [2013] investigated the issue of convergence in financial performance dynamics in the African continent premised on homogenous panels based on regions, income levels, legal origins and religious dominations. The empirical results confirmed that African financial markets have very heterogeneous fundamental, institutional and structural characteristics of development. Moreover, an economic instability and a political unrest have plagued many African countries, and still continue to thwart foreign investments.

The equity market in South Africa is an exception among the African market, as it was becoming increasingly integrated with global markets in the late 1990s. As Collins and Biekpe [2003a] emphasized, most African markets, excluding South Africa, are relatively small compared to other emerging markets, with lower volume and fewer listed companies. The authors pointed out that since 1994, South Africa, upon its inclusion in the IFCI index[4], has carried a very heavy weight in portfolios of emerging market fund managers, who mostly benchmark to the IFCI index. Piesse and Hearn [2005] stressed that, in most cases, African markets are still very small and inactive. The exception to this is South Africa, which has a highly successful financial market and a stock exchange that is linked with world capital markets. Heymans and da Camara [2013] indicated that the U.S. and the U.K. consistently remain by value within the top three rankings of South Africa's main trading partners. Moreover, it is important that 20 percent of the top 40 companies listed on the Johannesburg Securities Exchange are also listed and actively traded on international equity markets. Collins and Abrahamson [2004] investigated global versus regional integration in African equity markets. In order to measure regional integration, they used South African sector indexes as the benchmark foreign series in the regional measure. They emphasized that the South African stock market is the largest market in Africa, and is therefore likely to have the greatest impact on regional markets. Among others, Leung et al. [2014] confirmed that financial and economic crisis of 2008 and 2009 took a heavy toll on the South African economy which officially entered recession during the fourth quarter of 2008. Recession was identified by negative real GDP growth rate after three consecutive negative quarters.

The stock market in Namibia is of a special interest as it has grown significantly since the establishment in 1992. Although a large part of the growth in market capitalization is accounted for by large foreign companies (mainly from South Africa) that are dual listed on the Namibian Stock Exchange (NSX) and the Johannesburg Stock Exchange (JSE),

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[4] IFCI – International Finance Corporation Investable index.

a significant development has been observed in the NSX over the last years [Eita, 2012]. Since its independence from South Africa, Namibia has maintained strong and growing economic ties to its 'big neighbor'. Much of Namibia's success is attributed to the fixed exchange rate regime, as the Namibian dollar is fixed at par value to the South African Rand. On the other hand, the fixed exchange regime automatically implies that South African macroeconomic shocks are quickly transmitted to Namibia [Neidhardt, 2009].

The Egyptian Stock Exchange (EGX) is a prime example of a long-established market that has received a lot of investor attention over the last years [Billmeier, Massa, 2008]. Recent changes include revised listing requirements and exchange membership rules, as well as the introduction of new systems for information, dissemination, settlement of transactions and automated trading [Jefferis, Smith, 2005]. Many of the giant Egyptian corporations are listed in foreign markets. During the GFC, the Bourse in Egypt suffered from a flight of capital to safer havens. The tourism sector was also adversely affected and revenue generated from the Suez Canal declined.

The Nigerian Stock Exchange (NSE) was, until the early 1990s, primarily a forum for trading government bonds rather than equities, and trade was highly regulated. An automated trading system was introduced in 1999. Turnover and liquidity have increased significantly, although both remain relatively low [Jefferis, Smith, 2005]. The recapitalization of the Nigerian banking industry in 2004 and the banks' entrance to the stock market have significantly increased the market capitalization in the NSE. During the GFC, the Nigerian financial market was substantially affected and the main NSE index achieved the global minimum on January 2009.

Like Egypt, Morocco has a relatively old stock exchange, established in 1929, although it has been inactive for a long period. The exchange has been transformed by developments during the 1990s, with an extensive series of reforms [Jefferis, Smith, 2005]. The successful reforms of the financial sector focused on the liberalization of interest rates, changes in monetary policy, a decrease in the government access to credit, major regulatory changes of the banking sector, and fundamental changes in the operations of the stock market [Ghysels, Cherkaoui, 2003]. There is a strong link between the Moroccan market and the European markets, and with the French market in particular. Therefore, the Casablanca Stock Exchange (CSE) was substantially affected by the GFC and it dropped by 13 percent in 2008Q3.

The Nairobi Stock Exchange (NSE) was established in 1954. The Kenyan market has denoted an upsurge in activity since 1993 due to economic reforms, privatization, and relaxation of restrictions on foreign investors and of exchange controls. However, implementation of the economic reform programme has been inconsistent and political problems remain [Jefferis, Smith, 2005]. On the other hand, an implementation of live trading on the automated trading system at the NSE in 2006 caused great improvement in market surveillance and liquidity. The Nairobi Stock Exchange was the top ranked equity market in Africa in 2010Q1 [Aduda et al., 2012]. It was believed that the effect on the Kenyan stock market by the GFC would be relatively small as most economies in Africa are marginal recipients of portfolio flows. However, during the crisis period, there was a sharp spike in the inflation rate. Contributing factors to this rise are the 2008 drought and the post 2008 election crisis.

An important strand of the literature explores the GFC influence on stock markets in a worldwide framework. As this research concentrates on the African equity markets, we focus on a brief review of previous studies related mostly to the emerging economies including the selected African countries. Calomiris et al. [2012] considered three 'crisis shocks' related to the key features of the GFC for the emerging and developed economies: the collapse of global trade, the contraction of credit supply, and selling pressure on firm's equity. They investigated two African equity markets in Egypt and South Africa among others emerging economies. Didier et al. [2012] examined the determinants of comovement between the U.S. stock market returns and local stock market returns across 83 countries during the GFC. Their analysis distinguished between the period before and after the collapse of Lehman Brothers on September 15, 2008. They explored the nine African markets (i.e. Nigeria, Kenya, Namibia, Botswana, Egypt, South Africa, Mauritius, Morocco, and Tunisia) in the group of the emerging international equity markets. They found that only countries with high ratios of equity holdings by U.S. investors exhibited greater comovement during the GFC. Lane and Milesi-Ferretti [2011] engaged in the geographical impact of the recent crisis. They prepared rankings of region-based groups of countries among the most and least affected by the crisis, according to various criteria. Several African markets, i.e. Namibia, Togo, Angola, Zimbabwe, Cent. Afr. Rep., Eritrea, Guinea, entered the groups of the "Top 5" crisis countries in the world. Rose and Spiegel [2012] focused on national causes and consequences of the recent global financial crisis in the case of 107 countries, ignoring cross-country relationships and contagion effects. They analysed several selected African markets, but only South Africa and Namibia were shortlisted among others the "Top 40" crisis countries in the world. Lagoarde-Segot and Lucey [2009] investigated a shift-contagion vulnerability in the Middle East and North Africa (MENA) stock markets during major crises including e.g. the 1997-98 Asian crisis, the 1998 Russian and Brazilian financial turmoil periods, the 2001 Turkish crisis, the 2001 WTC terrorist attacks, the 2002 Argentinean crisis, and the GFC. Their results confirmed heterogeneous and increasing levels of financial vulnerability in the MENA stock markets. Neaime (2012) analysed the seven MENA major equity markets indexes in the period January 2007 – December 2010 including the 2007 U.S. subprime crisis. He asserted that in the aftermath of the GFC, the MENA countries (i.e. Egypt, Jordan, Morocco, Tunisia, Kuwait, Saudi Arabia, and the UAE) experienced significant financial and economic slowdowns. Allen and Giovannetti (2011) presented the effects of the GFC on Sub-Saharan Africa (SSA). They investigated the channels through which the economic and financial crisis was transmitted to SSA, with a special focus on counties in situation of fragility. The countries belonging to the operational definition of fragile countries are Kenya and Nigeria, among others. The authors stressed that during the period of growth prior to the GFC, Sub-Saharan Africa had become more integrated with the rest world. This increasing international integration has exposed the SSA economies much more to disruption in trade and to other shocks. Most of the SSA countries have almost consecutively suffered fuel, food and financial shocks.

## 3. Statistical procedure for formal identification of crisis periods

There exists a vast empirical literature on the interdependences of financial markets during the GFC, but there is no unanimity among researchers about the crisis periods in various countries. In a study such as this one, it is crucial to determine the pre-crisis and crisis periods. In the literature these periods are usually presented arbitrarily. Therefore, the important contribution of this paper is a formal statistical identification of the crisis periods in the group of the selected African stock markets in the context of the GFC.

The literature has shown that a direct identification of crisis periods is possible based on statistical procedures for dividing market states into up and down markets. For example, Lunde and Timmermann [2000] proposed an algorithm for detecting bull and bear states, however, they stressed that there is no generally accepted formal definition of up and down markets in finance literature. Pagan and Sossounov [2003] developed an algorithm that seemed to be useful in locating periods in time that were considered bull and bear markets in the U.S. equity prices. They tested monthly data of the S&P500 index, in the period from January 1835 to May 1997. Lee et al. [2011] proposed a modified version of the Pagan-Sossounov method of dividing market states into bullish, bearish, and range-bound markets. We employ a three-stage procedure of dividing market states into up and down markets, presented in the paper [Olbrys, Majewska, 2014]. The methodology builds on Pagan and Sossounov [2003]. In the first step, we conduct a preliminary identification of turning points, i.e., peaks and troughs, based on the conditions (1)-(2), respectively:

$$\ln P_{t-8},\ldots,\ln P_{t-1} < \ln P_t > \ln P_{t+1},\ldots,\ln P_{t+8}, \tag{1}$$

$$\ln P_{t-8},\ldots,\ln P_{t-1} > \ln P_t < \ln P_{t+1},\ldots,\ln P_{t+8}, \tag{2}$$

where $P_t$ represents the market index of month $t$, and from successive peaks/troughs we choose the highest/deepest one. Pagan and Sossounov [2003] stressed that in the cycle literature an algorithm for describing turning points in time series was developed by Bry and Boschan [1971], but they modified this algorithm by taking the eight months window (instead of six) in marking the initial location of turning points. In the second step, we rule out the phases (peak-trough or trough-peak) that last for less than four months, and cycles (peak-trough-peak or trough-peak-trough) that last for less than sixteen months. Pagan and Sossounov [2003] pointed out that in cycle dating the minimal cycle length is fifteen months, hence sixteen months were chosen to create a symmetric window of eight periods. Moreover, they advocated four months as the minimal length of a phase. In the last step we calculate the amplitudes $A$ for each phase (amplitude is the difference in the natural logs of the index value in subsequent turning points). During the bull/bear market period there must be a large enough (of at least 20%) rise/fall in the index value. This means that the amplitude of a given phase must fulfill the condition $A \geq 0.18$ or $A \leq -0.22$ for the bull or bear market period, respectively.

## 4. Testing for contagion effect

There is no unanimity in research regarding the causes of increasing cross-market correlations in crisis periods, but the majority of researchers agree that during critical market events correlations change meaningfully. This effect is often justified by the authors as a consequence of contagion. Edwards [2000] stressed that contagion has been defined in the literature in many different ways, including as any transmission of shocks across countries. He distinguished between three mechanisms through which economic shocks are propagated across countries: (1) global disturbances that affect all (or most) countries in the world; (2) shocks coming from a related country, and (3) all instances not covered by the two previous cases, in which contagion is defined as a residual, and thus as a situation where the extent and magnitude of the international transmission of shocks exceeds what was expected by market participants. For more details see [Edwards, 2000] and the references therein. Pericoli and Sbracia [2003] presented five definitions of contagion adopted by the literature and the corresponding measures used in empirical work. However, they found that early studies did not always distinguish between contagion and interdependence. The authors stressed that definitions and measures of contagion work well in the presence of an unambiguous identification of financial crisis. Bekaert et al. [2005] defined contagion as excess correlation, that is, correlation over and above what one would expect from economic fundamentals.

They engaged contagion from an asset pricing perspective and they expressed it by correlation of the factor model residuals. Dungey et al. [2005] asserted that a range of different methodologies of testing for the existence of contagion make it difficult to assess the evidence for and against contagion. Rigobon [2002] emphasized that "(…) there is no accordance on what contagion means".

In their broadly cited paper, Forbes and Rigobon [2002] defined contagion as a significant increase in cross-market linkages after a shock to one country (or group of countries), but they stated that this definition is not universally accepted. They stressed that heteroskedasticity in market returns biases tests for contagion based on correlation and correlation coefficients are conditional on market volatility. Therefore they proposed the following correction for the volatility bias:

$$\hat{\rho}_{VA} = \frac{\hat{\rho}_C}{\sqrt{1 + \delta\left[1 - (\hat{\rho}_C)^2\right]}}, \tag{3}$$

where $\hat{\rho}_{VA}$ is the volatility-adjusted cross-correlation coefficient between markets, $\hat{\rho}_C$ is the estimated conditional cross-correlation coefficient in the crisis period, and δ is the relative increase in the variance of market returns in the crisis period compared to the pre-crisis period:

$$\delta = \frac{\hat{\sigma}_C^2}{\hat{\sigma}_{PC}^2} - 1, \tag{4}$$

where $\hat{\sigma}_C^2$, $\hat{\sigma}_{PC}^2$ are the variances in the high-volatility (crisis) and low-volatility (pre-crisis) periods, respectively. By construction, it is obvious that $\hat{\rho}_{VA} \leq \hat{\rho}_C$, i.e. during the periods

of high volatility the unconditional volatility-adjusted cross-correlation $\hat{\rho}_{VA}$ will be smaller than the estimated conditional cross-correlation $\hat{\rho}_C$ between markets. The evaluation of contagion is carried out by testing the hypotheses:

$$H_0 : \rho_{VA} = \rho_{PC},$$
$$H_1 : \rho_{VA} \neq \rho_{PC}$$

(5)

where $\rho_{PC}$ is the cross-correlation coefficient in the pre-crisis period and the null hypothesis states that there is no contagion. The Z-statistic, which is asymptotically a standard normal random variable, tests null of no contagion, that is, the equality of the crisis with pre-crisis cross-market correlation coefficients. The test is performed with the Fisher [1921] z-transformation of sample correlation coefficients. If the absolute value of the Z-statistic is greater than the critical value, the null hypothesis of identical correlation coefficients can be rejected.

## 5. Testing for integration effect

It is well known fact that over the last thirty years, developed and emerging economies have been undergoing a large globalization process. Most countries have become increasingly integrated, both in terms of real and financial transactions. However, Beine et al. [2010] emphasized that globalization reflected by trade and financial integration is likely to have a bright and a dark side for investors, mainly in the context of diversification. The bright side of integration is the opportunity to diversify portfolios worldwide. On the other hand, the globalization can exhibit a dark side for international investors, as it can increase the degree of comovement on the left hand side of the return distribution during periods of financial downturn, exactly when the positive effects of diversification are most needed.

According to the literature, the evidence is that contagion can be confused with market integration since both have a tendency to increase correlations among markets, especially during bear market periods. Growing international integration could lead to a progressive increase in market correlations, and markets could be more correlated in periods of high volatility [Longin, Solnik, 1995]. Some researchers pointed out that integration can be global or regional, e.g. [Collins, Abrahamson, 2004; Bekaert et al., 2005]. As the aim of this paper is to test for integration effects in the selected African equity markets, we employ tests interpreted as integration tests. We use formal procedures for testing the equality of correlation matrices computed over non-overlapping subsamples, e.g. [Jennrich, 1970; Larntz, Perlman, 1985; Longin, Solnik, 1995; Chesnay, Jondeau, 2001; Goetzmann et al., 2005; Brière et al., 2012; Olbrys, Majewska, 2014]. The evaluation of integration is carried out by testing the hypotheses:

$$H_0 : P_C = P_{PC},$$
$$H_1 : P_C \neq P_{PC}$$

(6)

where $P_C$, $P_{PC}$ are true (population) correlation matrices in the crisis and pre-crisis periods, respectively, and the null hypothesis states that there is no integration effect during crises. Different test statistics have been proposed in the literature to test the problem (6). One of the most popular is the test introduced by Jennrich [1970]. Let $\hat{P}_C = \left(\hat{\rho}_{ij}^C\right)$ and $\hat{P}_{PC} = \left(\hat{\rho}_{ij}^{PC}\right)$ be sample correlation matrices in the crisis and pre-crisis periods of sample size $n_C$ and $n_{PC}$, respectively. The average correlation matrix is equal to $\hat{P} = \dfrac{1}{n_C + n_{PC}}\left(n_C\hat{P}_C + n_{PC}\hat{P}_{PC}\right)$, $\hat{P} = \left(\hat{\rho}_{ij}\right)$, and $\hat{P}^{-1} = \left(\hat{\rho}^{ij}\right)$. As we investigate dependencies in two subsamples of equal size $n_C = n_{PC} = n$, we employ the following version of the Jennrich [1970] test statistic $T_J$:

$$T_J = \frac{1}{2}tr\left(Z^2\right) - diag(Z)' \cdot S^{-1} \cdot diag(Z), \tag{7}$$

where $Z$ is a square matrix given by the following equation:

$$Z = \sqrt{\frac{n}{2}} \cdot \hat{P}^{-1} \cdot \left(\hat{P}_C - \hat{P}_{PC}\right), \tag{8}$$

and matrix $S = \left(\delta_{ij} + \rho_{ij} \cdot \rho^{ij}\right)$, where $\delta_{ij}$ is the Kronecker delta. In Eq. (7), *diag(Z)* denotes the diagonal of the matrix $Z$ (8) in a column form. The Jennrich test statistic $T_j$ has an asymptotic $\chi^2\left(p(p-1)/2\right)$ distribution if the correlation matrix is computed for $p$ variables. If the value of the $T_j$ statistic (7) is greater than the critical value, the null hypothesis of identical correlation matrices can be rejected.

Although the Jennrich [1970] test statistic (7) is quite popular in the literature, Larntz and Perlman [1985] pointed out that this test is basically a large sample test and can perform poorly for small samples. They proposed a test statistic $T_{LP}$ which determined a test with reasonable small sample properties and with power comparable to that of Jennrich test (7) for large samples. The basic idea is to apply the Fisher [1921] z-transformation to each sample correlation coefficient in the correlation matrices $\hat{P}_C = \left(\hat{\rho}_{ij}^C\right)$ and $\hat{P}_{PC} = \left(\hat{\rho}_{ij}^{PC}\right)$, and to consider the $\dfrac{p(p-1)}{2}$-dimensional random column vectors consisting of the off-diagonal z-transformations $(1 \le i < j \le p)$ arranged in lexicographic order. In the case of two subsamples of equal size $n_C = n_{PC} = n$, we use the following version of the Larntz-Perlman test statistic $T_{LP}$:

$$T_{LP} = \sqrt{\frac{n-3}{2}} \cdot \max_{1 \le i \le j \le p}\left|z_{ij}^C - z_{ij}^{PC}\right|, \tag{9}$$

where $z_{ij}^C$ and $z_{ij}^{PC}$ are the Fisher z-transformations of sample correlation coefficients $\hat{\rho}_{ij}^C$ and $\hat{\rho}_{ij}^{PC}$, respectively. Larntz and Perlman propose the significance level α test under which the null (6) is rejected if $T_{LP} > b_\alpha$, where $b_\alpha > 0$ is chosen such that

$(\Phi(b_\alpha) - \Phi(-b_\alpha))^{p(p-1)/2} = 1 - \alpha$, and $\Phi$ is the cumulative distribution function of the standard normal distribution.

Based on the cases studied, Larntz and Perlman propose the following rule-of-thumb: when the ratio of sample size to dimension does not exceed 4, i.e. when $(n/p) \leq 4$, then the $T_{LP}$ test statistic (9) is recommended. As the sample size $n \to \infty$, both the Jennrich and the Larntz-Perlman tests are asymptotically consistent.

## 6. Data description and empirical results in the U.S., the U.K., and the major African stock markets

The data consists of monthly and weekly logarithmic returns of the major African stock market indexes, the New York market index-S&P500, and the London market index-FTSE100, in the period beginning January 2003 and ending December 2013.

### 6.1. Preliminary statistics

Table 1. presents a brief information about the equity market indexes analysed in the study, in order of decreasing value of market capitalization at the end of 2012.

TABLE 1.

**The stock market indexes used in the study**

|   | Market | Market Cap., USD billion, Dec 2012 | Index |
|---|--------|-----------------------------------|-------|
| 1 | New York Stock Exchange (United States) | 14085.9 | S&P500 |
| 2 | London Stock Exchange (United Kingdom) | 3396.5 | FTSE100 |
| 3 | Johannesburg Stock Exchange (South Africa) | 998.3 | FTSE/JSE ALL SHARE |
| 4 | Namibian Stock Exchange (Namibia) | 159.9 | NSX Overall |
| 5 | Egyptian Exchange (Egypt) | 60.1 | MSCI Egypt |
| 6 | Nigerian Stock Exchange (Nigeria) | 57.8 | NSE ALL SHARE |
| 7 | Casablanca Stock Exchange (Morocco) | 52.8 | MASI |
| 8 | Nairobi Securities Exchange (Kenya) | 14.8 | NSE 20 |

Source: http://www.african-exchanges.org; http://www.world-exchanges.org (access 25.04.2016)

Table 2. contains summarized statistics for the monthly logarithmic returns for the stock market indexes used in the study, as well as statistics testing for normality.

## Summarized statistics for weekly logarithmic returns for the equity market indexes used in the study

| | Index | Mean | Standard deviation | Skewness | Excess kurtosis | Doornik-Hansen test |
|---|---|---|---|---|---|---|
| U.S. | S&P500 | 0.001 | 0.024 | -1.045 [0.000] | 7.038 [0.000] | 196.494 [0.000] |
| U.K. | FTSE100 | 0.001 | 0.024 | -0.569 [0.000] | 4.348 [0.000] | 155.320 [0.000] |
| Africa | FTSE/JSE ALL SHARE | 0.003 | 0.027 | -0.089 [0.387] | 1.937 [0.000] | 61.151 [0.000] |
| | NSX Overall | 0.002 | 0.034 | -0.277 [0.007] | 1.698 [0.000] | 45.481 [0.000] |
| | MSCI Egypt | 0.005 | 0.044 | -0.785 [0.000] | 3.292 [0.000] | 78.355 [0.000] |
| | NSE ALL SHARE | 0.002 | 0.032 | -0.105 [0.304] | 3.112 [0.000] | 125.978 [0.000] |
| | MASI | 0.002 | 0.022 | -0.454 [0.000] | 5.167 [0.000] | 223.738 [0.000] |
| | NSE 20 | 0.002 | 0.031 | 1.149 [0.000] | 11.339 [0.000] | 402.767 [0.000] |

Notes: The table is based on all sample observations during the period January 2003-December 2013. The indexes are in the same order as in Table 1. The test statistic for skewness and excess kurtosis is the conventional $t$-statistic. The Doornik-Hansen test [2008] has a $\chi^2$ distribution if the null hypothesis of normality is true. The numbers in brackets are $p$- values.

Source: Authors' calculations (using *Gretl 1.9.14* software).

The empirical results presented in Table 2 are worth a comment. The measure for skewness shows that the return series are skewed, except for the FTSE/JSE ALL SHARE and NSE ALL SHARE series. The measure for excess kurtosis shows that the series are leptokurtic with respect to the normal distribution. The Doornik-Hansen [2008] test rejects normality for the return series at the 5 per cent level of significance.

### 6.2. Formal identification of crises for the U.S., the U.K., and the major African stock markets

As was stated in Section 3, we employ the three-stage procedure of dividing market states into bullish and bearish markets to identify crisis periods, based on monthly logarithmic returns of major stock market indexes. Figure 1 presents the crisis periods for the S&P500 and the FTSE100, while Figure 2 demonstrates the crisis periods for the six indexes on the African stock markets, obtained from the procedure. The empirical results are generated in the whole sample period from January 2003 to December 2013. The horizontal axis stands for time (months), and the vertical axis stands for the market index. The vertical lines and light grey areas stand for the crisis periods.

We obtained the following crisis periods for the investigated stock markets:
1.  October 2007 – February 2009 (the U.S.),
2.  October 2007 – February 2009 (the U.K.),
3.  May 2008 – February 2009 (South Africa),
4.  October 2007 – February 2009 (Namibia),
5.  April 2008 – February 2009 (Egypt),
6.  February 2008 – March 2009 (Nigeria),
7.  March 2008 – January 2009 (Morocco),
8.  January 2007 – February 2009 (Kenya).

As it is necessary to appoint one month as the beggining of the crisis period for all countries, we propose October 2007 (see Fig. 1). In light of the results, it seems that we can treat February 2009 as the end of the crisis. Finally, we advocate October 2007 – February 2009 as the period of the recent global financial crisis. According to the literature, for the African markets (except for Namibia and Kenya) we observe a pronounced delay of the crisis symptoms compared to the developed stock markets. This delay could be a result of the strict exchange control regulations in countries in Africa, which made direct investment and trade in toxic asset very difficult, if not impossible. Only on the Nairobi Securities Exchange, the crisis period was longer and it lasted from January 2007 to February 2009. A contributing factor to the latter could be ascribed to a decline in the inflow of portfolio capital to Africa, which resulted in Kenya (and Ghana) having to postpone sovereign bond issues worth $800 Million. In South Africa, the inflow of investment capital prior to the 2010 FIFA World Cup soccer event probably also contributed to the pronounced delay of the crisis symptoms compared to the developed stock markets. Another contributing factor of the delay is excellent risk management procedures that were in place at the Johannesburg Securities Exchange prior to the default of Lehman Brothers [Kotze, Labuschagne, 2014]. Finally, it is worthwhile to note that in the case of the Namibian stock market the crisis period was exactly the same as for the developed markets.

**FIGURE 1.**

**Crisis periods for the U.S., the U.K. stock markets, obtained from the procedure of dividing market states, in the whole sample January 2003 – December 2013**
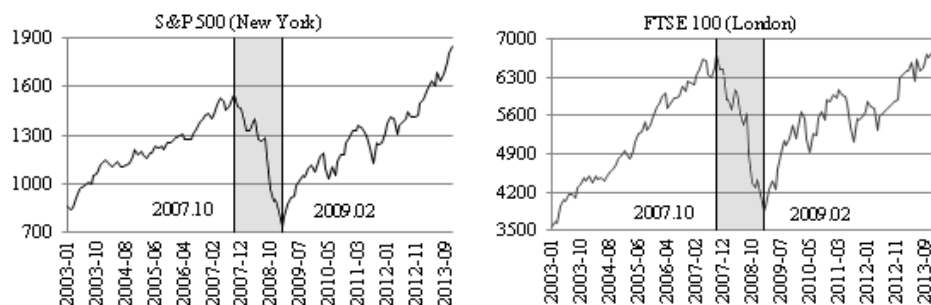


Source: Authors' calculations

FIGURE 2.

**Crisis periods for the six African stock markets, obtained from the procedure of dividing market states, in the whole sample January 2003 – December 2013**
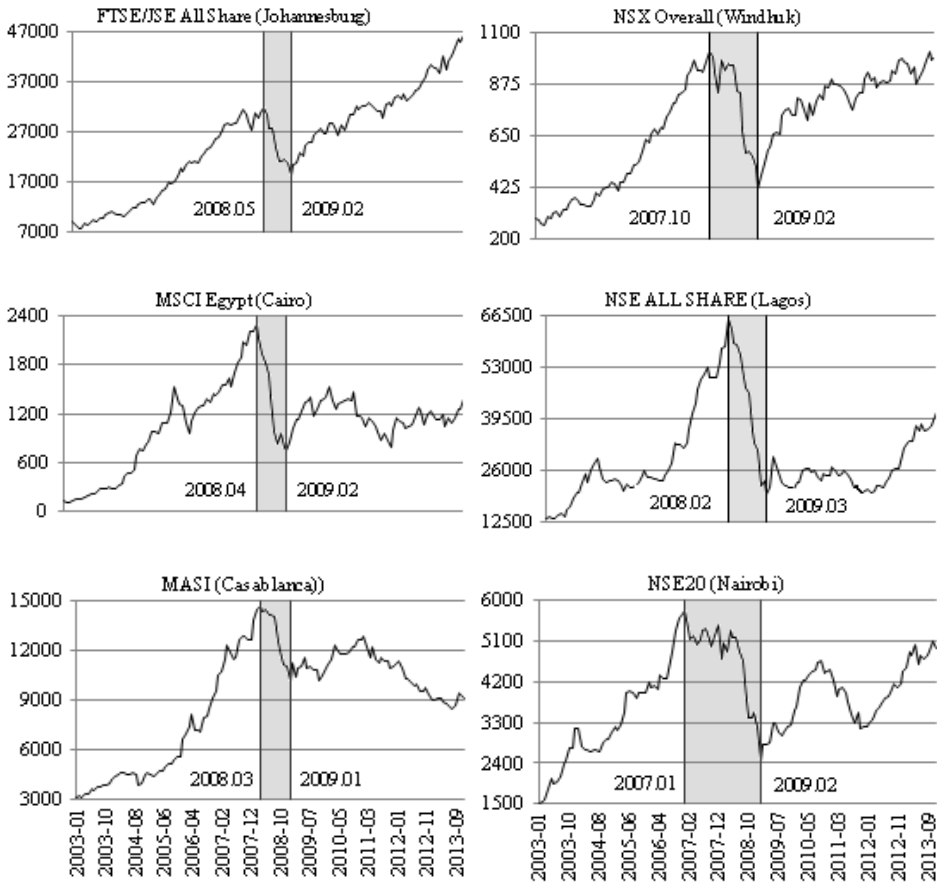


Source: Authors' calculations.

### 6.3. Empirical results of contagion tests

This subsection presents the empirical results of the verification procedure of the first research hypothesis of no contagion among the U.S., the U.K., and the major African equity markets during the 2007-2009 financial crisis. Based on the Fig. 1, we observe October 2007 – February 2009 as the crisis period. The crisis period contains only seventeen months and this obliges us to use higher frequency data. Hence we use weekly Wednesday-to-Wednesday logarithmic returns, which are thought to iron out any

possible impact of the day-of-the-week effects of daily data[5]. Moreover, researchers use weekly returns to avoid the nonsynchronous trading effect II, which is felt when we examine various relationships among stock markets located in different time zones, e.g. [Olbrys, 2013] and references therein.

Table 3. contains standard contemporaneous cross-correlations and volatility-adjusted cross-correlation coefficients, given by Eq. (3), of weekly logarithmic returns on pairs of the indexes S&P500/African stock market index. For comparison, we calculate dependencies both in the whole sample (January 2003 – December 2013) and in two adjacent subsamples of equal size: (1) the pre-crisis period May 2006 – September 2007 (74 weekly returns), and (2) the crisis period October 2007 – February 2009 (74 weekly returns).

We investigate the cross-market linkages after a shock to the U.S. financial market. The supporting values are equal to: $\hat{\sigma}_C^2 = 0.00136$ (the variance in the high-volatility period in the U.S. stock market) and ⋮ (the variance in the low-volatility period in the U.S. stock market), while the relative increase in the variance of the S&P500 returns, given by Eq. (4), is equal to $\delta = 4.272$.

**TABLE 3.**

**Contemporaneous cross-correlations and volatility-adjusted cross-correlations of weekly logarithmic returns on pairs S&P500/African stock market index**

| Index | Contemporaneous cross-correlations | | | Volatility-adjusted cross-correlations | | | | | | |
| | Whole sample (1) | Pre-crisis (2) | Crisis (3) | Crisis (3) | | | | | | |
| | $\hat{\rho}$ | $\hat{\rho}_{PC}$ | $\hat{\rho}_C$ | Change compared to the period (2) | Z-statistic | Contagion | $\hat{\rho}_{VA}$ | Change compared to the period (2) | Z-statistic | Contagion |
|---|---|---|---|---|---|---|---|---|---|---|
| FTSE/JSE ALL SHARE | 0.649 [0.000] | 0.581 [0.000] | 0.695 [0.000] | ↑19.6% | 1.202 | $H_0$ | 0.388 | ↓33.2% | -1.581 | $H_0$ |
| NSX Overall | 0.623 [0.000] | 0.520 [0.000] | 0.633 [0.000] | ↑21.7% | 1.056 | $H_0$ | 0.335 | ↓35.5% | -1.412 | $H_0$ |
| MSCI Egypt | 0.274 [0.000] | 0.251 [0.031] | 0.422 [0.000] | ↑68.1% | 1.203 | $H_0$ | 0.199 | ↓20.8% | -0.342 | $H_0$ |
| NSE ALL Share | 0.008 [0.841] | -0.016 [0.893] | -0.307 [0.008] | ↑1818.7% | -1.871 | $H_0$ | -0.139 | ↑769.5% | -0.770 | $H_0$ |
| MASI | 0.072 [0.084] | 0.137 [0.245] | 0.019 [0.871] | ↓86.1% | -0.738 | $H_0$ | 0.008 | ↓94.0% | -0.805 | $H_0$ |
| NSE 20 | 0.158 [0.000] | -0.035 [0.766] | 0.274 [0.018] | ↑682.9% | 1.964 | $H_0$ | 0.124 | ↑251.8% | 0.986 | $H_0$ |

Notes: The table is based on: (1) the whole sample period January 2003 – December 2013; (2) the pre-crisis period May 2006 – September 2007 (74 weekly returns); (3) the crisis period

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[5] It is known in the literature that there are day-of-the-week effects reflected in the significantly positive Friday and negative Monday returns.

October 2007 – February 2009 (74 weekly returns). The returns are weekly Wednesday-to-Wednesday logarithmic returns. The indexes are in the same order as in Table 1. P-values are in brackets. Fisher Z-statistic [1921] tests null of no contagion. The Student's t critical value is 2.353 (at the 2% significance level).

Source: Authors' calculations (using *Gretl 1.9.14* software)

Likewise, we investigate the cross-market linkages after a shock to the U.K. financial market. The supporting values are equal to: (the variance in the high-volatility period in the U.K. stock market) and (the variance in the low-volatility period in the U.K. stock market), while the relative increase in the variance of the FTSE100 returns, given by Eq. (4), is equal to $\delta = 3.492$. Table 4 contains standard contemporaneous cross-correlations and volatility-adjusted cross-correlation coefficients, given by Eq. (3), of weekly logarithmic returns on pairs of the indexes FTSE100/African stock market index.

**TABLE 4.**

**Contemporaneous cross-correlations and volatility-adjusted cross-correlations of weekly logarithmic returns on pairs FTSE100/African stock market index**

| Index | Contemporaneous cross-correlations | | | Volatility-adjusted cross-correlations | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Whole sample (1) | Pre-crisis (2) | Crisis (3) | Crisis (3) | | | | | | |
| | $\hat{\rho}$ | $\hat{\rho}_{PC}$ | $\hat{\rho}_C$ | Change compared to the period (2) | Z-statistic | Contagion | $\hat{\rho}_{VA}$ | Change compared to the period (2) | Z-statistic | Contagion |
| FTSE/JSE ALL SHARE | 0.728 [0.000] | 0.711 [0.000] | 0.755 [0.000] | ↑6.2% | 0.592 | $H_0$ | 0.477 | ↓32.9% | -2.296 | $H_0$ |
| NSX Overall | 0.690 [0.000] | 0.642 [0.000] | 0.703 [0.000] | ↑9.5% | 0.693 | $H_0$ | 0.423 | ↓34.2% | -1.929 | $H_0$ |
| MSCI Egypt | 0.309 [0.000] | 0.430 [0.000] | 0.442 [0.000] | ↑2.8% | 0.092 | $H_0$ | 0.226 | ↓47.3% | -1.425 | $H_0$ |
| NSE ALL Share | -0.008 [0.841] | 0.071 [0.550] | -0.272 [0.019] | ↑283.1% | -2.174 | $H_0$ | -0.132 | ↑86.2% | -1.267 | $H_0$ |
| MASI | 0.070 [0.093] | 0.168 [0.153] | 0.042 [0.720] | ↓75.0% | -0.792 | $H_0$ | 0.020 | ↓88.2% | -0.930 | $H_0$ |
| NSE 20 | 0.120 [0.004] | -0.054 [0.647] | 0.305 [0.008] | ↑464.8% | 2.292 | $H_0$ | 0.149 | ↑176.7% | 1.270 | $H_0$ |

Notes: The table is based on: (1) the whole sample period January 2003 – December 2013; (2) the pre-crisis period May 2006 – September 2007 (74 weekly returns); (3) the crisis period October 2007 – February 2009 (74 weekly returns). The returns are weekly Wednesday-to-Wednesday logarithmic returns. The indexes are in the same order as in Table 1. P-values are in brackets. Fisher Z-statistic [1921] tests null of no contagion. The Student's t critical value is 2.353 (at the 2% significance level).

Source: Authors' calculations (using *Gretl 1.9.14* software)

The empirical results presented in Tables 3-4 indicate a heterogeneity of the African equity markets in the scope of changes in both contemporaneous and volatility-adjusted cross-correlations. Firstly, during the crisis period the estimated contemporaneous cross-correlations between the U.S. (the U.K.) and the African markets were greater than the corresponding cross-correlations in the pre-crisis period for five markets, except for Morocco. Secondly, the Forbes-Rigobon [2002] correction seems to be a rather strong tool for adjusting cross-market correlations for the African markets, except for Nigeria and Kenya. To wit, assuming the U.S. (the U.K.) financial market as a source of risk and using the coefficient δ of the relative increase in the variance of the S&P500 (FTSE100) returns in the crisis compared to the pre-crisis period, we get a substantial reduction of the value of correlation. As a result, the volatility-adjusted cross-correlations in the crisis period are lower comparing with the pre-crisis period for four African markets, except for Nigeria and Kenya. Apart from these facts, no reason to reject the null hypothesis (5) was found, both for the U.S. (Table 3.) and the U.K. (Table 4.) stock markets assumed as the sources of crisis.

Regarding the African markets, Ahmadu-Bello and Rodgers [2012] used similar methodology and they compared levels of contagion between the U.S. and developed markets (the high integration group of six markets), against levels of contagion between the U.S. and African markets (the low integration group). They investigated ten African markets in Botswana, Cote D'Ivoire, Egypt, Kenya, Mauritius, Morocco, Nigeria, Tunisia, South Africa, and Zambia. The authors concluded that in African markets rather herding behavior is the best explanation of the contagion effect during the recent crisis.

Moreover, our results are generally consistent with the Morales and Andreosso-O'Callaghan [2014] results. The authors analyzed contagion effects arising from the U.S. sub-prime market in a worldwide framework. They investigated five African markets in Egypt, Kenya, Morocco, Nigeria and South Africa among others and they did not find significant evidence supporting contagion effects derived from the U.S. stock market.

### 6.4. Empirical results of integration tests

The second research hypothesis states that there was no integration effect between the U.S., the U.K., and the major African equity markets during the GFC. To test the problem (6) we employ both the Jennrich (7) and Larntz-Perlman (9) tests of the equality of the correlation matrices over time. Longin and Solnik [1995] stressed that the covariance/correlation matrix of international asset returns plays a special role in the finance literature, as knowledge about its behavior is crucial for the computation of trading portfolios. Our calculations are based on weekly Wednesday-to-Wednesday logarithmic returns of stock market indexes. Moreover, we test the equality of the correlation matrices in two subsamples of equal size, see e.g. [Chesnay, Jondeau 2001; Brière et al. 2012]. Likewise in subsection 6.3, we advocate two periods: (1) the pre-crisis period May 2006 – September 2007 (74 weekly returns) and (2) the crisis period October 2007 – February 2009 (74 weekly returns).

Table 5 summarizes the integration tests performed on the whole group containing the S&P500, the FTSE100, and the six African stock market indexes. The results based

on both the Jennrich and the Larntz-Perlman tests show that the differences in correlation between the two sub-periods are not significant. Therefore, we have no reason to reject the null hypothesis (6) which states that the correlation matrix is constant over two adjacent sub-periods: the pre-crisis and the crisis periods.

<div align="right">TABLE 5.</div>

### Results of the Jennrich and Larntz-Perlman integration tests

| Test periods | Jennrich test | | | | | Larntz-Perlman test | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Test statistic $T_J$ | $\chi^2$ critical value (2%) | | $\chi^2$ critical value (5%) | | Test statistic $T_{LP}$ | $b_\alpha$ critical value (2%) | | $b_\alpha$ critical value (5%) | |
| May 2006 – Sept 2007 & Oct 2007 – Feb 2009 | 26.097 | 45.419 | $H_0$ | 41.337 | $H_0$ | 2.202 | 3.381 | $H_0$ | 3.116 | $H_0$ |

Notes: The table is based on: (1) the pre-crisis period May 2006 – September 2007 (74 weekly returns); (2) the crisis period October 2007 – February 2009 (74 weekly returns). The returns are weekly Wednesday-to-Wednesday logarithmic returns. The table contains the Jennrich test statistic, given by Eq. (7), as well as the Larntz-Perlman test statistic, given by Eq. (9). The statistics test the null of no integration. The number of variables $p=8$.

Source: Authors' calculations (using *Gretl 1.9.14* software)

It is pertinent to note, that our study of integration differs from the literature in several aspects. According to the selected research concerning the African markets, Collins and Abrahamson [2004] measured integration for African markets on a sector-by-sector basis. They found that the most integrated markets were in South Africa, Egypt and Morocco, which are also the oldest and largest markets in the continent. However, the autors did not investigate regional and global integration effects during the financial crises. Likewise, Piesse and Hearn [2005] found evidence for potential integration between financial markets in Sub-Saharan Africa, but they employed different methods and did not investigate integration effects in the context of the recent GFC. Therefore, our empirical results of integration tests are not comparable in general with those mentioned above.

## 7. Conclusion

The purpose of this paper was to test two research hypotheses that there was no contagion and no integration effects among the U.S., the U.K., and the selected African stock markets (in South Africa, Namibia, Egypt, Nigeria, Morocco and Kenya) during the GFC. To address this issue, we formally detected the crisis periods for all investigated markets. We employed the Pagan-Sossounov [2003] procedure of dividing market states into up and down markets based on monthly logarithmic returns of the major indexes. The sample period included the 2007 U.S. subprime crisis. We proposed two periods:

(1) the pre-crisis period May 2006 – September 2007 and (2) the crisis period October 2007 – February 2009.

The empirical results confirmed no reason to reject both hypotheses. Regarding the first hypothesis of no contagion, the results are consistent with the literature and indicate that heteroskedasticity in market returns biases tests for contagion based on correlation, e.g. [Collins, Biekpe, 2003b; Ahmadu-Bello, Rodgers, 2012] for African markets. As for the second hypothesis of no integration effect, the results revealed that the African markets in general, with the exception of South Africa, are rather weakly connected with global capital flows. As Brunnermeier [2009] asserted, the 2007 U.S. subprime crisis has been very close to a classical banking crisis and the crisis transmission through financial and banking channels has been especially crucial.

Due to the importance of the problem, a possible direction for further investigation would be to test the integration effect applying other methods, e.g. the tests based on the international asset pricing models [Bekaert et al. 2005].

## The authors' participation in the preparation of the article

Prof. Coennrad Labuschagne - data base for African markets, overview of literature, linguistic preparation – 30%

Elżbieta Majewska, Ph.D. – development of concepts, assumptions and methods, carryting out calculations and econometric analyses – 35 %

Joanna Olbryś, Ph.D., D.Litt. - overview of literature, development of concepts, assumptions and methods, interpretation of econometric research results – 35%

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# IS LABOUR LAW A HINDRANCE IN INDIA'S PUBLIC ENTERPRISES REFORMS?

**Summary**

With a growing dependency on the private participation across the globe, India also implemented the economic reforms process but these reforms have not been supported by any major amendments in the labour Laws though privatization of public enterprises, is one of the key issues in the ongoing economic reforms and India has a major workforce employed in the PEs. Global experiences in privatization appear to suggest that there should be a clear-cut privatization law, which will sustain the logic of what to privatize, how to privatize and for whom to privatize, but till today India has not even considered enacting such a law. The presence of old labour laws and the absence of a privatization law present a complex situation at the time of the second generation of economic reforms undertaken by India. This paper tries to investigate how the Indian Labour law is helpless in helping the labour and in protecting the larger interest of the PE's reforms.

**Key words:** Nationalization, privatization, labour law, reforms

**JEL**: E02, E69, F62, H00, H10, H11, H20, H80, J01, J08, J28, J45, J51, J53, J65, K00, K31, L39, L52

## 1. Introduction

World is moving fast with less government intervention in industry and business. Last few decades have shown Market as a new driver of industry and business. World has seen a new state-market platform in last few decades, where the state is a facilitator than a producer. This is a more a new type of state-market interaction, which is in full swing not only in Asia but also in Europe, Latin American – Caribbean Economy, African economy and in other parts of the world. India being one of the pioneer practitioners of state run system until the 1980s has primarily gone through a new phase of economic reforms after 1991 when dependency on private sector is gradually increasing. Privatization of PEs is one of the complementary steps in this direction.

This paper highlights how being one of the large employers of workers in PEs, India is still enactive in implementing the labour law reforms or establishing a privatization law, which will complement the entire process of privatization.

## 2. India: The Notion of Nationalization

PEs were given due importance in the growth of the country since independence (in 1947). The Industrial Policy Resolution of 1948 stressed the active role of the State in development of industries. This philosophy was also enshrined in the Directive Principles of State Policy in the Indian Constitution. In December 1954, the Indian Parliament passed a resolution proclaiming that the 'socialist pattern of society' was the objective of the State. The Industrial Policy Resolution of 1956 stated that the "adoption of the socialist pattern of society as the national objective, as well as the need for planned and rapid development require that all industries of basic and strategic importance or in the nature of public utility services should be in the public enterprises. Apart from that, the other crucial industries, which require large-scale investments for which only the State can provide, have been kept under the public enterprises. Hence, the State bears the unequivocal obligation for the development of the industries in future" [*Industrial Policy Statement*, 1956].

Greater preference has been assigned to the industrialization in the public enterprises by the Five Year Plans in accordance with the policy. PEs has been seen as channels of socializing the mechanism of production in the areas of crucial importance in the successive Industrial Policy Resolutions (IPRs) of 1977 as well as 1980. Moreover, since the IPR of 1948, industries were categorised into the three groups:
  –   first set related to defence, heavy industry, mining, aircraft, air and rail transport, communications and power - these would remain in the public sector;
  –   second grouping consisted of a group, which would be unfasten to both the public as well as private sectors;
  –   third faction consisted of those which were left to the private sector in areas such as consumer goods etc.

However, public sectors were confined to the consumer goods and hotels and tourism, etc. Besides, public sector matured to such a large size that it became mostly unable to manage; especially when private sick industries were took over.

## 3. Redefining the Role of PEs in India

It was only in 1991 that a serious review of the performance of public enterprises was undertaken. The Industrial Policy Resolution of July 1991 was a landmark policy statement, which redefined the role of the public sector and the direction of future growth. It took note of the problems faced by the public sector such as surplus labour, lack of technological up-gradation, inadequate attention to research and development, and low return on investment. It stated that the priority areas of growth would henceforth be in essential infrastructure, goods and services, exploration and exploitation of oil and natural

resources, technological development and building of manufacturing capacities in areas which are crucial for the long-term development of the economy and where private sector investment is inadequate, and manufacture of products where strategic considerations predominate, such as defence equipments. It is also decided to offer the mutual funds, financial institutions, general public and workers, a part of the government's shareholding in the public enterprises, in order to augment resources and to boost extensive public involvement.

<div align="right">

**FIGURE 1.**
</div>

**Movement in Growth of Financial Investment in India's Pes**
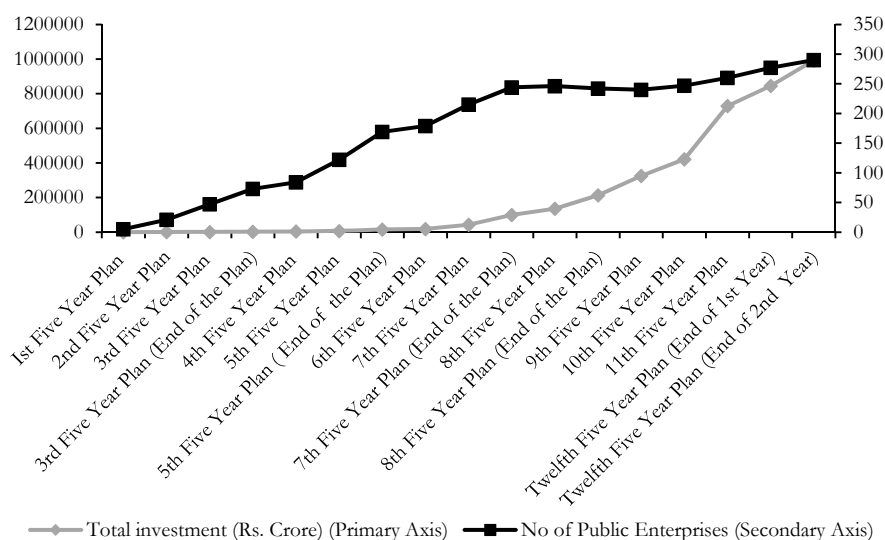


Source: [*Public Enterprises Survey*, 2013-2014].

Since 1991, India has followed a policy of liberalization of the economy. Trade and Industry were unshackled from bureaucratic tangles and red tapes. Industrial licensing was abolished for all projects, except for some industries, which were related to security and strategic importance, hazardous chemicals and products of elitist consumption. Boards of public enterprises were made more professional and were given greater powers. Importance was given to Memorandum of Understanding (MOU) entered into by the public enterprises with government departments, which would set out performance indicators every year and to which both parties would be accountable [*Industrial Policy Statement*, 1991].

However, the impact of these measures has not been up to the expectations. About 119 enterprises out of a total of 230 operating enterprises were in losses to the tune of Rs.10, 387 crores as of March, 2002. Cumulative losses of public enterprises were a massive Rs.69, 932 crores. Overall rate of return on capital employed (i.e. net profit to capital employed) in public enterprises was only 6.67% in 2001-02. During 2004-2014, the no. of sick Central Public Sector Enterprises (CPSEs) and their losses have been shown in table 1. These losses have continuously increased .Although, the no. of sick

units (registered with BIFR) has decreased to half, the losses have increased more than three times during 2004-05 to 2012-13.

TABLE 1.

### Sick and loss making CPSEs

| Year | No. of Sick CPSEs* | Accumulated Losses of Sick CPSEs (Rs crore)* | No. of Sick CPSEs** | No. of loss Making CPSEs during the Year | Loss of Loss Making CPSEs (Rs. crore) |
|------|------|------|------|------|------|
| 2004-05 | 90 | 82 352 | 81 | 73 | 9 003 |
| 2005-06 | 81 | 83 554 | 75 | 63 | 6 845 |
| 2006-07 | 74 | 89 064 | 83 | 61 | 8 526 |
| 2007-08 | 46 | 72 820 | 78 | 54 | 10 303 |
| 2008-09 | 46 | 68 577 | 73 | 55 | 14 621 |
| 2009-10 | 46 | 62 828 | 69 | 60 | 16 231 |
| 2010-11 | 45 | 65 146 | 63 | 62 | 21 816 |
| 2011-12 | 45 | 65 642 | 63 | 64 | 27 683 |
| 2012-13 | 45 | 70 918 | 61 | 78 | 28 562 |
| 2013-14 | 45 | 56 845 | 58 | 71 | 20 055 |

* Operating CPSEs as registered with Board for Industrial and Financial Reconstruction (BIFR)

** CPSEs as per the definition of Board for Reconstruction of Public Sector Enterprises (BRPSE)

Source: [*Public Enterprises Survey*, 2013-2014].

Despite huge investments in the public enterprises, the Government is required to provide more funds every year to the public enterprises by means of loans and grants, subsidies etc. Table 2 gives the recent picture of subsidies received by 14 CPSEs during 2010-2014. These subsidies are in the form of product/service, cash, interest and others. Total subsidies were 45 407.40 crores in 2010-11, which increased to 173 578.00 crores in 2013-14. Thus, there is fourfold increase in subsidies received by these CPSEs.

TABLE 2.

### Subsidies Received by CPSEs (in crore)

| Subsidies | 2010-11 | 2011-12 | 2012-13 | 2013-14 |
|------|------|------|------|------|
| Product/Service | 34 579.84 | 59 968.88 | 148 733.20 | 137 334.50 |
| Cash | 10 429.41 | 20 605.59 | 22 921.81 | 34 567.38 |
| Interest | 3.5 | 44.95 | 49.44 | 50.84 |
| Other | 394.62 | 409.37 | 1 031.53 | 1 625.68 |
| Total | 45 407.40 | 81 028.80 | 172 736.00 | 173 578.00 |

Source: [*Public Enterprises Survey*, 2013-2014].

In order to improve the performance of the public enterprises, the Government instituted the concept of Memorandum of Understanding (MOU) in 1986. However, it has been found that these yearly agreements become a ritual and do not result in improvement of the performance of the enterprises nor reduce the control that government departments have in the running of the enterprises. The Rangarajan Committee on Disinvestment of Public Sector Enterprises (1993) recommended that in all units reserved for the public sector, the target ownership of government should be 51% to enable control over management; a target ownership of 26% may be considered in exceptional cases. In other cases, the target ownership could be zero. The Disinvestment Commission set up in 1996 to counsel the modality and level of sale of equity of public enterprises suggested that strategic sale should be, generally, the means of sale of government equity [*Disinvestment Commission*, Report No 1, 1997]. It made detailed recommendations on PEs by the time it was wound up in 2004. It also made general recommendations regarding corporate governance in PEs and machinery for expediting disinvestment of the government equity.

Until now, the government has carried out disinvestment in three phases. The first phase viz from 1992 to 1999 saw small percentages of government equity in selected enterprises being bundled and sold to financial institutions; the second phase from 2000 to 2004 saw strategic sale of public enterprises and the third phase is the partial disinvestment of PEs after 2004.

Table 3. gives the comparative details of number of companies disinvested, equity sold, realization etc. As evident from Table 3, during the first phase of disinvestment (1992-1999), the government succeeded in partially disinvesting its stake (worth Rs.2793 crores) in more than 39 enterprises and obtaining Rs.19,573 crores. In contrast, in the second phase (2000 – 2004), the government sold 51% or more equity (worth Rs.894 crores) through the strategic sale method in 36 enterprises and obtained Rs.11344 crores. Since 2004, however, there has been a rethink on the strategic sale method of disinvestment and only small percentages of equity have been disinvested in selected companies. With the advent of the United Progressive Alliance (UPA) Government in 2004 as a part of third phase, privatization has been given up while disinvestment has been planned only for selected enterprises, as it is evident from Table 3.

It is clear, therefore, that Government has viewed disinvestment as a source of revenue rather than for improving the governance and profitability of the public enterprises. This amounts to selling the family silver to pay the butler! Government appears to have abandoned privatization of public enterprises; instead it appears keen to disinvest minor shareholding in them for short term revenue needs. In such an exercise, profitability of public enterprises through private participation in management does not appear to be even remotely considered. There is a limit to what can be achieved through continued government majority ownership of public enterprises. Ultimately, government would have to resort to privatization of those CPSEs which do not have to remain in government's majority ownership on account of national interests.

TABLE 3.
## Summary of receipts from disinvestment and methodology: 1991 to March 2014

| Years | Budgeted receipt (Rs. crore) | Total receipts (Rs. crore) | Transaction Methodology |
|---|---|---|---|
| 1991-92 | 2 500 | 3 037.74 | Minority shares sold in Dec, 1991 and Feb, 1992 by auction method in bundles of "very good", "good" and "average" companies |
| 1992-93 | 2 500 | 1 912.51 | Shares sold separately for each company by auction method. |
| 1993-94 | 3 500 | – | Equity of 6 companies sold by auction method but proceeds received in 94-95. |
| 1994-95 | 4 000 | 4 843.10 | Shares sold by auction method. |
| 1995-96 | 7 000 | 168.48 | Shares sold by auction method. |
| 1996-97 | 5 000 | 379.67 | GDR(Global Depository Receipt) - Videsh Sanchar Nigam Limited (VSNL) |
| 1997-98 | 4 800 | 910 | GDR –Mahanagar Telephone Nigam Limited (MTNL) |
| 1998-99 | 5 000 | 5 371.11* | GDR-VSNL; Domestic offerings of Container Corporation of India Ltd (CONCOR) and Gas Authority of India Limited (GAIL); Cross purchase by 3 Oil sector companies i.e. GAIL, OIL and Natural Gas Corporation (ONGC) and Indian Oil Corporation (IOC). |
| 1999-00 | 10 000 | 1 860.14 | GDR-GAIL; Domestic offering of VSNL; capital reduction and dividend from Bharat Aluminium Company Ltd (BALCO); Strategic sale of Modern Food Industries (India) Ltd (MFIL). |
| 2000-01 | 10 000 | 1 871.26 | Strategic sale |
| 2001-02 | 12 000 | 5 657.69 | Strategic sale |
| 2002-03 | 12 000 | 3 347.98 | Strategic sale |
| 2003-04 | 14 500 | 15 547.41 | Strategic sale |
| 2004-05 | 4 000 | 2 764.87 | sale of residual shareholding in disinvested CPSEs /companies |
| 2005-06 | No target fixed | 1 569.68 | No disinvestment |
| 2006-07 | No target fixed | – | sale of minority shareholding in CPSEs |
| 2007-08 | No target fixed | 4 181.39 | No disinvestment |
| 2008-09 | No target fixed | – | sale of minority shareholding in Central Public Sector Enterprises (CPSEs) |
| 2009-10 | No target fixed | 4 259.90 | sale of minority shareholding in CPSEs |
| 2010-11 | 40 000.00 | 22 144.21 | sale of minority shareholding in CPSEs |
| 2011-12 | 40 000.00 | 13 894.05 | sale of minority shareholding in CPSEs |
| 2012-13 | 30 000.00 | 23 956.06 | sale of minority shareholding in CPSEs |
| 2013-14 | 40 000.00 | 15 819.45 | sale of minority shareholding in (CPSEs) |
| Total | | 152 789.72 | |

* Out of Rs. 5371.11, Rs.4184 crore constitutes receipt from cross purchase of shares of ONGC, GAIL and IOC.

** Out of Rs. 1479.27 Rs.459.27 crore constitute receipt from cross purchase of shares of ONGC, GAIL and IOC.

Source: [*Annual Report*, 2001-02; *Department of Disinvestment…*, 2014].

The next part of the discussion explores the state of Labour in CPSEs, the protection afforded to them under existing laws and the need to have a privatization law.

### 4. Labour in India's Public Enterprises

As per National Sample Survey Organization (NSSO) 1997 estimates, the total workforce in India was around 355 million of which 269 million was in the rural areas and 86 million was in the urban areas. Total workforce in the organized sector was 27 million, of which 20 million was in the government and 7 million in the private sector. Absolute workforce in the central public sector undertakings was under 2 million. However, primarily due to the economic tensions and voluntary retirements, the workforce diminished to 1.3 million amid the most recent ten years, without any privatization or strategic disinvestments. Moreover, the decline in the labour intensity of production and low growth in agriculture partially induced a fall in the employment growth from 2.7 percent on yearly basis in 1983-94 to 1.07 percent in 1994-2000. Costs were cut and the workforce was rationalized by the corporate India due to increased domestic and foreign competition. Growth in employment in the public sector has been negative in the aftermath of liberalization.

**TABLE 4.**

**Employment in CPSEs**

| Year | Employees (in lakh)* |
|------|----------------------|
| 2006-07 | 16.14 |
| 2007-08 | 15.65 |
| 2008-09 | 15.33 |
| 2009-10 | 14.9 |
| 2010-11 | 14.4 |
| 2011-12 | 14.5 |
| 2012-13 | 14.02 |
| 2013-14 | 13.51 |

*excluding contract workers

Source: [*Public Enterprises Survey*, 2013-2014].

Various reports such as the Report of the Fifth Central Pay Commission (1997), Reports of the Task Forces headed by Geetha Krishnan (2001), Rakesh Mohan (2001) and Montek Singh Ahluwalia (2001) on Government employment, Railways and Employment Policy respectively, have pointed out the need to reduce redundant workforce. During disinvestment of public enterprises, most private bidders have sought rationalization of the workforce. However, Government of India has so far been insisting on assurances of job security for one year from the date of privatization and on liberal compensation for voluntary retirement.In India, PSUs are still one of the most important providers of jobs.

As on 31.3.2014, the 290 CPSEs employed over 13.51 lakh people (excluding contract workers) and the outgo on salaries and wages amounted to Rs 1,21,038 crores with per capita salary, wages and employees expenses amounted to Rs.8,88,305. This is compared

to 16.14 lakh workers employed in 2006-07 and outgo on salaries and wages of Rs 52586 crores and per capita salary, wages and employees expenses of Rs.325869 (Table 4.).

It will be evident from this Table that the total number of employees in CPSEs is declining every year since 2006-07, except in 2011-12 while on the other hand, per capita emoluments has been increasing. About 30% of the manpower in CPSEs belongs to managerial and supervisory cadres.

CPSEs now operate under dynamic market conditions. Many of them face shortage of staff. The Voluntary Retirement Scheme (VRS) has made limited impact on reduction of surplus staff. About 6.17 lakh employees opted for VRS from 1988 to 2014. Details of VRS availed during the last 3 years is given in the following Table 6.

**TABLE 5.**

**VRS in CPSES (in numbers)**

| Years | Managerial/ Executive | Supervisory | Workers | Total |
|---|---|---|---|---|
| 2011 | 429 | 136 | 1331 | 1896 |
| 2012 | 227 | 75 | 1032 | 1334 |
| 2013 | 360 | 176 | 1350 | 1886 |

Source: [*Public Enterprise Survey*, 2013-14, Vol. 1].

In the context of restructuring CPSEs, rationalization of manpower has become a necessity. Government established the National Renewal Fund (NRF) in February 1992 to cover both the expense of VRS and the expenditure on retraining of retrenched workers. The NRF was abolished in February 2000 and the scheme of Counselling, Retraining and Redeployment (CRR) is being implemented by the Department of Public Enterprises since 2001-02. The CRR Scheme was notified in November 2007 to widen its scope and coverage. An evaluation of the usefulness of the scheme is yet to be undertaken.

## 5. Roots in Labour Laws in India

Middle of the nineteenth century witnessed the emergence of new areas of employment in the sub-continent with the advancement of factories and industries. This resulted in the steady migration of the workforce to the urban areas where factories and mills were mostly situated. Around then, without any state control or association of the labours, the employers were less worried about the requirements of their workers; the hours of work were too long, wage rates much low the subsistence level, and the conditions of the employment were unacceptable.

The situation led to the enactment of a number of legislations beginning from the year 1881. Various governments in South Asia decided to keep in force most of the pre-independence laws with some modifications and amendments thereof, in the form of administrative rules, to meet the changing needs. Almost the same governmental

decision to allow most of these laws to remain in force were taken in liberated India. These include *interalia*, the Factories Act (1881), Workmen's Compensation Act (1923), Trade Unions Act (1926), Trade Disputes Act (1929), Payment of Wages Act (1936), Maternity Benefit Act (1939), and the Employment of Children Act (1938).

'Labour laws'[1] in India were introduced with the advent of colonial industrialization. These were established through many enactments relating to industrial and labour issues. Just after the independence in India it was found that without proper labour laws it would be difficult to solve workers' problems in a democratic manner. However, at various critical junctures in public enterprises, these laws have been used as instruments to protect the interest of the workers. Since privatization has rapidly spread across the boundaries of various nations, the old labour laws in public enterprises are being revealed as grossly inadequate. The interrelationship between these laws and privatization is brought out in the following discussion.

## 5.1. Employee Protection under labour law

Different labour laws provide various securities to the workers. These labour laws are appropriate to the organization regardless of whether it is in the Public Sector or in the Private Sector. Other than this, workers' assurance can be guaranteed by consolidating suitable provisions in the Shareholders' Agreement.

### 5.1.1. Applicability of Industrial Disputes Act 1947

The arrangements under the Industrial Disputes Act 1947 are admissible to an organization even after the disinvestment. Under the Industrial Disputes Act, which have characterized "Industrial establishment or undertaking" under Section 2 (Ka) as indicated by an "Industrial establishment or undertaking" implies a foundation or undertaking in which any industry is continued to:

a)  An industry is considered an industry if any unit of such organization holding a few activity, is severable from the other entity or entities of such enterprise or undertaking such, unit shall be believed to be an independent industrial enterprises or undertaking;

b)  If the prime action griped n in such firm / enterprise / any entity thereof is an industry and the other activity or each of the other activities griped by such firm or enterprise or any entity thereof is not severable from and is, for the reason of holding on, or supporting the holding on of, such prime action/actions, the entire firm or enterprise or, as the case may be, unit thereof shall be considered to be an industrial firm or enterprise.

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[1] Labour Law regulates matters, such as, labour employment, remunerations, and conditions of work, trade unions, and labour management relations. It also include social laws regulating such aspects as compensation for accident caused to a worker at work, fixation of minimum wages, maternity benefits, sharing of the company's profit by the workers, and so on. Most of these legal instruments regulate rights and responsibilities of the working people.

In perspective of the above definition, the organization will persist to be an industrial establishment even after the disinvestment and all the arrangements of the Industrial Disputes Act will naturally apply to the company. The major fallacy is the presumption of the trade unions that the workers of a PSU are more protected under the law compared to the private sector. However, in fact, as long as the enterprise is the "Industrial establishment", regardless of it being in the public or the private sector, the provisions of the Industrial Disputes Act are equally applicable.

### 5.1.2 Provisions governing service conditions

The companies normally have "Certified Standing Orders" for their workmen. The Standing Orders have been certified under the Industrial Employment (Standing Orders) Act, 1946. The service conditions of the workmen of the company are normally governed by the said "Certified Standing Orders". If, after disinvestment, the prospective buyer proposes to make any change in the service conditions applicable to the workmen, he has to give a notice in the prescribed manner under Section 9-A of the Industrial Disputes Act. Section 9-A of the Industrial Disputes Act reads as follows:

No employer, who proposes to affect any change in the conditions of service applicable to any workman in respect of any matter specified in the Fourth Schedule, shall affect such change:

a) without giving to the workmen likely to be affected by such change a notice in the prescribed manner of the nature of change proposed to be affected; or

b) Within twenty-one days of giving such notice

Provided that no notice shall be required for affecting any such change –

a) Where the change is affected in pursuance of any settlement or award; or

b) Where the workmen likely to be affected by the change are persons to whom the Fundamental and supplementary Rules, Civil Services (Classification, Control and Appeal) Rules, Civil Service (Temporary Service) Rules, Revised Leave Rules, Civil Service Regulations, Civilians in Defence Services (Classification, Control and Appeal) Rules, or the Indian Railway Establishment Code or any other rules or regulations that may be notified in this behalf by the appropriate Government in the official Gazette, apply.

'The Fourth Schedule' as mentioned in the above definition is being reproduced below:

Condition of service for change of which notice is given:

1. Wages, including the period and mode of payment;

2. Contribution paid, or payable, by the employer to any provident fund or pension fund or for the benefit or the workmen under any law for the time being in force;

3. Compensatory and other allowance;

4. Hours of work and rest intervals;

5. Leave with wages and holidays;

6.    Starting, alteration or discontinuance of shift working otherwise than in accordance with standing orders;
7.    Classification by grades;
8.    Withdrawal of any customary concession or privilege or change in usage;
9.    Introduction of new rules of discipline, or alteration in existing rules, except inn so far as they are provided in standing orders;
10.   Rationalization, standardization or improvement or plant or technique, which is likely to lead to retrenchment or workmen;
11.   Any increase or reduction (other than casual) in the number of persons employed or to be employed in any occupation or processes or department of shift (not occasioned by circumstances over which the employer has no control).

In this way, under the arrangements of the Industrial Disputes Act 1947, read along the provisions of the Industrial Employment (Standing Orders) Act, 1946, any adjustment in the duty conditions of the workers will be administered by the arrangements of the law, must be adhered to as relevant in the organization preceding the disinvestment. This is not to imply that Certified Standing Orders were unable to change, even before the disinvestment by the management of the company. In any case, as law recommends, a notification must be given by the administration to the workers, which does not inexorably imply that just by giving a notification, duty conditions might be changed in a way unfavourable to the benefits of the workers. In the event that the workers find the notification conceives change in working conditions adverse to their intrigues, they can quickly raise an "Industrial Dispute" in front of the Competent Authorities designated under the Act.

The *Industrial Dispute* has been defined under Section 2K of the Industrial Disputes Act, which reads as follows:

*Industrial Dispute* means any dispute or difference between employers and employees, or between employers and workmen, or between workmen and workmen, which is connected with the employment or non-employment or the terms of employment or with the conditions of labour of any person

Moreover, Authorities under the Act are dealt in Chapter II of the Industrial Disputes Act, while successive chapters outline the processes of the rectification of the Industrial Disputes. Therefore, the interests of the workmen will remain protected, as protected at present, under the current provisions of Industrial Disputes Act, 1947.

Bipartite/tripartite Agreements administer the matters related to job security, wages, perks, welfare etc. of the workers in an organized sector. Under the Section 2, these agreements are in the nature of "settlement" and are protected under various arrangements of the Act. There will be requirement that the management of the company will enter into the bipartite/tripartite agreements with the workers through the Unions yet after the disinvestment. The provisions of the agreement would be always administered by the collective bargaining practices and procedures. Mutual consent would be the basis for such agreement between two or more parties. In a nutshell, meeting the timely productivity and production targets by the workers induce the management to decide the better service conditions, etc. on a regular basis.

### 5.1.3 Protection against arbitrary/closure of an undertaking

Regarding protection against arbitrary closure of any establishment of the Company, it may be mentioned that "closure" of an Industrial Establishment is governed by Section 25(O) of the Industrial Dispute Act. Section 25(O) reads as follows:

1. An employer who intends to close down an undertaking of an industrial establishment to which this chapter applies shall, in the prescribed manner, apply, for prior permission at least ninety days before the date on which the intended closure is to become effective, to the appropriate Government, stating clearly the reasons for the intended closure of the undertaking and a copy of such applications shall also be served simultaneously on the representatives of the workmen in the prescribed manner:
   Provided that nothing in this sub-section shall apply to an undertaking set up for the construction of buildings, bridges, roads, canals, dams or for other construction work.

2. Where an application for permission has been made under sub-section (1), the appropriate Government, after making such enquiry as it things fit and after giving a reasonable opportunity of being heard to the employer, the workmen and the person interested in such closure may, having regard to the genuineness' and adequacy of the reasons stated by the employer, the interests of the general public and all other relevant factors, by order and for reasons to be recorded in writing, grant or refuse to grant such permission and a copy of such other order shall be communicated to the employer and the workmen.

3. Where an application has been made under sub-section (1) and the appropriate Government does not communicate the order granting or refusing to grant permission to the employer within a period of sixty days from the date on which such application is made, the permission applied for, shall be deemed to have been granted on the expiration of the said period of sixty days.

4. An order of the appropriate Government granting or refusing to grant permission shall, subject to the provision of sub-section (5), be final and binding on all the parties and shall remain in force for one year from the date of such order.

5. The appropriate Government may, either on its own motion or on the application made by the employer, or any workman, review its order granting or refusing to grant permission under sub-section (2) or refer the matter to a Tribunal for adjudication: Provided that where a reference has been made to a Tribunal under this sub-section, it shall pass an award within a period of thirty days from the date of such reference.

6. Where no application for permission under sub-section (1) is made within a period specified therein, or where the permission for closure has been refused, the closure of the undertaking shall be deemed to be illegal from the date of closure and the workmen shall be entitled to all the benefits under any law for the time being in force as if undertaking had not been closed down.

7. Notwithstanding anything contained in the foregoing provisions of this section, the appropriate Government may, if it is satisfied that owing to such exceptional

circumstances as accident in the undertaking or death of the employer or the like, it is necessary so to do, by order, direct that the provisions of sub-section (1) shall not apply in relation to such undertaking for such period as may be specified in the order.

8. Where an undertaking is permitted to be closed down under sub section (2) or where permission for closure is deemed to be granted under sub-section (3) every workman who is employed in that undertaking immediately before the date of application for permission under this section, shall be entitled to receive compensation which shall be equivalent to fifteen days' average pay for every completed year of continuous service or any part thereof in excess of six months.

From the above definition, it is clear that the company management before or after disinvestment is not free to close down any part of the company at their sweet will. The closure is governed by the law of land and so for the existing provisions of Industrial Disputes Act are concerned, "genuineness and adequacy of the reasons stated by the employer" and "the interests of the general public and all other relevant factors", have to be examined by the appropriate Government and, for doing that the Government has to give a reasonable opportunity of hearing to the employer and workmen and the persons interested in such closure. Disinvestment does not empower the management of the company to shut down any undertaking unless the government allows for the same. Thus, the Act provides protection against any arbitrary shutdown of the company undertaking even after the disinvestment.

Occasionally, some trade unions demand confirmations regarding external development previously enjoyed by the villages adjacent to the plant in the post-disinvestment period. Likewise, the contract workers too request regularization of their employments prior to the disinvestment. Investment in peripheral development cannot be forced to any employer under the law. In any case, as a judicious administrative convention, bigger companies invest generously in the advancement of the areas surrounding the establishment.

So far the regularization of contract labour is concerned, PE or no PE, an industrial undertaking in this regard is governed by the provisions of Contract Labour (Regulation and Prohibition) Act, 1970 and Rules made there under. Hence, the contract labourers and unions representing their interest may take recourse to the said Act and Rules after the disinvestment and may pursue the matter in furtherance of their demand.

### 5.1.4. Provisions in the Shareholders' Agreement

Shareholders' Agreement generally incorporates the concerns of the Government regarding employee protection. Normally, the following clauses are kept in the Shareholders' Agreement:

1. The parties envision that all employees of the company on the date hereof shall continue in the employment of the company.
2. The Company shall not retrench any part of its labour force for a stipulated period from the closing date other than any dismissal or termination of

employees of the Company from their employment in accordance with the applicable staff regulations and standing orders of the Company or applicable Law.

3.  Typically the agreements include a recital stating that the strategic partner recognizes that the Government in relation to its employment policies follows certain principles for the benefit of the members of the Scheduled Caste/ Scheduled Tribes, Physically Handicapped persons and other socially disadvantaged sections of the society and that the strategic partner shall use its best efforts to cause the company to provide adequate job opportunities for such persons. Further, in the event of any reduction in the strength of the employees of the company, the strategic partner shall use its efforts to ensure that the physically handicapped persons are retrenched at the end.

4.  Subject to the above Clauses, any restructuring of the labour force of the Company shall be implemented in the manner recommended by the Board any in accordance with all applicable laws. The strategic partner in the event of any reduction of the strength of its employees shall, ensure that the Company offer its employees an option to voluntarily retire on terms that are in any manner, less favourable than the voluntary retirement scheme offered by the Company on the date of the agreement [*Disinvestment Policy& Procedures*, 2001].

## 5.2. Extent of Redundancy

It is true that PSEs are overstaffed. One could, however, differ on the extent of redundancy. Various methodologies have been adopted for estimating redundancy. These have placed redundancy between 18% to 25% [Gupta, 1998]. Industrial sickness prompting redundancy of the workers inflicts severe difficulties to the government in formulating plans that will improve the socio-economic issues of the displaced workers. Social balance is severely disturbed due to the retrenchment of the workers. The social fabric of the country could be in danger precisely due to the dissatisfaction rising out of the employment scenario. In order to guarantee the future redeployment of the displaced workers, the government is best suggested to fortify the social security system, and likewise make sufficient retraining offices in that situation. Industrial restructuring can only succeed by retraining the workers.

## 5.3 Labour Laws and Privatization in India

The protection given to labour and employees under the Industrial Relations Act has affected the pace of privatization programme in India. Even in a few cases where privatization has been accomplished, the Government obtained a much lesser price for its stake due to its insistence on labour retention agreements for a specified period; even by law, no person can be retrenched without his consent in India. Buyers of public enterprises have consciously over estimated the price of retention and its effect on

productivity; also on the compensation that will be ultimately have to be paid to get rid of the excess labour through Voluntary Retirement Schemes (VRS). The Government has postponed the negative effects of labour restructuring for maybe a couple of years at the most; this ultimately catches up with them after the period of retention is over. Even during the retention period, the managements of privatized enterprises have been reportedly making conditions difficult for those they want to retrench and usually succeed in such persons applying for voluntary retirement. When appeals are made to the Government, they are informed that the existing redressal machinery should take care of such complaints.

Naib [2004] presented post disinvestment employment position in nine divested PSEs, 12 disinvested ITDC hotels and a unit of Hotel Corporation of India; show that from initial employee strength of 43 433 at the time of disinvestment, 4 390 employee separation has taken place. During the same period, 1 050 fresh appointments have also taken place resulting in a net reduction in work force by 3 340, which is around 7.69 per cent of the employees' strength at the time of disinvestment.

These changes in employment have to be viewed in light of the fact that there has been a uniform decline in employment amongst all SOEs irrespective of whether they have been divested or not. Apparently, decline in employment was also due to the fact that SOEs were facing competition. A study by Naib [2003] on the impact of market structure on employment divided the disinvested PSEs till 1999-2000 into two groups: those which are functioning in competitive environment (25 enterprises) and those which are operating in monopoly environment (13 enterprises). It was found that the employment declined in the post-divestiture period for the complete sample of 38 enterprises, as well as for the enterprises operating in competitive environment. As post-liberalization pressure increased on the PSEs, a number of them resorted to restructure labour strength through VRS. The unpredictable result was that there was a rise in the mean employment in the monopoly enterprises amid this period.

The managements of privatized enterprises have resorted to payment of handsome compensations to induce labour to opt for VRS. They have no responsibility to provide any non-monetary safety net for retrenched workers, such as training in entrepreneurship, assistance in job search etc. Recent privatizations have thrown up innumerable problems for retrenched labour of privatized enterprises. Some of them have been forced to literal penury through unemployment and family exploitation for gaining compensation money.

It may, therefore, be desirable that the Government does the labour restructuring in a systematic manner prior to privatization not only by providing for monetary compensation but also through non-monetary safety nets such as retraining, redeployment, entrepreneurship development and job assistance. This would ensure that the Government obtains a proper price for its stake during privatization and at the same time take care of workers' interests.

Overstaffing and labour restructuring are some of the prominent issues that have to be faced in the run up to privatization. It is an essential duty of the government to restructure labour prior to privatization. The example of Sri Lanka was well cited in an earlier Ganesh [2001], Bharti and Ganesh [2004] argued that labour restructuring

in India is seldom attempted prior to sale, and agreements entered into with the prospective buyers have merely guaranteed employment for a certain period, whereas Sri Lanka, which undertook labour/employment restructuring prior to the privatization, could possibly be a model for India.

The link between disinvestment proceeds and expenditure on social sector schemes will become apparent to members of the public only through a Disinvestment Fund.

Most of the governments are balancing economic reform with labour reform. From the first report of DC, it became a great concern for the government to take note of redundancy of labour force in SOEs. This is the reason behind the idea of creating a Disinvestment Fund.

In its Second Report the Disinvestment Commission had recommended that government announce a stable VRS policy with reference to its terms and conditions and provide adequate funds for its implementation by different PSUs. However, in practice, the Commission had come across instances where PSUs who have implemented the VRS scheme have not been able to secure funding support from the Government. The Commission felt that the future of several PSUs and the value of shares sold would change for the better if surplus employees were provided acceptable VRS terms. The following steps were recommended:

1.   For finalizing the terms of VRS on a stable and long-term basis providing individual management to have autonomy to have a range within which they may deviate from the set terms for different age groups, different categories of employees and different industrial sectors.
2.   Prompt funding for implementing the VRS scheme.
3.   Suitable publicity measures for VRS scheme must be adopted for brought into the knowledge of the employees .
4.   As there is danger of a one-time lumpsum payment being frittered away by the employees or drained out by unscrupulous middlemen, a special scheme may be drawn up through commercial banks, UTI or LIC, wherein the VRS benefits are invested on behalf of individual employees to provide long-term benefits and some measure of social security.

The Fourth Report by the DC also discussed VRS extensively. The studies on PSUs carried out by the Commission before making its recommendations reveal that several PSUs, including the profit-making ones, have staffing levels well in excess of the comparable competing units in the domestic and international markets. DC advised that given the need to become in a globally competitive, it is imperative to review staffing levels in PSUs and balancing the size of workforce.

The Fifth Report of the Disinvest Commission has advised the government to create a Disinvestments Fund from where employers could get benefit of Voluntary Retirement Scheme (VRS). Disinvestment Commission in its fifth report stated the receipts of disinvestment be placed separately in a Disinvestment Fund (DF) and also advised to merge the National Renewal Fund (NRF) with DF. It further argued that the revenue collected through disinvestment and kept in DF may be utilized for helping the loss incurring PEs for the purpose of restructuring before disinvestment. After a long time National Investment Fund (NIF) was established in November 2005 for the

purpose of channelizing the proceds from disinvestment of CPSEs. But disinvestment proceeds received during April 2009-March 2012 were also utilized for selected social sector schemes allocated for by Planning Commission/ Department of Expenditure due to crisis situation caused by the global slowdown of 2008-09 and a severe drought in 2009-10. In 2013 government of India has further approved restructuring of the NIF and finalized that the disinvestment proceeds with effect from financial year 2013-14 will be deposited to the existing 'Public Account' under the head NIF and it will remain in that account till further investment/ withdrawn for the approved purpose.

The Government in initial phase of the post reforms (1991-2004) period has not shown great concern for these recommendations. Economic reforms and labour reforms were in two different directions. In fact the restructuring of PEs were not even a priority as a part of economic reforms. On the labour union front, one of the former trade union general secretary considered the entire struggle as a lost game as he pointed out in 2003.

The division within the ranks of the trade union movement has weakened the workers struggle against privatization. The picture is like this – whenever the movement is strong, we are able to stop the drift towards privatization; but whenever it is weak, the government has been successful. (Frontline, 2003.)

A country that has mounting unemployment problem Privatization has not improved employment over the short term. In, This is really a cause of concern [Hindu, 2002]. Naib [2003] argued that in India, the most important shock of privatization is on the labour as employment levels dropped after divestiture. As post-liberalization pressure increased on public enterprises a number of them restored to VRS. Drop in employment in 25 enterprises out of 38 surveyed, is statistically significant. In other 13 enterprises also the drop is not statistically proved. Since most of the Indian PEs are labour intensive, labour is bound to be one of the crucial issues in Indian privatization.

In India, labour law does not provide any guidelines for the share holding by the workers at the time of privatization. Indian Courts are unable to make any decision in favour of the workers which has a large population in the PEs. In absence of privatization law which includes a separate section on labour law, precedeing the process of privatization swiftly looks difficult. Empirical evidence in India's privatization programme appears to suggest that workers have very little opportunity of protection during and after privatization. The old labour laws are not enough to make enough impact on workers' welfare in a dynamic changing economy. The workers' welfare is weakening due to current way of privatization of PEs. There are certain emerging gaps due to the presence of labour laws and the absence of a privatization law. It is high time that India started to work on a new law of Privatization .The matter of privatization law is more important than privatization because 'only the legal framework can decide basic safeguards guaranteeing the integrity and efficiency of the privatization process [Guislain, 1992]'. More recently, the Labour ministry of government of India (The Economic Times, 31 October and 17 December 2015) has started the process of rationalizing the provision of 44 labour law by converting them into four labour codes such as codes on wages, codes on industrial relations (which includes Industrial Dispute act 1947, The Trade

Union Act 1926 and The Industrial Employment standing orders Act, 1946)[2], codes on social security and welfare and codes on safety and working conditions.


## 6. The Need for Privatization Law

India has undertaken massive reform in various economic fields. Privatization as a part of the economic reform had been targeted by the government's coalition partners and status quo seekers and it is evident that privatization/disinvestment is now in the 'stop go' phenomenon. There was a demand by the BALCO workers to become share holders in the BALCO privatization process through Management Employees Buy Outs (MEBOs). This was not agreed to by the government. In a recent landmark judgment, the Supreme Court of India had stated that workers cannot have a say in who should own the enterprise. This has arisen because there is no Privatization law which will enable workers will get ownership rights or share in the process of privatization. Workers' interests are almost the last concern for the government.

International experiences in privatization suggest that there should be a comprehensive law related to the workers' rights under privatization law. For instance, in Jordan, the Privatization Law no. 25/2000, issued in July 2000, provided the necessary legal and institutional framework for the workers. Article 18 of the Privatization Law in Jordan states that

Each and every employee or consultant working at the Commission must inform the Chairman of the Commission in writing, at the commencement of the execution of any privatization transaction, of any benefit that he/she, his/her spouse, predecessors or descendents to the third degree or siblings may accrue, directly or indirectly, in return for services rendered to any party which is directly or indirectly connected to the privatization transaction in question. The Chairman of the Commission shall decide on the impact of such benefits on the impartiality of such an employee, consultant or expert involved in the privatization transaction and, accordingly, and in any event, shall have the right to discharge such an employee, consultant or expert from working at the Commission or on the transaction in question.

The French Privatization Law of 1986 also provided for specific shareholding by employees including special advantages such as discounts or payment terms or both. This Law was amended in 1993 to supplement the statutes adopted in 1986 and one of the objectives of this amendment was to encourage retail and employee shareholding [*The French Privatization Law*, 1986]. Employee Ownership in Privatization has been a feature in the countries of the former Soviet Union. In most of these countries, workers are preferred buyers of former State Owned enterprises [Gates, Saghir, 1995]. Frydman [1998] an advisor to groups that support privatization and entrepreneurship in Central

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[2] The main proviso of the draft code will allow firms /undertaking/enterprises employing up-to three hundred workers to dismiss workers with no government authorization compared to 100 workers at present. This proposal was collectively rejected by the trade unions of India.

and Eastern Europe, is categorical that Privatization must be accompanied by a proper legal framework in order to be successful.

But in India in the absence of privatization law the Supreme Court of India, in its decision on BALCO privatization, stated that

In a democracy; it is the prerogative of each elected Government to follow its own policy. Often a change in Government may result in the shift in focus or change in economic policies. It is not for the Courts to consider relative merits of different economic policies and consider whether a wiser or better one can be evolved. For testing the correctness of a policy, the appropriate forum is the Parliament and not the Courts. Here the policy was tested and the Motion defeated in the Lok Sabha on 1st March, 2001.Thus, apart from the fact that the policy of disinvestment cannot be questioned as such, the facts herein show that fair, just and equitable procedure has been followed in carrying out this disinvestment. In the case of a policy decision on economic matters, the Courts should be very circumspect in conducting any enquiry or investigation and must be most reluctant to impugn the judgment of the experts who may have arrived at a conclusion unless the Court is satisfied that there is illegality in the decision itself.

In a different decision on HPCL/BPCL privatization, the Supreme Court has discussed the international experiences in privatization law saying that apart from United Kingdom, there have been privatization programmes in France and Italy in Europe. Similarly massive programme has been carried out in Argentina, Mexico and Brazil. In these countries, Privatization Acts have been enacted and numerous routes are adopted to achieve privatization.

In India such legal framework for further privatization is an essential requirement because past privatization practices and judgments on privatization has made it clear that labour laws themselves as they stand are not in a position to decide the stake of the workers in Privatization.

## 7. Conclusions

India had undertaken partial divestiture of its public sector enterprises since 1991. From the year 2000, however, India boldly shifted from partial divestiture to full divestiture (privatization). Though, the Government has apparently given up any idea of privatisation of the public sector entrerprises for the present, privatisation as a state policy could be adopted by future governments, if they were to take a long term view on the viability of running such enterprises which are not of national importance. Admittedly, there would be many difficulties in the process of implementing this shift in policy. In the last few judgments on divestiture of public sector Units, the Supreme Court of India came out strongly in favour of the government's policy on privatisation. For instance, in the landmark judgment on BALCO, the Supreme Court held that the workers had no say in the ownership of the company. These judgments had the effect of ignoring workers' interests in the name of competition and growth. While India's labour laws had protected workers in the past, the wave of globalization and the imperatives of economic growth

had forced the Government to embark on economic reforms. These reforms are being supported by four new labour law codes. It is suspected that these laws will really allow firms to retrench labours and allow many firms to join the economy but hardly protect the agenda of workers' participation in share ownership during privatization of CPSEs which has happened in many Central and Eastern Europe. The trickledown effect of such privatization will be also on India's many PEs which exits at state level. Future amendments in the labour Laws and its relations with privatization of PEs is one of the key issues in the ongoing economic reform when India has a major workforce employed in the PEs. International experiences in privatization appear to suggest that there should be a transparent privatization law, but till today India has not even considered enacting such a law. Rethinking on a new approach to the workers in privatization, Law is not only required for the success of privatization process, but it is equally required for the Indian State, which has constitutional obligation to protect the interest of the welfare of the citizens. State should be very much concerned about policies which have long run impact for the Public sector workers. The presence of old labour laws and the absence of a privatization law present a complex situation at the time of the second generation of economic reforms undertaken by India. It is clear that if the labour laws of India are not conducive to privatization, then nothing tangible can be achieved in the attempt to privatize the public sector units. The solution to this dilemma is to enact a combination of effective and reformed labour law will help achieve privatization while taking due care of workers' interests. Reforming Labour laws and implementing privatization law in India will be an important message for economies which have concern to proceed further on the market driven economic model.

### The authors' participation in the preparation of the article

Gopal Ganesh, Ph.D. – development of initial concepts, participation in carrying out research and developing results for the initial years of privatisation – 40%

Nalin Bharti, Ph.D. – further development of concepts, data collection and carrying out research for more recent years and establishing the connection between past and present for developing results – 60%

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# THE DETERMINANTS OF EGTC DEVELOPMENT IN POLAND

### Summary

A comprehensive interpretation of the European Grouping of Territorial Cooperation (EGTC) requires interdisciplinary studies, with particular focus on economic aspects. An EGTC is an innovative legal instrument of the EU and an economic tool developed to improve cross-border, transnational and interregional cooperation. Fifty EGTCs had been established in Europe by the end of 2014, including 3 EGTCs in Poland.

The aim of this article is to indicate and discuss the key determinants of development of such institutions, as well as to point out barriers and present proposals to overcome them. The operation of Polish groupings in view of European ones was discussed in this article. A working model describing internal and external determinants was developed. In the context of cohesion policy, it was proved that objectives and tasks of the groupings are coincident with the objectives of the European Territorial Cooperation. Previous original studies on EGTC development in Europe were used. Legal documents were analysed, a survey and interviews with directors of EGTCs were conducted in 2015.

**Key words**: cooperation, European, territorial, cross-border, EGTC

**JEL**: F15

## 1. Introduction

The European Grouping of Territorial Cooperation EGTC, hereinafter referred to as the EGTC, is a breakthrough economic, political and legal instrument. Its introduction has begun a new stage in the UE cohesion policy. This instrument has greatly improved cross-border, transnational and interregional cooperation, contributing to the strengthening of the social and economic cohesion (and recently territorial cohesion as well) of the areas which use this instrument.

However, numerous barriers, which slow down the development of EGTCs, limiting the full use of the potential of this tool, occurred. This also concerns Poland, where three European groupings exist and another two are being established.

The development of territorial cooperation prior to establishing the EGTCs in Poland is documented by relatively rich literature resources; however, a relatively low number of

studies were dedicated to a comprehensive assessment of cooperation outcomes in the social, economic and spacial dimension [Dołzblasz, Raczyk, 2010, p. 10].

The publications on EGTCs are relatively poor. This mainly results from the lack of access to source materials related to EGTCs in Europe. Most Polish studies on EGTCs were made when these organisations were only being established. In the meantime EU and national legislation was changed. In Poland the EGTC activities have been analysed mainly in legal [Kusiak-Winter, 2011; Kentnowska, 2012, pp. 234-250; Buczkowski, Żukowski, 2014, pp. 13-83] and political science terms [Adamczuk, 2014, pp. 13-20; Ruszkowski, 2010, pp. 269-276; Lewkowicz, 2013, pp. 43-70], and less frequently in economic terms [Jóskowiak, 2013, pp. 18-28].

It should be pointed out that, unlike the system research, a detailed analysis of the determinants of development is possible in respect of Poland. The author managed to obtain all the necessary documents and establish priceless cooperation with the EGTC authorities. The concept of the research proposed by the author may be used for more comprehensive identification of strengths and weaknesses, as well as opportunities and threats of the EGTC development in the European Union.

## 2. The history and core of EGTCs

The functioning of the EGTC as an instrument of cohesion policy refers to issues concerning local and regional development. Furthermore, through direct connections and associations with territorial cooperation in the borderlands, it also refers to issues concerning European integration [Pancer-Cybulska, 2015, pp. 383-393; Ładysz, 2011, pp. 30-40]. Europe has always been diverse in terms of social and economic development of its states and regions [Schoutheete, 1999, p. 99]. The border areas were in a particularly difficult situation [Kasprzyk, 2004, p. 25; Toczyski, Sartorius, Zaucha, 1997, p. 65]. Therefore, the improvement of social and economic cohesion became one of the priorities of the European regional policy [Proniewski, 2008, p. 296]. It was necessary to develop systemic solutions limiting or removing the key barriers in the cross-border, transnational and interregional cooperation. For this purpose, at the end of the 20th century "non-sovereign, territorial units" [Mikołajczyk, 2005, p. 297] were given an opportunity to enter into direct contacts with their foreign counterparts. New regulations and institutions were favourable to the development of international cooperation at local and regional level [Toczyski, Sartorius, Zaucha, 1997, p. 94-109; Dumała 2009, p. 31; Dołzbasz, Raczyk, 2010, pp. 204-206].

From an economic point of view, institutions which operate properly generate "added value" [Luks, 2012, p. 126] and help in accelerating social and economic development. EGTCs have become such institutions [Adamczuk, 2014, pp. 13-20]. Regulations provided them with legal personality, status and competencies unknown in the current history of the European Union [Studzieniecki, 2015, p. 15; Pancer-Cybulska, 2015, pp. 383-393]. European groupings rely on the experience and achievements of Euroregions [Jóskowiak, 2013, p. 28; Mędza, 2014, pp. 281-], which despite the lack of legal personality have become important entities of international relations [Lewkowicz, 2013, p. 47].

Many European Euroregions have been transformed into groupings since provisions enabling the establishment of an EGTC entered into force. Poland's Euroregions were provided with three options [Mędza, 2014, pp 291-291]:

1. to establish an EGTC based on an Euroregion;
2. to establish an EGTC without liquidating an Euroregion;
3. to abandon the establishment of an EGTC and continue operating as an Euroregion.

Transformation into an EGTC was taken consideration, for example, by the Nysa Euroregion [Mędza, 2014, pp. 288-292] and Sprewa-Nysa-Bóbr [Ślusarz, 2014, p. 38]. However, most Polish Euroregions (in particular, these located at the EU external borders) decided to keep their current status. It should be stressed that the EGTC instrument did not provide membership of entities outside the EU until 2013. Even after amending legislation, the establishment of an EGTC with entities outside the EU will be a challenge that requires not only a good political will but also an introduction of implementing provisions in national law.

## 3. Concepts and tools to study EGTCs

A comprehensive interpretation of the EGTC mechanism requires interdisciplinary research with particular focus on economic aspects (Figure 1). EGTCs are a tool mainly for economic and social objectives. Literature study and the analysis of the operation of all the European groupings in the European Union allowed to develop a working model describing the determinants of EGTC development. The determinants were divided into internal, dependent on the EGTC members themselves, and external, dependent on the most important entities determining the territorial cooperation, i.e. the European Union and the states from which the members of a grouping come from Resources and regulations were distinguished among the most significant factors of EGTC development.

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The resources are mostly external funds (such as funding from the ETC programmes), and, to a lesser extent, internal funds (from fees). The legal determinants (Figure 2.) of the operation of EGTCs are complex. EGTCs operate simultaneously based on the EU and national regulations. Internal documents are drawn up based on these regulations. Practically, the provisions of the states from which members join an EGTC have indirect influence on the EGTC organisation as well.

**FIGURE 1.**
**Model describing the determinants of EGTC development**

| EGTC members |
|---|

**Internal determinants**

| Internal regulations | Internal resources |
|---|---|

| Organizational determinants | Legal determinant | Economic determinants | Political determinants |
|---|---|---|---|

| External regulations | External resources |
|---|---|

| Programmes |
|---|

**External determinants**

| European Union | States |
|---|---|
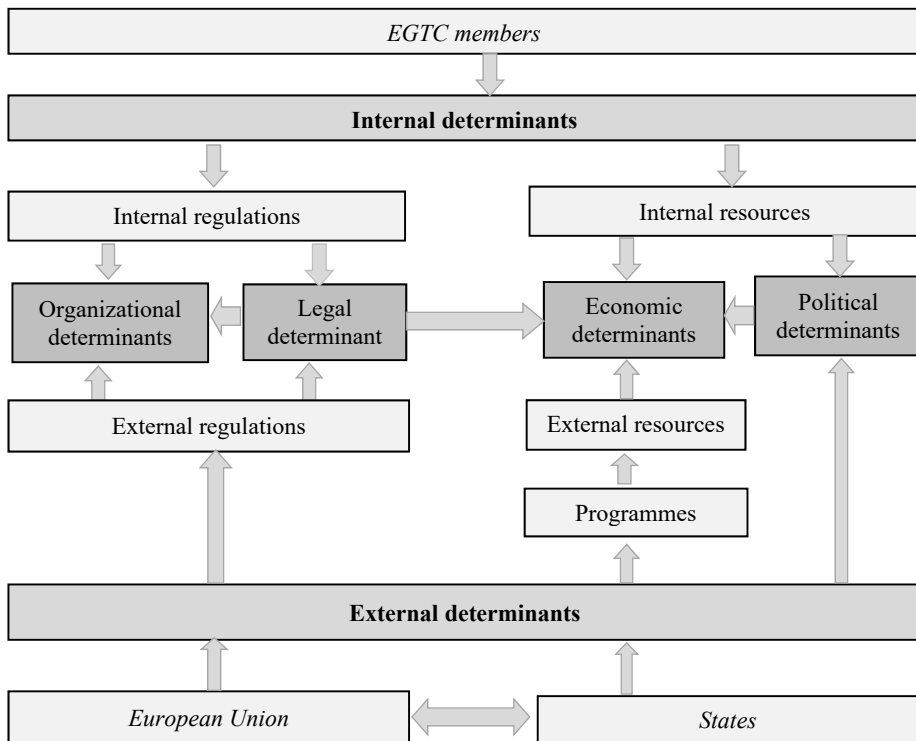
Source: own work

**FIGURE 2.**
**Legal determinants of EGTC development**

| EU regulations |
|---|

| Regulations of the country where EGTC office is located | EGTC | Regulations of other countries |
|---|---|---|

| EGTC's internal regulations |
|---|
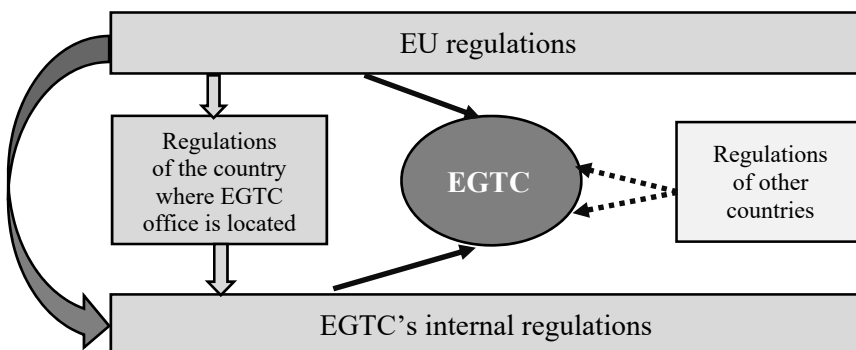
Source: own work

The study on the Polish EGTCs has an advantage over the study of other groupings as more comprehensive comparison between theory and practice is available. In order to make such comparison, a questionnaire taking into account the key determinants of development was prepared.

## 4. The operation of EGTCs

The first EGTC was established in 2008. In Europe 50 EGTCs were registered by the end of 2014. Most of them (19) were set up in Hungary, the least (1) in Sweden and Bulgaria. In total, nineteen states have made use of the EGTC instrument. The instrument did not arise interest in the UK and Scandinavia. The EGTC members are mainly local government units. The number of EGTC members varies between 2 to 188. The number of all EGTC members is 780.

Most of the groupings (32) were established for an unlimited period of time. Other groupings were set up for a period from 6 to 50 years. Concerning their area, the groupings can be divided into:
1. small (up to 1000 km²) – 32% of the EGTCs;
2. medium (more than 1000 km² up to 10 000 km²) – 24% of the EGTCs;
3. large (up to 10 000 km²) – 44% of the EGTCs.

The institution which coordinates and promotes the EGTC development in Europe is the Committee of the Regions. The Association of European Border Regions also plays an important role. Its members are both Euroregions and EGTCs. Three EGTCs operate in Poland (Figure 3.).They are not interested in joining the Association.

**FIGURE 3.**

### EGTCs in Poland
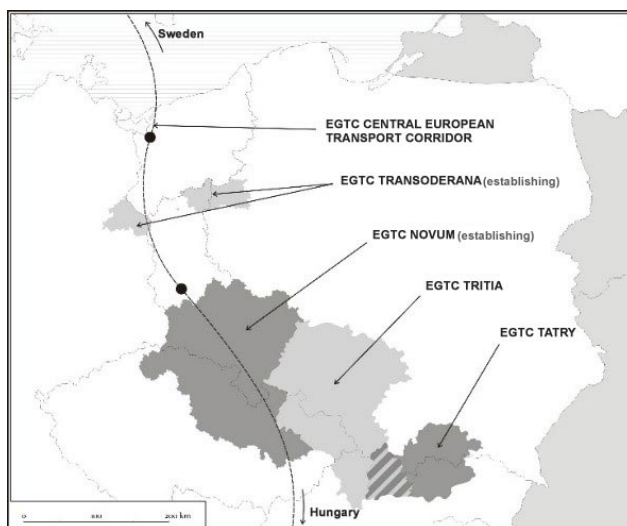


Source: own work.

They were established between 2013 and 2014. The process of institutionalisation for many European EGTCs was long and tedious because it required consultations and consent of as many as four departments.

Concerning the EGTC Tatry, a difficulty arose of the requirement for another documents to be approved by the supreme bodies of both members-founders (Congresses), despite the fact that the amendments in those documents, which were required by the MFA, did not concern substantive issues and did not amend the core provisions of internal documents (Convention and Statute). On the other hand, determining the final contents of internal documents posed an issue for the ETC ŚKT (Środkowoeuropejski Korytarz Transportowy) due to divergent legal interpretation in the founding states.

Only the EGTC Tritia founders did not encounter any difficulties when registering their EGTC. A detailed description of the determinants in view of the conducted survey (Table 1.) was discussed in the further part of this article.

TABLE 1.

**The determinants of EGTC development in Poland in view of the survey**

| No. | Issue | EGTC ŚKT | EGTC Tatry | EGTC Tritia |
|-----|-------|----------|------------|-------------|
| 1. | Difficulties during registration | Yes | Yes | No |
| 2. | The 2014 budget | PLN 231 385 | PLN 52 593.40 | PLN 279 203 |
| 3. | Number of personnel employed by the EGTC in 2014 | 0 | 0 | 4 |
| 4. | Establishing problem committees | No | No | No |
| 5. | Managing the ETC programme | No | No | No |
| 6. | Managing the Small Projects Fund | No | No | No |
| 7. | Intention to join the Association of European Border Regions | No | No | I do not know |
| 8. | Usefulness of the EGTC platform of the Committee of the Regions | Yes | Yes | No |
| 9. | Implementation of the projects funded from the EU funds | Yes | No | Yes |
| 10. | Preparation of development strategy | Intended to prepare | Yes | Yes |
| 11. | Plans to accept new members | Yes | No | No |
| 12. | Issues to solve related to the EGTC's operation | Yes | Yes | Yes |

Source: own work.

## 5. Internal development determinants

The organisational structure of all the EGTCs in Poland includes two mandatory bodies (General Meeting and the president). Furthermore, another supervisory authority was introduced in Poland, the supervisory body (Figure 4). The Polish EGTCs, unlike many European EGTCs, did not see the need for establishing problem committees. As for the EGTC Tatry, it was stated that the aim of the members-founders was to develop as simple and uncomplicated structure of its bodies as possible, which would make its operating and making decisions easier.

**FIGURE 4.**

**EGTC's structure**
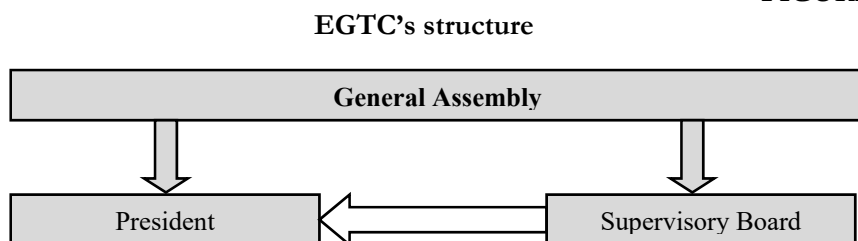


Source: own work based on the convention and statutes of EGTCs.

In three operating EGTCs their members are only regional authorities and associations of local government units. The EU regulation [2006] provided five categories of membership. Due to the amended provisions [EU Regulation, 2013], the number of categories increased to seven. A public entity, university, is planned to be included in this structure in the establishing EGTC. No state has joined an EGTC. EGTCs include 11 entities in total. The cooperation in the planned EGTCs is to cover a bigger number of members (Table 2.).

**TABLE 2.**

**The structure of EGTCs by membership categories**

| Category of membership | Regulation version | | EGTCs | | | | | Number of members | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Existing (E) | | | Planned (P) | | E | P | E + P |
| | 2006 | 2013 | EGTC Tatry | EGTC Tritia | EGTC ŚKT | EGTC Novum | EGTC Trans-oderana | | | |
| EU states | + | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| States outside the EU | - | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Regional government | + | + | 0 | 4 | 5 | 5 | 0 | 9 | 5 | 14 |
| Local government | + | + | 0 | 0 | 0 | 0 | 30 | 0 | 30 | 30 |
| Selected public law bodies | + | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Selected public law bodies and public undertakings | - | + | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| Selected companies | - | + | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Associations | + | + | 2 | 0 | 0 | 4 | 0 | 2 | 4 | 6 |
| **Total** | | | **2** | **4** | **5** | **9** | **31** | **11** | **40** | **51** |

Source: own work based on the convention and statutes of EGTCs

The territorial cooperation of the existing and planned groupings comes down mainly to cross-border cooperation with one or two neighbouring countries (tab. 3.). So far such cooperation has been established only with the Slovak Republic and the Czech Republic.

The establishment of cooperation with Germany is currently being planned. It should be noted that an EGTC with Lithuania is not planned, which results from complex bilateral relations.

The specificity of the EGTC ŚKT causes that this grouping focuses on interregional cooperation with entities from Sweden and Hungary. This is the only EGTC which is considering to accept new members. Expansion of territorial cooperation gives a possibility to strengthen interregional contacts (even among distant partners) and to adapt the methods of spatial planning and management. On this basis, it is possible to develop wider economic, social and cultural cooperation [http://cetc.pl/index.php?lang=en&mod=oporozumieniu, (accessed: 22.02.2016)].

**TABLE 3.**

**The EGTCs by states from which their members come from**

| States | EGTCs | | | | | Number of members | | |
|---|---|---|---|---|---|---|---|---|
| | Existing (E) | | | Planned (P) | | E | P | E+P |
| | EGTC Tatry | EGTC Tritia | EGTC ŚKT | EGTC Novum | EGTC Trans-oderana | | | |
| Poland | 1 | 2 | 2 | 3 | 18 | 5 | 21 | 26 |
| Czech Republic | 0 | 1 | 0 | 6 | 0 | 1 | 6 | 7 |
| Germany | 0 | 0 | 0 | 0 | 13 | 0 | 13 | 13 |
| Slovak Republic | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 2 |
| Sweden | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| Hungary | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 2 |
| **Total** | **2** | **4** | **5** | **9** | **31** | **11** | **40** | **51** |

Source: own work based on the convention and statutes of EGTCs.

Table 4. presents the area of activity of EGTCs. Territorial cooperation developed by the existing EGTCs focuses in the Provinces of Malopolska, Silesia, Opole, and Western Pomerania. Lower Silesia Province and areas from Lubuskie and Wielkopolska Provinces are to join it in the near future. The existing EGTCs comprise an area from 12 500 km² to 230 000 km², so they belong to large groupings.

The priority objectives of EGTCs were established in accordance with the EU guidelines, which provide that an EGTC should develop territorial cooperation in order to increase social, economic and territorial cohesion. In two cases the territorial cooperation was limited to cross-border cooperation. Two EGTCs indicated transport as a priority issue of their activity (Table 5.).

Furthermore, each EGTC determined its detailed objectives and activities. It should be pointed out that all the EGTCs are to support activities related to education, infrastructure and entrepreneurship development, labour market, transport and tourism (Table 6.). Only one EGTC stated that it is not going to handle agriculture, but four EGTCs declared to implement activities to connect cities and towns with villages. One EGTC pointed out the need for the implementation of lobbying. Staff and financial resources are significant factors of EGTC development.

TABLE 4.

## The area of activity and the territory of EGTCs

| EGTC | The area of activity in Poland | The area of activity abroad | Territory |
|---|---|---|---|
| EGTC SKT | − Western Pomerania Province <br> − Lubuskie Province | Hungary: <br> − Komitat Vas, Komitat Zala <br> Sweden: <br> − Scania County | 230 000 km² |
| EGTC Tatry | − Małopolska Province | Slovak Republic: <br> − Districts: Kežmarok, Levoča, Poprad, Sabinov, Stará Ľubovňa in the Prešov Region <br> − Districts: Dolný Kubín, Liptovský Mikuláš, Námestovo, Ružomberok, Tvrdošín in the Žilina Region <br> − Spišská Nová Ves District in the Košice Region | 12 500 km² |
| EGTC Tritia | − Opole Province <br> − Silesia Province | Slovak Republic: <br> − Žilina Region <br> Czech Republic <br> − Moravian-Silesian Region | 34 069 km² |
| EGTC Novum | − Lower Silesia Province <br> − The area of municipalities and districts which are the members of the Association of the Polish Municipalities in the Nysa Euroregion <br> − The area of municipalities and districts which are the members of the Association of the Polish Municipalities in the Glacensis Euroregion | Czech Republic: <br> − Liberec Region <br> − Hradec Králové Region <br> − Pardubice Region <br> − Olomouc Region <br> − The area of municipalities and districts which are the members of the Association of the Nysa Euroregion <br> − The area of municipalities and districts which are the members of the Association of the Glacensis Euroregion | The determination of the territory will be possible once the EGTC has been registered. The territory of some members will overlap. The territory will change along with changes taking place in the structure of Euroregional associations. |
| EGTC Transoderana | Wielkopolska Province: <br> − Czarnków-Trzcianka County <br> − Towns: Piła, Krzyż Wielko-polski, Trzcianka, Wieleń <br> Lubuskie Province <br> − Gorzów County <br> − Strzelce-Drezdenko County <br> − Towns: Gorzów Wielkopolski, Kostrzyn nad Odrą, Drezdenko, Strzelce Krajeńskie, Witnica <br> − Municipalities: Bogdaniec, Santok, Stare Kurowo, Zwie-rzyn <br> Western Pomerania Province <br> − Wałcz County | Germany <br> − Märkisch-Oderland district <br> − Towns: Buckow, Müncheberg, Seelow Strausberg <br> − Municipalities: Fredersdorf-Vogelsdorf, Golzow, Gusow – Platkow, Hoppegarten, Letschin, Lindendorf, Neuhardenberg, Rehfelde, Vierlinden | The determination of the territory will be possible once the EGTC has been registered. The territories of some members will overlap. |

Source: own work based on the convention and statutes of EGTCs.

### The priority objectives and issues of EGTCs

| EGTC | Priority objective | Priority issue |
|---|---|---|
| EGTC ŚKT | The facilitation and support of cross-border, transnational and interregional cooperation within the Central European Transport Corridor, as well as strengthening economic and social coherence, in particular by the implementation of projects or programmes of territorial cooperation. | The EGTC's activity focuses on **road transport** issues. |
| EGTC Transoderana | The broadening and deepening of Polish-German territorial cooperation, aimed at strengthening the cross-border communication axis in the area between Berlin and Pila, in the zone of parallel railway and road connections, as well as the sections of the Odra, Warta and Noteć rivers corresponding to them in order to achieve the objectives of the current EU strategy "Europe 2020". | The EGTC's activity focuses on **rail transport** issues. |
| EGTC Tatry | The further development, facilitation and dissemination of Polish-Slovak cross-border cooperation to strengthen economic and social coherence in the area of the EGTC's activity on the Polish and Slovak side of the Tatras. | No priority issue has been determined. |
| EGTC Tritia | The facilitation and support of cross-border, transnational and interregional cooperation among its members in order to strengthen economic and social coherence, in particular by the implementation of the projects or programmes of territorial cooperation with the following objectives: 1. to facilitate everyday life for the citizens from the EGTC area; 2. to create cross-border coherence in the whole area; 3. to implement projects for joint and strategic development. | No priority issue has been determined. |
| EGTC Novum | The intensification, facilitation and dissemination of Polish-Czech cross-border cooperation to strengthen economic and social coherence in the EGTC area. | No priority issue has been determined. |

Source: own work based on the convention and statutes of EGTCs.

The economic situation of those EGTCs is difficult but it slowly stabilises. In 2014 the budget of this institution varied from PLN 52 593.40 to 279 203. The employment of personnel posed a problem. The EUWT Tritia employed all its staff (president, accounting officer, two project managers) part time. The EUWT SKT employed its personnel (accounting officer, lawyer, translator, IT specialist) based on the contract work. The EUWT Tatry could not employ two people based on the employment contract (its president and project manager) till 2015. It should be pointed out that employing personnel by an EGTC as a legal entity is one of the biggest barriers for all EGTCs in Europe.

### The detailed objectives and tasks of EGTCs

| No. | Objectives and tasks | EGTC SKT | EGTC Tatry | EGTC Tritia | *EGTC Novum* | *EGTC Trans-oderana* | Number of indications |
|---|---|---|---|---|---|---|---|
| 1. | research | + | + | - | + | + | 4 |
| 2. | security | - | + | + | + | + | 4 |
| 3. | water supply | - | + | + | + | - | 3 |
| 4. | education | + | + | + | + | + | 5 |
| 5. | energy | - | + | + | + | + | 4 |
| 6. | economy | + | - | + | - | + | 3 |
| 7. | cross-border trade | - | + | + | + | - | 3 |
| 8. | infrastructure | + | + | + | + | + | 5 |
| 9. | innovations | + | - | - | + | + | 3 |
| 10. | social integration | + | + | - | + | + | 4 |
| 11. | culture | - | + | + | + | + | 4 |
| 12. | lobbing | + | - | - | - | - | 1 |
| 13. | logistics | + | - | - | - | - | 1 |
| 14. | connecting cities and towns with villages | - | + | + | + | + | 4 |
| 15. | entrepreneurship | + | + | + | + | + | 5 |
| 16. | agriculture | - | - | - | - | + | 1 |
| 17. | technological change | + | + | - | + | - | 3 |
| 18. | labour market | + | + | + | + | + | 5 |
| 19. | sport | - | - | + | - | + | 2 |
| 20. | environment | + | + | + | + | + | 5 |
| 21. | transport | + | + | + | + | + | 5 |
| 22. | tourism | + | + | + | + | + | 5 |
| 23. | administrative cooperation | - | + | + | + | - | 3 |
| 24. | waste management | - | + | + | + | - | 3 |
| 25. | health | - | + | + | + | + | 4 |
| Total | | 14 | 19 | 18 | 20 | 18 | - |

Source: own work based on the convention and statutes of EGTCs.

## 6. National determinants

The EGTC activities are governed not only by the EU provisions but also by national provisions [Kusiak-Winter, 2011, pp. 55 – 90]. The rules of establishing EGTCs in Poland were stipulated in an act [Act of 2008]. It was decided that a State may join any EGTC (as one of its members). In this case only the consent of the Council of Ministers is required.

The procedure of joining an EGTC by local government units turned out to be more complex. First, the decision was made by the decision making body of that unit acting by the absolute majority of the statutory number of members. Next, the Minister in charge of foreign affairs gave his consent by a decision, after consultation with the relevant

Interior Minister, the Minister in charge of public funding and the Minister in charge of regional development, within 3 months from the day of obtaining the resolution or decision (Figure 5.).

The minister in charge of foreign affairs was obliged to keep the Register of the European groupings of territorial cooperation. The contents of the register was regulated by [Regulation 2009].

The registration of an EGTC was made by a person authorised by the members of such EGTC to conduct such activity by attaching:

1. the EGTC's convention and statute;
2. the resolutions or decisions of the EGTC's members on acceptance of the statute;
3. authorisation to conduct activities related to the EGTC's registration;
4. consent of each member to join the EGTC.

The EGTC's convention and statute as well as their amendments were announced in Monitor Sądowy i Gospodarczy free of charge. The announcement was made by the Minister in charge of foreign affairs.

The EGTC was obliged to submit an application to the Committee of the Regions within ten working days from the day of the registration or publication of its convention and statutes. The Committee of the Regions transferred that application to the Publications Office of the European Union in order to publish an announcement about establishing such EGTC in the Official Journal of the European Union, series C.

In 2013 Monitor Polski B was liquidated under the Act on the Reduction of Certain Obligations of Citizens and Businesses [2011]. In Poland the register kept by the Foreign Affairs Minister became an official source of information about EGTCs. There was no refusal to grant consent or register an EGTC by 2014.

In 2015 the Council of Ministers adopted assumptions for the bill on amending the Act on the European grouping of territorial cooperation submitted by the Minister of Infrastructure and Development [http://centrumprasowe.pap.pl/cp/en/news/info/ 24109„cir-obradowala-rada-ministrow%28komunikat%29;jsessionid=jyc+oGI2F58 dz9ZOxzHkiqkN.undefined (accessed: 15.04.2015)].

The rules of the EGTC establishment and operation were clarified and simplified. The proposed amends concern:

1. determining a more detailed procedure of EGTC establishment;
2. the way of joining an EGTC by Polish businesses operating for common good;
3. the implementation of so-called silent procedure (if no decision on giving consent to join an EGTC is issued within 6 months, this will mean the consent to its establishment);
4. specifying the rules of performance in case of amending basic internal documents of an EGTC;
5. the method of record keeping by EGTCs with its registered office in Poland;
6. the clarification of the rules of performance in case of dissolving an EGTC or the infringement of public interest by an EGTC.

FIGURE 5.

**The procedure of establishing an EGTC in Poland**

Passing a resolution by the decision making body of the local government unit by an absolute majority or decisions by a body governed by public law

→ DECISION ON ESTABLISHING AN EGTC

Submitting the resolution or the decision, the EGTC's convention and statute to the MFA (Ministry for Foreign Affairs)

→ APPROVAL OF THE DECISION ON JOINING THE EGTC

*EGTC with its registered office in Poland*

*EGTC with its registered office outside Poland*

Decision issued by the MFA after consultation with the MOI (Ministry of Interior), MOF (Ministry of Finance) and the Ministry of Regional Development

→ Entry into the EGTC register kept by the MFA

Registration in the country where the registered office of the EGTC is located

Acquisition of legal personality by the EGTC

→ Announcing the convention and statute in the Official Journal of Poland "Monitor Polski

Informing the MFA on establishing the EGTC

Registration in the Office for Official Publications of the European Communities

Publication of the announcement about establishing the EGTC in the Official Journal of the EU

Source: own work based on the information from the EGTC Tatry.

In Poland the key role in determining the role of an EGTC in the ETC managing programmes is played by the Ministry of Development and Infrastructure (former Ministry of Regional Development). According to the document of the Ministry of Regional Development entitled *The Programme of cross-border cooperation with the participation of Poland in the years 2014-2020* [2012]: *"Poland welcomes the use of EGTCs as institutions responsible for the implementation of the projects of territorial cooperation. Nevertheless, due to complicated EU provisions on EGTCs and the lack of experience in EGTC activities in Poland, in the years 2014-2020 Poland does not intend to give them a function of the Managing Authority of ETC programmes, but it will encourage to establish EGTCs in order to manage the implementation of such projects."*

## 7. European determinants

The EGTC activity is inseparably associated with cohesion policy. The EGTCs whose registered office is located in Poland were established too late to use fully the funds for the development of territorial cooperation during the period between 2006 and 2013. Taking into account the fact that in the period between 2014 and 2020 the European territorial cooperation became one of the two objectives of cohesion policy, the establishment of another EGTCs and the mobilization of the activities of existing EGTCs can be expected.

A new (EU) regulation of the European Parliament and the Council [No 1299/2013] on the European territorial cooperation gives a better control over the international context of the programmes and introduces more detailed provisions on the programmes of cooperation and activities. The need for third countries to be involved was pointed out "in order to reflect the specification of this cooperation". More systematic references to the role, which – in the context of cooperation – the European groupings of territorial cooperation (EGTCs) are to play, were included. A hundred and two programmes in total were provided for the implementation of the objectives and priorities of the European territorial cooperation, including:

1.  Interreg VA – 88 programmes, including 60 "internal borders" programmes, 12 "IPA" (Instrument for Pre-accession assistance) programmes, 16 "ENI" (European Neighbourhood Instrument) programmes;
2.  Interreg VB – 15 programmes;
3.  Interreg V C – 4 programmes (Interreg Europa, Interact, Urban, Espon).

In respect of the programmes of cross-border cooperation, the EU regions at NUTS 3 level along with all internal and external land borders have been supported. As for the transnational cooperation, the Commission established a list of transnational areas covering the regions at NUTS 2 level, ensuring continued cooperation in bigger and coherent areas, determined based on the previous programmes, including, if necessary, macroregional and marine strategies. The interregional cooperation covered the whole territory of the European Union.

The EGTC programmes dedicated to Poland were presented in Table 7, indicating simultaneously the EGTCs which can use an individual programme. The EGTCs are

eligible for financing from all the programmes of transnational and interregional cooperation, as well as from the selected programmes of cross-border cooperation.

**TABLE 7.**

**The programmes of European territorial cooperation dedicated to Poland in the years 2014-2020**

| Type of programme | Programme | Main priorities of the programme and symbols of investment priorities | The area covered by [NUTS 3] | | EGTCs which can use the programme |
|---|---|---|---|---|---|
| | | | In Poland | Abroad | |
| Cross-border | Poland - Slovak Republic 155 mill. EUR | 1. Environment (p. 6c) 2. Culture (p. 6c) 3. Transport (p. 7bc) 4. Education (p. 10b) | ***Subregions*** <u>Małopolska Province</u> 1. Krakowski 2. Nowosądecki 3. Oświęcimski <u>Silesia Province</u> 4. Bielski 5. Tyski <u>Podkarpackie Province</u> 6. Krośnieński 7. Przemyski 8. Rzeszowski | 1. Žilina Region 2. Prešov Region 3. Košice Region | 1. EGTC Tatry 2. EGTC Tritia |
| | Czech Republic - Poland 226 mill. EUR | 1. Safety (disaster preventions) p. 5) 2. Education (p. 10) 3. Labour market (p. 8) 4. Administrative cooperation (p. 11) | ***Subregions*** <u>Silesia Province</u> 1. Bielski 2. Rybnicki <u>Lower Silesia Province</u> 3. Jeleniogórski 4. Wałbrzyski <u>Opole Province</u> 5. Nyski 6. Opolski ***Districts*** <u>Lower Silesia Province</u> 7. Strzeliński <u>Silesia Province</u> 8. Pszczyński | 1. Liberec Region 2. Hradec Králové Region 3. Pardubice Region 4. Olomouc Region 5. Moravian-Silesian Region | EGTC Tritia EGTC Novum |
| | Poland-Saxony 70 mill. EUR | 1. Environment (p. 6c) 2. Culture (p. 6c) 3. Education (p. 10) 4. Transport (p. 7bc) 5. Administrative cooperation (p. 11) | ***Subregions*** <u>Lower Silesia Province</u> 1. Jeleniogórski ***Districts*** <u>Lubuskie Province</u> 2. Żarski | 1. Görlitz district 2. Bautzen district | |

| | | | | | |
|---|---|---|---|---|---|
| | Brandenburg-Poland<br>100 mill. EUR | 1. Administrative cooperation (p. 11)<br>2. Education (p. 10)<br>3. Environment (p. 6cd)<br>4. Culture (p. 6cd)<br>5. Transport (7.bc) | **Subregions**<br>Lubuskie Province<br>1. Gorzowski<br>2. Zielonogórski | 1. Märkisch-Oderland district<br>2. Oder-Spree district<br>3. Spree-Neiße district<br>4. the City of Frankfurt (Oder)<br>5. the City of Cottbus | EGTC Trans-oderana |
| | Mecklenburg-Western Pomerania-Brandenburg-Poland<br>134 mill. EUR | 1. Administrative cooperation (p. 11)<br>2. Education (p. 10)<br>3. Transport (7.b)<br>4. Environment (p. 6 cd)<br>5. Culture (p. 6c) | **Subregions:**<br>Western Pomerania Province<br>1. Koszaliński<br>2. Szczecinecko Pyrzycki<br>3. Szczeciński<br>4. the City of Szczecin | 1. Barnim district<br>2. Uckermark district<br>3. Märkisch-Oderland district<br>4. Vorpommern-Rügen district<br>5. Vorpommern-Greifswald district<br>6. Mecklenburgische Seenplatte district | |
| | Southern Baltic Sea<br>83 mill. EUR | 1. Entrepreneurship (p. 3bc)<br>2. Environment (p. 6 c)<br>3. Culture (p. 6c)<br>4. Waste management (p. 6f)<br>5. Transport (p. 7c)<br>6. Labour market (p. 8)<br>7. Administrative cooperation (p. 11) | **Subregions**<br>Western Pomerania Province<br>1. the City of Szczecin<br>2. Szczeciński<br>3. Stargardzki<br>4. Koszaliński<br>5. Gdański<br>Pomerania Province<br>6. Slupski,<br>7. Starogardzki,<br>8. Trójmiejski<br>9. Elbląski. | The coastal areas of Lithuania, Denmark, Sweden and Germany | |
| | Lithuania-Poland)<br>51.5 mill. EUR | 1. Environment (p. 6c)<br>2. Culture (p. 6c)<br>3. Labour market (p. 8)<br>4. Social integration (p. 9a)<br>5. Administrative cooperation (p. 11) | **Subregions**<br>Warmia-Mazuria Province<br>1. Elcki<br>Podlasie Province<br>2. Suwalski<br>3. Białostocki | 1. Alytus County<br>2. Marijampolė County<br>3. Kaunas County<br>4. Tauragė County<br>5. Vilnius County (without the City of Vilnius) | |

| Trans national | Baltic Sea Region 264 mill. EUR | 1. Research (p. 1ab) 2. Innovations (p. 1ab) 3. Technological change (p. 1ab) 4. Economy (p. 6g) 5. Environment (p. 6bg) 6. Transport (p. 7bc) 6. Administrative cooperation (p. 11) | The area of the whole country | Denmark, Sweden, Finland, Lithuania, Latvia, Estonia, Germany (selected regions), Norway, Belarus, Russia (selected regions) | All EGTCs |
|---|---|---|---|---|---|
| | Central Europe 246 mill. EUR | 1. Research (p. 1b) 2. Innovations (p. 1b) 3. Technological change (p. 1b) 4. Economy (p. 4e, 6ce) 5. Environment (p. 6ce) 6. Transport (p. 7bc) | The area of the whole country | Austria, Croatia, Czech Republic, Poland, Slovak Republic, Slovenia, Hungary, Germany (selected regions) Italy (selected regions) | All EGTCs |
| Inter regional | Interreg Europa 359 mill. EUR | 1. Research (p. 1ab) 2. Innovations (p. 1ab) 3. Technological change (p. 1ab) 4. Entrepreneurship (p. 3d) 5. Economy (p. 4e, 6g) 6. Environment (p. 6gc) 7. Culture (p. 6c) | The area of the whole country | European Union, Norway and Switzerland | All EGTCs |

Source: own work.

The compliance of the investment priorities of individual programmes with the objectives and tasks which the EGTCs included in their documents should be pointed out (Table 8.). It means that the EGTCs are well-prepared to absorb the funds from ETC programmes.

**TABLE 8.**

## The investment priorities of ETC programmes in view of the objectives and tasks of EGTCs

| Programme | EGTC SKT | EGTC Tatry | EGTC Tritia | EGTC Novum | EGTC Transoderana |
|---|---|---|---|---|---|
| Cross-border | | ***Poland - Slovak Republic Programme:***<br>1. Environment<br>2. Culture<br>3. Transport<br>4. Education | ***Poland – Slovak Republic Programme:***<br>1. Environment<br>2. Culture<br>3. Transport<br>4. Education<br><br>***Czech Republic – Poland Programme***<br>1. Safety – disaster prevention<br>2. Education<br>3. Labour market<br>4. Administrative cooperation | ***Czech Republic – Poland Programme***<br>1. Safety – disaster prevention<br>2. Education<br>3. Labour market<br>4. Administrative cooperation | ***Brandenburg-Poland Programme***<br>1. Administrative cooperation<br>2. Education<br>3. Environment<br>4. Culture<br>5. Transport |
| Transnational RMB Programme | 1. Research<br>2. Innovations<br>3. Development of technology<br>4. Economy<br>5. Environment<br>6. Transport<br>7. Administrative cooperation | 1. Research<br>2. Innovations<br>3. Development of technology<br>4. Economy<br>5. Environment<br>6. Transport<br>7. Administrative cooperation | 1. Research<br>2. Innovations<br>3. Development of technology<br>4. Economy<br>5. Environment<br>6. Transport<br>7. Administrative cooperation | 1. Research<br>2. Innovations<br>3. Development of technology<br>4. Economy<br>5. Environment<br>6. Transport<br>7. Administrative cooperation | 1. Research<br>2. Innovations<br>3. Development of technology<br>4. Economy<br>5. Environment<br>6. Transport<br>7. Administrative cooperation |
| Central Europe Transnational Programme | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Economy<br>5. Environment<br>6. Transport | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Economy<br>5. Environment<br>6. Transport | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Economy<br>5. Environment<br>6. Transport | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Economy<br>5. Environment<br>6. Transport | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Entrepreneur-ship<br>5. Environment<br>6. Transport |
| Inter regional Programme | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Entrepreneur-ship<br>5. Economy<br>6. Environment<br>7. Culture | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Entrepreneur-ship<br>5. Economy<br>6. Environment<br>7. Culture | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Entrepreneur-ship<br>5. Economy<br>6. Environment<br>7. Culture | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Entrepreneur-ship<br>5. Economy<br>6. Environment<br>7. Culture | 1. Research<br>2. Innovations<br>3. Technological change<br>4. Entrepreneur-ship<br>5. Economy<br>6. Environment<br>7. Culture |

Source: own work.

Connecting the ETC priorities with EGTC activities is one of the most important criteria of successful cohesion policy.

## 8. Conclusions

The EGTC is a pioneering but not fully working EU legal instrument. There are serious barriers both on the registration stage and on the stage of managing this institution. There is a lack of understanding of what an European grouping of territorial cooperation is, what characteristics it has and what role it should play, taking into account its cross-border identity. This issue concerns the institutions involved in the programmes of the European Cooperation at national, regional and local level.

It should be noted that the European Union intended to develop a new dimension of territorial cooperation. This new instrument has become an opportunity for regions and towns located in the border area. Soon, it will be possible to use the EGTC instrument in the cooperation with Russia, Ukraine and Belarus.

Practically, the position of the Polish EGTCs in view of EU regulations on EGTCs and the programmes of the European territorial cooperation has been marginalised. The establishment of an EGTC in Poland requires "to pave the way", convince law makers and dispel the doubts about its international status.

A considerable success has been already achieved thanks to the determination of the founders of EGTCs as well as their organisational and financial involvement. All the EGTCs have established efficient structures, clearly determined their objectives and tasks. They have drawn up or are drawing up their development strategies, including the use of EU funds. The first Polish EGTC, Tritia, is perceived as a "pioneering entity of cross-border relations" and a "model example of cooperation" [Adamczuk, 2014, p. 19].

National institutions still have a lot of power to limit the EGTC competencies. The government administration authorities must be convinced to gradually assign their rights to EGTCs in accordance with the intention of the European Union. The foreign policy of a country may facilitate the EGTC development if it results in removing barriers which still occur in relations with neighbouring states. In neighbouring states there is mistrust of EGTCs (in particular when the registered office is located in Poland).

It should be emphasised that despite the barriers which occur not only in Poland but in other countries, a new, promising system of transnational cooperation has been developed in Europe. When external conditions improve, it will allow for taking a significant step to achieve the most important ETC's objective, which is social and economic coherence in Europe.

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# USING SIPRES – A FUSION OF THE REVISED SIMOS' PROCEDURE AND ZAPROS – IN THE ROAD ROUTE SELECTION PROCESS

**Summary**

Road route decisions very frequently cause discussions and disagreement since they involve the number of stakeholders with competing interests. Before the construction of the road can start, the route for this road has to be determined, taking into account various facets, e.g. financial, technological, social and environmental ones. Such a situation can be described in the following way: the best possible choice must be made out of a finite set of alternatives (potential road routes) evaluated against a set of criteria. For this purpose different multi-criteria decision aiding methods can be used, e.g. a novel tool called SIPRES. Its algorithm combines the key elements of the revised Simos' procedure and the ZAPROS method. The method is transparent and easy to implement. On the one hand, it allows decision-makers to define their preferences simply and provides a straightforward but effective method for analysing the trade-offs between the alternatives using selected reference alternatives only (the ZAPROS-like approach). On the other hand, the revised Simos' procedure applied in the method allows determining the cardinal scores for the alternatives.

The purpose of this paper is to illustrate how the road route can be selected with the help of the SIPRES method, and to show thereby that this technique may be useful for solving such complex problems and may improve a decision-making process in certain situations.

**Key words**: road route selection, MCDA, SIPRES

**JEL**: C44, C65, R42

## 1. Introduction

Road construction is a complex project which consists of many stages. Before the construction can commence the courses of the proposed route solutions have to be identified and assessed taking into account many different issues, e.g. functional, technical, economic, environmental and social ones. In many instances, several alternatives of the road route are examined (sometimes even over a dozen or tens). Information collected during this stage is used to determine the location and type of the road to be built [Górecka, 2013, p. 24].

Since the selection of a given road investment alternative is connected with certain financial, transport, ecological and safety effects, it is necessary to support the decision-

making process with scientific approach. For typical economic and social impact assessment a widely used cost-benefit analysis (CBA) is sufficient. In other cases multi-criteria decision analysis (MCDA) can be applied [Budzyński, Kaszubowski, 2014, p. 2405]. A few examples of such applications are briefly described in Table 1.

Other approaches that can be helpful in the analysis of the road investment alternatives and in choosing the most preferred one are, e.g. control lists and histograms as well as map, network and indicator methods [see: *Podręcznik dobrych praktyk…*, 2008; Szafranko, 2014].

**TABLE 1.**

**Examples of MCDA applications in the road route selection process**

| No. | Application | Description (alternatives, criteria, approach) |
|-----|-------------|-----------------------------------------------|
| 1 | **Highway in the Kano area, Nigeria** [Sunusi et al., 2015] | This work presents a model developed by integrating Geographical Information System (GIS) with Analytic Hierarchy Process (AHP) and applies it to select an optimum highway alignment location which is economical and compatible with environment. The aim of this study was to locate a suitable Least Cost Path (LCP) between two points that would pass major towns of Kura, Modobi and Kabo Local Government Areas (LGA) within the area under study. Three route themes were considered, namely engineering, environmental and a hybrid theme, and the last one turned out to be the shortest, the most economical and suitable. |
| 2 | **East ring road of Warsaw, Poland** [*Określenie przebiegu…*, 2015] | In this technical, economic and environmental study sixteen alternatives (eight basic ones and eight ones taking into account sub-alternative solutions) were considered. They were assessed using fourteen criteria, e.g. noise, destruction of habitats, number of wells in the area influenced by the project, nuisance of construction works, distance from Nature 2000 Training Ground Rembertów and level of acceptance by self-governments. Analytic Hierarchy Process (AHP) was applied to build a ranking of the alternatives considered. |
| 3 | **Ring road of Malbork city, Poland** [Budzyński, Kaszubowski, 2014] | In the paper four alternatives of the Malbork orbital road were considered. Following criteria were taken into account in their evaluation: technology, transport, safety, environment, complementarity and the land availability. A two-step approach was used to select the most appropriate route: firstly, Analytic Network Process (ANP) was applied to determine the weights of the criteria, and secondly, the weights were transferred to the Analytic Hierarchy Process (AHP) to construct a ranking of the alternatives considered. |

| 4 | **Highway in Sinai Peninsula, Egypt** [Effat, Hassan, 2013] | In this paper Geographic Information System (GIS) tools were used to develop the least-cost path for a corridor to link three cities in a desert environment of Sinai Peninsula. Environmental and economic factors were integrated through a spatial multi-criteria model using Analytic Hierarchy Process (AHP). Three visions (routes) were taken into account: an engineering vision, an environmental vision and a hybrid one. A multi-criteria evaluation was used to compare these three routes and the hybrid route was finally recommended. |
|---|---|---|
| 5 | **E-763 highway entrance into Belgrade, Serbia** [Marković et al., 2013] | The subject of the analysis in this paper is the evaluation of two alternatives of the preliminary design of E-763 highway entrance into Belgrade by either the right or the left bank of the Sava River. In the assessment of these two potential solutions twenty criteria were taken into account and the ranking of the alternatives considered was obtained using VIKOR and PROMETHEE II methods. |
| 6 | **Road X, Somewhere** [Górecka, 2013] | Article presents the possibility of using multi-criteria decision aiding methods based on the outranking relation from ELECTRE and PROMETHEE families as well as methods belonging to the verbal decision analysis framework in the analysis regarding drafting of a road route. Input data, i.e. evaluations of five alternatives and weights of criteria, comes from [Biruk et al., 2007]. In the assessment of the route solutions the following four criteria are taken into consideration: cost of realization, vehicle's average travel time, impact on the environment and safety of the travellers. |
| 7 | **Expressway 'Via Baltica', Poland** [Jastrzębski, Kaliszewski, 2011] | Study is focused on a real-life problem of choosing the most appropriate route for the expressway 'Via Baltica' from the Lithuanian border to Warsaw [see: *Strategia rozwoju…* 2008]. Forty routes evaluated from the point of view of four criteria (traffic network criterion as well as economic, social and environmental ones) were considered in the article. Solver in Excel and the weighted Chebyshev function were used to find Pareto effective alternatives for the specified weights of the criteria. For selecting the most preferable route the use of an appropriate filter (e.g. cut-off values for the evaluations of the alternatives) within the mechanism of finding effective alternatives was suggested. |
| 8 | **Dublin port motorway, Ireland** [Rogers, Bruen, 2000] | This paper describes a practical application of the ELECTRE III method to ranking the various project options considered in a preliminary environmental evaluation conducted on the Port Access and Eastern Relief Route (PAERR) – a motorway proposed for Dublin City. |

| 9 | **Expressway S6 (Lębork – Tricity ring road), Poland** [*Wybór wariantu…*] | In this study the Analytic Hierarchy Process (AHP) was applied to select the most preferred road route from the environmental point of view. Eleven alternatives were considered, evaluated and compared using twelve criteria, e.g. noise, collision with protected species of plants, impact on protected species of animals, collision with the main ecological corridors, nuisance of construction works, impact on underground water, impact on soil and impact on material assets. |
| --- | --- | --- |
| 10 | **Expressway S19, Poland** [*Raport o oddziaływaniu…*] | In this study the Analytic Hierarchy Process (AHP) was applied to select the most environmentally preferred road route for the expressway S19 from the border of Lublin and Subcarpathian Voivodeships to Sokolów Malopolski. Analysis was conducted separately for two parts of the expressway. In the case of the first part five alternatives were evaluated with respect to fifteen criteria. For the second part eight alternatives were assessed using nineteen criteria. |

Source: own elaboration, [Budzyński, Kaszubowski, 2014; Effat, Hassan, 2013; Jastrzębski, Kaliszewski, 2011; Marković et al., 2013; *Określenie przebiegu…*, 2015; Rogers, Bruen, 2000; *Raport o oddziaływaniu…*; *Wybór wariantu…*; Sunusi et al., 2015].

When it comes to MCDA methods, in the road route selection process AHP [Saaty, 2006; Saaty, Vargas, 1991] is frequently used (see: Table 1.). It is also recommended in document entitled *Podręcznik dobrych praktyk wykonywania opracowań środowiskowych dla dróg krajowych* [2008] in Poland, especially for choosing localization alternatives and environmental protection devices. According to this document, it can also be used in the selection process of technological and organizational alternatives as well as for environmental compensation [*Podręcznik dobrych praktyk…*, 2008, p. 164]. Unfortunately, if the number of alternatives and/or criteria is high, then pair-wise comparisons on which AHP is based, may be really tedious and difficult for decision-makers (since large number of elements decreases the consistency of the comparisons conducted). In such a situation a recently developed technique called SIPRES [Górecka, 2015] can be applied. It has the following advantages: it allows decision-makers to define their preferences qualitatively, in a simple and effortless way, and it allows determining the cardinal scores for the alternatives.

The aim of this paper is to bring the SIPRES method closer to potential users and to show its usefulness in supporting decision-makers in the road route selection process. The article consists of an introduction, a conclusion and two sections. In the first section the SIPRES algorithm is described. The second section provides an illustrative example concerning the eco-challenging problem of a route selection for a road.

## 2. Overview of the SIPRES method

The acronym SIPRES stands for: **Si**mos' **p**rocedure for **Re**ference **S**ituations. It is based on two methods: revised Simos' procedure [Figueira, Roy, 2002] and ZAPROS

[Larichev, Moshkovich, 1995], and aims at obtaining a complete ranking of the alternatives with scores measured on a cardinal scale. The SIPRES method was introduced in 2015 [Górecka, 2015] as a continuation of the works on a tool for the verbal evaluation of the negotiation template connected with the MARS approach [see: Górecka et al., 2014; Górecka et al., 2016]. Based on the original paper, in which two baseline methods were also presented, a detailed description of the SIPRES algorithm is given below.

Let $F = \{f_1, f_2,..., f_n\}$ be a finite set of $n$ evaluation criteria; $X_k$ – a finite set of possible verbal values on the scale of criterion $k = 1,2,...,n$, where $|X_k| = n_k$;

$X = \prod_{k=1}^{n} X_k$ is the set of all possible vectors in the decision space of n criteria; and

$A = \{a_1, a_2,..., a_m\} \subseteq X$ is a subset of $X$ describing the alternatives considered.

The SIPRES procedure consists of the following steps:
1.   We determine the evaluation scale for each criterion considered in the decision-making problem.
2.   We prepare a set of blank cards and a set of cards with hypothetical alternatives (each with the best evaluation for all the criteria but one) as well as the ideal and anti-ideal reference vectors (with the best and the worst evaluations for all the criteria, respectively) and rank them from the worst to the best one.
3.   We introduce blank cards between two successive cards if necessary. The greater the difference between the evaluations of the alternatives, the greater the number of blank cards:
     a)   no blank card means that the alternatives do not have the same evaluation and that the difference between the evaluations is equal to one unit $u$ used for measuring the intervals between evaluations,
     b)   one blank card means a difference of two units, two blank cards mean a difference of three units, etc.
4.   We determine how many times the best alternative is better than the worst one in the ranking.
5.   We process the information obtained as in the revised Simos' procedure in order to obtain the normalized scores for the elements compared, i.e. to form the Joint Cardinal Scale (JCS).
6.   We substitute the evaluations in each vector describing the alternative considered in the decision-making problem by the corresponding scores from the JCS. For each alternative we define the distance from the ideal alternative using the formula:

$$L_i = \sum_{k=1}^{n} \left( p_k^{\max} - p_{ik} \right) \tag{1}$$

where $p_{ik}$ is the score from the JCS substituting the assessment of alternative $a_i$ according to criterion $f_k$ and $p_k^{\max}$ is the score for the best possible assessment for a given criterion.

7.   We construct the complete final ranking of the alternatives according to the distance values $L_i$ in ascending order.

Processing the information in the way described in the revised Simos' procedure (mentioned in point 5 above) is as follows [Figueira, Roy, 2002, pp. 322-323]:

1.   Let $n^*$ be the number of positions in the ranking, $e'_r$ – the number of blank cards between the positions $r$ and $r+1$, and $z$ – the ratio showing how many times the best element in the ranking is better than the worst one. We calculate:

$$e_r = 1 + e'_r \quad \forall r = 1,...,n^* - 1 \tag{2}$$

$$e = \sum_{r=1}^{n^*-1} e_r \tag{3}$$

$$u = \frac{z-1}{e} \tag{4}$$

retaining six decimal places for $u$. Subsequently, we determine the non-normalized score $p(r)$ for each position in the ranking:

$$p(r) = 1 + u \cdot (e_0 + ... + e_{r-1}) \tag{5}$$

where $e_0 = 0$.

We round these scores to two decimal places. If there are several elements in the same position $r$, all of them obtain the same score $p(r)$.

2.   Let $g_k$ be an element in the position $r$, and $p'_k$ – the non-normalized score of this element, $p'_k = p(r)$. We calculate:

$$P' = \sum_{k=1}^{n} p'_k \tag{6}$$

$$p^*_k = \frac{100 \cdot p'_k}{P'} \tag{7}$$

Subsequently, we determine $p''_k$ by deleting some of the decimal digits from $p^*_k$. Let $s$ be the number of decimal places taken into account. We compute:

$$P'' = \sum_{k=1}^{n} p''_k \leq 100 \tag{8}$$

$$\varepsilon = 100 - P'' \leq 10^{-s} \cdot n \tag{9}$$

$$v = 10^s \cdot \varepsilon \tag{10}$$

Finally, we set $p_k = p_k'' + 10^{-s}$ for $v$ suitably selected elements and $p_k = p_k''$ for

the other $n - v$ elements. We obtain $\sum_{k=1}^{n} p_k = 100$, where $p_k$ is the normalized

score of the element $g_k$, with the required number of decimal places.

The choice of the $v$ elements, whose scores will be rounded, is performed using the following algorithm [Figueira, Roy, 2002, pp. 323-324]:

1.    For each element $g_k$ we determine the ratios:

$$d_k = \frac{10^{-s} - (p_k^* - p_k'')}{p_k^*} \tag{11}$$

$$d_k^* = \frac{(p_k^* - p_k'')}{p_k^*} \tag{12}$$

2.    We create two lists, $R$ and $R^*$ :
      –     the $R$ list, consisting of the pairs $(k, d_k)$ sorted in the ascending order of $d_k$,
      –     the $R^*$ list, consisting of the pairs $(k, d_k^*)$ sorted in the descending order of $d_k^*$.

3.    We set $M = \{k : d_k > d_k^*\}$, $|M| = m$.

4.    We partition the set of $n$ elements into two subsets: $F^+$ and $F^-$, where $|F^+| = v$ and $|F^-| = n - v$, as follows:

      –     if $m + v \leq n$, then $F^-$ consists of the $m$ elements of $M$ and the last $n - v - m$ elements of $R^*$ which are not in $M$; while $F^+$ consists of the first $v$ elements of $R^*$ which are not in $M$;
      –     if $m + v > n$, then $F^+$ consists of the $n - m$ elements not belonging to $M$ and the first $v + m - n$ elements of $R$ which are in $M$; while $F^-$ consists of the last $n - v$ elements of $R$ which are in $M$.

The key characteristics of the SIPRES approach are summarized below.

TABLE 2.

**SIPRES approach – summary**

| Application |
|---|
| Designed to elicit a sound preference relationship that can be applied to future cases; especially useful in the case of decision-making problems with mostly qualitative parameters and no objective model for their aggregation |
| **Decision-making problem** |
| More oriented to tasks with a fairly large number of alternatives, while the number of criteria is usually relatively smaller |
| **Decision-makers** |
| Does not require any special knowledge of decision analysis from the decision-makers; allows decision-makers to define their preferences in a simple and user-friendly way |
| **Methodology** |
| Combines the key elements of revised Simos' procedure and ZAPROS method to construct universal decision rules in the criteria space and then use them on any set of actual alternatives |

Source: own elaboration.

## 3. Illustrative example

The present study illustrates the application of the SIPRES method in transport planning decision-making. Its usefulness for decision aiding processes connected with route selection will be demonstrated by an example which concerns the problem of choosing the most environmentally preferred alternative of the road construction out of twenty five that have been identified at the stage of drawing up the project concept.

Let us assume that in this eco-challenging problem the following issues are discussed and taken into account in the alternatives' assessment:

- $f_1$ – negative project's impact on the inhabitants (noise, clearance of buildings, drinking water contamination),
- $f_2$ – negative project's impact on the monuments and historical treasures (churches and chapels endangered, noise),
- $f_3$ – negative project's impact on the landscape (endangered beauty spots, road slopes, areas visible from the road),
- $f_4$ – negative project's impact on the environment (endangered trees, endangered habitats, intersections with the protected areas, endangered birds species from the Birds Directive, endangered plant species that are under strict protection).

Evaluation scales for all the criteria considered have been defined linguistically. They are presented in Table 3. Table 4 provides the performance matrix for the twenty five potential routes considered and the four criteria used to evaluate them.

TABLE 3.

## Criteria and scales for route selection

| Criterion | | Evaluation scale |
|---|---|---|
| $f_1$ | Negative project's impact on the inhabitants | L1. Lack |
| | | W1. Weak |
| | | M1. Moderate |
| | | S1. Strong |
| | | E1. Extreme |
| $f_2$ | Negative project's impact on the monuments and historical treasures | L2. Lack |
| | | W2. Weak |
| | | M2. Moderate |
| | | S2. Strong |
| $f_3$ | Negative project's impact on the landscape | L3. Lack |
| | | W3. Weak |
| | | M3. Moderate |
| | | S3. Strong |
| $f_4$ | Negative project's impact on the environment | L4. Lack |
| | | W4. Weak |
| | | M4. Moderate |
| | | S4. Strong |
| | | E4. Extreme |

Source: own elaboration.

TABLE 4.

## Evaluations of the alternatives considered in the illustrative example

| Alternatives | Criteria | | | |
|---|---|---|---|---|
| | $f_1$ | $f_2$ | $f_3$ | $f_4$ |
| $a_1$ | W1 | W2 | L3 | W4 |
| $a_2$ | L1 | M2 | L3 | M4 |
| $a_3$ | W1 | W2 | M3 | L4 |
| $a_4$ | W1 | L2 | W3 | L4 |
| $a_5$ | M1 | W2 | L3 | W4 |
| $a_6$ | M1 | W2 | W3 | L4 |
| $a_7$ | M1 | L2 | M3 | L4 |
| $a_8$ | L1 | W2 | S3 | L4 |
| $a_9$ | W1 | W2 | L3 | L4 |
| $a_{10}$ | L1 | W2 | W3 | L4 |
| $a_{11}$ | M1 | L2 | W3 | L4 |
| $a_{12}$ | W1 | L2 | L3 | W4 |
| $a_{13}$ | L1 | M2 | W3 | W4 |
| $a_{14}$ | M1 | W2 | L3 | L4 |
| $a_{15}$ | L1 | W2 | L3 | W4 |
| $a_{16}$ | L1 | M2 | L3 | W4 |
| $a_{17}$ | L1 | W2 | M3 | L4 |
| $a_{18}$ | W1 | M2 | L3 | L4 |
| $a_{19}$ | W1 | W2 | W3 | L4 |
| $a_{20}$ | L1 | M2 | W3 | L4 |
| $a_{21}$ | E1 | L2 | W3 | L4 |
| $a_{22}$ | W1 | L2 | L3 | M4 |
| $a_{23}$ | W1 | W2 | L3 | M4 |
| $a_{24}$ | S1 | L2 | W3 | L4 |
| $a_{25}$ | L1 | L2 | W3 | S4 |

Source: own elaboration.

Table 5 presents the ranking of cards with hypothetical alternatives, determined by the decision-maker in accordance with steps 2 and 3 of the SIPRES algorithm. The ranking includes the alternatives with the best evaluations for all the criteria but one along with the ideal and anti-ideal alternatives. Additionally, the information required by step 4 of the algorithm is provided on how many times, in the decision-maker's opinion, the best alternative is better than the worst one.

**TABLE 5.**
**Decision-maker's preferences based on the card play procedure**

| E1 | S2 | S3 | E4 | |
|----|----|----|----|----|
| 10 blank cards | | | | |
| L1 | L2 | L3 | E4 | |
| E1 | L2 | L3 | L4 | |
| 1 blank card | | | | |
| L1 | L2 | L3 | S4 | |
| S1 | L2 | L3 | L4 | |
| 1 blank card | | | | |
| L1 | L2 | S3 | L4 | |
| L1 | S2 | L3 | L4 | |
| 2 blank cards | | | | According to decision-maker [L1, L2, L3, L4] is 25 times better than [E1, S2, S3, E4] |
| L1 | L2 | L3 | M4 | |
| M1 | L2 | L3 | L4 | |
| 1 blank card | | | | |
| L1 | L2 | M3 | L4 | |
| L1 | M2 | L3 | L4 | |
| 1 blank card | | | | |
| L1 | L2 | L3 | W4 | |
| W1 | L2 | L3 | L4 | |
| 1 blank card | | | | |
| L1 | W2 | L3 | L4 | |
| L1 | L2 | W3 | L4 | |
| 2 blank cards | | | | |
| L1 | L2 | L3 | L4 | |

Source: own elaboration.

Following step 5 of the algorithm, the information on decision-maker's preferences is processed to obtain the normalized scores for the elements compared, i.e. to form the Joint Cardinal Scale (JCS). The calculations conducted are shown in Tables 6-8.

**Determining the non-normalized scores of the hypothetical alternatives (z=25)**

| Position r | Alternatives in the position r | | | | Number of blank cards between the positions r and r+1 | e_r | Non-normalized scores p(r) rounded to 2 decimal places |
|---|---|---|---|---|---|---|---|
| | f₁ | f₂ | f₃ | f₄ | | | |
| 1 | E1 | S2 | S3 | E4 | 10 | 11 | 1.00 |
| 2 | L1 | L2 | L3 | E4 | 0 | 1 | 8.76 |
| 3 | E1 | L2 | L3 | L4 | 1 | 2 | 9.47 |
| 4 | L1 | L2 | L3 | S4 | 0 | 1 | 10.88 |
| 5 | S1 | L2 | L3 | L4 | 1 | 2 | 11.59 |
| 6 | L1 | L2 | S3 | L4 | 0 | 1 | 13.00 |
| 7 | L1 | S2 | L3 | L4 | 2 | 3 | 13.71 |
| 8 | L1 | L2 | L3 | M4 | 0 | 1 | 15.82 |
| 9 | M1 | L2 | L3 | L4 | 1 | 2 | 16.53 |
| 10 | L1 | L2 | M3 | L4 | 0 | 1 | 17.94 |
| 11 | L1 | M2 | L3 | L4 | 1 | 2 | 18.65 |
| 12 | L1 | L2 | L3 | W4 | 0 | 1 | 20.06 |
| 13 | W1 | L2 | L3 | L4 | 1 | 2 | 20.76 |
| 14 | L1 | W2 | L3 | L4 | 0 | 1 | 22.18 |
| 15 | L1 | L2 | W3 | L4 | 2 | 3 | 22.88 |
| 16 | L1 | L2 | L3 | L4 | | | 25.00 |
| | | | | | 19 | 34 | 248.23 |

Source: own elaboration.

**Determining the normalized scores of the hypothetical alternatives (s=2, z=25)**

| Position r | Alternatives in the position r | | | | p_k* | p_k" | d_k | d_k* | Set M | p_k |
|---|---|---|---|---|---|---|---|---|---|---|
| | f₁ | f₂ | f₃ | f₄ | | | | | | |
| 1 | E1 | S2 | S3 | E4 | 0.402852 | 0.40 | 0.017743 | 0.007080 | (M) | 0.40 |
| 2 | L1 | L2 | L3 | E4 | 3.528985 | 3.52 | 0.000288 | 0.002546 | | 3.53 |
| 3 | E1 | L2 | L3 | L4 | 3.815010 | 3.81 | 0.001308 | 0.001313 | | 3.82 |
| 4 | L1 | L2 | L3 | S4 | 4.383032 | 4.38 | 0.001590 | 0.000692 | (M) | 4.38 |
| 5 | S1 | L2 | L3 | L4 | 4.669057 | 4.66 | 0.000202 | 0.001940 | | 4.67 |
| 6 | L1 | L2 | S3 | L4 | 5.237079 | 5.23 | 0.000558 | 0.001352 | | 5.24 |
| 7 | L1 | S2 | L3 | L4 | 5.523104 | 5.52 | 0.001249 | 0.000562 | (M) | 5.52 |
| 8 | L1 | L2 | L3 | M4 | 6.373122 | 6.37 | 0.001079 | 0.000490 | (M) | 6.37 |
| 9 | M1 | L2 | L3 | L4 | 6.659147 | 6.65 | 0.000128 | 0.001374 | | 6.66 |
| 10 | L1 | L2 | M3 | L4 | 7.227168 | 7.22 | 0.000392 | 0.000992 | | 7.23 |
| 11 | L1 | M2 | L3 | L4 | 7.513193 | 7.51 | 0.000906 | 0.000425 | (M) | 7.51 |
| 12 | L1 | L2 | L3 | W4 | 8.081215 | 8.08 | 0.001087 | 0.000150 | (M) | 8.08 |
| 13 | W1 | L2 | L3 | L4 | 8.363212 | 8.36 | 0.000812 | 0.000384 | (M) | 8.36 |
| 14 | L1 | W2 | L3 | L4 | 8.935262 | 8.93 | 0.000530 | 0.000589 | | 8.94 |
| 15 | L1 | L2 | W3 | L4 | 9.217258 | 9.21 | 0.000297 | 0.000787 | | 9.22 |
| 16 | L1 | L2 | L3 | L4 | 10.071305 | 10.07 | 0.000863 | 0.000130 | (M) | 10.07 |
| Sum | | | | | 100 | 99.92 | | | | 100 |

Source: own elaboration.

TABLE 8.

**R and R* lists (s=2, v=8, m=8, n=16)**

| | List R | | | | | | List R* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **r** | **Alternatives** | | | | **d_k** | **r** | **Alternatives** | | | | **d_k*** |
| | **f₁** | **f₂** | **f₃** | **f₄** | | | **f₁** | **f₂** | **f₃** | **f₄** | |
| 9 | M1 | L2 | L3 | L4 | 0.000128 | 1 | E1 | S2 | S3 | E4 | 0.007080 |
| 5 | S1 | L2 | L3 | L4 | 0.000202 | 2 | L1 | L2 | L3 | E4 | 0.002546 |
| 2 | L1 | L2 | L3 | E4 | 0.000288 | 5 | S1 | L2 | L3 | L4 | 0.001940 |
| 15 | L1 | L2 | W3 | L4 | 0.000297 | 9 | M1 | L2 | L3 | L4 | 0.001374 |
| 10 | L1 | L2 | M3 | L4 | 0.000392 | 6 | L1 | L2 | S3 | L4 | 0.001352 |
| 14 | L1 | W2 | L3 | L4 | 0.000530 | 3 | E1 | L2 | L3 | L4 | 0.001313 |
| 6 | L1 | L2 | S3 | L4 | 0.000558 | 10 | L1 | L2 | M3 | L4 | 0.000992 |
| 13 | W1 | L2 | L3 | L4 | 0.000812 | 15 | L1 | L2 | W3 | L4 | 0.000787 |
| 16 | L1 | L2 | L3 | L4 | 0.000863 | 4 | L1 | L2 | L3 | S4 | 0.000692 |
| 11 | L1 | M2 | L3 | L4 | 0.000906 | 14 | L1 | W2 | L3 | L4 | 0.000589 |
| 8 | L1 | L2 | L3 | M4 | 0.001079 | 7 | L1 | S2 | L3 | L4 | 0.000562 |
| 12 | L1 | L2 | L3 | W4 | 0.001087 | 8 | L1 | L2 | L3 | M4 | 0.000490 |
| 7 | L1 | S2 | L3 | L4 | 0.001249 | 11 | L1 | M2 | L3 | L4 | 0.000425 |
| 3 | E1 | L2 | L3 | L4 | 0.001308 | 13 | W1 | L2 | L3 | L4 | 0.000384 |
| 4 | L1 | L2 | L3 | S4 | 0.001590 | 12 | L1 | L2 | L3 | W4 | 0.000150 |
| 1 | E1 | S2 | S3 | E4 | 0.017743 | 16 | L1 | L2 | L3 | L4 | 0.000130 |
| **F⁺={2, 5, 9, 6, 3, 10, 15, 14};  F⁻={1, 4, 7, 8, 11, 12, 13, 16}** | | | | | | | | | | | |

Source: own elaboration.

Tables 9 and 10 present the normalized scores for the hypothetical reference alternatives and the Joint Cardinal Scale respectively. The normalized scores reflect the scale of concessions required, when the ideal alternative is replaced by the alternative under consideration.

TABLE 9.

**Normalized scores of the hypothetical alternatives**

| Alternatives | | | | **p_k** |
|---|---|---|---|---|
| **f₁** | **f₂** | **f₃** | **f₄** | |
| E1 | S2 | S3 | E4 | 0.40 |
| L1 | L2 | L3 | **E4** | 3.53 |
| **E1** | L2 | L3 | L4 | 3.82 |
| L1 | L2 | L3 | **S4** | 4.38 |
| **S1** | L2 | L3 | L4 | 4.67 |
| L1 | L2 | **S3** | L4 | 5.24 |
| L1 | **S2** | L3 | L4 | 5.52 |
| L1 | L2 | L3 | **M4** | 6.37 |
| **M1** | L2 | L3 | L4 | 6.66 |
| L1 | L2 | **M3** | L4 | 7.23 |
| L1 | **M2** | L3 | L4 | 7.51 |
| L1 | L2 | L3 | **W4** | 8.08 |
| **W1** | L2 | L3 | L4 | 8.36 |
| L1 | **W2** | L3 | L4 | 8.94 |
| L1 | L2 | **W3** | L4 | 9.22 |
| **L1** | **L2** | **L3** | **L4** | 10.07 |

Source: own elaboration.

**Joint Cardinal Scale**

| JCS | |
|---|---|
| Evaluation $f_k(a_i)$ | Score |
| E4 | 3.53 |
| E1 | 3.82 |
| S4 | 4.38 |
| S1 | 4.67 |
| S3 | 5.24 |
| S2 | 5.52 |
| M4 | 6.37 |
| M1 | 6.66 |
| M3 | 7.23 |
| M2 | 7.51 |
| W4 | 8.08 |
| W1 | 8.36 |
| W2 | 8.94 |
| W3 | 9.22 |
| L1 | 10.07 |
| L2 | 10.07 |
| L3 | 10.07 |
| L4 | 10.07 |

Source: own elaboration.

Following step 6 of the SIPRES algorithm we substitute the evaluations in each vector describing the alternative by the corresponding scores from the JCS. For each alternative we define the distance from the ideal alternative and on this basis we build the ranking of the alternatives. The distances to the ideal alternative for each alternative considered as well as their ranks are given in Table 11.

Taking into account preferences determined by the decision-maker the most environmentally friendly road route is alternative $a_{10}$. Straight after it, on the second and on the third place respectively, are alternatives $a_4$ and $a_9$. In turn, the worst alternative from the ecological point of view is alternative $a_{21}$.

TABLE 11.
**Alternatives considered, their distances to the ideal alternative and ranks**

| $a_i$ | Criterion value | | | | Score | | | | Distance $L_i$ | Rank |
|-------|------|------|------|------|------|------|------|------|------|------|
|       | $f_1$ | $f_2$ | $f_3$ | $f_4$ | $p_{i1}$ | $p_{i2}$ | $p_{i3}$ | $p_{i4}$ | | |
| $a_{10}$ | L1 | W2 | W3 | L4 | 10.07 | 8.94 | 9.22 | 10.07 | 1.98 | 1 |
| $a_4$ | W1 | L2 | W3 | L4 | 8.36 | 10.07 | 9.22 | 10.07 | 2.56 | 2 |
| $a_9$ | W1 | W2 | L3 | L4 | 8.36 | 8.94 | 10.07 | 10.07 | 2.84 | 3 |
| $a_{15}$ | L1 | W2 | L3 | W4 | 10.07 | 8.94 | 10.07 | 8.08 | 3.12 | 4 |
| $a_{20}$ | L1 | M2 | W3 | L4 | 10.07 | 7.51 | 9.22 | 10.07 | 3.41 | 5 |
| $a_{19}$ | W1 | W2 | W3 | L4 | 8.36 | 8.94 | 9.22 | 10.07 | 3.69 | 6 |
| $a_{12}$ | W1 | L2 | L3 | W4 | 8.36 | 10.07 | 10.07 | 8.08 | 3.70 | 7 |
| $a_{17}$ | L1 | W2 | M3 | L4 | 10.07 | 8.94 | 7.23 | 10.07 | 3.97 | 8 |
| $a_{11}$ | M1 | L2 | W3 | L4 | 6.66 | 10.07 | 9.22 | 10.07 | 4.26 | 9 |
| $a_{18}$ | W1 | M2 | L3 | L4 | 8.36 | 7.51 | 10.07 | 10.07 | 4.27 | 10 |
| $a_{14}$ | M1 | W2 | L3 | L4 | 6.66 | 8.94 | 10.07 | 10.07 | 4.54 | 11 |
| $a_{16}$ | L1 | M2 | L3 | W4 | 10.07 | 7.51 | 10.07 | 8.08 | 4.55 | 12 |
| $a_1$ | W1 | W2 | L3 | W4 | 8.36 | 8.94 | 10.07 | 8.08 | 4.83 | 13 |
| $a_6$ | M1 | W2 | W3 | L4 | 6.66 | 8.94 | 9.22 | 10.07 | 5.39 | 14 |
| $a_{13}$ | L1 | M2 | W3 | W4 | 10.07 | 7.51 | 9.22 | 8.08 | 5.40 | 15 |
| $a_{22}$ | W1 | L2 | L3 | M4 | 8.36 | 10.07 | 10.07 | 6.37 | 5.41 | 16 |
| $a_3$ | W1 | W2 | M3 | L4 | 8.36 | 8.94 | 7.23 | 10.07 | 5.68 | 17 |
| $a_8$ | L1 | W2 | S3 | L4 | 10.07 | 8.94 | 5.24 | 10.07 | 5.96 | 18 |
| $a_7$ | M1 | L2 | M3 | L4 | 6.66 | 10.07 | 7.23 | 10.07 | 6.25 | 19.5 |
| $a_{24}$ | S1 | L2 | W3 | L4 | 4.67 | 10.07 | 9.22 | 10.07 | 6.25 | |
| $a_2$ | L1 | M2 | L3 | M4 | 10.07 | 7.51 | 10.07 | 6.37 | 6.26 | 21 |
| $a_5$ | M1 | W2 | L3 | W4 | 6.66 | 8.94 | 10.07 | 8.08 | 6.53 | 22 |
| $a_{25}$ | L1 | L2 | W3 | S4 | 10.07 | 10.07 | 9.22 | 4.38 | 6.54 | 23.5 |
| $a_{23}$ | W1 | W2 | L3 | M4 | 8.36 | 8.94 | 10.07 | 6.37 | 6.54 | |
| $a_{21}$ | E1 | L2 | W3 | L4 | 3.82 | 10.07 | 9.22 | 10.07 | 7.10 | 25 |

Source: own elaboration.

## 4. Conclusions

The SIPRES method presented in this article is an uncomplicated and functional technique that can improve the road route selection process, especially when the number of alternatives considered is large. In such a situation it is much less laborious and time-consuming than frequently used AHP.

Furthermore, this simple method requires the decision-makers to supply the basic preferential information only – they are able to operate with an intuitively interpreted card tool when defining preferences. Thanks to this technique we are able to determine the cardinal scale for the alternatives and build their ranking, in which no two alternatives will be incomparable.

Finally, it should be remembered that the applications of the SIPRES method are not limited to the complex transportation problems connected with the road route selection. It can be also applied in negotiation support to build a negotiation offers scoring system

as well as in policy-making, strategic planning, R&D project selection and human resource management to order alternatives considered or to select the best one.

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# THE SYNTHETIC MEASURE OF THE LEVEL OF SMART GROWTH IN THE EUROPEAN UNION COUNTRIES

### Summary

The issue of smart growth is a relatively new one, yet it has already been discussed by a few authors. According to the definition proposed by the European Commission, smart growth it is growth based on two pillars: knowledge and innovation. Smart growth is difficult to measure due to its complexity, multidimensionality, unobservability. The aim of the paper is construction of the synthetic measure of the level of smart growth. The research focuses on the 28 European Union countries in 2013.

**Key words**: smart growth, Europe 2020 strategy, European Union, Hellwig's synthetic measure of development

**JEL**: C38, O11

## 1. Introduction

Recent years have witnessed numerous changes in economic theories, especially with reference to the following concepts [Piech, 2009, pp. x-xi]:

– information society, i.e. the one which uses teleinformation technologies intensively,
– knowledge-based economy (KBE), including 'the new economy' (teleinformation technologies it promotes), issues in education (knowledge society), as well as innovation systems, and the institutional system, which is considered indispensable for the development of the above-mentioned elements.

These concepts were emphasized in the EU programmes such as the Lisbon Strategy and the Europe 2020 Strategy. The Lisbon Strategy stated that "knowledge and innovation are the beating heart of European growth" [*Working together…*, 2005, p. 4]. The Europe 2020 Strategy, a new long-term European growth programme, which replaced the Lisbon Strategy, stresses the need for a greater coordination of the EU member states in order to overcome the crisis and implement the reforms which will enable to face the challenges of globalization, ageing societies and a growing need for resource efficiency. Therefore, three priorities were determined [*Europe 2020…*, 2010, p. 8]:

– smart growth – developing an economy based on knowledge and innovation,
– sustainable growth – promoting a more resource efficient, greener and more competitive economy,
– inclusive growth – fostering a high-employment economy delivering economic, social and territorial cohesion.

According to the definition proposed by the European Commission, smart growth it is growth based on two driving forces: knowledge and innovation. The Commission defines aims whose implementation is supposed to foster smart growth: to improve the quality of education, to improve research, to support transfer of innovations and knowledge inside the EU, to fully use information and communication technologies, and to ensure that innovative ideas are turned into new products and services that can generate growth and jobs and help address social challenges both in Europe and worldwide [*Europe 2020…*, 2010, pp. 9-10]. It also proposed the following main indicators for monitoring smart growth [*Europe 2020…*, 2010, p. 12]:

– gross domestic expenditure on R&D (% of GDP),
– early leavers from education and training (% of population aged 18-24),
– tertiary educational attainment (% of population aged 30-34).

Smart growth is difficult to measure due to its complexity, multidimensionality, unobservability. Its measurement requires prior solution of various problems such as the imprecise and unquantifiable definition of both smart growth itself and its pillars, the choice of method, the choice of measurements referring to different aspects of smart growth, the choice of an optimal set of indicators including the criterion of information availability and lowering the cost of obtaining such information, data availability.

The aim of the paper is construction of the synthetic measure of the level of smart growth in the European Union countries (EU-28) in 2013[1]. In this study the concept of measurement of smart growth is based on Knowledge Assessment Methodology (KAM) [Chen, Dahlman, 2005], European Innovation Scoreboard (EIS) [*Innovation Union…*, 2015] and Hellwig's synthetic measure of development (HSMD) [Hellwig, 1968]. The results of the research will be important for regional policy, under which decisions are made about the use of EU funds.

## 2. Research method

Hellwig's synthetic measure of development [Hellwig, 1968] is one of classical methods of linear ordering of multivariate objects (e.g. countries, provinces, municipalities, etc.)[2]. Under this method, the Euclidean distance of each multivariate object from the development pattern is determined. In this method, the following stages can be distinguished:

Stage 1. Selection of indicators basing on substantive and statistical reasons (see paragraph 3).

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[1] The choice of the year was connected with data availability.
[2] See other taxonomic methods in [Hwang, Yoon, 1981; Nowak, 1990].

Stage 2. Identification of type of indicators (stimulant, destimulant, nominant).

Stage 3. Normalization of the values of indicators.

In this study standardization[3] was used

$$z_{ij} = \frac{x_{ij} - \overline{x}_j}{s_j} \quad (i = 1, 2, ..., n, j = 1, 2, ..., m),\tag{1}$$

where

$x_{ij}$ – $i$-th value of $j$-th indicator,

$\overline{x}_j$ – mean of $j$-th indicator,

$s_j$ – standard deviation of $j$-th indicator.

Stage 4. Determination of development pattern $z_0 = [z_{01}, z_{02}, ..., z_{0j}, ... z_{0m}]$, where

$$z_{0j} = \begin{cases} \max_i z_{ij}, & \text{if } z_{ij} \text{ variable is a stimulant} \\ \min_i z_{ij}, & \text{if } z_{ij} \text{ variable is a destimulant} \end{cases}.\tag{2}$$

Stage 5. Calculation of the Euclidean distance of $i$-th object from the development pattern

$$d_{i0} = \sqrt{\sum_{j=1}^{m} (z_{ij} - z_{0j})^2} \quad (i = 1, 2, ..., n)\tag{3}$$

Stage 6. Determination of the value of synthetic measure of development for $i$-th object

$$m_i = 1 - \frac{d_{i0}}{d_0} \quad (i = 1, 2, ..., n),\tag{4}$$

where

$$d_0 = \overline{d}_0 + 2s_0,\tag{5}$$

$$\overline{d}_0 = \frac{1}{n}\sum_{i=1}^{n} d_{i0},\tag{6}$$

$$s_0 = \sqrt{\frac{1}{n}\sum_{i=1}^{n} (d_{i0} - \overline{d}_0)^2}.\tag{7}$$

Stage 7. Linear ordering of objects according to the values of synthetic measure.

HSMD has the following properties:
– usually takes values in the range [0, 1], but in some cases it may take negative values and this means that the analyzed object is definitely worse than others [Nowak, 1990, p. 89; Zeliaś, 2000, p. 93],
– measure value for the pattern is 1,
– the higher level of a complex phenomenon, the higher value of measure of development [Zeliaś, 2000, p. 41].

### 3. Indicators of the level of smart growth

The selection of indicators was based on substantive and statistical reasons. Two types of research was used as the substantive reason: Knowledge Assessment Methodology (World Bank) and European Innovation Scoreboard (European Commission).

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[3] See other methods in [*Handbook of construction…*, 2008, pp. 83-85].

The KAM, which was developed within the framework of *The Knowledge for Development* (K4D) programme, is regarded as the most developed way of measuring KBE. It distinguishes four key pillars [Chen, Dahlman, 2005, p. 33]:

–   Economic Incentive and Institutional Regime, responsible for developing economic policy and the work of institutions. Extending, disseminating and using knowledge by these entities is supposed to ensure effectiveness by an adequate division of resources and by boosting creativity. Indicators: tariff and non-tariff barriers, regulatory quality, rule of law.

–   Education and Human Resources, which means personnel who can adopt to constantly developing technological solutions thanks to upgrading their skills. Indicators: adult literacy rate (% age 15 and above) latest version – average years of schooling, secondary enrollment, tertiary enrollment.

–   Innovation System, which involves the activities of economic entities, research centres, universities, advisory bodies and other organizations whose operations are adjusted to preferences of more and more demanding customers. Indicators: researchers in R&D, per million population or in the latest version: payments and income from licence fees, patents applications granted by the US Patent and Trademark Office, per million population, scientific and technical journals articles, per million population.

Information Infrastructure, which ensures effective communication and faster transfer of data. All these aspects influence transfer of information and knowledge. The measurements applied: telephones per 1000 population (telephone mainlines and mobile phones), computers per 1000 population, Internet users per 10000 population. The pillars are used to construct two global indexes [Chen, Dahlman, 2005, pp. 9-13]:

–   Knowledge Index (KI), which determines the knowledge potential of a country; this indicator is calculated as an arithmetic average of three subindexes, which represent three pillars of KAM (except the Economic Incentive and Institutional Regime),

–   Knowledge Economy Index (KEI), which determines a general development level of a knowledge-based economy; this indicator is calculated as an arithmetic average of four subindices, which represent the four pillars of KAM.

The advantages of this method are simplicity, clarity, and versatility. It enables comparison of the KI and KEI indicators and their components in both dimensions: intertemporal and international. The method is criticised inter alia for [Becla, 2010, pp. 56-70]:

–   insufficient theoretical background,
–   the tendency to repeat information by indicators,
–   the lack of differentiated weights for indicators,
–   insufficient information about many of the analyzed economies,
–   inaccessibility of indicators in the systems of international statistics,
–   incomparability of data due to a variety of data sources.

Among numerous methods of innovation measurement, the most advanced and the most popular one with economists is the European Commission method, used since 2000 in the reports of the European Innovation Scoreboard (EIS). The EIS Table of

2015 is based on 25 indicators concerning scientific research and innovation and includes 28 EU member states, South Korea, USA, Japan, Canada, Australia and the BRICS countries. The indicators are divided into three main dimensions [*Innovation Union…*, 2015, pp. 7-8]:

- enablers, i.e. basic elements enabling innovation to emerge (human resources, finance and support, open excellent and research systems),
- firm activities capturing innovation performance of European firms (investments, linkage and entrepreneurship, intellectual assets),
- outputs capturing the ways in which innovations turn into economic benefits (innovators, economic effects).

The EIS approach is criticized inter alia for [Hollanders, van Cruysen, 2008, pp. 9-10]:

- a too statistical (correlation) approach to innovation instead of relying on a model of innovation, which means that the method is lacking in theoretical basis,
- too much concentration on high technologies, while innovation may occur irrespective of the intensity of research and development,
- co-linearity – some indicators are correlated, as a result of which the method is focused on R&D,
- problems with identification of stimulants – it is not always the case that a higher indicator is beneficial for general innovation,
- problems with data availability and completeness.

In this study the initial set contained 37 indicators: 12 from KAM methodology and 25 from EIS methodology. The lack of data was the reason for the rejection of 14 indicators. For the other 23 indicators the level of diversity was examined (the critical value of the coefficient of variation was set at 10 %). Moreover to eliminate from the set of indicators those variables which are too strongly correlated with other variables, Hellwig's parametric method was used (the critical value of the coefficient of correlation was set at 0,7). The final set of indicators presents table 1. Eight of them (from 1 to 8) belong to EIS methodology, one is from KAM methodology (No. 9).

Table 2 contains the basic descriptive statistics of indicators of the level of smart growth. The highest variation relates to indicator "Community trademarks per billion GDP (in PPS)" (IA_2.3.3 – 102%), the lowest – to indicator "Percentage population aged 30-34 having completed tertiary education" (HR_1.1.2 – 24.7%). Two indicators "Community trademarks per billion GDP (in PPS)" (IA_2.3.3) and „Sales of new to market and new to firm innovations as percentage of turnover" (EE_3.2.4) have achieved the lowest value for Romania. Ireland was characterized by the highest values of two indicators: "Percentage population aged 30-34 having completed tertiary education" (HR_1.1.2) and "Knowledge-intensive services exports as percentage of total service exports" EE_3.2.3.

TABLE 1.

**Indicators of the level of smart growth**

| No. | Symbol | Indicator | Source | Type |
|---|---|---|---|---|
| 1 | HR_1.1.2 | Percentage population aged 30-34 having completed tertiary education | Eurostat | Stimulant |
| 2 | HR_1.1.3 | Percentage youth aged 20-24 having attained at least upper secondary level education | Eurostat | Stimulant |
| 3 | FI_2.1.2 | Non-R&D innovation expenditures as percentage of turnover | Eurostat (CIS) | Stimulant |
| 4 | LE_2.2.2 | Innovative SMEs collaborating with others as percentage of SMEs | Eurostat (CIS) | Stimulant |
| 5 | IA_2.3.3 | Community trademarks per billion GDP (in Purchasing Power Standard) | Eurostat | Stimulant |
| 6 | IN_3.1.2 | SMEs introducing marketing or organisational innovations as percentage of SMEs | Eurostat (CIS) | Stimulant |
| 7 | EE_3.2.3 | Knowledge-intensive services exports as percentage of total service exports | Eurostat | Stimulant |
| 8 | EE_3.2.4 | Sales of new to market and new to firm innovations as percentage of turnover | Eurostat (CIS) | Stimulant |
| 9 | KAM_9 | Scientific and Technical Journal Articles per million inhabitants | World Bank | Stimulant |

Source: own elaboration.

TABLE 2.

**Basic descriptive statistics of indicators**

| No. | Symbol | Minimu value | Maximum value | Mean | Standard deviation | Coefficient of variation (%) |
|---|---|---|---|---|---|---|
| 1 | HR_1.1.2 | 22.5 *Italy* | 52.6 *Ireland* | 37.9 | 9.4 | 24.7 |
| 2 | HR_1.1.3 | 41.9 *Spain* | 86.9 *Croatia* | 68.4 | 10.6 | 15.5 |
| 3 | FI_2.1.2 | 0.14 *Luxembourg* | 1.55 *Estonia* | 0.68 | 0.37 | 55.1 |
| 4 | LE_2.2.2 | 12.7 *Italy* | 66.7 *United Kingdom* | 34.6 | 12.3 | 35.6 |
| 5 | IA_2.3.3 | 1.6 *Romania* | 37.1 *Malta* | 7.9 | 8.1 | 102 |
| 6 | IN_3.1.2 | 6.8 *Netherlands* | 18.2 *Greece* | 12.8 | 3.2 | 25.3 |
| 7 | EE_3.2.3 | 14.2 *Lithuania* | 77.0 *Ireland* | 40.6 | 16.4 | 40.5 |
| 8 | EE_3.2.4 | 3.7 *Romania* | 19.6 *Slovakia* | 10.3 | 3.6 | 34.6 |
| 9 | KAM_9 | 367.5 *Bulgaria* | 2228.0 *Denmark* | 1194.5 | 462.0 | 38.7 |

Source: own elaboration.

## 4. The level of smart growth in the European Union countries in 2013

Table 3 contains the values of synthetic measure of the level of smart growth for 28 European Union countries in 2013.

**TABLE 3.**

**Values of synthetic measure of the level of smart growth in 2013**

| No. | Country | Value of synthetic measure |
|-----|---------|---------------------------|
| 1 | Denmark | 0.345 |
| 2 | United Kingdom | 0.330 |
| 3 | Cyprus | 0.325 |
| 4 | Greece | 0.306 |
| 5 | Slovenia | 0.286 |
| 6 | Germany | 0.284 |
| 7 | Estonia | 0.272 |
| 8 | Luxembourg | 0.255 |
| 9 | Ireland | 0.247 |
| 10 | Finland | 0.245 |
| 11 | Austria | 0.239 |
| 12 | Belgium | 0.237 |
| 13 | Sweden | 0.228 |
| 14 | Slovakia | 0.224 |
| 15 | France | 0.212 |
| 16 | Czech Republic | 0.196 |
| 17 | Hungary | 0.169 |
| 18 | Lithuania | 0.150 |
| 19 | Malta | 0.147 |
| 20 | Croatia | 0.140 |
| 21 | Netherlands | 0.132 |
| 22 | Portugal | 0.113 |
| 23 | Poland | 0.099 |
| 24 | Latvia | 0.098 |
| 25 | Italy | 0.093 |
| 26 | Spain | 0.090 |
| 27 | Romania | -0.013 |
| 28 | Bulgaria | -0.035 |
| Mean | | 0.193 |
| Standard deviation | | 0.1 |

Source: own elaboration.

The synthetic measure achieves value of 1 for the pattern. Moreover the higher value of synthetic measure, the higher level of smart growth. The results shows that the level of smart growth in the EU-28 countries was not very high in 2013. The mean value of synthetic measure of smart growth level was 0.193, while standard deviation – 0.1. The highest value was 0.345 (Denmark) and two countries have achieved negative values (Romania, Bulgaria).

The positions of the countries in the ranking of smart growth level ware connected with the values of indicators. In the table 4 are presented the rankings of the countries in terms of the value of each indicator as well as in terms of the value of synthetic measure (HSMD).

**TABLE 4.**

**Scoreboard of the level of smart growth in 2013**

| Country | HR_1.1.2 | HR_1.1.3 | FI_2.1.2 | LE_2.2.2 | IA_2.3.3 | IN_3.1.2 | EE_3.2.3 | EE_3.2.4 | KAM09 | HSMD |
|---|---|---|---|---|---|---|---|---|---|---|
| Denmark | 9 | 18 | 21 | 8 | 7 | 15 | 3 | 4 | 1 | 1 |
| United Kingdom | 6 | 26 | 25 | 1 | 14 | 5 | 4 | 3 | 6 | 2 |
| Cyprus | 5 | 25 | 15 | 2 | 3 | 17 | 9 | 11 | 19 | 3 |
| Greece | 17 | 11 | 8 | 11 | 24 | 1 | 5 | 10 | 18 | 4 |
| Slovenia | 16 | 2 | 18 | 4 | 13 | 11 | 25 | 15 | 5 | 5 |
| Germany | 18 | 16 | 3 | 23 | 9 | 18 | 6 | 7 | 13 | 6 |
| Estonia | 12 | 14 | 1 | 6 | 5 | 23 | 11 | 22 | 17 | 7 |
| Luxembourg | 2 | 21 | 28 | 24 | 2 | 2 | 2 | 20 | 10 | 8 |
| Ireland | 1 | 19 | 20 | 18 | 12 | 4 | 1 | 21 | 7 | 9 |
| Finland | 7 | 3 | 22 | 13 | 10 | 26 | 8 | 13 | 3 | 10 |
| Austria | 22 | 4 | 19 | 7 | 4 | 7 | 24 | 18 | 9 | 11 |
| Belgium | 11 | 23 | 13 | 3 | 16 | 24 | 10 | 12 | 8 | 12 |
| Sweden | 4 | 17 | 10 | 19 | 6 | 20 | 12 | 24 | 2 | 13 |
| Slovakia | 23 | 7 | 9 | 10 | 26 | 12 | 20 | 1 | 21 | 14 |
| France | 8 | 22 | 23 | 15 | 21 | 3 | 13 | 5 | 16 | 15 |
| Czech Republic | 24 | 5 | 11 | 12 | 22 | 25 | 15 | 6 | 11 | 16 |
| Hungary | 19 | 8 | 12 | 9 | 25 | 6 | 22 | 19 | 24 | 17 |
| Lithuania | 3 | 10 | 5 | 5 | 19 | 13 | 28 | 25 | 23 | 18 |
| Malta | 25 | 24 | 4 | 27 | 1 | 8 | 26 | 16 | 25 | 19 |
| Croatia | 26 | 1 | 7 | 14 | 27 | 16 | 27 | 17 | 20 | 20 |
| Netherlands | 10 | 20 | 27 | 16 | 11 | 28 | 19 | 9 | 4 | 21 |
| Portugal | 20 | 27 | 14 | 25 | 18 | 14 | 17 | 8 | 12 | 22 |
| Poland | 15 | 9 | 6 | 17 | 20 | 27 | 16 | 23 | 22 | 23 |
| Latvia | 14 | 12 | 2 | 21 | 23 | 19 | 14 | 26 | 26 | 24 |
| Italy | 28 | 13 | 16 | 28 | 15 | 9 | 18 | 14 | 15 | 25 |
| Spain | 13 | 28 | 24 | 20 | 8 | 21 | 21 | 2 | 14 | 26 |
| Romania | 27 | 15 | 26 | 22 | 28 | 10 | 7 | 28 | 27 | 27 |
| Bulgaria | 21 | 6 | 17 | 26 | 17 | 22 | 23 | 27 | 28 | 28 |

Source: own elaboration.

The results inconsistent with the expectations are: low position of Sweden in the scoreboard and high positions of Cyprus and Greece. Usually, Sweden is in the top of the rankings related to the economic development, while Cyprus and Greece – in the middle. This results can be related with the lack of indicators of economic development among indicators of the level of smart growth. Sweden took low positions in terms of the following indicators: EE_3.2.4 (24 position), IN_3.1.2 (20 position), LE_2.2.2 (19 position). Cyprus achieved a high position in terms of the following indicators: LE_2.2.2 (2 position), IA_2.3.3 (3 position), HR_1.1.2 (5 position), and Greece in terms of the following indicators: IN_3.1.2 (1 position) and EE_3.2.3 (5 position).

## 5. Conclusions

The issue of smart growth is a relatively new one, yet it has already been discussed by a few authors [Markowska, Strahl, 2012; Bal-Domańska, 2013; Strahl, 2014; Sobczak, 2014]. Nevertheless, studies on this topic are scarce. Their authors unanimously agree that there is a need for detailed theoretical and empirical research. The pillars of smart growth, i.e. knowledge and innovation, have been broadly discussed in literature, both in Poland and abroad [*Gospodarka oparta na…*, 2007; Piech, 2009; *Gospodarka oparta na…*, 2011; Chen, Dahlman, 2005; Hollanders, van Cruysen, 2008], yet there is no consent as to the method of defining and measuring them.

The research presented in the paper are the author's first attempt to measure the level of smart growth of the European Union countries. However, they may provide a starting point for future work.

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# THE LEAST INNOVATIVE REGIONS IN POLAND IN THE PROCESS OF SMART SPECIALISATION

**Summary**

Smart specialisation constitutes an important framework for regional innovation policy making in the EU. According to the EU documents, the process of smart specialisation can be applied in all types of regions: the most developed ones as well as the least innovative ones. It is thus of great importance for regions with a low level of innovation performance due to numerous innovation challenges faced by these regions (such a situation can be observed in the case of four least innovative regions in Poland).

The main objective of the paper is to assess the advancement of the least innovative Polish regions in the process of smart specialisation. In order to achieve this objective, the following detailed objectives are expected to be met: 1. presentation of innovation challenges for the least developed regions in Europe; 2. selection of the least innovative Polish regions on the basis of four indicators; 3. assessment of the advancement in the smart specialisation process in selected regions with reference to their economic, social and innovation potential. As research methods, the authors used descriptive analysis, analysis of strategic documents, case studies analysis and statistical analysis. As results from the analysis, the approach to the identification process of smart specialisations in the least innovative Polish regions was diverse. Depending on the maturity level of work on updating Regional Innovation Strategies, awareness of competitive advantages at the sectoral and technological level, used methods, different concepts of their identification have been adopted.

**Key words**: national and regional smart specialisation, innovation policy, Poland

**JEL**: R58, O39

## 1. Introduction

The notion of smart specialisation is an important framework in the structural funding period 2014-2020. Although the original academic concept of this policy was sectorally oriented and focused on the productivity gap between the EU and the US, it is increasingly

applied to regional innovation context[1]. Having scarce resources and limited budgets, regions should allocate them taking into account external influences (e.g. global competition) and internal factors (e.g. sectoral specialisations, university-industry linkages, innovation infrastructure). Within the smart specialisation process, every region should nominate activities that aim at exploring and discovering new technological and market opportunities in order to open perspectives for regional competitive advantage [Foray at al., 2009, quoted by: Baier, Kroll, Zenker, 2013, p. 1]. The initial concept of smart specialisation is thus connected with the concentration of public resources in knowledge investments on particular activities in order to strengthen comparative advantage in existing or new areas [OECD, 2013, p. 11]. The smart specialisation concept expands its influence to regional innovation policy making as the elaboration of smart specialisations at regional level is seen as an *ex-ante* conditionality for the cohesion policy programmes in the perspective 2014-2020. Regions are thus invited to design regional innovation strategies for smart specialisation (RIS3) as a translation of the principles of smart specialisation into operational elements of regional innovation strategies [Czyżewska, Golejewska, 2014]. In other words, smart specialisation can be considered as a regional policy framework for innovation driven growth.

It is highlighted in the European Commission's documents that the process of smart specialisation can be applied in all types of regions: the most developed ones as well as the least innovative ones [European Commission, 2010; Asheim, Grillitsch, 2015, p. 3]. The smart specialisation approach suggests regions that are not leaders in any of the main science and technology domains to focus in R&D and innovation on few key priorities [OECD, 2013, p. 28]. The innovation challenge in regions with different level of innovation performance will vary taking into account their economic structure and specialisation of key regional agents: firms, universities and public research institutions [OECD, 2013, p. 28][2]. Research on the smart specialisation process is in many cases devoted to the best performing European regions. It seems thus more important to focus scientific attention on the least developed regions that have to tackle different socio-economic and innovation challenges while participating in the smart specialisation process. This is one of the main reasons to pursue an empirical examination of the advancement of the smart specialisation process in selected regions in Poland. While in theory smart specialisation should be a strategy for all regions, the practical implications are challenging for a number of the least developed regions as to whether they can gain the benefits from the efforts involved in the elaboration of the smart specialisation strategies.

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[1] The theoretical framework of the smart specialisation concept has been developed in particular in the following papers: [OECD 2013; Foray, David, Hall, 2009; McCann, Ortega-Argiles 2013; Camagni, Capello, 2013].

[2] There exist different classifications of innovation-related groupings of regions. According to the categorization of regions by the OECD with the use of socio-demographic, economic and innovation-related variables, different regions have different levels of innovation performance. The regions have been classified into three macro categories: knowledge hubs, industrial production zones and non-S&T-driven regions. Some OECD regions perform better than their national average, nearly all of the knowledge hubs belong to the countries that are considered to be innovation leaders. According to this ranking, all Polish regions belong thus to the last category. The paper provides as well a review of approaches for other innovation-related groupings of regions [Ajmane Marsan, Maguire, 2011, pp. 30-31].

If smart specialisation strategy meant a high technology strategy it would not be applicable for all types of regions. There exist however wider interpretations of this notion that give opportunities for most regions [Charles, Gross, Bachtler 2012, p. 6][3]. Poland has been selected as an example of a catching-up European economy. Within Polish regions a selection mechanism has been used to indicate the least innovative NUTS 2 regions based on the Eurostat statistics (see point 3).

The main objective of the paper is to examine the advancement of the least innovative Polish regions in the process of smart specialisation. In order to achieve the main objective of the paper, the following detailed objectives are expected to be met: 1. presentation of literature review of challenges for the least developed regions in Europe, in particular in Poland; 2. selection of the least innovative Polish regions on the basis of four indicators: GDP *per capita*, population aged 25-64 with tertiary education attainment, R&D expenditure and patent applications to the EPO; 3. assessment of the advancement in the smart specialisation process in selected regions with reference to their economic, social and innovation potential.

As research methods, the authors used descriptive analysis, analysis of strategic documents and statistical analysis. The statistical analysis is based on Eurostat Regional Statistics. The lack of actual and comparable regional data for the whole group of regions caused the choice of the year 2011, as the reference year. In case of patent applications the last analyzed year was 2010.

## 2. Innovation challenges for less developed regions in Europe

Regions are increasingly recognized as a relevant level of innovation policies given the weight of agglomeration economies (the more connected the firms clustered together, the greater the network and learning effects, the lower the cost of production), [OECD, 2013, p. 28]. There is a vast literature testing the relevance of different theoretical concepts and challenges related to innovation and socio-economic performance in developed regions in Europe while this is much less so in the case of less developed regions in Europe, especially those with the post state-socialism background [Blažek et al., 2014, p. 13].

Regional economies of less developed regions, especially those of Eastern European countries, are integrated into European economy due to the following strengths: relatively cheap labour force (offering good qualifications) available in close geographic proximity to the West European market, in case of selected regions also strong industrial tradition, and the existence of basic infrastructure. Therefore, these regions were able to attract a large amount of foreign capital in the form of greenfield investment or in the process

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[3] Charles, Gross and Bachtler [2012, p. 5] do not see a great difference between the new idea of smart specialisation and previous regional innovation systems and strategies. However, according to them, the smart specialisation concept is a focus on diversity of economic activity. The most successful regions have the advantages in implementing smart specialisation and innovation which are partly connected with the diversity of regional economy. As diversity leads to greater opportunities for growth, specialisation in weak or non-innovative activities can lead to weak growth.

of privatization of the former state-owned companies (regions with post-socialist tradition). Consequently, these regions were able to benefit from the transfer of know-how but they became to a significant extent dependent on decision-making process of the large foreign firms [Blažek et al. 2014, p. 27].

There is a great variety of economic structures of regions with less developed research and innovation systems. Therefore, according to Blažek et al. [2014, pp. 28-33], at least three broad categories of regions should be enumerated: 1. metropolitan regions with diversified economic structure, 2. old industrial regions and 3. economically weak regions (mostly peripheral and rural regions). There are however several features of economic structure of these regions. The first feature is the branch-plant character of their economic base (functional division of labour among the regions within a single industry: high-level functions such as headquarters and R&D centers are located in metropolitan regions, production of new products in highly developed industrial regions and the production of standardized goods in less developed regions). In consequence, in most cases less developed regions attract activities requiring low qualifications. In order to succeed in acquiring some higher level functions to less developed regions, the regional authorities should cultivate the overall environment in the region (institutions, education system, intermediary institutions) and engage all triple/quadruple helix actors. The second feature of less developed regions is that many local firms operate as lower-tier suppliers of global value chains. It is important to highlight the fact that lower tier suppliers are charged with production of large quantities of standardized goods based on a well-known technology. Consequently these companies are expected to provide mainly cost-saving measures and not any innovative solutions. The third feature of these regions is their weak endogenous sector as these regions have long-lasting low level of innovativeness and entrepreneurship (due to bureaucratic procedures, low availability of external finance, low prestige of entrepreneurs in the society and low ability to take up risks).

The main conclusion resulting from the study of Kravtsova and Radosevic[4] [2012] is that Eastern European countries have lower productivity level that might be expected from production and R&D capabilities and lower level of science and technology outputs (namely patents and papers) given the number of their researchers. According to Kravtsova and Radosevic [2012, p. 123], there exist three main challenges for these countries. Firstly, a prominent policy feature of EE is the lack of vision related to its education/training systems. Secondly, a key challenge at firm level is how firms can make the transition from mastery of production to technological (R&D and innovation) capabilities as the process is not automatic and requires changes within firms and in the national innovation systems. Thirdly, a reorientation of R&D systems from the current exclusive focus on knowledge generation to knowledge diffusion and absorption orientation is suggested (as essential competence for catching-up in the knowledge based economy).

In less developed regions one can also observe the immature institutional framework, a lack of trust among regional stakeholders and a general lack of networking culture

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[4] This study refers to the national level of analysis but innovation challenges mentioned by the authors are the same for the regional level in Eastern European countries.

and capabilities, which can make difficult the selection of domains of potential specialisation. Another challenge is related to an immature governance system that can result in a danger of a capture of the SS process by strong actors [Blažek et al., 2014, p. 26]. Plawgo et al. [2013] have therefore observed that the higher the level of innovativeness of a region, the higher is decision makers' readiness to take actions to strengthen regional innovation system even further.

Instead of developing their own research and innovation strategies based on comprehensive understanding of underlying preconditions, in many instances regions with less developed research and innovation systems design only imitative regional innovation strategies, focused on copying foreign best practices. This was often done without a proper adaptation of these best practices to the specific features of the particular region or without a proper diagnosis of the innovation potential[5]. Nowadays one can observe more strategic and adapted approaches in designing innovation strategies at the regional level [Blažek et al., 2014, p. 23]. In this perspective, a new approach toward innovation would be welcome at regional and national level. As stated by Gorzelak et al. [2010, p. 4], Poland is lacking an overall, general strategy for the entire society and public institutions aiming at supporting innovative thinking and behavior and creating general innovation awareness among different social groups in the country.

All these observations and arguments have important implications for a suitable design of smart specialisation process in regions with less developed research and innovation systems, especially that according to Gorzelak et al. [2010, p. 12] attempts to make innovation and R&D projects one of the key priorities in less developed regions have not been successful yet. And this situation is not very surprising taking into account all deficiencies listed in this subchapter. Moreover, in the case of many regions with less developed research and innovation system numerous barriers for innovativeness combine to create a negative synergy and regions differ in the scale of these barriers. It is thus even more important to design smart specialisations in a way it helps overcome some of the mentioned challenges.

## 3. The least innovative Polish regions and their advancement in the smart specialisation process

The selection of Polish regions that have been taken into account in the empirical analysis concerning the advancement of the smart specialisation process is based on 4 S&T related indicators:

1. Regional gross domestic product per capita (in EUR) by NUTS 2 regions in 2011;
2. Population aged 25-64 with tertiary education attainment in 2011;
3. Total intramural R&D expenditure (GERD) by NUTS 2 regions as % of GDP in 2011;
4. Patent applications to the EPO by priority year by NUTS 2 regions (number of applications per million of inhabitants), 2008-2010 average.

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[5] For details about Poland in this respect see: Gorzelak et al. 2007.

The regions have been ranked according to each of these four indicators. The scores in four separate rankings have been averaged and finally, a composite rank has been built for each region (Table 1.). On the basis of the results, four worst performing regions in Poland have been identified: Warmińsko-Mazurskie, Opolskie, Kujawsko-Pomorskie and Świętokrzyskie. The selected regions differ in terms of the structure of the economy, geographical, historical and social conditions. Only one out of 4 selected regions – Świętokrzyskie - belonged to the group with the low socio-economic potential, while other regions to the group with the lowest socio-economic potential [Golejewska, 2015].

**TABLE 1.**

**Ranks for Polish regions**

| Regions | GDP per capita, Euro, 2011 | Population aged 25-64 with tertiary education attainment, 2011 | R&D expenditure, % of GDP, 2011 | Patent applications to the EPO, number of applications per million of inhabitants, 2008-2010* average | Average | Rank |
|---|---|---|---|---|---|---|
| Mazowieckie | 1 | 1 | 1 | 3 | 1.5 | 1. |
| Małopolskie | 7 | 2 | 2 | 1 | 3 | 2. |
| Dolnośląskie | 2 | 6 | 8 | 5 | 5.25 | 3. |
| Pomorskie | 5 | 4 | 4 | 9 | 5.5 | 4. |
| Łódzkie | 6 | 8 | 7 | 2 | 5.75 | 5. |
| Śląskie | 3 | 5 | 9 | 8 | 6.25 | 6. |
| Wielkopolskie | 4 | 10 | 6 | 7 | 6.75 | 7. |
| Lubelskie | 15 | 7 | 5 | 6 | 8.25 | 8. |
| Podlaskie | 13 | 3 | 11 | 15 | 10.5 | 9. |
| Podkarpackie | 16 | 12 | 3 | 11 | 10.5 | 10. |
| Lubuskie | 9 | 14 | 16 | 4 | 10.75 | 11. |
| Zachodniopomorskie | 8 | 11 | 13 | 13 | 11.25 | 12. |
| **Świętokrzyskie** | **12** | **9** | **12** | **14** | **11.75** | **13.** |
| **Kujawsko-Pomorskie** | **10** | **15** | **14** | **12** | **12.75** | **14.** |
| **Opolskie** | **11** | **16** | **15** | **10** | **13** | **15.** |
| **Warmińsko-Mazurskie** | **14** | **13** | **10** | **16** | **13.25** | **16.** |

Source: Eurostat Regional Statistics, own calculations

In the Warmińsko-Mazurskie region one of the most important causes of economic weakness was closing down of state farms initiated during economic transformation. Despite poor economic situation, the region develops steadily. Industries of vital importance to the region are indicated in strategic documents. These are: wood and furniture sector, food processing (in particular dairy industry, beer production, organic agriculture and manufacturing of high-quality food produce) and tourism. Industrial structure of the region's cluster initiatives corresponds to the regional economic specialties [PARP, 2012a, pp. 3-8]. Scientific potential of the region is concentrated on its capital, where the biggest regional state school - the University of Warmia and Mazury is based. Its rich educational offer compensates for the lack of technical schools in the region. The region

is facing a problem of very low public R&D expenditure (23 times smaller than in the capital region) and weak linkages between science and economy. Half of the representatives of the region's R&D sector did not cooperate with economic operators in 2011-2013. The branch and size structure of firms and historical, geographical and environmental circumstances of the region determine the development path of enterprises. Their investment should not be limited solely to highly innovative projects, as most of them has not kept pace with the current-day economic challenges [*Regionalny Program Operacyjny Województwa Warmińsko-Mazurskiego…*, 2014, pp. 3-6].

The Opolskie region is the smallest one in Poland in terms of territory and population. It is characterized by an average level of economic development and high level of industrialization. The dominant sectors are: food-, energy-, chemistry-, non-metal materials-, machines and electromechanical-, metal- and furniture industry. A particular challenge for the region is to overcome a slow development of the service sector. In 2000-2011 the Gross Value Added in services grew by 78 per cent in comparison to 96 per cent as the country average. The economic system of the region is reinforced by 25 entities performing research and development activity. The biggest R&D institutes include universities located in the region's capital: the Opole University and the Opole University of Technology. For the region it is important to develop clusters initiatives [*Regionalny Program Operacyjny Województwa Opolskiego…*, 2014, pp. 10-15]. The sector-oriented structure of clusters initiatives is very diverse. Most of them operate in the tourism sector (3), as well as the construction and eco-construction (2). The areas of operation of single initiatives include such sectors as: chemistry, eco-energy, training and consulting, IT, medical and timber-furniture [PARP, 2012b, pp. 3-10]. The regional development of clusters is supported by numerous science oriented institutions as well as business support institutions such as innovation and entrepreneurship centers including: Opole Science and Technology Park, Kędzierzyn-Koźle Industrial Park, Academic Entrepreneurship Incubator associated with Opole University of Technology etc. [PARP, 2012b, p. 15]. Weaknesses of the region are: low level of financial assistance to R&D and low activity of entities forming Regional Innovation System [*Regionalna Strategia Innowacji Województwa Opolskiego…*, 2014, p. 29].

The Kujawsko-Pomorskie region is characterized by strong specialisation in industrial production. Five industries: food processing; manufacture of chemicals and chemical products; paper and paper products; metal products and rubber and plastic products generate almost three quarters of sales revenues of industrial processing. Electro-mechanical, wood and electronic industries play also an important role in the economy of the region. According to the European Cluster Observatory, there are two clusters in the Kujawsko-Pomorskie region: Bydgoszcz Industrial Cluster and Tuchola Forest Tourist Cluster. According to the results of studies carried out by the Torun Regional Development Agency, the printing, electronic industry, machine-tool, wood-furniture and tourist-spa industries are also favorable for the development of cooperation between entities [PARP, 2012c, pp. 3-8]. In many industries, firms from the Kujawsko-Pomorskie region are among the Polish leaders, generating a substantial part of the national output. They are also seen as leaders in innovativeness and technological development, as reflected in high exports and the active participation in linkages within global players. The number

of centers for innovation and entrepreneurship in the region is steadily growing. In 2007, there were 35 entities and in 2009, 2010 and in 2012: 37, 39 and 43 respectively. The present potential provides a very solid basis for future development of the region based on modern and innovative economy [*Regionalny Program Operacyjny Województwa Kujawsko-Pomorskiego…*, 2015, pp. 12-14]. However, it still lacks laboratories carrying out the research and development at the global level and commercialization of results of research units [*Regionalna Strategia Innowacji Województwa Kujawsko-Pomorskiego…*, 2015, p. 16].

The last least innovative Polish region, Świętokrzyskie, is divided into the industrial part (north) and the rural part (south and east). Its industrial potential was shaped mainly by activity of the Old Polish Industrial Region. The region's key branches are: metallurgy, machine construction, casting, construction and food processing. The level of entrepreneurial activity is relatively low, however the highest among the regions of Eastern Poland. Most of the enterprises operate in a relatively low-innovation level sectors (87.4 per cent in comparison to average 68.4 per cent in Poland). Most of the clusters are active in power engineering and tourism. There are also single clusters in food industry, ceramics, construction and design. There are 24 innovation and entrepreneurship centers in the region, including Kielecki Technological Park, Kielecki Technological Incubator, Regional Center for Innovation and Technology Transfer [PARP, 2012d, pp. 3-12]. The Świętokrzyskie region belongs to Eastern Poland Macroregion characterized by relatively low level of higher education sector development. There are 15 higher schools in the region, mostly non-public and only one technical school. There is a need to support the development of: fair and congress branch on the basis of Kielce Trade Fairs (the third centre of this type in Central and Eastern Europe), market gardening and horticulture production (organic processed food) and tourism sector services, based on the map of areas with the biggest tourist traffic [*RPO WS 2014-2020*, pp. 35-44]. Weaknesses of the region are: low efficiency of public R&D expenditure, low private spending on R&D and insufficient awareness of technology transfer mechanisms and commercialization [*Strategia Badań i Innowacyjności (RIS3)*, 2014, pp. 26-27].

The EU's regional development agenda stresses the importance of smart specialisation strategies as an essential tool for promoting sustainable, smart and inclusive growth. According to the results of the study carried out by the World Bank, in Poland, substantial work has already been done in designing regional innovation strategies based on the new smart specialisation concept. However, the resulting RIS3s may not yet be fully compliant with the EC's *ex ante* conditionalities within thematic objective 1 on strengthening research, technological development and innovation at national, macro-regional and regional levels [Piątkowski et al., 2013, p. 3]. At the regional level, it is still not clear how the issue of private sector investment in RTD will be tackled and what the basis for an eventual assessment of the success or failure of a given specialisation will be [Piątkowski et al., 2013, p. 29][6].

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[6] However, if one takes into account the level of regional orientation on pro-innovative development paths that is measured by the proportion of pro-innovative objectives to all the objectives of Regional Development Strategy (RDS) the situation is a little bit different. Analysing this indicator, the Development Strategies of the Kujawsko-Pomorskie region, the Świętokrzyskie region and the Warmińsko-

Smart specialisations are based on combinations of branches and technologies. In the analysed regions they have been defined in different ways. In the Warmińsko-Mazurskie region, three selected specialisations: water economy, high quality food and wood and furniture have their specificities but also common areas and problems. The Development Strategy of Warmińsko-Mazurskie 2025 underlines the importance of the following horizontal issues: ICT, financing, logistics (poor transport accessibility and internal consistency), fairs and promotion (using existing fair and congress infrastructure) and public and business protection [*Strategia rozwoju społeczno-gospodarczego…*, 2013, p. 70]. The criteria for the selection of smart specialisations in the Kujawsko-Pomorskie region were: innovative potential, economic results, effects relevant to the Strategy and beneficiaries. With regard to the latter criterion, a broad spectrum of beneficiaries was taken into account (networks of suppliers, subcontractors, producers of final products, service suppliers, universities and R&D institutes), [*Regionalna Strategia Innowacji Województwa Kujawsko-Pomorskiego…*, 2015, p. 61]. In the Opolskie region, it has been assumed that smart specialisations occur when specified technology or its product is present in each of three phases of regional transfer of knowledge. Therefore smart specialisations can be identified in a region if specified technologies and/or their products are or become simultaneously:

1.  a research object of regional R&D sector (institutes, laboratories and universities located in the region),
2.  a subject to pilot implementation projects conducted by an enterprise located in the region,
3.  a subject of purchase or sale at the regional and supra-regional market [*Regionalna Strategia Innowacji Województwa Opolskiego…*, 2014, p. 105].

When technology complies with all the three criteria it is recognized as smart specialisation. If only two criteria are met it is identified as potential smart specialisation. The fulfilment of one criterion enables it to be classified as regional specialisation (manufacturing or use), [*Regionalna Strategia Innowacji Województwa Opolskiego…*, 2014, p. 107]. In Świętokrzyskie two groups of smart specialisations were identified: key and horizontal specialisations. ICT, renewable energy development and fair and congress infrastructure should contribute to dynamic development of the key specialisations [*Strategia Badań i Innowacyjności (RIS3)*, 2014, pp. 32-33]. The implementation of smart specialisations in the Świętokrzyskie region is divided into three phases: 1. phase (2014) – preparation, 2. phase (2015-2016) – testing, 3. phase (2017-2020+) – improving and acceleration. "Population" of smart specialisations shall be all the enterprises operating in identified four specialisation areas. A priority target group shall be enterprises with a high growth potential and management able to use public resources effectively. This group should generate value added for the whole region [*Strategia Badań i Innowacyjności (RIS3)*, 2014, pp. 45-46]. Smart specialisations and methods of their identification in selected Polish regions are presented in Table 2.

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Mazurskie region might be considered as the most oriented on innovativeness, in which all the objectives of the RDS contain an innovativeness component. Simultaneously, Regional Innovation Strategies (RIS) of these three regions are as closely as possible to the RDS [Plawgo et al., 2013, p. 62].

TABLE 2.

## Smart specialisations in Polish regions and their methods of identification

| Region | Smart specialisations with reference to EU RIS3 priorities | Methods of identification |
|---|---|---|
| Kujawsko-Pomorskie | 1. Food safety and personalized food-processing, fertilizers, packages; <br> 2. medicine, medical services, health tourism; culture, arts, creative industries; <br> 3. tools, moulds and plastic products; <br> 4. automotive, technical transportation means, industrial automation; <br> 5. processing of information, multimedia, software and ICT; <br> 6. bio-intelligent specialisation: natural potential, environment, energy; <br> 7. transport, logistics and trade: waterways and land routes; <br> 8. Cultural heritage, art, creative industries | Smart specialisations identified precisely, not as branches or technologies but as mutual dependency chains. <br> Methods of identification: <br> – foresight; <br> – analysis of the strongest regional branches; <br> – analysis of R&D potential (particularly science and technology parks); <br> – public consultation. <br> Process of implementation and monitoring precisely defined in RIS. |
| Opolskie | 1. *group of technologies – smart specialisations* (polymers, rubber and plastics, organic chemicals, cleaning products, energy-efficient construction, cement and concrete, wood, power systems, design and manufacture of machines and equipment, metals, fuel production, manufacture of motors, high voltages, plant production, milk processing) <br> 2. *group of technologies – potential smart specialisations* (health and physiotherapy products, spatially integrated regional tourism product, integration process of system of intermodal environmentally friendly transport) | Choice of areas, in which innovations go through all the stages of technology transfer (R&D, using in production, expansion on the regional and supra-regional market) and technologies used in the region and providing products and services. <br> Methods of identification: <br> – quantitative and qualitative approach (foresight); <br> – identification of development areas, key scopes of activities and groups of key regional technologies. <br> Systematic collection of data and analysis of indicators provided in Regional Development Strategy (RDS) and RIS. |
| Świętokrzyskie | 1. *key specialisations*: resource-efficient construction; metal & foundry industries; health & wellness tourism; modern agriculture and food processing; <br> 2. *horizontal specialisations:* energy efficiency; ICT; conferences & fairs; | Specialisations included in recently prepared RIS3. <br> Methods of identification: <br> – analysis of R&D potential; <br> – analysis of economic specialisations; <br> – foresight; <br> – market selection (auto-selection); <br> – public consultation. <br> The RIS3 foresees a mid-term (in 2016) and final evaluation (in 2020). |
| Warmińsko-Mazurskie | 1. water economy (accommodation and biological renewal, transport, sports, tourism, agri-food industry, machinery, yachts, environment, science); <br> 2. high quality food (aqua and animal farming, food processing, manufacturing and services for livestock, production of agro machineries, and processing and disposal of farm waste, science); <br> 3. wood and furniture (furniture production, carpentry, wood processing, design services and maintenance of wooden goods, science); | Smart specialisations defined as groups of related branches on the basis of the works of two projects teams (external and internal). Consultations of Socio-Economic Development Strategy for the Warmińsko-Mazurskie Region 2025 (SEDS) carried out with authorities of Pomorskie and Podlaskie. A new mechanism of actualization is not planned because within the region operates electronic Monitoring System of Strategy used for SEDS. On-going evaluation is planned for 2018/2019, ex-post evaluation for 2026. |

Source: Authors based on: [*Regionalna Strategia Innowacji Województwa Kujawsko-Pomorskiego…*, 2014; *Regionalna Strategia Innowacji Województwa Opolskiego…*, 2014; *Strategia rozwoju społeczno-gospodarczego województwa warmińsko-mazurskiego…*, 2013; *Strategia Badań i Innowacyjności (RIS3)…*, 2014].

In 2015, the Board of the Świętokrzyskie region has accepted the list of the selected consortia for development of smart specialisations of Świętokrzyskie [http://www.sejmik. kielce.pl]. The consortia are represented by coordinators acting as market makers for a given smart specialisation. Enterprises engaged in various activities in the area of smart specialisations expect demonstration of advantages which can accrue if they invest in R&D. Therefore, it is planned to develop a business plan for each smart specialisation in the form of so-called "process sheet" presenting transformation process of a given sector, specifying aims, sources, reference values, the acceptance level of the market and the level of the return on public investment [*Strategia Badań i Innowacyjności (RIS3)*, 2014, p. 45, quoted after Czyżewska, Golejewska 2016, pp. 74-75].

The Warmińsko-Mazurskie region has identified narrow specialisations which can be recognized as specialisation niches. They correspond to potential of the region. Smart specialisations are reflected in Regional Operational Programme of Warmińsko-Mazurskie 2014-2020. In some measures the compliance with chosen specialisations is an essential requirement for funding that excludes many companies from possibility of applying. It can raise question, why one of the poorest regions in Poland limits the range of specialization so much but on the other hand if one want to be perfect in everything usually one is not perfect in anything.

Smart specialisations in Kujawsko-Pomorskie are reflected in the Regional Operational Programme of Kujawsko-Pomorskie 2014-2020. Several projects can be carried out and financed through the Regional Operational Programme if they are in compliance with the list of regional smart specialisations. Moreover, monitoring, evaluation and update of the regional innovation strategy containing smart specialisations will be funded from the technical assistance operational programme [*Regionalny Program Operacyjny Województwa Kujawsko-Pomorskiego…*, 2014].

Smart specialisations of the Opolskie region have also their transposition in the Regional Operational Programme of Opolskie 2014-2020, in particular with reference to the R&D activities of regional companies. As in the case of Kujawsko-Pomorskie, projects that are in compliance with the regional smart specialisations can be funded from the Regional Operation Programme [*Regionalny Program Operacyjny Województwa Opolskiego…*, 2014].

In general, as the regional operational programmes 2014-2020 are ongoing, we still need evaluation reports to see how smart specialisations have been in practice transposed into regional economies.

The issue of regional specialisations followed a thorough consultation process. Given the fact that the process of identification of smart specialisations took place differently in individual regions, the degree of complexity of regulations regarding specialisations in strategic documents was also diverse. It is indeed difficult to say today whether the above specialisations become real specialisations fostering development and competitiveness of the regions [Dziemianowicz et al., 2014].

## 4. Conclusions

The process of smart specialisation can be applied in all types of regions. The least innovative Polish regions selected for empirical analysis in the paper are facing numerous problems, such as low public R&D expenditure, low level of entrepreneurial activity, slow development of the service sector or weak linkages between science and economy. In less developed regions one can also observe the immature institutional framework and a lack of trust among regional stakeholders. Moreover, instead of developing their own research and innovation strategies based on thorough understanding of socio-economic preconditions, in many instances regions with less developed R&I systems design imitative regional innovation strategies, based on foreign best practices.

The approach to the identification process of smart specialisations in Poland was diverse. Depending on the maturity level of work on updating Regional Innovation Strategies, awareness of competitive advantages at the sectoral and technological level, used methods and technics and other factors, different concepts of their identification have been adopted. In consequence, each region has slightly different vision how the monitoring and evaluation processes should run. Evaluation system should aim at verification of expected and achieved effects of implementation of smart specialisations, show achievement of objectives, adjust prepared action plans, as well as respond to the changes in the environment. The suggested institutional solution could be the use of existing steering groups on evaluation at regional level, creation of subgroups on smart specialisations and steering group on evaluation of smart specialisations at national level [Stawicki et al., 2014].

Smart specialisations can be identified in different ways. The results of the empirical analysis have shown that methods of identification of smart specialisation in the least innovative Polish regions are quite similar. Polish regions selected specialisations as groups of industries, groups of technologies (smart and potential smart specialisations) or key and horizontal specialisations.

As stated by Dziemianowicz et al. [2014], the approach of regional smart specialisations gives a prominent role to cluster initiatives. Clusters can become an essential element of identification of priority areas and implementation of Regional Innovation Strategy. It is therefore essential to support regional cluster initiatives in conjunction with regional smart specialisations.

It is expected that RIS3 strategies should help regions to create their competitive advantage and overcome at least some of socio-economic and innovation challenges, however their results are expected once the strategies are fully implemented which indicates some avenues for further research. On the other hand, it is questionable whether implementation of the smart specialisation concept will not deepen regional disparities in the European Union. But still it will be possible to assess the level of regional disparities in a medium-time or in a long-time perspective.

**The authors' participation in the preparation of the article**

Dorota Czyżewska-Misztal, Ph. D. – Introduction – 50%, Innovation challenges for less developed regions in Europe – 70%, The least innovative Polish regions and their advancement in the smart specialisation process – 30%, Conclusions – 50%.

Anna GOLEJEWSKA, Ph. D. – Introduction – 50%, Innovation challenges for less developed regions in Europe – 30%, The least innovative Polish regions and their advancement in the smart specialisation process – 70%, Conclusions – 50%.

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# A CLASSIFICATION OF POLISH HOUSEHOLDS BASED ON A CREDIT PORTFOLIO AND DEBT SERVICE RATIO[1]

**Summary**

The aim of this paper is to show the diversity of Polish households' financial behavior in terms of debt as well as an identification of households that are characterized by a high debt to income ratio. The article also attempt to assess the debt to income ratio as a measure of households over-indebtedness. To achieve the main objective, the cluster analysis method was used. Based on the households credits portfolio and the level of debt to income ratio, 11 homogeneous groups of households were generated. Five of them were characterized by a high debt to income ratio (>30%), which classify them as over-indebted.

**Key words:** over-indebtedness, Polish households, debt to income ratio, credit portfolio, cluster analysis

**JEL**: D10, D14

## 1. Introduction

The increase of households debt level is characteristic of most developed economies [Bloxham, Kent, 2009]. Moreover, in the theory of economics the debt is perceived as an instrument stabilizing the level of household consumption in time [Gumy, 2007; Barba, Pivetti, 2009; Świecka, 2009], which is directly related to the life-cycle hypothesis [Modigliani, Brumberg, 1954]. In the early stages of the life cycle of a household, when the demand for funds is high and the level of savings is small, a credit plays an important role. Therefore, saving and borrowing of households are mechanisms for smoothing consumption in time. Households use credits when their incomes are low and save when their income increases [Świecka, 2009; Vandone, 2009; Betti et al., 2001].

However, the dynamic increase in the volume and value of loans provided to households, together with financial mismanagement and a lack of financial awareness, due

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in large part to the scarcity of financial education, can contribute to over-indebtedness [Bywalec, 2009; Świecka, 2008, 2009]. It is therefore necessary to distinguish two types of terms: indebtedness and over-indebtedness [Russell et al, 2011; Vandone, 2009; Gumy, 2007; Disney et al., 2008].

Overindebtedness is a relatively new term which, because of its complex and multidimensional nature has not yet been clearly interpreted [Vandone, 2009; Świecka, 2008, 2009; European Commission, 2008; Keese, 2009; Kempson, 2002; Schicks, 2010; Bricks, McKee, 2010; Carprntier, van den Bosch, 2008; Bryan et al., 2010; Russell et al., 2011; D'Alessio, Iezzi, 2012; Bridges, Disney, 2004; Kempson et al., 2004; Betti et al., 2007; OXERA, 2004].

So far many different indicators of over-indebtedness was created. Household can be regarded as being at risk of over-indebtedness if a significant part of their income is spent on debt service. Therefore, one of the most often measures of over-indebtedness is debt service ratio. For gaining information on whether the debt servicing costs are not excessive, it is necessary to determine the threshold of this indicator. In the literature it is taken at the level 20-50% [Rebiere, 2007; Carpentier, Van den Bosch, 2008; DeVaney, 1994; DeVaney, Lytton, 1995; Faruqui, 2006; MORI 2003; OXERA, 2004; D'Alessio, Iezzi, 2012; Beer, Schürz, 2007; Kempson, 2002].

Another indicator used in the researches of over-indebtedness is margin[2] [Zajączkowski, Żochowski, 2007; Johansson, Persson, 2006]. Margin is the amount that stays in a household after deducting current income by the amount allocated for debt repayment and other fixed expenditures. The negative margin may indicate financial problems of household. It means an inability of household to repay debt and basic expenses from a current income.

Other indicators measuring over-indebtedness are based on arrears [D'Alessio, Iezzi, 2012; Carpentier, van den Bosch, 2008; Bryan et al., 2010; Disney et al., 2008], the number of credit commitments [D'Alessio and Iezzi 2012 Bryan et al., 2010 Disney et al. 2008] or a subjective assessment of the financial situation of household [D'Alessio, Iezzi, 2012; Carpentier, van den Bosch, 2008; Bryan et al., 2010; Disney et al., 2008].

The aim of this paper is to show the diversity of Polish households' financial behavior in terms of debt as well as an identification of households that are characterized by a high debt to income ratio. The article also attempt to assess the debt to income ratio as a measure of households over-indebtedness.

## 2. Data and methods

The study was based on data from Household Budget Survey in 2011, which was conducted by Central Statistical Office of Poland. The study involved 37375 households, of which 30% were indebted. Analysis was performed on indebted households with the use of cluster analysis.

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[2] Margin was determined by basic types of expenditure method – household income is reduced by the amount of real incurred fixed expenditures such as rent, energy and by expenditures on basic goods and services such as food, transport, housing, water.

The cluster analysis, non-hierarchical, k-means method was used to study the composition of households' debt portfolio. Due to the size of research sample and qualitative dependent variable data-mining module was used. The basic criterion for the classification using cluster analysis were different financial products, as well as the level of debt service ratio. Cluster analysis was conducted on the basis of 5 variables representing different forms of debt (mortgage, debt in credit card, credit in bank, credit in other institutions and loans from private persons) as well as debt to income ratio. If the level of this indicator is bigger than 30%, then a household is perceived as over-indebted. The fact of declaring (yes-no) by a household the listed above forms of debt and the level of debt to income ratio (yes=the level of indicator is bigger than 30%) was a basis for identification and naming the types of households (Table 1).

The obtained results were the basis for profiling clusters (types of households). The profiling was conducted by cross-tabulation using contingency tables, which show the simultaneous distribution of several features.

## 3. Results

Conducted cluster analysis based on the structure of households credit portfolio and the level of debt to income ratio allowed to distinguish and identify 11 homogeneous groups of households. Five of them, clusters 1, 3, 6, 8 and 9, were characterized by a high level of debt-to-income (over 30%), which classifies them as over-indebted in the light of debt service ratio (Table 2). Distinguished clusters were characterizes by following features:

**Cluster 1** – the least numerous and most diverse in terms of structure of credit portfolio. It is formed by only 103 households, this is less than 1% of analyzed population. The mortgages dominated in a credit portfolio of this group of households (19% of disposable income). Also bank credits (6% of disposable income) and credits in other institutions (9% of disposable income) were popular in these households. Debt service ratio, compared to other groups with a high debt to income ratio, was relatively small and amounted 38%. Margin in this cluster amounted as much as PLN 1925 and was the highest among households where debt to income ratio exceeded 30%. Relatively low was in this group the percentage of households with insufficient income to cover debt repayment and basic expenses related with functioning of household (15.5%). The high level of margin and a low percentage of households with a negative margin was affected by very high income received by the representatives of this cluster. Average equivalent income in the group amounted more than PLN 2,880 and thus was the highest among all distinguished clusters. In addition, it is worth emphasizing that as many as 64% of households of this cluster receives the highest income (fifth quintile).

Households from the first cluster were characterized by the following socio-economic features:

–   relatively low age of the head of household (65% of households were run by people aged 25-44),

–   relatively high percentage of households with dependent children,

- dominance of households run by staff of private or public sector (almost 90%),
- relatively high proportion of households (30%) of small towns (from 20-99 thousand inhabitants),
- a high level of education of householders (more than half (53%) of households led by people with higher education).

**TABLE 1.**

**Indicators of cluster analysis – having (YES) or not having (NO) particular kinds of credits and debt to income ratio >30%**

| Indicators | Clusters | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Mortgage | yes | no | no | yes | yes | yes | no | yes | no | no | no |
| Debt in credit card | no | no | no | no | no | no | yes | no | no | no | no |
| Credit in bank | yes | yes | yes | yes | no | no | no | yes | yes | no | no |
| Credit in other institutions | yes | no | no | no | no | no | no | no | yes | yes | no |
| Loans from private persons | no | no | no | no | no | no | no | no | no | no | yes |
| Debt to income ratio >30% | yes | no | yes | no | no | yes | no | yes | yes | no | no |
| Numer of households | 103 | 6391 | 648 | 378 | 1464 | 305 | 452 | 236 | 161 | 749 | 164 |
| % of households | 0.9 | 57.8 | 5.9 | 3.4 | 13.2 | 2.8 | 4.1 | 2.1 | 1.5 | 6.8 | 1.5 |

Source: The authors' own compilation based on Household Budget Survey in 2011.

**Cluster 3** – the largest in terms of number, among clusters where the value of household debt exceeds 30% of their income. It counts 648 households, which is nearly 6% of the analyzed population. This cluster is characterized by the highest debt to income ratio (63%). Households representing this cluster were indebted mainly in banks and this kind of credit absorbed almost 60% of their income. Little significance in this group had: debt in credit card (3% of income) and loans from private persons (2.4% of incomes). Households in this cluster were characterized by relatively low equivalent income (PLN 1548). As much as every fourth household in this group received equivalent income at a level of the first quintile, and almost one in five (18.4%) at the second quintile. Low incomes and high debt-to-income ratio translated in this cluster into the highest percentage of households with negative margin (37%). The average value of margin in a whole cluster, was the lowest among all distinguished groups of households and it amounted only PLN 221.

Households from the third cluster were characterized by the following socio-economic features:
- a relatively high percentage of single-person households (22%),
- a relatively high percentage of retirees and pensioners households (41%) and farmer households (9%),

–   the dominance of households from rural areas (50%),
–   a high age of the head of household (average 51 years), almost half of the
    households in this cluster were run by persons over 55, and every fifth
    household – by a person over 65,
–   low education of the head of household, half of the households were run by
    persons with at least primary education (16%) and vocational/middle school
    education (35%).

**Cluster 6** was represented by 305 households (2.8%), where debt level exceeded
30% of their incomes. The credit portfolio of households in this cluster was dominated
by mortgages, which determined almost 60% incomes. On the other hand, little
significance had debt in credit cards (3.8% of income). The ratio of debt to income in
households from this cluster, similar to cluster 3, was very high and amounted as much
as 63%. However, in contrast to the households from cluster 3, households from this
group were characterized by very high level of income. In this group of households
The average equivalent income amounted to PLN 625. More than half of households from
cluster 6 (56%) received the highest income (quintile V), what translated into a higher
level of margin (PLN 984) and a lower percentage of households with a negative margin
(18%).

Households from the sixth cluster were characterized by the following socio-economic
features:
–   a relatively high percentage of single-person households (22%),
–   a relatively high percentage of self employed (21%),
–   a relatively high percentage of households with one (24%) or two (19%)
    dependent children,
–   relatively high percentage of households (50%) living in big cities (with
    population over 500 thousand inhabitants),
–   low age of head of the household (average 38 years old), as much as ¾ of
    households are run by persons below 44 years old),
–   high level of education of head of the household.

**Cluster 8** was formed by 236 households (2.1%), where the average level of debt
to income ratio amounted 44%. In a credit portfolio dominated mortgages (25% of
income) and credits in banks (16% of income). Households from this cluster are
characterized by quite high equivalent income (average PLN 2333). Half of the
household from this cluster had the highest level of income (quintile V).

Moreover, household from cluster 8, generally well coped with debt repayment
and covering basic expenses. Only 15% of households had a negative margin. Although,
considering relatively high income, the level of margin was in these households not
high and amounted about PLN 1 000.

**Synthetic characteristics of households with high debt to income ratio (> 30%)**

| Features | Clusters | | | | |
|---|---|---|---|---|---|
| | **1** | **3** | **6** | **8** | **9** |
| Dominant type of credit (% of income) | mortgage (19%) in banks (6%) in other institutions (9%) | in banks (57%) | mortgage (59%) | mortgage (25%) in banks (16%) | in banks (17%) in other institutions (28%) |
| Debt to income ratio | 38% | 63% | 63% | 44% | 49% |
| margin | PLN 1 925 | PLN 221 | PLN 984 | PLN 1 056 | PLN 321 |
| % of households with negative margin | 16% | 37% | 18% | 15% | 32 % |
| Age of a head of household | low | high | low | low | high |
| Equivalent income | very high (PLN 2884) | low (PLN 1548) | very high (PLN 2626) | quite high (PLN 2333) | average (PLN 1720) |
| Biological type of family | households with dependent children | single-person households | single-person households, couples with one or two dependent children | couples with one or two dependent children | single-person households |
| Socio-economic group | staff of private or public sector | retirees and pensioners, farmers | self employed | staff of private or public sector | retirees and pensioners |
| Type of place | small cities with population 20 – 99 thousand inhabitants | village | very big cities with population over 500 thousand inhabitants | – | village |
| Education of a head of household | high | low | high | quite high | low |
| Sex of a head of household | – | – | – | man | – |

Source: The authors' own compilation based on Household Budget Survey in 2011.

Households from the eighth cluster were characterized by the following socio-economic features:

– low age of the head of household (average 40 years old), 70% of households were run by people below 44 years old,
– a relatively high percentage of households with one (25%) or two (25%) dependent children,
– dominance of households run by staff of private or public sector (75%),
– quite high level of education of a head of household. More than 40% of households were run by persons with higher education (40%), and almost 40% households were run by persons with secondary education,
– relatively high percentage of households run by men (72%).

**Cluster 9** consist of only 161 households (1.5% of analyzed population). The debt to income ratio in this group of households amounted 49%. In a debt structure dominated credits from other institutions (28% of income) and credits in banks (17% of income). Little significance had debt in credit cards (3.5% of incomes) and loans from private persons (1% of income). Households classified to cluster 9, were characterized by average level of equivalent income (PLN 1720), very low margin (PLN 320) and high percentage of households with negative margin (32%).

Households from the ninth cluster were characterized by the following socio-economic features:

– the highest among all distinguished clusters age of the head of household (average 52 years old), 75% of household be run by people over 45 years old,
– a relatively high percentage of single-person households (17%),
– a relatively high percentage of retirees and pensioners households (28%),
– almost half of the households were located on village (44%),
– low level of education of a head of household, relatively high proportion of households run by persons with primary school and lower education (15%) and vocational or middle school education (32%).

The other six distinguished groups of households (clusters: 2, 4, 5, 7, 10, 11) were characterized by a low debt to income ratio, not exceeding 30% (table 3). Therefore in the light of the criterion of debt-to-income indicator, these are households without problem of over-indebtedness.

**TABLE 3.**

**Synthetic characteristics of households with low debt to income ratio (<30%)**

| Feature | Clusters | | | | | |
|---|---|---|---|---|---|---|
| | 2 | 4 | 5 | 7 | 10 | 11 |
| Dominant type of credit (% of income) | in banks (11%) | mortgage (12%) in banks (6%) | mortgage (15%) | credit card (16%) | in other institutions (10%) | from private persons (16%) |
| Debt to income ratio | 11% | 19% | 16% | 17% | 10% | 16% |
| margin | PLN 1 533 | PLN 3 107 | PLN 3141 | PLN 1792 | PLN 1956 | PLN 612 |
| % of households with negative margin | 7% | 0.5% | 2% | 11% | 6% | 19% |
| Age of a head of household | high | low | low | average | average | large age span |
| Equivalent income | average (PLN 1620) | the highest (PLN 2734) | very high (PLN 2730) | average (PLN 2115) | average (PLN 1869) | low (PLN 1163) |
| Biological type of family | couples with dependent children and others | couples with dependent children | couples with dependent children | single-person household | couples with dependent children and others | single-person household, single-parent families |
| Socio-economic group | retirees and pensioners | staff of private or public sector | self employed | retirees and pensioners | – | retirees and pensioners, living on unearned sources |
| Type of place | village | – | very big cities with population over 500 thousand inhabitants | big cities with population over 100 thousand inhabitants | small cities with population up to do 99 thousand inhabitants | – |
| Education of a head of household | low | quite high | high | quite high | low | very low |
| Sex of a head of household | - | man | man | - | - | woman |

Source: The authors' own compilation based on Household Budget Survey in 2011.

## 4. Summary and conclusions

Conducted cluster analysis based on the structure of households credit portfolio and the level of debt to income ratio allowed to distinguish and identify 11 homogeneous groups of households. Five of them were characterized by a high level of debt-to-income (over 30%), which classifies them as over-indebted in the light of debt service ratio. On the basis of the cluster analysis the following conclusions can be drawn:

–   The high debt to income ratio (over 30%) do not necessarily mean financial problems of households. In the group of households with the highest debt-to-income ratio (63%) the proportion of households with a negative margin was 18%, which means that in about every fifth household income was not sufficient to cover the debt repayment and basic costs associated with functioning of household. In turn, in a group of households where the debt to income ratio was much lower (49%), the percentage of households with a negative margin was almost twice as high (32%). In contrast, in households with very low debt service ratio (19%), almost one fifth had a negative margin.

–   Problems with covering basic costs associated with functioning of household and debt repayment had mainly households run by poorly educated people with low or middle-income. In case of households with high incomes led by people well educated, high level of debt to income ratio did not lead to financial problems.

–   Households with mortgages relatively rarely had negative margin. They are characterized by high or very high incomes and even high debt burden did not cause financial problems in these households. The high debt to income ratio, related with drawdown of the mortgage, does not generate financial problems, and it should be assumed that it appeared mainly due to the specific nature of this kind of credit. Mortgages are characterized with quite high amounts of repaid installments and thus in relation to other categories of credits, the debt to income ratio in case of mortgage credits is generally high.

Based on the conducted research it can be stated that high level of debt to income ratio do not always reflect the negative financial situation of household. A much better measure of over-indebtedness seems to be negative margin which indicates a real financial problems of household.

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# IMPLICATIONS OF ARBITRATION AND MEDIATION IMPLEMENTATION FROM THE PERSPECTIVE OF BIALYSTOK

### Summary

In the era of progressive economic and trade cooperation at a national and international level, the number of disputes related to them is increasing. Statistics overviewing the activity of Polish courts dealing with proceedings in commercial cases confirm the fact. The development of alternative disputes resolution instruments, in particular regarding arbitration and mediation, gives rise to hope for remedying the situation. At the moment their scope is of little significance related to the entirety of legal transactions. Moreover, there are areas virtually devoid of them. The Podlaskie region is one of such areas. Recently, collaboration of the Chamber of Industry and Commerce in Bialystok and the Faculty of Law of University of Bialystok resulted in the launch of the Arbitration and Mediation Center of the Podlaskie region. As a part of the project, mediation services were commenced and further steps to launch the Eastern Court of Arbitration were taken. It seems that the undertaking can bring satisfactory results for socio-economic trading. The assumption will be possible to be verified in practice in the nearest future.

**Keywords**: arbitration, mediation, alternative disputes resolution instruments.

**JEL**: J52

## 1. Introduction

In recent years, there has been a significant progression of complex interdependencies between economics and law. On the one hand, as a rule, legislative processes take into account their economic impact, on the other hand, more often they tend to be a consequence of economically relevant processes or facts. Therefore, popularization of the concept of economic analysis of law should be emphasized. This is an interdisciplinary field that combines legal science with economic science. "Based on principles and models coming from economics, the research method of economic analysis of law puts particular emphasis on achieving maximum efficiency of regulations, which means abandoning a dogmatic analysis of law to identify factual and actual results achieved by specific legislative solutions" [Maraszek 2011, p. 8; more broadly: Beldowski,

Metelska-Szaniawska 2007, pp. 51-69; Tokarczyk 2007, pp. 175-184]. Several economic goals can be pointed out in law. They include:

– building an effective wealth deployment system;
– settlement of economic conflicts between legal entities;
– increase in individual and social well-being concerning tangible and intangible goods;
– achieving minimum economic efficiency [Stelmach, Brożek, 2007, p. 208].

The outlined phenomenon should be thus particularly considered with regard to such subjects as alternative disputes resolution (ADR), where a legal or economic perspective approach proves insufficient to present its compound character and implications.

The purpose of this paper is to disseminate the idea of ADR through presenting its specific conditions from a local perspective of Eastern Poland. The institution of ADR in Western European countries is well-established and multiple theoretical and practical studies have been published regarding the topic [see e.g. the *Arbitration, dispute resolution*…]. Also, Polish Law & Economics literature on ADR gives theoretical fundaments for a scientific account of the subject. The paper's aim is, however, to give an image of mediation and arbitration in the spirit of the Law in Action concept – showing a practical impact of applying a certain legal solution on the region's economy in the most important moment of taking action.


## 2. Excessive length of judicial proceedings in the Polish courts of general jurisdiction

Entrepreneurs embody the economic and legal interdependencies. Of course, a voice from a single trader does not translate directly into a legal effect. As such voices are heard in a large number – "drops of water wear away a stone". The dependence is very clearly reflected in the issue of the excessive length of judicial proceedings. It is a situation when the time from the beginning to the end of judicial proceedings extends to an extent in which ensuring the immediacy of justice is impossible. In other words, it comes too late to provide the sense of justice, public or private interest, as well as the image of courts and social trust towards them. Naturally, when there are objective or subjective reasons (e.g. particular complexity of facts, complexity of legal issues, force majeure, etc.), a reasonable extension of court proceedings is possible. However, while the same excessive length of judicial proceedings is a bad thing, its progression becomes alarming. The progression in the average duration of court proceedings in commercial cases is of a particular concern, as shown in the following chart (see Chart 1.).

CHART 1.

**The average duration of court proceedings in commercial law cases in first instance in regional and district courts in 2010-2014 (in months)**
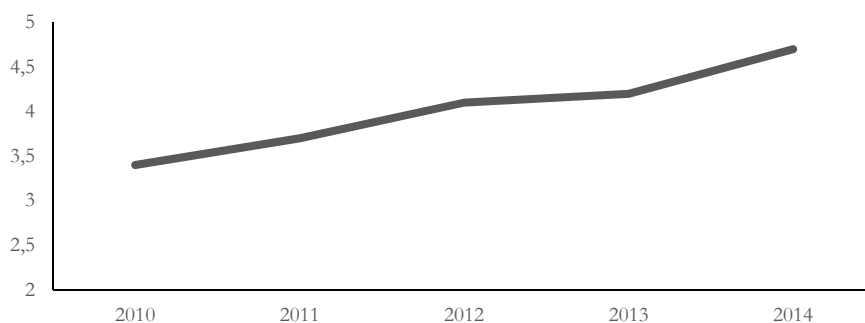


Source: own study based on: [*Complaint against excessive length of proceedings…*, 2015, s. 9].

The average duration of proceedings in commercial law cases in the period increased by almost 40% (i.e. by more than a month in relation to the average value for 2010 of approx. 3.5 months).

High hopes for remedying the situation have been pinned on the European Court of Human Rights in Strasbourg, which, referring to complaints by individuals dissatisfied with decisions of national courts (payable under the European Convention on Human Rights and Fundamental Freedoms after the exhaustion of the national course of proceedings), strongly denounced the excessive length of judicial proceedings [http://bip.ms.gov.pl/pl/prawa-czlowieka/europejski-trybunal-praw-czlowieka/podstawowe-informacje-dotyczace-skladania-skargi-do-europejskiego-trybunalu-praw-czlowieka/ (accessed: of 18.04.2015); Keller, Forowicz, Engi, 2010].

Unfortunately, international courts (including the Strasbourg Court) began to fall in chronicity, which became the highlight of recent complaints about the excessive length of the EU criminal justice system [http://www.lex.pl/czytaj/-/artykul/ets-bedzie-mogl-byc-pozwany-za-przewlekly-proces, as of 18.04.2015]. Moreover, the Strasbourg Court was engaged generally in criminal law cases (which in the social perception are associated with the essence of human rights), and subsequently Polish cases related to civil, administrative, etc. law have started to occur. Although the Court has repeatedly stated delays of Polish courts and the state had to bear consequences, there has been no sanitation.

As reasons for the excessive length of judicial proceedings, a prolonged waiting period for experts' opinions and the lack of an adequate system controlling their qualifications are frequently mentioned [Information on the activities of the Ombudsman in 2013 and on observance of human and civil rights and freedoms, 2014, p. 49]. Parties rebel against the pathological excessive length of judicial proceedings. On the one hand, it manifests in disapproval of the public and numerous "watchdog" projects

(mobilizing the judiciary to act), on the other hand, an increase in the number of formal complaints about excessive length of proceedings is noticeable (see Table 1.).

TABLE 1.

**The number of complaints about excessive length of proceedings taking into account the mode of case settlement and the amount of awarded damages**

| Year | Submitted | Settled | | | | | | Total amount of compensation awarded (PLN) |
| | | Overall | including | | | | | |
| | | | awarded entirely or partially | dismissed | rejected | in other ways | |
|---|---|---|---|---|---|---|---|
| **2010** | 158 | 149 | 44 | 68 | 26 | 11 | 93 500 |
| **2011** | 259 | 255 | 69 | 95 | 60 | 31 | 177 600 |
| **2012** | 327 | 314 | 113 | 108 | 77 | 16 | 253 517 |
| **2013** | 558 | 516 | 125 | 204 | 125 | 62 | 295 874 |
| **2014** | 732 | 732 | 177 | 255 | 227 | 73 | 414 300 |

Source: own study based on: [*Complaint against excessive length of proceedings…*, 2015, p. 10].

In comparison to the data from 2010 the number of complaints on the excessive length of proceedings in commercial cases has increased almost fivefold. The total amount of adjudicated compensations is also growing with the same rate. Entrepreneurs base their businesses on the motto: "Time is money" and the excessive length of judicial proceedings makes the core of their claims outdated, completely destroying it, and even leading businesses to bankruptcy.

The accession of Poland to the European Union, the intensive implementation process of EU aid, as well as the natural socio-economic development (in three decades from the political transformation) resulted in an increase in the number of contentious commercial cases brought before courts (see Table 2.).

TABLE 2.

**The number of proceedings in commercial cases to be heard by courts in 2010-2014**

| Description | | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| **District courts** | | 26 669 | 34 008 | 46 598 | 60 938 | 72 047 |
| **Regional courts** | **first instance** | 6 707 | 7 535 | 10 309 | 13 348 | 15 454 |
| | **appeals** | 1 084 | 1 545 | 2 603 | 2 656 | 3 084 |
| **Appellate courts** | | 660 | 719 | 948 | 1 320 | 1 700 |
| **Total** | | **35 120** | **43 807** | **60 458** | **78 262** | **92 285** |

Source: own study based on: [*Quantitative analysis…*, 2015, p. 2].

The Ministry of Justice of Poland and the Presidents of Polish courts were faced with the necessity to bring a remedy the complex situation. Changes cannot always be introduced comprehensively, quickly and effectively. If it cannot be done directly, is it not possible to create an alternative or parallel solution? It seems that such a solution is provided by alternative dispute resolutions [Blake, Browne, Sime, 2014; Partidge, 2009; Paulsson, 2013; Rogers, 2014; Steffek, 2013].

### 3. Mediation and arbitration as key alternative dispute resolutions

Settling disputes in ways alternative to the court path has its origins in the ancient times. Relevant persons or institutions were engaged in a conflict resolution in a simpler, faster and cheaper way than it was a case at courts. The means of dispute settlement known then were mediation and arbitration. These forms generally have existed till today.

Contemporary arbitration operates on the basis of international agreements, European Union law, national legislation (codes, trade agreements, rules of arbitration courts, informal codes of ethics and customs). Arbitration court system in Poland is based mainly on the Code of Civil Procedure [Law of 17 November 1964. Part V]. In the light of its provisions, arbitration is conducted usually by a non-state entity that adjudicates on civil law disputes submitted to be resolved on the basis of the arbitration clause [*Report: Amicable settlement*…, 2014, p. 15]. The arbitration clause is an agreement between parties of a dispute (in the case of permanent consumer arbitration courts operating at the Trade Inspection Office – a contract between a consumer and an entrepreneur), whose purpose is to consent to submit a dispute arising between them to arbitration. In the content of such agreements an object of disputes or a legal relationship from which a dispute arose are primarily indicated [*Report: Amicable settlement*…, 2014, p. 15]. Commercial arbitration is of the greatest importance with regard to socio-economic trading.

Mediation (*mediare,* Latin – "to stay in the centre"), is based on voluntary and confidential meetings or activities of parties in conflict in the presence of a mediator (a neutral person, not involved in the dispute, "non-judge"), whose aim is to elaborate an agreement mutually acceptable by all parties in conflict (and not only with a favourable outcome for one of them, as it is in the case of a court order) [*Report: Amicable settlement*…, 2014, p. 7*; Regulating Dispute Resolution*…, 2014; Roberts, Palmer, 2005; Berger, 2009; Park, 2012; *Human Rights in International*…, 2009; Rogers, 2014]. "Parties themselves are in charge of the process and may organize it as they wish and terminate it at any time" [*Directive of 21 May 2008.*, Art. 13 justification]. The mediator makes sure interests of all parties are properly protected and works out a consensus acceptable by them. Mediation is not identical with the concepts of conciliation, arbitration, or negotiation. On the basis of EU law Member States courts of general jurisdiction were obliged to give a declaration of enforceability of such agreements, which content is not "contrary to their national law, including their private international law" [*Directive of 21 May 2008*, Art. 19 justification]. If Member State's law does not provide for enforceability of a specific

agreement, then also there are grounds to refuse granting the enforcement clause. The power of the clause is no different from the power of agreements concluded before courts. Unfortunately, so far Polish citizens apply this efficient alternative in a marginal way (see: Table 3.).

TABLE 3.

### The records of commercial cases in mediation in 2010-2020

| Description | | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| **District Courts** | number of cases in which parties were directed to mediation under a court order | 656 | 1 053 | 1 640 | 1 656 | 1 834 |
| | proceedings discontinued as a result of an approval of settlement reached before a mediator | 142 | 182 | 299 | 340 | 296 |
| **Regional Courts** | number of cases in which parties were directed to mediation under a court order | 192 | 376 | 739 | 1 156 | 1 262 |
| | proceedings discontinued as a result of an approval of settlement reached before a mediator | 27 | 71 | 129 | 195 | 251 |
| **Total** | | 1017 | 1682 | 2807 | 3347 | 3643 |

Source: own study based on: [*Quantitative analysis…*, 2015, p. 6].

## 4. The excellent alternative and yet unpopular

The unsatisfactory state has been further aggravated by unequal access to mediation and arbitration offered in the country, so that there are deficient areas in this regard, and sometimes even "blank spaces". The Podlaskie region is one of them. What is the reason? Is the local trading not in need of arbitration and mediation? Or rather is it about being accustomed to their absence in legal realities of the region? Probably, the fact that potential defendants do not know arbitration and mediation and the local palestra underestimates them, is also relevant. As it seems, the nature of the local society is a no less important cause of the current absence of arbitration and mediation in the Podlaskie region. It is manifested in the penchant for submitting disputes to courts, in almost instinctive submissions of appeals against judgments, complaints or requests for reopening of proceedings. These trends are beyond the common-sense approach preventing a conclusion of agreements beneficial to all parties in a dispute. It is certainly worth reversing.

Why should arbitration and extra-judicial mediation be favoured? Firstly, the methods are successfully used not only at the international and foreign level, but mainly in other regions of the country. It is worth underlining that thanks to use of alternative disputes resolution instruments the fundamental right of access to justice by companies, including reasonable duration of procedure, exposed by the Court of Justice of the European Union (CJEU) in the wide range of caselaw regarding the excessive length of judicial proceedings and the issue of remedies connected thereto (i.a. C-185/95 P Baustahlgewebe,

dated 17 December 1998; as well as more recent cases: C-385/07 P, Der Grüne Punkt – Duales System Deutschland dated 16 July 2009; C-385/07 P, Der Grüne Punkt case dated 16 July 2009; C-50/12 P Kendrion, dated 26 November 2013; C-58/12 P the Groupe Gascogne dated 26 November 2013; C-40/12 P Gascogne Sack Deutschland dated 26 November 2013), can be transformed into effective enforcement procedures.

In addition, regarding their advantages, the following features are worth mentioning: the possibility to select arbitrators and mediators (according to their competence and achievements, with respect to the merits of a dispute), the quality of proceedings, taking into account specificities of a particular case, in general a shorter time taken to resolve a dispute. For a change – in the judiciary system parties do not have any influence on how the judge will consider their case – whether it will be a matter of routine for them or maybe their initiation in the subject. In connection to it – the quality of hearings is diverse, they tend to be carried out meticulously, even taking into account details irrelevant to a case ("just in case"), resulting in inconveniences for parties and an extended time of proceedings. And it is not the only weakness of the judiciary system.

The question arises why, despite the obvious shortcomings in courts, commercial entities, guided by business logics, after all, still prefer them? In the doctrine it is generally believed that several key issues are determined as the criteria to compare the general justice system to arbitration and mediation. Firstly, understandable and measurable for everybody proceeding costs and fees which are varied (from low to very high – depending on an institution and the amount in dispute) and not charged to the state budget. In the general judiciary system the issue is regulated in an entirely different manner. In the budget for 2015 it is provided that for the activity of 339 courts (11 appellate courts, 45 regional courts, 283 district courts, 1 Institution of Budgetary Economy), the state will issue 6 692 742 thousand zlotys, and the revenues will amount to 2 129 163 thousand zlotys. The expenditure includes: compulsory social security (including emoluments of retired judges and family salaries), judiciary (units of courts and other activities), education (other forms of education specified separately). For example, the Court of Appeal in Bialystok will have the revenue of 121 076 thousand zlotys, and the spending is planned at the amount of 409 334 thousand zlotys [bip.ms.gov.pl/pl/dzialalnosc/budzet/download,2875,0.html (accessed: 13.04.2015)].

It should also be taken into consideration that during proceedings (generally shorter than court ones) a dispute settlement body (as already mentioned, a judge is not always an expert in the scope of a case, whereas an arbitrator / arbitrators or a mediator are chosen by parties according to their substantive competence), rules of evidence (more formalized in courts), confidentiality of proceedings (in courts, as a rule, open to the public, and in arbitration and mediation strictly confidential), level of communication intensity between parties during a case (in courts essentially there is none, in arbitration it is present and in mediation it is significant), problems with jurisdiction (in the judiciary system they occur more frequently), or results of settlement for each party (in court and arbitration – success on one party and loss for the other, in mediation a consensus is reached by both parties). The synthetic comparison between the general jurisdiction and arbitration and mediation is summarized in the table (see Table 4.).

TABLE 4.

## The comparison of the effectiveness of the general justice, mediation and arbitration

| Criteria | General justice | Arbitration | Mediation |
|---|---|---|---|
| Costs of proceedings | high | varied (from low to very high) | very low |
| Duration of proceedings | very long | varied | very short |
| Who decides? | judge | arbitrator / arbitrators | parties |
| Rules on presenting evidence | very formalized | formalized in varying degrees | none |
| Confidentiality | none | full | full |
| Communication between parties | none | little | intense |
| Problems with jurisdiction | present | varied | none |
| Result for parties | success / loss | success / loss | success for both parties |

Source: own study based on: [Pieckowski, 2012, p. 4].

## 5. Arbitration and mediation in the Podlaskie region

So far in Bialystok intense and effective efforts to launch an alternative system of justice in the field of arbitration and mediation have been made [more information about the initiative to create the Eastern Court of Arbitration: http://bialystok.tvp.pl/19083567/ w-bialymstoku-powstanie-wschodni-sad-arbitrazowy (accessed: 04.20.2015); http://www.podlaskie.strefabiznesu.pl/artykul/cel-wschodni-sad-arbitrazowy-w-bia lymstoku (accessed: 20.04.2015)]. Regarding them, the concepts of the Chamber of Industry and Commerce in Bialystok implementing the project "Centra Arbitrażu i Mediacji – projekt pilotażowy" (Arbitration and Mediation Centres – a trial project) and the Faculty of Law at University of Bialystok (originally the launch of arbitration was envisaged there) came together, which resulted in the actual project (the Faculty of Law provided personnel and substantial facilities, and the Chamber – organizational tasks and basic financial means), in which the Author is directly involved. Until now mediation as a part of the Podlaskie Arbitration and Mediation Center at the Chamber of Industry and Commerce in Bialystok was launched [http://www.iph.bialystok.pl/index.php?option =com_content&view=article&id=130&Itemid=212&lang=pl (accessed: 17.04.2015)], whereas the works on starting arbitration are ongoing. The Author suggested the name "Eastern Court of Arbitration", which was warmly welcomed by stakeholders, as well as by the socio-economic environment. The statutory and regulations of the institution [http://www.iph.bialystok.pl/wp-content/uploads/2015/10/Regulamin_Wschodniego _S%C4%85du_Arbitra%C5%BCowego_20150624.pdf (accessed: 17.06.2015)] were prepared and the Court started its operation [http://www.iph.bialystok.pl/wscho dni-sad-arbitrazowy (accessed: 17.06.2015)]. Will such a venture be profitable?

In commercial courts of the Podlaskie region, in order to resolve a dispute, parties have to wait. According to local practitioners (interview with Judge Tomasz Kaluzny [Więcko, 2015, pp. 9-10]; interview with Witold Karczewski and Maciej Bobrowicz, PhD [http://www.radio.bialystok.pl/gosc/index/id/119208 (accessed: 20.04.2015)]), arbitration allows for professional handling of cases. The range of specialists among judges, although it is relatively large, is not developed adequately to the complexity and diversity of legal transactions. Thus, either courts alone dodge unpopular categories of cases (e.g. questioning their jurisdiction), or defendants do not bring these issues to courts which do not specialize in the field. This is an opportunity for ADR, especially for arbitration. For instance, the author initiated governing civil disputes of local government units and disputes arising from their international (mostly cross-border) activities by the Eastern Court of Arbitration [cf. Perkowski, 2014, pp. 266-270; Perkowski, 2013, pp. 292-310; Perkowski, 2012, pp. 105-112].

Moreover, taking advantage of the cross-border location and excellent contacts of the Chamber of Industry and Commerce (based on its business successes) and the University of Bialystok (especially the Border University Network guaranteeing access to potential arbitrators and mediators from the East) in the East – the Eastern Court of Arbitration can specialize in settling commercial disputes related to cooperation in this business direction. These original competence assets seem important factors in the success of the newly-formed arbitration unit. Arbitration in the Podlaskie region is not only a novelty, but also an opportunity. Many authorities from entrepreneurs, practitioners to researchers are involved in its promotion, which makes it credible in its starting period. In addition, Bialystok is not "lackadaisical" in the market terms and legal expertise here is not expensive. This factor may be attractive from the perspective of entrepreneurs from other regions of the country.

## 6. Summary

The Eastern Court of Arbitration in Bialystok passed the planning stage successfully and currently it is in the phase of *sui generis* "embryonic development.". It initiated its activities in June 2015 and its operation is under observation. The assessment criteria are: increase in cases heard by the Eastern Court of Arbitration (in total), an average time for processing, a selection of the Eastern Court of Arbitration arbitrators, the quality and satisfaction of defendants (which should not be understood directly, but from the view of effectiveness of potential appeals from arbitrators' decisions). The procedural practice of the Eastern Court of Arbitration may also pose a problem. In the beginning submitting and hearing cases can be problematic, but over time difficulties will be overcome and it will reach full professionalism.

Considered a role model of order and organizational efficiency Germans say: "Übung macht den Meister" (Practice makes perfect). May the Podlaskie Arbitration and Mediation Center and the Eastern Court of Arbitration attain the best sense of efficiency and cost-effectiveness, and their clients and defendants – reasonable results.

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# OPTIMIZATION OF THE FORMULA FOR COOPERATION BETWEEN BIALYSTOK AND GRODNO

**Summary**

Socio-economic situation and development of a particular region, county, municipality depend on many factors. Their location (geographic, geopolitical) is of particular importance. It seems that the role of the factor grows in inverse proportion to the deficit of other developmental factors. In other words, if a certain local government unit is not rich economically (e.g. its budget, taxes, etc.), or otherwise privileged, not only it should but it is obliged to take advantage of its position. The issue is to turn what has been generally a limitation (the state border, peripheral character, the end of communication routes) into an asset. That was the historical and geopolitical challenge faced by the municipalities Bialystok and Grodno. The historically Polish cities became split not only by the Polish - Belarusian border but also by the external border of the European Union. The problem that naturally arises from the fact can be brought to determining whether existing institutions and procedures allow to alleviate cross-border barriers. In addition, it has to be determined whether the current potential in this regard will provide or may ensure effectiveness. Therefore, the paper covers the principles of local cross-border and euroregional cooperation, prospects on the European Grouping of Territorial Cooperation (EGTC), as well as geopolitical determinant factors of relations between Bialystok and Grodno.

**Keywords**: twin towns, town twinning, international cooperation of cities, Euroregion „Niemen", European Grouping of Territorial Cooperation.

**JEL**: K33

## 1. Introduction

International cooperation of cities is a result of town twinning, which developed in Europe after World War II. Initially, it was focused on overcoming the consequences of the war. The partnership was implemented through direct meetings of towns' residents of different countries and it could develop through joint initiatives [Kalitta, 2012, p. 37].

Cites were supposed to take on construction of a new Europe. These partnerships developed simultaneously with the unification process of Western Europe [Smith, 2011, p. 50]. Currently, international cooperation of cities can be used in the implementation of EU funds in problematic regions within the European Union's regional policy. Its purpose is to "activate backward regions, to reconstruct depressed regions, to invigorate and reconstruct urban areas and activate the border regions" [Becla, Czaja 2014, p. 21]. Disparities in development of regions are caused by, among others, "processes related to the division of labor in an industrial society; increasingly shorter cycles of innovations' development; globalization and digitization; new standards in qualifications and skills; different endogenous potentials output of regions" [Greta, 2014, p. 50]. Adequate implementation of regional policy based on international cooperation is an opportunity to improve living conditions of residents, to strengthen local labor markets and business development.

This paper aims to present the most important aspects of cooperation between Bialystok and Grodno. Also, based on the analysis presented here, the authors propose of optimization international cooperation between these cities. The opportunity for a change in problem regions is international cooperation in the formula of twin cities, Euroregions or the European Grouping of Territorial Cooperation. To achieve the aim it will be used the following research methods: analytical method, statistical method and the comparative method.

## 2. Bialystok and Grodno – characteristics of international activity

An example of cities cooperating in the formula of twin (partner) towns is a collaboration between the city of Bialystok (Poland) and the city of Grodno (Belarus). Bialystok is the capital of the Podlaskie region and the seat of its regional government. It is the largest urban area in the north-eastern Poland. It is the administrative, economic, cultural and scientific center of the region. For many centuries it is a city populated by people of different religions and nationalities [*The Borderland Poland – Belarus…*, 2013, p. 15]. Other indicators characterizing Bialystok include: the area of 102 km²; 295, 282 inhabitants (as of 2013), [*Grodno and Bialystok…*, 2015, pp. 10, 19].

Grodno is the capital city of the Grodno district, administrative and cultural center of the region [*The Borderland Poland – Belarus…*, 2013, p. 21]. It is characterized by multiculturalism. In the urban are representatives of more than 60 nationalities and different religions are present. The city has 356,557 inhabitants, and its area is 142 sq km overall (as of 2013), [*Grodno and Bialystok…*, 2015, pp. 19, 10]. The basic information of Bialystok and Grodno are shown in Table 1.

**Basic information on Bialystok and Grodno**

| Description | Grodno | Bialystok |
|---|---|---|
| The total area in sq km | 142 | 102 |
| Population | 356,557 | 295,282 |
| Population per 1 sq km of the total area of the city | 2 511 | 2 891 |
| Median of the age (middle age) | 33.9 | 39.0 |
| Natural increase per 1000 of the population | 5.3 | 1.1 |
| Unemployed registered in thousands | 1.0 | 17.2 |
| Colleges | 3 | 11 |
| University students in thousands | 29.1 | 36.0 |
| Theatres | 2 | 3 |
| Tourist units of collective accommodation | 22 | 27 |
| Apartments in thousands | 122.7 | 122.6 |
| Flats per a thousand of the population | 10.4 | 5.3 |
| Cars in thousands of units | 115.3 | 107.8 |

Source: [*Grodno and Bialystok…*, 2015, pp. 10-32].

The city of Grodno is an important partner of Bialystok within the formula of twin towns. Bialystok also cooperates with many other partner cities, e.g. Eindhoven (Netherlands), Kaunas (Lithuania), Milwaukee County (USA), the District of Dijon (France), Pskov (Russia), Grodno (Belarus), Kaliningrad (Russia), Bornova (Turkey), Gori (Georgia), Balti (Moldova), Gyumri (Armenia), Lutsk (Ukraine), Sumqayit (Azerbaijan), [Internal documents of the Department of the President in the Municipal Office in Bialystok].

Grodno cooperates with the following cities: Limoges (France), Druskininkai (Lithuania), Lazdijai (Lithuania), Vilnius (Lithuania), Chimiki (Russia), Cheboksary (Russia), Vologda (Russia), Slupsk (Poland), Ashkelon (Israel), Kraljevo (Serbia) [http://grodno.gov.by/ru/main.aspx?guid=2081, accessed: 03.05.2014].

## 3. Framework documents for the partnership between Grodno and Bialystok

Nowadays, cooperation between twin cities is of importance in the process of building and developing partnerships between regions. The agreements between the cooperating local government units of the towns situated on two different sides of the same border aim at strengthening and developing friendly relations between the local communities. The twin cities in the framework of signed agreements undertake to create and promote twinning in many areas (for example: economy, education, tourism, sport). The fundamental objectives of the cooperation are exchange experiences, collaboration

between companies, joint activities for development of EU projects, exchange of sport and cultural activities.

The first cooperation agreement between Bialystok and Grodno was signed on 16 June 2000. The cooperation between the partner cities defined in it focused primarily on the areas of economy, education and culture. The agreement was in force for a period of three years. According to the agreement, the term was automatically extended for the next three years [*Agreement for 2000-2003*]. Under *the Cooperation Agreement between the City of Grodno (Belarus) and the City of Bialystok (Poland) for 2000-2003* the program of cooperation between the city of Grodno and the city of Bialystok was adopted, it is presented in Table 2. [*Agreement for 2000-2003*, points 1-4].

**TABLE 2.**

**The program of cooperation between the city and the city of Grodno Bialystok for 2000-2003**

| Sphere (area, field) | Characteristics |
|---|---|
| economic | – building conditions for cooperation between relevant organizations in Grodno and Bialystok;<br>– inspiring cooperation between Chambers of Industry and Commerce in Grodno and Bialystok;<br>– assistance in finding partners for cooperation;<br>– encouraging entrepreneurs to participate in exhibitions in Grodno and Bialystok |
| information exchange | – initiating cooperation between media in the two cities (e.g. exchange of publishing materials, radio and television programs);<br>– mutual visits of journalists to Grodno and Bialystok;<br>– cooperation between spokespersons of the Mayor of Grodno and the President of Bialystok; |
| culture, art, education, science, sport, tourism | – inspiring and promoting exchanges and cooperation between interested entities in Grodno and Bialystok (universities and schools, entities responsible for culture, art and tourism); |
| exchange of experience between local government authorities | – conducting information exchange of in the following areas: activities of local government bodies, environmental protection, public utilities, public transport, social, sports, culture and arts. |

Source: [*The Agreement for 2000-2003*, points 1-4].

Currently, the framework for cooperation between the cities of Bialystok and Grodno is specified in the following legal documents:

– *the Agreement on cooperation between the City of Grodno (Belarus) and the City of Bialystok (Poland) for 2000-2003*;

– *the Agreement on cooperation between the City of Bialystok and the City of Grodno of 16 December 2009.*

Based on the provisions of the Agreement on cooperation between Grodno and Bialystok projects involving promotion of bilateral relations and social stabilization of both cities and projects in the field of national minority cultures development will be implemented, [*Agreement for 2000-2003*, paragraphs 5-6].

Whereas both parties expressed willingness to continue cooperation, measures to renew the agreement were taken. Another *Agreement on cooperation between the City of Grodno and the City of Bialystok* was signed on 16 December 2009. The document was concluded on the basis of *Resolution No. XLV / 557/09 of the City Council of Bialystok of 7 September 2009.* The document contains the main directions and forms of cooperation carried out on the principles of partnership, equality, trust and mutual benefit in the fields of economy, experience exchange  in the areas of public tasks, culture, art, education, science, tourism, sports and health [*Resolution of 7 September 2009.*, §1].

The twin cities will, *inter alia*, create conditions for development of cooperation between relevant organizations and stakeholders (e.g. cooperation between Chambers of Industry and Commerce and other business organizations from Bialystok and Grodno), [*Agreement of 16 December 2009*, art. 2].

## 4. Town twinning – definition

Municipal partnerships or town twinning can be defined as foreign contacts of local governments, which are characterized by direct involvement of residents of municipalities and local organizations in cooperation with municipalities and communities abroad. Municipal partnerships are a form of international cooperation at a local level. They determine close contacts between communities of different countries and enable an access to experience exchange and cooperation in many areas of social life for local authorities in different countries [Skorupska, 2005, p. 15].

Town twinning (municipal partnerships) along with euroregions are organizational forms of cross-border cooperation of local authorities. Their lesser degree of institutionalization or formalization distinguishes them from euroregions.

International cooperation of cities is supposed to bring nations together. The initiator of the action should be local authorities which are close to citizens. This ensures development of social activity, action for local community and bringing other nationalities closer to each other. Involvement and participation in social life of twin cities determine popularization of universal values, e.g. security, justice, tolerance, respect, freedom [Musial, 2012, pp. 220-221].

Polish local governments engage in thriving international cooperation of a bilateral character. Agreements concluded with neighbor entities and other entities serve as examples. This activity is mainly associated with implementation of EU funds. In addition, local governments eagerly join different types of organizations on a local and regional level to exchange experience, contacts and indicate their presence in the

international arena [Szadkowska, 2010, p. 102]. Twin cooperation between local governments from both sides of the border is often a form of grassroots diplomacy as it is carried out by municipalities (the lowest unit of territorial division of a state), so that they gain some independence from the national government.

## 5. Legal dimension of international town twinning

The constitutional and legislative reforms, which took place in Poland after 1989, enabled local governments to establish cooperation with local governments in other countries. One of the objectives was to standardize the transformation rules for participation of local governments in international relations [Skorupska, 2005, pp. 12-13].

The basic legal acts relevant for the twinning of Bialystok and Grodno include:

1. international law (binding Poland):
   – *European Framework Convention on Cross-border Cooperation concluded between Territorial Communities and Local Authorities* (referred to as *the Madrid Convention*), signed in Madrid on May 21, 1980;
   – *European Charter of Local Self-Government* signed in Strasbourg on October 15, 1985;
2. bilateral agreements between Poland and Belarus:
   – *Declaration on good neighborly relations, mutual understanding and cooperation between the Republic of Poland and the Republic of Belarus*, signed on October 10, 1991;
   – *Agreement between the Government of the Republic of Poland and the Government of the Republic of Belarus on the principles of cross-border cooperation*, signed on April 24, 1992;
   – *Treaty between the Republic of Poland and the Republic of Belarus on good neighborliness and friendly cooperation*, signed on June 23, 1992;
3. Polish legislation:
   – *Constitution of the Republic of Poland of April 2, 1997*;
   – *Local Government Act of March 8, 1990*;
   – *Act on local government units joining international associations of local and regional communities of September 15, 2000*;
4. Belarusian legislation:
   – *Constitution of the Republic of Belarus of March 15, 1994* [Конституция от 15 марта 1994];
   – *Act on territorial administration and local self-government of the Republic of Belarus of 4 January 2010* [ЗАКОН от 4 января 2010];
   – *Act on administrative-territorial system of the Republic of Belarus of May 5, 1998* [ЗАКОН от 5 мая 1998];
   – *Act on national and territorial meetings of July 12, 2000* [ЗАКОН от 12 июля 2000].

These regulations are the basis for international cooperation between Poland and Belarus at the international and regional levels.

## 6. Is the twinning formula applicable in the relations between Bialystok and Grodno?

To confirm effective cooperation between Bialystok and Grodno in the framework of twinning formula the following legal documents should be mentioned: *Agreement on cooperation between the city of Grodno (Belarus) and the City of Bialystok (Poland) for the period 2000-2003* and *Agreement on cooperation between the City of Bialystok and the City of Grodno of December 16, 2009*, as well as practical effects of the cooperation.

The cooperation of the twin cities of Bialystok and Grodno is reflected in the following areas of social life .:

1.  in the field of sports, e.g.: the Podlaskie District Cycling Association organized the 25th International Junior Cycling Race involving players from the city of Grodno and the Lithuanian city of Alitius (29.06-02.07.2013) [Internal documents of the Podlaskie Basketball Club "Żubry" in Bialystok];
2.  in the field of culture, e.g.: the Puppet Theatre of Bialystok performed the play "Chopin – Impression" in Grodno (2011); in the Cultural Centre of Bialystok the exhibition "Belarus Press Photo 2010-2011" was presented with guests: Sergey Michalenko and Sergey Gudilin - the winner of the Grand Prix of BPP 2011 (2011). [Internal documents of the Cultural Centre of Bialystok];
3.  in the economic sphere, e.g.: representatives of Bialystok participated in a meeting with 15 representatives of the Belarusian Entrepreneurs Club of Grodno and Grodno Free Economic Zone (28.10.2010); delegates from Bialystok took part in the "International Investment Forums. Grodno – the city at the crossroads" (2010-2012), [Internal documents of the Strategy and Development Department of the Municipal Office in Bialystok];
4.  in the field of education, e.g.: the University of Bialystok cooperates directly with universities from Belarus, among others, in the area of research, exchange of research results, exchange of academic staff and students, participation in conferences, joint development of scientific publications [Internal documents of the Department of International Relations and Promotion of the Marshal Office of Podlasie in Bialystok].

An important field of cooperation between Bialystok and Grodno is the economy. The twin cities initiate and support development of cooperation between relevant organizations and bodies (e.g. creating conditions for optimum operation of the Chambers of Industry and Commerce and other organizations and businesses from Bialystok and Grodno). There is the International Investment Forum "Grodno-City at the intersection of the borders", a cyclical event organized by the City of Bialystok and City of Grodno. The first forum was held in 2009 in Grodno. The meeting is an opportunity for intensification of cooperation between economic entities, development of exports, attracting investments, promotion and presentation of offers of the

Special Economic Zone GRODNOINVEST. In addition, meetings with exhibitors of the fair "Euroregion Niemen" among others from Belarus, Russia, Latvia, Germany are held simultaneously. The second International Investment Forum "Grodno-City at the intersection of the borders" was held on September 29 – October 1, 2010. On 28-30 September 2011 the third International Investment Forum "Grodno – City at the intersection of the border" took place in Grodno in which the authorities of Bialystok participated. Another result of the bilateral economic cooperation between Bialystok and Grodno was the meeting of the Mayor of Grodno, the Grodno Oblast Deputy Governor and business representatives from Belarus on 28 June 2010 at the Guest Palace. The meeting was attended by Polish entrepreneurs and representatives of local authorities. They talked about opportunities, conditions and prospects of investing in the capital of the Podlaskie region and principles of cooperation with local companies and entrepreneurs. The XVII Polish - Belarusian Economic Forum Neighborliness 2013 took place on June 26 in Bialystok. The main theme of the meeting was "Regional cooperation in the field of agriculture and food industry as a driving force for investment and trade cooperation between Poland and Belarus". The Forum was organized by the Polish – Belarusian Chamber of Commerce in Warsaw, Belarusian Chamber of Commerce and Industry in Minsk, the Chamber of Commerce in Bialystok and the Department of Trade and Investment Promotion of the Polish Embassy in Belarus with partners: the Belarusian Council of Farmers, the Republican Confederation of Entrepreneurs of Belarus, Podlaskie province authorities and the authorities of Lublin and Grodno and the Brest Circuit. In preparation of the project the Ministry of Economy and the Ministry of Agriculture and Rural Development of the Republic of Poland and the Republic of Belarus were involved. The forum was attended by over 300 entrepreneurs from Poland and Belarus. There have been many more similar projects.

Effective co-operation of the partner cities of Bialystok and Grodno requires certain financial resources. The main sources of funding of this collaboration are: own funds, European Union and international funds, budget resources of foreign partners. Own funds allow governments of both cities for independence and a wide spectrum of activities. It should be emphasized that local government units much easier to set aside funds for implementation of international cooperation in the framework of its own budgets in comparison to resources available to Euroregions or EGTC. It is worth mentioning here about the formula of cooperation within the Euroregion "Niemen", whose members are, *inter alia*, Bialystok and Grodno.

## 7. Cross-border cooperation within the Euroregion "Niemen"

Cross-border cooperation is an opportunity for development of Eastern Poland, including the Podlaskie region. Even before the Polish accession to the European Union, it was hoped that the effects of the peripheral location of the area will be resolved through cooperation within Euroregions. When initiating the first Euroregions it was envisaged that partners would focus on initiating and strengthening

economic cooperation, promotion of the regions' culture and frontier tourism, joint action to protect environment, cultural and educational activities, strengthening relations with neighboring countries, as well as finding and implementing new possibilities and forms of cooperation [Ram, 2002, p. 190]. That was the case with regard to the decision to create the Association of Cross-Border "Euroregion Niemen".

The Association was established under the agreement of June 6, 1997 signed by representatives of the border regions from Poland, Lithuania and Belarus. It was agreed that it would be of an open character. With time, the regions of the Kaliningrad District of the Russian Federation also joined. From the Polish part there were local governments which became the members of the Association of the Euroregion "Niemen" (including the City of Bialystok). From the Belarusian side in the Euroregion there is the Grodno region (including Grodno), from Lithuania the authorities participating in the Association "Euroregion Office in Marijampole" and from the Russian party – the Russian regions: Chernyakhovsk, Gusev, Osersk, Krasnoznamensk, Moscow Oblast and Nesterov (in 2014 other areas of the Kaliningrad region expressed interest in joining the Euroregion "Niemen"). The city of Suwalki was chosen for its seat. The main purpose of the agreement was to "create conditions for socio-economic and cultural and scientific cooperation in the border areas of the neighboring countries" [*Agreement of 6 June 1997*, § 2.1].

Initially, the formula of Euroregion in cross-border relations was sufficient, though imperfect. The lack of legal personality of all Euroregions meant that they did not have (and still do not have) optimal conditions for effective and efficient activity in their environment. The situation of peripheral areas in Poland has improved after joining the European Union in 2004, but some problems have remained, as in functioning of Euroregions their legal position have not changed – the instrument has not been regulated in EU or even national law; further it has the status of an association.

The Euroregion "Niemen", as well as other cross-border associations established in an EU country, could start to apply for the status of an intermediary in the allocation of EU funds for cross-border activities. Activities related to umbrella projects have become a major and basically the only field of action for many Euroregions. However, the number of grants will drop drastically with the completion of the EU financial perspective for 2014-2020, and other sources of funding may not be available due to the increase in the number of entities applying for funds and because of strict criteria for granting them. This could mean the end of some Euroregions.

In the European Union the search for another path of cooperation, a new formula based on EU law that could compete with Euroregions (and even substitute them) and effectively mitigate the backwardness of cross-border areas has begun. The chance appeared at the end of 2006 when the formula of the European Grouping of Territorial Cooperation (EGTC) was developed.

## 8. Possibility of cooperation between Bialystok and Grodno in the framework of the European Grouping of Territorial Cooperation

The EGTC again aroused hopes of improving the socio-economic, infrastructure and general economic situation of the cross-border area, as well as led to a "new start" in the center-periphery relations [Nadalutti 2013, p. 768]. By virtue of *Regulation (EC) No 1082/2006 of the European Parliament and of the Council of July 5, 2006 on the European Grouping of Territorial Cooperation* establishing groupings in cross-border areas was made possible. A few years later, *Regulation No 1082/2006* was amended by *Regulation No 1302/2013 of December 17, 2013* and a number of significant changes in order to solve the problems of the first groupings were introduced.

The EGTC is an instrument for cross-border cooperation, which is granted legal capacity and capacity to perform acts in law – moreover, this ability is the broadest allowed by legislation of a country in which the EGTC has its seat. This is what Euroregions particularly lack.

A grouping can be established only in the territory of a Member State, and its headquarters must be located in a country of whose law at least one of the members of the grouping is governed by [*Regulation of December 17, 2013*, Art. 2.1 introduced by Art. 1). The list of entities that can join a grouping is as follows:

–    Member States or authorities at national level;
–    regional authorities;
–    local authorities;
–    public undertakings within the meaning of Art. 2. 1 point b) of *Directive 2004/17/EC of the European Parliament and of the Council* or public law entities within the meaning of Art. 1 par. 9 second subparagraph of *Directive 2004/18/EC of the European Parliament and of the Council*;
–    undertakings entrusted with implementation of services of general economic interest in accordance with national and EU law applicable;
–    national, regional or local authorities or bodies or public enterprises equivalent to those referred to in point d) from third countries, subject to the conditions laid down in Art. 3a [*Regulation of December 17, 2013*, Art. 3.1 introduced by Art. 1];
–    associations of the aforementioned entities [*Regulation of December 17, 2013*, art. 3.1 introduced by Art. 1].

The EGTC can be joined by members of third countries or overseas territories [*Regulation of December 17, 2013*, Art. 3a. par. 1 introduced by Art. 1] – it is an opportunity for real cooperation between Bialystok and Grodno within EGTC.

Facilitating and promoting territorial cooperation through the EGTC in the area of cooperation aim at achieving a kind of social and economic cohesion. Activity of a grouping may be limited to a given task / project or multiple tasks / projects [Niczyporuk, Perkowski, Kołodko Sawicki, 2010, p. 253]. These are the types of tasks that can be carried out by a grouping:

- "to implement programs under the European Territorial Cooperation (e.g. EGTC as the Managing Authority and / or the Joint Technical Secretariat for ETC programs),
- to implement projects co-financed by ETC structural funds (e.g. cross-border / transnational / interregional projects),
- to initiate other forms of territorial cooperation outside EU funding,
- to implement other EU funded projects regarding territorial cooperation" [Niczyporuk, Perkowski, Kołodko Sawicki 2010, p. 253].

In Poland, three groupings have now their headquarters, and in the Podlaskie region works on starting a Polish-Lithuanian EGTC are going on. Successful completion of the works could be an opportunity for a future access of the Grodno region to the Polish-Lithuanian EGTC. The creation of grouping should be treated as an investment – its establishment is time consuming and expensive, but with correct use of the collaborative tool it can bring a return on investment in the form of better infrastructure, creating high-quality networks of social and human capital and efficient use of natural assets in the cross-border areas.

Potential cooperation between Bialystok and Grodno within the framework of an EGTC is primarily an opportunity of economic development. Cooperation of entrepreneurs, including the area of tourism, processing or marketing, can be crucial for development of the Polish-Belarusian border area. For many years it has been possible to cooperate with Belarus within activities of the Euroregion "Niemen" and funds for cross-border cooperation. The EGTC can intensify the cooperation and bring it to an entirely new level.

## 9. Summary

For many years Bialystok remains in close relations with Grodno, and the formula of town twinning is applicable in relations between them. The formula of twin towns of Bialystok and Grodno is an important platform for international cooperation of local governments, as well as stimulates and activates local communities. Binding agreements and its empirical results confirm the twinning. Representatives of both cities take part in many cultural, sporting and economic meetings. Cooperation between Bialystok and Grodno in the field of economy; exchange of experience in the field of public tasks; culture, arts, education, science, tourism; sports; health improves bilateral relations and builds friendship between the cities. The formula of town twinning between Bialystok and Grodno is evolving.

The fruits of cooperation may seem insufficient given the problems with the entry into force of *the Agreement on local border traffic between Poland and Belarus* [*Agreement of February 12,* 2010]. The entry into force of the Agreement will result in a positive change in the social, cultural, familial, economic and political sphere. This may be a stimulus for an even broader opening of Belarus to the West.

The cross-border cooperation within the Euroregion "Niemen" exists, although it is very limited, and therefore ineffective, due to the lack of legal personality of Euroregions.

Accordingly, the catalogue of measures that can be implemented with the cooperation is quite narrow and not directly proportional to problems that occur in peripheral areas. The possibility of cooperation between Bialystok and Grodno in the framework of the EGTC seems to be more attractive. Since Polish-Belarusian border cooperation takes place on the basis of the Euroregion "Niemen", it has also a chance to come through a grouping. This is a chance for strengthening cross-border economic, social, economic and even scientific (including in R&D sector) development of Bialystok and Grodno, and even of entire regions – the Podlaskie region and the Grodno region. The catalogu of potential activities is much broader, and even access to EU funds appears to be much simpler both in the current EU financial perspective for 2014-2020, as well as after such a kind of support.

Any form of international cooperation undertaken should be based on partnership and mutual benefits. Its results will depend on strong commitment, determination and high competence of partners. Only this guarantees success.

## The authors' participation in the preparation of the article

Włodzimierz Musiał – development of concepts, assumptions and methods, carrying out the research and the remaining input of work – 50%

Wojciech Zoń – development of concepts, assumptions and methods, carrying out the research and the remaining input of work - 50%;

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