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The Role of Innovation in Fostering Competitiveness and Economic Growth: Evidence from Developing Economies

Abstract

This paper deals with the essential features determining the role of innovation in developing economies by examining the structure of innovation measures. The economic growth and competitiveness of developing economies are powerfully connected to its innovation status. The purpose of this paper is to examine the significance of innovation in driving economic growth per capita and competitiveness in selected developing economies. In order to determine the interconnection among the variables of innovation, competitiveness, and growth, assorted methodological measurement instruments have been applied. The data were collected from both primary and secondary sources. The results suggest the importance of specific innovation dimensions for prospective economic growth in developing economies. The identical measures responsible for fragile innovation are associated to the low composite measures of innovation accomplishment. This demonstrates the enormous disparity concentrated in every innovation aspect over time, specifically in innovation output and enterprise performances between the developing economies and the EU–28 average measures. The research results indicate the usage of appropriate economic instruments in diminishing the problems that developing economies are currently dealing with.

Keywords: *innovation, competitiveness, economic growth, developing economies, EU–28*

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1. Introduction

Various research studies have emphasised the importance of innovation in supporting competitiveness and economic growth. The innovation performance barometers evaluated by the innovation indices can be valuable in comparisons between economies, and they contribute precious information for economists and policy makers. This paper investigates the fundamental features which, while not encouraging, are ongoing and distinguish the innovation performance in developing economies, also including their consequences on accumulated indices. Therefore, an examination was carried out of the structural components of innovation indices affecting competitiveness and economic growth in selected developing countries. The inspiration for this research results from detecting the endurance of measures that differently influenced innovation in the EU–28 and developing economies, a topic that had not gotten appropriate attention in recent years by innovation policymakers, but continues to restrict innovation, competitiveness, and economic growth. A comparative study of innovation and competitiveness in selected developing economies was thus carried out, recognizing and featuring the meaningful disparities in relation to alternative economies, and focusing primarily on innovation indices.

   The article demonstrates that the innovation performance in developing economies is greatly connected to their competitiveness rank. The identical indices responsible for fragile competitiveness are associated with weak innovation performance measures. This framework, compared with the EU–28 average measures, suggests major divergences in every innovation aspect, specifically in innovation output and enterprises' performances. The conducted investigation shows that the usage of adequate economic tools can alleviate the difficulties that exist in developing economies.

2. The Role of Innovation in Fostering Competitiveness and Economic Growth – a Theoretical Overview

The role of innovation is valuable at each stage of growth and development, because the formulation and dispersion of new technologies are precious for economic growth and competitiveness worldwide. The importance of innovation was identified by Adam Smith (1776, pp. 7–24) in the "An Inquiry into the Nature and Causes of the Wealth of Nations", wherein he indicated the new group of specialists ready for productivity advancement via knowledge. Joseph Schumpeter (1934, pp. 61–116), highlighted that innovation is a keystone of economic performance.

Many economists continued, revised, and expanded upon Schumpeter's theory e.g. John Kenneth Galbraith (1967, pp. 135–210), and Richard Goodwin (1946, pp. 95–104) created a modelling method of economic performance in order to examine the interplay between business activities and economic growth. Grossman and Helpman (1991, pp. 6–15) enhanced growth theory by analysing the role of the innovation in fostering economic growth. They analyzed innovation performance and economic growth in the global economy, and investigated the resources which contribute to long-term growth.

Various categories of innovation may play dissimilar roles at distinctive levels of development. In the initial stages of growth and development, accumulative innovation is related to the acceptance of technology from another country. High-tech and institutional reversals are analysed utilizing modern phrasing: dissimilar categories of innovation have been the focus of examination in several basic studies in classical economics. Then neoclassical economics basically discarded inquiries focusing on fluctuations, and instead concentrated on expansion, similar products/services, declining recovery in terms of range, and new technologies available to every manufacturer at zero cost, as well as properly skilled economic operators and absolute competition. Technological alterations were considered as external to the economic structure, while other categories of innovation were not deliberated upon.

Within the theoretical framework on enterprise innovation performance and open-market activities, mainstream economics has moderated the most impractical presumption of neo-classical economics, principally valid facts, regulated surroundings, and perfect competition. However, some principal imperfections have endured: institutional questions are not examined appropriately in the above-mentioned sections of economics, nor is a very precise approach of unpredictability applied.

There is no appropriate theory with respect to the formation of knowledge applicable in innovative activities and technological interdependence between enterprises. The influence of government has not been examined in a way that could support constructive counselling to economic policy-makers (ed. Fagerberg et al. 2004, pp. 1–599, Foray 2009, pp. 2–21; Lazonick, 2013; pp. 2–35, Radošević and Yoruk 2013, pp. 1015–1038; Lundvall, 2002, pp. 1–219; 2006, pp. 63–74, Smith, 2000, pp. 73–102). Two major methods of economic growth through innovation have been discovered: 1) technological competitiveness, focused on improving innovation performance by developing new goods/services or new market entries; and 2) growth accumulated by cost competitiveness focused on innovation, substituting human labour and industrial technology (Bogliacino, Pianta, 2011, pp. 41–53).

Considering that developing economies have had a market economy with basic investments during the recent period, one may ask: have national investments in innovation and the use of European funds had an impact on economic growth?

Innovation based on research and development and high-technologies are important for later levels of development in emerging economies, mostly in progressive businesses. Table 1. below presents an overview of miscellaneous features of innovation.

Table 1. The Role of Innovation in Developing Economies – An Overview of Miscellaneous Features of Innovation

Economy and category Classification	Instrument/aim of innovation	Category of innovation	Basic operators incorporated
Developing/low income economies, emerging and middle-income economies	Acceptance requires authorization- Innovation needs to answer individual local terms for outcomes	Accumulative innovation established on acceptance of foreign innovation and new technology	Research institutes, universities, private businesses, especially those with exposure to foreign markets and businesses
Comprehensive innovation: Innovation for low or middle income economies to enhance prosperity and business opportunities	Accumulative innovation based on foreign technology and knowledge. Public innovation is supportive for technical innovations in societies.	Small and medium enterprises, public and private organizations involved in distributing knowledge by networks, to private businesses	Mobile banking services
Mostly middle-income countries and chances for development for low-income economies	Developing the innovation scopes that are crucial for embracing the world technological boundary in specific industries important to prevent middle income ambush	Accumulative innovation and radical innovation with the capacity to challenge superior world innovators.	Requires complete expansion of innovation systems, including diasporas as a bond
Locate environmental, health and public disputes through global and local innovation exertions.	Primary innovations and scientific research operated in global partnerships and marginal innovation.	Universities and research institutions connected to global networks.	Important private businesses operating in these sectors.
Mostly middle-income countries and chances for development of low-income economies	Maintain competitiveness in frontier industries when the country is already at the frontier.	Innovation is adapted to developed economies and leads to growth in the global markets.	Incorporates mostly the private sector in interplay with public research institutions and universities.

Source: Summarization by author.

The creation and dispersion of innovation depend on new technological knowledge, which is produced by connections among various sources of innovation

in a comprehensive innovation system (Tidd et. al, 2016, pp. 57–65; Barney and Clark, 2007, pp. 3–265; Chesbrough, 2006, pp. 2–245; Chaminade and Edquist, 2005, pp. 1–47; Fagerberg, 2004, pp. 514–544; OECD, 2012., pp. 3–29). The perception of innovation sources can be described as generated knowledge that enterprises and organizations use for enhancing innovation and achieving success on the market. To encourage innovation, enterprises can receive information from research institutes, government authorities, consultants, and universities. The important international organizations evaluate various indicators valuable for researching the role of innovation in fostering competitiveness and economic growth (the Summary Innovation Index measured by Eurostat, the Global Competitiveness Index and Innovation sub-index prepared by the World Economic Forum). The level of productivity later influences economic growth rates. Various factors foster productivity, competitiveness and economic growth. The global competitiveness index (GCI) summarises the competitiveness components of an economy.

The GCI is constructed by accumulating adequate scores. The scores related to innovation are extremely independent, e.g. innovation pillar twelve – a strong capacity for innovation is a challenge to implement without a well-educated and skilled workforce (pillars four and five) that should absorb technologies (pillar nine), beyond accepted funding (pillar eight), a good market efficiency (pillar six), and also rely on the quality of business networks in a country and the quality of individual enterprises' operations and strategies (pillar eleven).

3. Composite Measures of Innovation Accomplishment

The discussion of Research and Development (R&D) as an undeveloped stage in the process of innovation partially results from the relations between variables of economic growth and R&D.

An Empirical model that is often used for constructing an R&D economic growth model is based on the following postulates: (Romer 1990, pp. 71–102):
- innovation and technological change accelerate economic growth;
- technological change is the result of planned innovation activities established by human resources that correspond to market challenges; and
- designs used for new products are competitive.

The final innovative output is created by application of Cobb-Douglas production function:

$$Y\left(H_y, L, x\right) = H_Y^{\alpha} L^{\beta} \int_0^{\infty} x(i)^{1-\alpha-\beta} \, di \tag{1}$$

where, H, L and x are human capital, labour, and producer durables, respectively. Building new designs in the Research and Development sector incorporates: H_I as total human capital in R&D, I as the knowledge stock and $\overset{*}{I}$ as Innovation or technological change.

$$\overset{*}{I} = \delta \mathrm{H}_I^\theta \, \mathrm{I} \tag{2}$$

The most important assumption in the presented equations that foster economic growth is related to the evidence that the creation of new products is continuous in human resources that operate in R&D subdivisions, and knowledge stock $\theta = 1$. By reason of the proportion in the equations, feasible products are provided to a similar degree and should be designated as x.

$$\mathrm{K}_{(t)} = \mathrm{Y}_{(t)} - C_{(t)} \tag{3}$$

The analysis is additionally interpreted by a premise that consumer goods do not devaluate. Adding devaluation could simply enumerate a recognizable phrase to the consumer expenditure of capital. Aligned with the typical particular subdivision model and in compliance with country revenue, including conventions, it is valuable to designate an estimating scope of total capital K as an aggregated output. Therefore, K (t) incorporates fundamental K at time t, where C(t) designates aggregated consumption at time t. It takes n entities of consumption to coordinate an individual entity of any category of consumer goods.

$$K = \eta \sum_{i=1}^{\infty} x_i = \eta \sum_{i=1}^{I} x_i \tag{4}$$

The already stated aggregated measure K is connected to the consumer goods that are absolutely used in manufacture. So, H and L are established, and K increases by the amount of consumption. It remains to determine the method for the aggregation of new ideas, that is, for the expansion of I .

Because I determines the rank of permanent goods that could be created, and because η entities of enterprise output are necessary, it is necessary to clarify for x from the comparison that $K = \eta I x$ and replace $x = \dfrac{K}{\eta I}$ inside the ending model of the production capacity.

$$\mathrm{Y}(\mathrm{H}_Y, L, x) + (\mathrm{H}_Y I)^\alpha (L\ )^\beta (K)^{1-\alpha-\beta} \eta^{\alpha+\beta-1} \tag{5}$$

The above-mentioned equations include nominal expectations and practical model assumptions. The last line of the comparison shows that the model operates just like the neoclassical growth model with labour and human capital improving

technological diversity. In particular, it shows the regular decreasing return on capital aggregation. Given the affected model of choices, an established permanent level of I should point to an equilibrium with a reliable condition in which the level of K is driven by the necessity that the borderline product of capital is balanced to the discount ratio.

If I develops at an exigently particularized exponential ratio, the economy would mobilize to a boundary on which K grows at the similar exponential ratio as I. Based on the transition route, the ratio of K to I should adjust, which indicates that y and x would change as well. Along the equalized growth path, X(i) and the measures of K to I are all fixed. The absence of convexity is observable in the interpretation for the definitive output as a function of major inputs of the presented model (H, L, $K,$ and I).

Research and Development has an explicit connotation for innovation applicable in enterprises. They are engines for an indirect influence on enhanced goods and services in aiding innovation by creating a capacity for absorption, adjusting adequate technologies, and circulating exploitation. The Global Innovation Index (GII) has a considerable and extensive inclusion, in the following aspects: it includes over 100 countries, and deals with over 80 indicators, arranged in seven innovation pillars. The seven pillars used in the 2016 issue of the GII are: Institutions, Human capital and research, Infrastructure, Market sophistication, Business sophistication, Knowledge and technology outputs and Creative outputs.

4. Research Results: a Comparative Analysis Among Selected Developing and EU–28 Economies

Evaluation of the importance of the above-mentioned innovation pillars, and notably the engagement among the subjects (or titles) apprehended by the seven indicators, would exceed the scope of this article. In brief, GII effects are clearly conferred, outside determining their capacity for systematic policy intentions. Table 2. presents the innovation performance rankings in selected developing economies. The study was conducted in 10 economies (Estonia – EST, Czech Republic – CZE, Slovenia – SLO, Hungary – HU, Slovakia – SVK, Latvia – LV, Lithuania – LT, Bulgaria – BGR, Poland – PL, Romania – RO), and the data for each economy cover the period 2008–2016.

Estonia and the Czech Republic have accomplished an enhancement in innovation and obtained a high rank during the recent period, compared to the other economies. Several economies have developed their innovation potential: Slovenia achieved an increased rank from 4th in 2008/2009 to 3rd in 2016; and Hungary reached ranking 4 in 2016/2017. Also, Lithuania, Bulgaria, Poland and Romania improved and settled their position. On the other hand, Slovakia has demonstrated

a worsening position during the eight years observed. The growth of innovation in the EU 28 and selected economies was estimated on data from 2016–2017.

Table 2. Rankings of the Global Innovation Index, 2008–2016

Country/economy	2008/2009	2010	2011	2012	2013	2014	2015	2016/2017
EST	29 (1)	29 (3)	23 (1)	19 (1)	25 (1)	24 (1)	23 (1)	24 (1)
CZE	33 (2)	27 (2)	27 (3)	27 (3)	28 (2)	26 (2)	24 (2)	27 (2)
SLO	36 (4)	26 (1)	30 (4)	26 (2)	30 (3)	28 (3)	28 (3)	32 (3)
HU	47 (6)	36 (4)	25 (2)	31 (5)	31 (4)	35 (5)	35 (5)	33 (4)
SVK	35 (3)	37 (5)	37 (6)	40 (7)	36 (6)	37 (6)	36 (6)	37 (7)
LV	60 (8)	44 (7)	36 (5)	30 (4)	33 (5)	34 (4)	33 (4)	34 (5)
LT	42 (5)	39 (6)	40 (7)	38 (6)	40 (7)	39 (7)	38 (7)	36 (6)
BGR	74 (10)	49 (9)	42 (8)	43 (8)	41 (8)	44 (8)	39 (8)	38 (8)
PL	56 (7)	47 (8)	43 (9)	44 (9)	49 (10)	45 (9)	40 (9)	39 (9)
RO	69 (9)	52 (10)	50 (10)	52 (10)	48 (9)	55 (10)	54 (10)	48 (10)

Source: The Global Innovation Index Report, different editions (2008/2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016), and own calculations.

Table 3. presents the economies' rankings in terms of each summary innovation index, the total global competitiveness index, and gross domestic product per capita in 2016–2017. In an effort to reveal the complete ranking of the selected 10 developing economies, they are presented in Table 1 in the classification of their aggregate rankings. From that angle, it can be seen that Hungary has indicated some variations in 2011 and 2012, while the ranking of Bulgaria has significantly alternated during the eight years observed. The accumulative Research and Development measure in various economies is a valuable measure for the R&D sector, the performance of industry, and macroeconomic and microeconomic dynamics.

Total gross expenditure on research and development – GERD – can be helpful for articulating R&D spending in every sector of an economy. The connections between different innovation, competitiveness and economic growth variables are presented in Table 4.   Pearson's correlation coefficients have indicated a linkage among crucial variables, especially between various dimensions of the Summary Innovation Index –SII (Human Resources – HR, Research System – RS, Finance & Support – FS, Firm Investments – FI, Linkage & Entrepreneurship – LE, Intellectual Assets – IA, Innovators – INN, Economic Effects – EE), GCI, GII, GDP per capita, GDP growth and GERD. The data were collected from primary and secondary sources. The research was carried out using the SPSS 23 statistical software package.

Different suggestions can be accentuated from the conducted empirical research in selected developing economies:
- There is a powerful positive correlation between GERD and GII (0.806);
- A very strong positive correlation exists between GDP per capita and GERD (0.927);

- The positive relationship between the Summary Innovation Index (SII) and RS, INN and LE indices, as shown by correlation coefficients of 0.947, 0.887 and 0.947 respectively, indicates that innovation performance depends on a developed research system, improved conditions for entrepreneurship, and a higher degree of innovation performance in selected developing economies;
- There is a significant positive correlation between GII and GDP per capita (0.794);
- The positive interdependence between firm investments and research systems (0.830) indicates that attracting investments in the small and medium-sized enterprises (SMEs) sector strongly depends on the developing research system;
- The strong linkage between Innovators and the Research System (0.867) demonstrates achieving a higher rank of national research and innovation systems depends on the number of innovators.

Table 3. Developing economies indicators ranks relative to the EU 28 according to innovation elements in 2016–2017

Elements	EST	CZE	SLO	HU	SLK	LV	LT	BGR	PL	RO
Summary Innovation Index	86 (9)	83 (8)	93 (10)	68 (7)	67 (7)	54 (4)	54 (3)	46 (2)	56 (5)	34 (1)
Human resources	96 (5)	98 (7)	144 (10)	80 (2)	112 (8)	93 (4)	126 (9)	87 (3)	97 (6)	68 (1)
Research system	73 (9)	64 (8)	83 (10)	47 (7)	36 (6)	36 (5)	29 (4)	19 (1)	27 (3)	24 (2)
Finance and support	148 (10)	91 (8)	49 (3)	56 (5)	52 (4)	87 (7)	110 (9)	21 (2)	56 (6)	14 (1)
Firm investments	130 (10)	95 (7)	111 (9)	86 (6)	63 (3)	100 (8)	83 (4)	50 (2)	85 (5)	20 (1)
Linkage &entrepreneurship	96 (9)	89 (8)	122 (10)	43 (6)	44 (7)	22 (4)	35 (5)	15 (2)	20 (3)	9 (1)
Intellectual assets	77 (8)	60 (6)	87 (9)	51 (4)	43 (2)	59 (5)	46 (3)	90 (10)	70 (7)	27 (1)
Innovators	80 (9)	90 (10)	80 (8)	61 (6)	79 (7)	51 (5)	21 (1)	35 (2)	40 (4)	37 (3)
Economic effects	56 (6)	88 (9)	74 (7)	99 (10)	86 (8)	44 (3)	29 (1)	31 (2)	53 (5)	48 (4)
Global Competitiveness Index – GCI	30 (1)	31 (2)	59 (8)	63 (9)	67 (10)	44 (5)	36 (3)	54 (7)	41 (4)	53 (6)
Global Innovation Index – GII	24 (1)	27 (2)	32 (3)	33 (4)	37 (7)	34 (5)	36 (6)	38 (8)	39 (9)	48 (10)
GDP per capita	42 (3)	41 (2)	39 (1)	59 (7)	49 (4)	56 (6)	53 (5)	83 (10)	60 (8)	69 (9)
GDP growth	9	5	7	8	1	4	6	3	2	10
GERD	3	2	1	5	4	8	6	9	7	10

Source: Summary Innovation Report 2016, Global Competitiveness Report 2016–2017, Eurostat GDP database and own calculations.

Table 4. Connection between different innovation, competitiveness and economic growth variables

	SII	HR	RS	FS	FI	LE	IA	INN	EE	GCI	GDP pc.	GDP growth	GII	GERD
SII	1	.515	.947**	.348	.779**	.947**	.348	.887**	.743*	-.012	-.839**	.072	-.803**	-.947**
HR	.515	1	.479	.333	.333	.636*	.164	.273	.067	-.091	-.745*	-.333	-.333	-.685*
RS	.947**	.479	1	.406	.830**	.964**	.212	.867**	.673*	-.079	-.903**	.285	-.891**	-.927**
FS	.348	.333	.406	1	.600	.430	.067	.297	.006	-.745*	-.467	.030	-.612	-.394
FI	.779**	.333	.830**	.600	1	.758*	.467	.697*	.345	-.370	-.709*	.224	-.867**	-.685*
LE	.947**	.636*	.964**	.430	.758*	1	.273	.818**	.600	-.079	-.939**	.139	-.867**	-.976**
IA	.348	.164	.212	.067	.467	.273	1	.224	-.055	-.200	-.139	-.139	-.358	-.273
INN	.887**	.273	.867**	.297	.697*	.818**	.224	1	.794**	-.115	-.770**	.115	-.770**	-.818**
EE	.743*	.067	.673*	.006	.345	.600	-.055	.794**	1	.285	-.467	.091	-.479	-.661*
GCI	-.012	-.091	-.079	-.745*	-.370	-.079	-.200	-.115	.285	1	.200	-.224	.333	.079
GDP pc.	-.839**	-.745*	-.903**	-.467	-.709*	-.939**	-.139	-.770**	-.467	.200	1	-.103	.794**	.927**
GDP growth	.072	-.333	.285	.030	.224	.139	-.139	.115	.091	-.224	-.103	1	-.309	-.067
GII	-.803**	-.333	-.891**	-.612	-.867**	-.867**	-.358	-.770**	-.479	.333	.794**	-.309	1	.806**
GERD	-.947**	-.685*	-.927**	-.394	-.685*	-.976**	-.273	-.818**	-.661*	.079	.927**	-.067	.806**	1

Source: Author's own calculation.

Compound innovation measures appear in various forms and capacities. Specified innovation indices and measures are the result of an instrument panel of indicators circulated by different international affiliations, but compound innovation measures and indicators are the main products and are accompanied by indices that allow for comprehension of economic rankings. Separate from innovation indices, competitiveness indices related to Research & Development activities are based on typical innovation gauges, and some even involve a pillar designated as 'innovation'. Several aggregate innovation indices have been adapted in recent years, especially in terms of their methodological features. In parallel with the results of conducted analyses, the indices became more inclusive, taking into account circumstances, indicators, economies, and years. Methodology differences could create individual uncertainties as they create non-comparable classifications. Therefore, the most powerful indicators should be concentrated on calculating values in past years applying the latest methodology, which permits cross-country comparison. The SII offers a comprehensive depiction of national innovation systems in economies with various features, and allows for understanding innovation performances as a multi – structural phenomenon.

5. Economic Instruments and Diminishing the Problems of Fragile Innovation Performance

Many surveys have indicated that the innovation plays a crucial role in fostering competitiveness and economic growth, which means that performances produce new value through knowledge as a focal issue. In this regard, economic instruments or tools should be directed to the following issues: knowledge diffusion, augmentation of innovation support, technological changes, enhancing innovation strategies, developing human resources, new skills, and firm competitiveness. There is an extensive list of problems in the theoretical and conceptual approaches when observing the innovation features that identify input elements of innovation measures.

A few illustrative examples are related to the usage of policy intervention. High education and the expansion of skills are major performances in the innovation structure because the formulation of individually-adapted knowledge skills are crucial input elements for innovation performances. Specific problems could demand policy intervention in the event of a disparity between enterprises' short-term requirements and the long-term enhancement of their knowledge on the labour market. Policy intervention securing a long-term supply of knowledge skills should be authorized in sectors where this disparity creates a problem for innovation performances.

The next significant issue in the conceptual framework is to determine the policy tools or economic instruments usually carried out by government officials to diminish fragile innovation policy problems. Evidence from developing economies indicates the great variety of economic policy instruments directly redistributed by governments in pursuing distinctive aims in distinctive fields of innovation structure. These could be arranged in accordance with the areas in which they perform, ensuring an overall consistency in the arrangement of economic policy instruments.

In terms of policy creation, the selection of economic instruments is still far from being fostered by a specific conception of goals. Frequently, economic policy tools are not formulated with respect to individual problems. Relatively speaking, a specific overview of goals could be taken from other authorities' parallel and/or identical interventions, selected to respond to the most common and inadequately examined motives for policy intervention.

6. Conclusions

The purpose of this paper was to investigate the significance of innovation in driving economic growth per capita and competitiveness in the following selected developing economies: Estonia, Czech Republic, Slovenia, Hungary, Slovakia, Latvia, Lithuania, Bulgaria, Poland, and Romania. With the aim of determining interconnections between the variables of innovation, competitiveness and growth, assorted methodological instruments have been applied. The research results have revealed positive relationships between the Global Innovation Index, GERD, GDP per capita, the Summary Innovation Index, Research Systems, Firm investments, Innovators and Linkage & Entrepreneurship. According to the calculated correlations, it can be concluded that innovation performance depends on a developed research system, improved conditions for entrepreneurship, and a higher degree of innovation performances in selected developing economies.

The conducted investigation has put forward a comprehensive, empirical, and theoretical review of the problems, economic instruments, tools, goals and policies that are related to every performance or input element in the innovation structure. This can serve to assure not only a strong foundation for accepting the multiplicity of innovation activities, but also to enhance the future theoretical bases for appropriate policies and surveys about specific countries and economies.

Additionally, innovation measures are crucial for a wider analysis concerning the total innovation performances with respect to input and output scales. Therefore, the paper has revealed an enormous disparity – found in every innovation

aspect during the observed years, specifically with respect to innovation output and enterprises' performances – between the developing economies and the EU–28 average measures.

Innovation indices are not sufficient analytical instruments because they do not differentiate inputs from outputs or inputs of innovation elements placed together in a unique measure. In ignoring the theoretical framework about innovation performances in economics and innovation structure approaches, cumulative indices do not achieve their stated aims of augmenting economic policy counselling.

The repetitive actions of theoretical and practical examinations constitute the basis for the advancement of economic sciences. The scientific surveys concerning policy tools are imperative factors in these repetitive actions, not just because policy tools (the tools authorities need to clarify innovation policy problems) are items of a systematic analysis based on their individual features, but also because they are the major pillars for creating research results more important for policymakers to aid them in developing policies aimed at diminishing the problems of fragile innovation performance in developing economies.

The conducted investigation recommends that in order to foster economic growth and competitiveness, concentration should be directed on appropriate policies and plans for actions that increase innovation in the developing economies. In recent years, many European economies have acknowledged the significance of innovation for enhancement of their economic growth, and therefore they have raised their intentions to develop research systems and innovation in their economies.

However, it is necessary for state authorities of the specific economies to recognise the importance of assuring a stable environment in order to augment the relationship between innovation, competitiveness and economic growth. Firstly, government authorities should accept the priority of innovation for durable economic growth per capita. This should be most visible in those economies where the simple alternatives have been discarded, and future economic growth or competitiveness relies upon on more effective methods of linking new inputs or upgraded outputs. Second, state authorities should increase innovation indirectly by supporting the creation of a suitable atmosphere for companies or SMEs that are ready to enlarge investment and increase their innovative potential. The government should also support innovation in a direct way, by financing national research or stimulating individual investment in the R&D sector. The above recommendations need competent and effective authorities to create crucial alternatives, with a balance between enhancement of the accepted surroundings to encourage innovation, and the creation of new national or individual leading performers. The proper mixture of policy aims and instruments could be created to improve an economy's level of growth expansion and the stability of a research innovation system, which could differ both with respect to specific periods and across economies.

References

Aubert J.-E. (2004), *Promoting Innovation in Developing Countries: A Conceptual Framework*, ʽWorking Paperʼ. Washington, DC: World Bank Institute.

Barney B., Clark D. (2007), *Resource-Based Theory – Creating and Sustaining Competitive Advantage,* Oxford University Press, Oxford.

Borrás S., Edquist C. (2013), *The choice of innovation policy instruments*, ʽTechnological Forecasting and Social Changeʼ, Vol. 80., No. 8, pp. 1513–1522.

Bogliacino F., Pianta M. (2011). *Engines of growth. Innovation and productivity in industry groups*, ʽStructural Change and Economic Dynamicsʼ 22, pp. 41–53.

Chesbrough H. (2006), O*pen innovation: The new imperative for creating and profiting from technology*, Harvard Business Press.

Chaminade C., Edquist C. (2005), *From theory to practice: the use of systems of innovation approach in innovation policy,* ʽPapers in Innovation Studiesʼ, 2005/2, Lund University, CIRCLE – Center for Innovation, Research and Competences in the Learning Economy, pp. 1–47.

Czarnitzki D., Toivanen O. (2013), *Innovation Policy and Economic Growth,* European Comission-Fellowship initiative The future EMU, European Economy, ʽEconomic Papersʼ, 482/2013, pp. 2–40.

Edquist C. (2004), *Systems of Innovation: Perspectives and Challenges.* [in:] Fagerberg, J., D. Mowery, and R. Nelson (eds), *The Oxford Handbook of Innovation*, Oxford: Oxford University Press, pp. 181–208.

Edquist C. (2014a), *Efficiency of Research and Innovation Systems for Economic Growth and Employment*, CIRCLE WP No. 2014/08, http: //www.circle.lu.se/publications (accessed: 16 March 2017).

Edquist C. (2014b), *Striving Towards a Holistic Innovation Policy in European Countries – But Linearity Still Prevails*!, STI Policy Review, Vol. 5, No. 2, pp. 1–19.

European Commission, (2010), *EUROPE 2020: a Strategy for Smart, Sustainable and Inclusive Growth*, Brussels, 3.3.2010. Communication from the Commission,COM (2010) 2020.

Eurostat database, http: //ec.europa.eu/eurostat/data/database (accessed: 16.03.2017).

Fagerberg J., Mowery D., Nelson R. (2004), *The Oxford Handbook of Innovation,* Oxford: Oxford University Press.

Fagerberg J., Godinho M. (2004), *Innovation and Catching-up*, [in:] Fagerberg J., Mowery D., Nelson R. (eds.), *The Oxford Handbook of Innovation*, Oxford: Oxford University Press, pp. 514–544.

Foray D. (2009), *Research, Innovation and Economic Growth: What does Really Matter?* Paper Presented at the Conference Futurise Public Support for Innovation: Efficiency and Future Prospects, Paris.

Filippetti A., Archibugi D. (2011), *Innovation in times of crisis: National Systems of Innovation, structure and demand*, ʽResearch Policyʼ, 40, pp. 179–192.

Galbraith J.K. (1967), *The New Industrial State*, Houghton Mifflin Co., Boston.

Goodwin M.R. (1946), *Innovations and the Irregularity of Economic Cycles* , The Review of Economics and Statistics, Vol. 28, No. 2, pp. 95–104.

Grossman M.G., Helpman E. (1991), *Innovation and Growth in the Global Economy*. Massachusetts Institute of Technology, pp. 359, ISBN 0–262–57097–1.

Helpman E. (2004), *The Mystery of Economic Growth. Cambridge*, MA: Harvard University Press.

INSEAD WIPO (2009), *The Global Innovation Index Report 2008/2009*. Fontainebleau, Ithaca, and Geneva.

INSEAD WIPO (2011), *The Global Innovation Index Report 2011*. Fontainebleau, Ithaca, and Geneva.

INSEAD WIPO (2012), *The Global Innovation Index Report, 2012*. Fontainebleau, Ithaca, and Geneva.

INSEAD WIPO (2013), *The Global Innovation Index, Report, 2013*. Fontainebleau, Ithaca, and Geneva.

INSEAD WIPO (2014), *The Global Innovation Index Report, 2014*. Fontainebleau, Ithaca, and Geneva.

INSEAD WIPO (2015), *The Global Innovation Index Report, 2015*. Fontainebleau, Ithaca, and Geneva.

INSEAD WIPO (2016), *The Global Innovation Index Report, 2016*. Fontainebleau, Ithaca, and Geneva.

Lazonick W. (2013), *The Theory of Innovative Enterprise: A Foundation of Economic Analysis in The Theory of Innovative Enterprise: Methodology, Ideology, and Institutions*" [in:] Jamee K. Moudud, Cyrus Bina, and Patrick L. Mason, (eds.), *Alternative Theories of Competition: Challenges to the Orthodoxy*, Routledge, pp. 127–159.

Lundvall B.-Å. (2002), *Innovation, Growth and Social Cohesion: The Danish Model,* Cheltenham, Edward Elgar.

Lundvall B.-Å. (2006), *Interactive learning, social capital and economic performance,* Foray, D. And Kahin B. (eds.), *Advancing Knowledge and the Knowledge Economy*, Harvard University Press, US, pp. 63–74.

Mytelka L.K. (ed.), (1999), *Competition, Innovation and Competitiveness in Developing Countries. Paris*: OECD.

Naudé W.A. (2010a), *Entrepreneurship, Developing Countries and Development Economics: New Approaches and Insights,* 'Small Business Economics Journal', 34 (1), pp. 1–12.

Naudé W.A. (ed.), (2010b), *Entrepreneurship and Economic Development. Basingstoke:* Palgrave Macmillan.

Naudé W.A. (2010c), *Entrepreneurship, Global Development, and the Policy Challenges*, Harvard College Economic Review, 4 (2), pp. 24–25.

OECD, (2012), *Innovation for development: The challenges ahead*, [in:] OECD Science, Technology and Industry Outlook, OECD Publishing.

Pece M.A. (2015), *Innovation and economic growth: an empirical anlysis for CEE*, 'Procedia Economics and Finance', Vol. 26, pp. 461–467.

Porter M.E. (2008). *On Competition. Updated and Expanded Edition*. Boston: Harvard Business School Publishing.

Petrariu I .R, Bumbac R., Ciobanu R. (2013), *Innovation: a path to competitiveness and economic growth. The case of CEE countries*, 'Theoretical and Applied Economics', Vol. XX, No. 5 (582), pp. 15–26.

Radošević S., Yoruk (2013), *Entrepreneurial propensity of innovation systems: Theory, methodology and evidence*, 'Research Policy', Vol. 42, No. 5, pp. 1015–1038. North-Holland.

Reinert E. (2003), *The Other Canon: The History of Renaissance Economics,* [in:] E. Reinert (ed) *Evolutionary Economics and Income Inequality*, Northampton: Edward Elgar Publishing.

Rome, P. (1990), *Endogenous Technological Change*, 'Journal of Political Economy', Vol. 98, No. 5, pp. 71–102.

Szirmai A., Naudé W., Goedhuys M. (2011), *Entrepreneurship, innovation and economic development: An overview*, [in:] *Entrepreneurship, innovation and economic development*, Oxford; New York, Oxford University Press.

Smit K. (2000), *Innovation as a Systemic Phenomenon: Rethinking the Role of Policy*, 'Enterprise & Innovation Management Studies', Vol. 1, No. 1, Routledge, pp. 73–102.

Smith A. (1776), *An Inquiry into the Nature and Causes of the Wealth of Nations.* Available from: http: //www.marxists.org/reference/archive/smith-adam/works/wealth-of-nations/index.htm (accessed: 16 March 2017).

Schumpeter A.J. (1934), *The Theory of Economic Development : An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*, 'Harvard Economic Studies', Vol. 46, Harvard College, Cambridge, MA.

Tidd J., Ramirez M., Denicolai S. (2016), Overcoming the false dichotomy between internal R&D and external knowledge acquisition: absorptive capacity dynamics over time. Technological Forecasting and Social Change, 104. pp. 57–65.

The International Monetary Fund, World Economic Outlook (2016), https: //www.imf.org/. (accessed: 16.03.2017).

The World Economic Forum, T*he Global Competitiveness Report 2016–2017.* https: //www.weforum.org/ (accessed: 16.03.2017).

UNU-INTECH (2005), *Measuring Innovation: Making Innovation Surveys work for Developing Countries*, Technology Policy Brief, 4 (1). Maastricht: UNU-MERIT.

Verspagen B. (2005), *Innovation and Economic Growth.* [in:] J. Fagerberg, D.C. Mowery, and R.R. Nelson (eds), *The Oxford Handbook of Innovation*, Oxford: Oxford University Press.

Westmore B. (2013), *R&D, Pateting and Growth: The Role of Public Policy*, 'OECD Economics Department Working Papers', No. 1047, OECD Publishing, pp. 2–48.

Streszczenie

ROLA INNOWACJI W PROMOWANIU KONKURENCYJNOŚCI I WZROSTU GOSPODARCZEGO NA PRZYKŁADZIE GOSPODAREK ROZWIJAJĄCYCH SIĘ

W niniejszym artykule przedstawiono istotne cechy określające rolę innowacji w gospodarkach rozwijających się poprzez zbadanie struktury miar innowacyjności. Wzrost gospodarczy i konkurencyjność gospodarek rozwijających się są silnie powiązane z ich poziomem innowacyjności. Celem niniejszego artykułu jest zbadanie znaczenia innowacji dla pobudzania wzrostu gospodarczego per capita i konkurencyjności w wybranych gospodarkach rozwijających się. W celu określenia wzajemnych powiązań między zmiennymi określającymi innowacyjność, konkurencyjność i wzrost, zastosowano różne metodologie pomiaru. Zebrane dane pochodzą zarówno ze źródeł pierwotnych, jak i wtórnych. Wyniki

wskazują na znaczenie konkretnych wymiarów innowacji dla przyszłego wzrostu gospodarczego w gospodarkach rozwijających się. Te same miary, które są odpowiedzialne za słabą innowacyjność, są powiązane z niskimi wartościami złożonych miar innowacyjności. Pokazuje to olbrzymią rozbieżność, widoczną w każdym aspekcie innowacyjności na przestrzeni czasu, w szczególności w zakresie efektów innowacji i osiągnięć przedsiębiorstw między gospodarkami rozwijającymi się a średnimi wartościami dla UE–28. Wyniki badań wskazują na konieczność wykorzystania odpowiednich instrumentów gospodarczych dla zmniejszania problemów napotykanych obecnie przez gospodarki rozwijające się.

Słowa kluczowe*: innowacje, konkurencyjność, wzrost gospodarczy, gospodarki rozwijające się, UE–28*