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The New Paradigm of Innovation Economics in the 21st Century: Solving the Enigma of Economic Growth

Lejla TERZIĆ¹

Abstract: *Innovation economics has become one of the most valuable fields of explorations in the new millennium. The new changing environment of a knowledge-based economy in the 21st century requires a new obligation for economic policy established on innovation economics. Without an economic theory and economic doctrines that face with the new paradigm and circumstances, it will be very difficult for policy creators to perform the activities required to accelerate economic growth. The aim of this article is to investigate the new paradigm of innovation economics in solving the enigma of economic growth model and indicators in selected advanced and emerging countries. In order to examine the interdependence between the indicators of innovation, well-being, human development and economic growth, several methodological evaluation tools have been employed. The determination of interdependence between selected indicators was performed by SPSS 23.0 statistical software package. Also, the article deals with new economic growth model, in accordance with a concise consideration of innovation economics and other economic doctrines afflicting to reveal the basic sources of economic growth, that emphasize the performance of economic, political and social institutions. The conducted research demonstrates that appropriate policies can help in diminishing the problems that remain in emerging countries.*

Keywords: economic doctrines, innovation economics, new paradigm, enigma of economic growth

JEL Classification: B10, B20, C88, O30, 047

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1. Introduction

Diversified research surveys have highlighted the contribution of innovation economics doctrine and relevance of innovation in stimulating economic growth. The innovation capabilities gauges estimated by the various institutions can be essential in comparability among countries, and they provide valuable recommendations for governments, economists and policy creators. Dominant economists progressively confess that the best policies are institutional and macroeconomic policies oriented to approval for research and innovation, education and skills creating, and digital modification in the surrounding of competitive markets. This article briefly illustrates the three predominant economics doctrines, especially doctrine of innovation economics that are challenging for the consideration and loyalty of policy designers. In extension to deliberating particular doctrine's assumptions and aims, it argues the benefits and constraints of individual economics doctrine. This article investigates the importance of innovation economics doctrine and innovation in increasing nation's well-being, human development and economic growth in selected advanced and emerging economies. In order to examine the correlations between the indicators of innovation, well-being, development and growth, several methodological evaluation tools have been employed.

The idea for this research outcome from revealing the strenght of evaluations that differently affected innovation in the advanced and emerging countries, a problem that had not received convenient consideration in last decennium by policy designers, but persists to restrain innovation, well-being, human development and economic growth. In the end, article embraces in what way particular doctrine observes economic circumstances and describes the various categories of policy suggestions that result from every particular economics doctrine and conducted research.

2. The New Paradigm of Innovation Economics in the 21st Century: A Theoretical Background

Innovation economics has become one of the most dynamic areas of research in the past few years. The renewal was incited by theoretical and practical augmentations. New methods transported from various fields in economics were employed in order to inward technological improvement with a macroeconomic inter-secular common equilibrium foundation and thusly overwhelme a dominant imperfection of Solow's model – the analysis of technological reversal as exogenous. Still, this is the motive why the new models are generally designated as endogenous. The creation of unique data packages for a various countries (Summers and Heston, 1991; Dixit and Pindyck, 1994, Sundbo, 1998, Smith, 1998, Maddison, 2001, Summers and Aten, 2002), has increased the curiosity in practical analysis that have caused new disputes for economic growth

theory. However, the present literature is enormous and still speedily increasing. In concise, explanations of the mentioned state of the art in this research field, look, in particular, Schumpeter (1942), Barro and Sala-i-Martin (2004), Porter (2008), Jones (2002), Freeman (1995), Sanidas (2005), Aghion and Durlauf (2005), Courvisanos (2012), Atkinson and Ezell (2014).

The new facts of a worldwide, knowledge-based economy in the 21st century necessitates a new obligation to economic policy model established on support for the creating innovation. Without an economic theory and economic doctrine that deal with the new phenomenon, it will be very difficult for policy creators to perform the activities required to accelerate economic growth. Opportunely, as defined in this article, a new economic growth theory founded on a specific attempt to explain the ideal how innovation develops has arisen in the last decennium. The aforementioned new economics doctrine – termed “innovation economics” – modifies the conventional economic growth model, so much that innovation, business sophistication, knowledge, technology, are located at the focus of the model preferably than observed as liberated strenghts that are mostly unchanged by economic policy. Innovation economics, also named neo-Schumpertarian economics, new growth economics, endogenous growth theory, new institutional economics, and evolutionary economics, is established on two basic principles:

1. The first principle is that the major aim of economic policy must be to stimulate higher productivity and outstanding innovation.
2. The second principle is that the markets depending on price indications only will not constantly be as effective as smart public-private partnerships in spurring higher productivity and greater innovation.

As long as neoclassical economic growth theory had primary to affect the limitation of the overall economic growth rate derived externally in Solow model (1956), in substitute models this was not inevitable. Accordingly the economic growth rate has continually been deliberated as endogenous, constructed by the allocation of income, economic, social or international associations, etc. The accentuation the traditional economists that follow the idea of Adam Smith (1776) established on the unplanned public emanations of useful performances of singular person or associations of individuals delegating inside a extremely heterogeneous system of a broadened distribution of labour activity, defined by limited natural resources, high-tech innovations and dynamic social connections is unsuitable with the idea of economic growth rate exposed as exogenous.

The above-mentioned effect is previously validated if we observe at so-called linear economic growth models (Kemeny, Morgenstern and Thomson, 1956, Kurz and Salvadori, 2008). Extended reproduction scheme created by Marx (1894) constructs a

two divisions: the n -sector model of von Neumann and Morgenstern (1944) and the one-sector model of growth developed by economists Harrod and Domar (1939). Actually, this respective Harrod- Domar model is in line with the initial Keynesian assumptions related to the economic dynamics.

The essential distinction with the new economic growth models is that the final are *intensive* models, distressed with interpreting the income per capita's growth. Still, intensive models are investigated in non-neoclassical analysts, classical economists, Marxists, Keynesians, etc. These approaches are neglected by economists Lucas (1988), Petrakos *et. al* (2005), Aghion and Durlauf (2005), Dutt (1990), Foley and Michl (1999), Salvadori (2003), Nelson (2009) and Bhaduri (2007).

Because continued economic growth in income per capita is debatably the most valuable measure of living standards and after all alternative indicators of well-being, such as population anticipation and the Human Development Index (HDI), usually, but not constantly, perform as a group with income per capita, to comprehend the origins of economic growth and the explicit importance to development and innovation economics. In addition to this, there is also the ensuing circumstance that highlights the strong correlations among economic growth and development. The focus of exploration in new growth economics are the forthcoming and basic origins of high-tech and innovation advancement that are composed with human capital establishment, is perceived as the major driver of the economy and a fundamental cause of increasing nation's living standards. However, the principal remark of this exploration is the Solow model. As long as the model at the start has been abandoned by dominant promoters of modern economic growth theory, it currently returned in an improved model. It is very interesting that the model was not refused because of the deficiency of dimensional microeconomic foundations of its scientific know-how and production function.

The essential characteristic of the new economic growth models is that they reject the traditional marginalist hypothesis of decreasing returns to capital aggregation. This is accomplished by widening the approach of capital to include human capital, new knowledge or innovation, and by conjuring specific areas related to the capital aggregation. The initial economic growth models tried to incorporate a dimension of growth instruments in a neoclassical macroeconomic scheme.

3. Synopsis of Innovation Economics and Other Economic Doctrines

Conceding that Adam Smith is the leader of neoclassical economics and John Maynard Keynes of neo-Keynesian economics, it is Joseph Schumpeter who is the laureate of innovation economics. Indeed, if there is a *holy book* for innovation economics it is

feasibly Joseph Schumpeter's book *Capitalism, Socialism, and Democracy* (1942). Manuscripting at almost the same period as Keynes, Joseph Schumpeter had a clearly contrasting view on the economy. According to Schumpeter, institutions, entrepreneurs, and technological alternation were at the heart of economy and its growth.

The economics doctrine developed by John Maynard Keynes grasped major level in the USA up to the stagflation of the 1970s drove to neoclassical economics (an alternation of classical economics doctrine) taking major level as a response contradictory to it. The answer opposite to Keynesian economics was specifically evident between traditional economists, who devised a neoclassical substitute to Keynesian economics acknowledged as *supply-side economics* that prevails the assertive economic paradigm for numerous conservative economists to nowadays. Monetarism, a counterpart of supply-side economics, assumed that instead then employing fiscal policy to react to business phases trenches as Keynes suggested, the government authorities must maneuver the money supply. On the governmentally way, modern neoclassical economists grasped almost the similar assumptions as supply-side economists, but created a neoclassical economics doctrine that included their particular ideas in a powerful performance of government and higher economic fairness. In the meantime, a several neo-Keynesian economists, with the opposite beliefs, hoped that were better capable to illustrate actual economic circumstances than the authentic Keynesian doctrine.

Table 1 – Synopsis of the Neoclassical, Neo-Keynesian and Innovation Economic Doctrine

Circumstance	Neoclassical Economic Doctrine		Neo- Keynesian Economic Doctrine	Innovation Economic Doctrine
	Traditional Neoclassical Doctrine	Liberal Neoclassical Doctrine		
Disposition of economic growth	Supply-side economics	Supply-side economics	Demand-side economics	Supply-side
Causes of economic growth	Capital aggregation	Capital aggregation	Consuming	Innovation, knowledge and productivity
Major economic policy aim	Economic growth and regulating business phases	Effectiveness and regulating business phases	Equity and regulating business phases	Economic growth and innovation
Major instruments	Reduced principal marginal tax rates and decrease rates on capital; decrease regulation	Fiscal regimen, improved economic regulation	Public spending, growing taxes, vigorous regulation	Tax, consumption, and regulatory policies to increase innovation, competitiveness, entrepreneurship

Circumstance	Neoclassical Economic Doctrine		Neo- Keynesian Economic Doctrine	Innovation Economic Doctrine
	Traditional Neoclassical Doctrine	Liberal Neoclassical Doctrine		
				competences, investment in new devices
Commerce theory	Free markets increase assigned effectiveness and consumer well-being	Free markets increase assigned effectiveness and consumer well-being, but government policies must reward those harmed by commerce	Commerce can harm workers and decrease customer demand	Commerce can bring gains, especially over competition and education, but for it to be most efficient policy must resist mercantilist misinterpretations and strongly stimulate innovation at domestic level
Conformation of government authorities	Restricted	Directed on the fundametal principles	Enormous and effective government	Recreated government and greater confidence on quasi-public associations and public-private partnerships
Disposition of performance	Market	Market	Institutions and their affiliations	Institutions and their affiliations

Source: Author's summarization.

Although representatives of traditional and liberal neoclassicism are consistent on many crucial economic assumptions, they distinct in several important directions. Traditional neoclassicalists discuss that the private capital accumulation is the foundation for economic growth. Liberal neoclassicalists differ from traditional neoclassicalists in being powerful proponents of larger income equality. Government spending policy is another field where traditional neoclassicism and liberal neoclassicism alternate. Traditional neoclassicalists believe that lower taxes and decreased government spending are important for growth. In contrast, liberal neoclassicalists concern about government spending because of its assumed consequences on fiscal discipline and public savings.

Innovation economics doctrine is led by several essential yardsticks, delineated underneath:

- *Innovation foster economic growth.*

Innovation economists assume that generally innovation foster economic growth in current knowledge-based economy, not capital aggregation, as neoclassical economists believed.

- *The principal operators of growth are dynamic and flexible efficiency.*

The focal point in neoclassical economics is “the examination of how communities employ limited resources to create valuable products and allocate them between people,” the spotlight in innovation economics is the investigation of how communities design new shapes of production, products or services to increase well-being of population. In antithesis to neoclassical economics, that is concentrated on capturing the price signals right to boost the efficient distribution of limited resources, innovation economics is concentrated on stimulating economic performers to develop their productive and innovative capacities.

From the belief of innovation economists, if policies created by government to support innovation deform price signals and result in insignificant “concern” defeat to the economy, thus, because distributive efficiency is not the principal determinant in fostering economic growth in the 21st century innovation and knowledge-based economy. According to the neoclassical economists’ society where distributive efficiency is the most important phenomenon and where market breakdowns are rare, individual can develop a compulsory case for inadequate government, without possibility to locate concerns of fairness and fields of central government responsibility, such as national safety. Innovation and population productivity rely upon, beside the performances of individual companies, on a spreaded collection of supports, e.g. powerful research potential, proficient employees, organizational networks, principles, and a large group of other determinants that public-private partnerships may perform an essential performance in aiding to assure innovation and prosperity.

- *Interaction of learning institutions is the pivotal to economic growth*

Innovation economists perceive that innovation and increase of productivity show up in the framework of institutions and their affiliations. They can observe innovation as an transformative action that proceeds over the synergy and education of multinational companies, and similar organizations that jointly create a comprehensive national innovation system. National innovation systems are institutional preparations that assist the progress of learning and innovation between economic stakeholders - and a powerful innovation policy develops innovation. Along these lines, innovation economics switches the standpoint of economic policy forward to building an institutional surroundings that stimulates technological alternation, entrepreneurial expansion, greater competences and national competitiveness. As a result of this perception, innovation economics concentrates not only on macroeconomic or monetary questions but also on microeconomic or institutional problems. Is innovation economics a demand-side or a supply-side economics doctrine? Economics of innovation concentrates on supply-side variables (knowledge, abilities, and capital investment). However, it is also

concentrated on the demand-side of the comparison in the way that it tries to enhance the demand by associations for the determinants that increase economic growth and innovation – especially, new knowledge, new abilities, and new capital investment.

- *The new knowledge-based economy gravitates forward to alternation rather than equilibrium*

Innovation economics considers that despite there is equilibrium in few markets at specific period, in a growing part of markets in the new knowledge-based economy, equilibrium is a temporary period. The cause of this is that markets are continually agitated by entrepreneurial entrance, distracting technologies, political and social disorders, outbreaks in trade, and also, never achieving the equilibrium. The loss of equilibrium is especially typical to industries featured by greater stages of modification and innovation.

- *Individuals and companies sometimes are not rational*

Rationality has commonly been comprehended to include flexibility beyond decision-making established on quantitative estimations. Outstanding innovation is situated on knowledge about customers' preferences and the assessment of the innovation to customers. For that reason, clever innovation policies attempt to fulfill what is essentially in a knowledge divergence. Therefore, it is very hard, maybe absurd, for individuals and companies to designate rational decisions under circumstances of ambivalence depending barely on price indications. Innovation economics is endured on a practical protocol that corresponding on the status. It is the cause why followers of innovation economics concentrate, beside economics, on new technology, entrepreneurial performances, local and regional development, culture, and legislation. That is the reason why followers review to a sensible and empirical cases of what has functioned and is expected to functionate in the forthcoming period. Innovation economics, for certain, proposes a various set of recommendations to policy creators, involving to standpoint on innovation increasement and higher productivity; to stimulate public-private partnerships; and to grasp diversity, dynamism and development. However, these recommendations should not be manifested into strict legislation.

- *Public-private partnerships are the right way to applicate innovation policy*

Innovation economics proposes that the exceptive question of the performance of the government intervention should not be enclosed, as it is presently by policy creators, while the state intervention versus the market liberalism. Alternatively, as Beinhocker (2006) recommends, the matter should be compassed as through the combination of state intervention and markets liberalism to develop an adequate progressive system. Neoclassical economists will focus to cases where state authorities made mistakes, and

neo-Keynesian economists will concentrate to examples where there exist collective redundancy and inequity. Supposing that there is a specified philosophy guiding this, the public-private partnerships could perform an essential role in a supporting non-governmental institutions.

4. Solving the Enigma of the New Economic Growth Model

Despite recognition of neoclassical growth theory, it was very difficult to interpret assertive visible features of the growth mechanism. The neoclassical growth model was restrained on the influence of high-tech increasement in boosting economic growth. The mentioned model was inadequate of illustrating why accumulation of capital and growth of inhabitants were ineffective to interpret the growth mechanism as detected for numerous economies. The constraints of neoclassical growth theory, broadcasted various endogenous models that tried to present better comprehension to the mechanisms of the economic growth. These endogenous growth models emphasized high-tech increasement as a key driver of long-term economic growth. The mentioned growth models simulated that technological progress rely upon economic judgment to innovate and relish advantages from innovating. Beside that, the endogenous growth models also rely upon the institutional development, funding of research and science, human capital aggregation and other numerous economic performances. According to Mankiw et al. (1992) investments in human capital, skills and education enhance the quality and quantity of labor dynamism that ultimately increase productivity. Acemoglu et al. (2005) argued in what way property rights and quality of education have created a study of institutions relevancy in increasing economic growth. They also incorporated impact of competition that strenghts companies to innovate (Porter, 2008).

4.1. The model of endogenous growth

The model of endogenous growth that highlights high-tech increasement as a origin of economic growth could be illustrated employing a production function by Cobb-Douglas:

$$Y = AK^{\alpha}L^{1-\alpha} \quad (1)$$

where:

Y is total output,

A is total factor productivity (TFP) indicator, $\alpha < 1$,

K and L present capital and labor force.

Considering that production function is featured in the mentioned Cobb-Douglas model, then production function in per capita concept can be presented by following equation:

$$y = aK^{\alpha} \quad (2)$$

Along these lines, proportionate alternation of real gross domestic product (GDP) overtime could be apportioned into two items:

$$\Delta y / y = \Delta a / a + \alpha \Delta k / k \quad (3)$$

where:

$\Delta a / a$ represents the economic growth rate of TFP and

$\alpha \Delta k / k$ presents the results of an increasement of per-capita stock over the economy.

Additional expansions of the Solow's model was given by Romer (1986) which emphasised the influence of high-tech knowledge on the productivity and economic growth. This concept can be illustrated by dividing economy into two divisions. The first division presents production of outputs and the second represents research and development that drives to economy's innovations. The next equations can be used to explicit above-mentioned two divisions of an economy:

$$Y = IK_y^{\alpha} L_y^{\beta} H_y^{1-\alpha-\beta} \quad 0 < \alpha < 1; 0 < \beta < 1. \quad (4)$$

$$I^* = I^{\theta} K_I^{\eta} L_I^{\mu} H_I^{1-\eta-\mu} \quad 0 < \eta < 1; 0 < \mu < 1. \quad (5)$$

where: variable y designates the quantity of factor applicated for production procedure and variable I represents the quantity of factor applicated for Research and

Development. I^* implies the new ideas, innovation created by the sector of research and development.

The economic growth rate of TFP is named as residual by Solow because it represents the share of economic growth that was not described by Solow's model. Aghion and Howitt (2009) were acknowledged in revealing the imperfection of the Solow growth model, which revealed that the TFP and high-tech increasement regulates growth of productivity for economies that drives well-being in the long period of time.

4.2. The New Growth Model

The foundation of the new growth model is a correspondence assumption through which the creators are able to shift from elements of well-being to their origins: different capital property that individual country is able to aggregate (Dasgupta, 2001, Layard, 2005, Arrow, Dasgupta, Goulder, Mumford, and Oleson, 2012, Duraipappah and Muñoz, 2012, George *et al.*, 2012, Rogers, Duraipappah, Antons, Muñoz, Bai, Fragkias, Gutscher, 2012, Gerlagh and Sterner, 2013).

Well-being at time (t) is designated $WB(t)$ and is simulated to following formula:

$$WB(t) = \int_t^{\infty} [U(\underline{C}(s))e^{\delta(s-t)}] ds \quad (1)$$

where: $\delta \geq 0$

$WB(t)$ - generational well-being at the time (t)

δ - is happiness discount rate,

$\underline{C}(s)$ represents a vector of consumption flows at time s,

Generational well-being is the modified flow of happiness of present and prospective generations. Economic growth is maintained if $dWB(t)/dt \geq 0$. Despite continual precondition is determined at the specific moment in time, the component WB needs an outlook of the country's future outside limits of time (t). The future prospective relies upon country's property at time (t), engaging of technology, population's preferences and institutional development beyond time (t). The country's property at specific moment (s) in the future time could be driven by the stocks of capital at the *earlier time* (Arrow *et al.*, 2012:6).

Therefore, given $\underline{K}(t)$ (the vector of assets stocks at time t), each may regulate $\underline{K}(s), \underline{C}(s)$ and $U(\underline{C}(s))$ for every $s \geq t$. Accordingly, $WB(t)$ may also be composed as:

$$WB(t) = WB(\underline{K}(t), t) \quad (2)$$

Generational well-being is articulated as a function of capital assets and time. The precondition is formed that $WB(t)$ is convertible in K . Differentiating $WB(t)$ with regard

to time t in equation (2) and striking $dV(t)/dt \geq 0$ creates a yardstick for inclusive growth at time t :

$$dWB(t)/dt = \partial WB / \partial t + \sum_i [(\partial WB(t) / \partial K_i(t))(dK_i(t)/dt)] \geq 0 \quad (3)$$

According to Arrow et al. (2012:7) sustainability yardstick to prices and investments over shadow prices.

$$p_i(t) \equiv \partial WB(t) / \partial K_i(t), \quad \forall i \quad (4)$$

The gauge goals at demonstrating whether a nation is corroding the productive foundation on which its actual and upcoming well-being is expected to rely upon. Beside mentioned gauges, *Global Innovation Index* (GII), announced in the World Economic Forum Report, assures indicators about innovation performances of numerous economies all around the world. The Human Development Index (HDI) published in United Nations Development Programme's Report is a aggregate composite measure of life expectancy, education, and per capita income indicators, that are employed to classify countries into four categories of human development.

4.3. Methodological Approaches Designed by International Institutions and Their Indicators

To investigate interdependence of the sources of economic growth a few methodological approaches and indicators have been included:

- The Well-being index (WBI), designed by Gallup World Survey and Sustainable Development Solutions Network (SDSN);
- The Global Innovation Index (GII), created by World Economic Forum and INSEAD methodology;
- The Human Development Index (HDI), established by United Nations Development Programme (UNDP) methodology;

It is essentially significance to design new categories of barometers that go beyond the typical quantitative evaluation of economic growth to incorporate qualitative elements. Gross domestic product is generally applicated by economists and the government to evaluate the welfare, well-being and health of a nation. Still, if at any time there was disputed symbol from the quantitative sphere, GDP is ti. GDP evaluates income, but not

fairness, it evaluates economic growth, but not devastation, and it rejects factors such as social cohesion and the natural surroundings (OECD, 2018). GDP employment challenges as a unique indicator of comparison among economies achieved a new improvement afterwards the worldwide economic crisis and the raise of awareness over climate alternation. Substitute gauge that tried to encompass the social aspect already obtains, despite the fact GDP is generally used as foundation. The most broadly used gauge is Human Development Index (HDI), that is a aggregated index that integrates distributed gauges for three aspects:

- life expectancy, as an indicator of nation health and durability;
- education and knowledge, as evaluated by the adult proficiency ratio (with 2/3 weighting) and the linked primary, secondary, and tertiary gross engagement ratio (with 1/3 weighting) and
- living standards, as evaluated by the GDP per capita at purchasing power parity (GDP PPP pc) logarithm.

The Global Innovation Index (GII), presently accessible for numerous countries, was designed by INSEAD and World Economic Forum to demonstrate level to which countries are answering to the innovation challenges. The GIi is constructed from the 84 variables distributed into eight aggregated indicators (pillars) that are arranged as 5 input indicators and 3 output indicators. The 5 input indicators involve: institutions and policies, infrastructure, human capacity, technological sophistication, business markets and capital (WEF, 2017). These indicators present factors that increase the innovation scope. The 3 output indicators incorporate competitiveness, knowledge and wealth. The GIi employs reliable information strained from different public or private organizations such as World Bank, International Monetary Fund, etc., and subjective data strained from the Executive Opinion Survey by the World Economic Forum. The innovation system of emerging economies share specific weaknesses, involving a deficiency of experienced human resources, incompetent innovation capacities in firms or companies, and weak cooperation between industries, universities, and research organizations. Above-mentioned weaknesses should be directed in innovation policies, the utilization of which will depend upon adequate governance.

5. Examination of the Interdependence between the Indicators of Innovation, Well-Being, Human Development and Economic Growth in Selected Advanced and Emerging Countries

Investigation of the interdependence between the indicators of innovation, well-being, development and economic growth was conducted by employment of different

methodologies and established dependence between selected advanced and emerging countries, concerning distinguish surveys and indicators. Determination of interdependence among selected indicators was implemented by auxiliary data and Pearson's correlation coefficients. In research results illustrated in table 2, that reveals classification of advanced and emerging countries by appliance of the various methodologies, the best classified countries are selected advanced countries (Switzerland, Norway, Luxembourg and Ireland).

Table 2 – Ranks and values of selected advanced and emerging countries by employing various methodologies and indicators of innovation, well-being, human development and economic growth for 2017

	WBI 2017		GII 2017		HDI 2017		GDP PPP p.c. 2017	
	Rank	Value 1-10	Rank	Value 0-100	Rank	Value 0-1	Rank	Value
Selected Advanced Countries								
Czech Republic	8	6.609	8	50.98	8	0.878	8	35,223
Slovakia	9	6.098	11	43.43	12	0.845	9	32,895
Ireland	5	6.977	4	58.13	4	0.923	2	72,632
Iceland	3	7.504	6	55.76	5	0.921	5	52,150
Estonia	14	5.611	9	50.93	9	0.865	11	31,473
Luxembourg	6	6.863	5	56.40	7	0.898	1	109,192
Denmark	2	7.522	3	58.70	3	0.925	6	49,613
Norway	1	7.537	7	53.14	1	0.949	3	70,590
Switzerland	4	7.494	1	67.69	2	0.939	4	61,360
United Kingdom	7	6.714	2	60.89	6	0.909	7	43,620
Selected emerging countries								
Lithuania	10	5.902	14	41.17	11	0.848	10	31,935
Hungary	15	5.324	13	41.74	13	0.836	13	28,910
Latvia	12	5.850	10	44.61	14	0.830	14	27,291
Poland	11	5.973	12	41.99	10	0.855	12	29,251
Croatia	16	5.293	15	39.80	15	0.827	15	24,095
Romania	13	5.825	16	39.16	16	0.802	16	23,991

Source: Calculation is performed on data announced by the World Economic Forum, International Monetary Fund, UNDP, and World Bank country data base for 2017.

By Global Innovation Index (GII) Romania and Croatia are the lowest classified countries. Switzerland is the most innovative country by GII. The best classified country by Well-Being Index is Norway, and Croatia is the lowest positioned country. By investigating indicator of economic growth - GDP per capita (Purchasing Power Parity), the best classified countries are Luxembourg and Ireland, and the lowest positioned countries are Romania and Croatia. The highest classified countries by the Human Development Index are Norway and Switzerland. Czech Republic has been classified at the same position according to different indices.

Following research should reveal the interdependence between the most popular measures of economic growth and relevant indicators of innovation, human development and well-being. The correlations of classified indicators (Well-Being Index, Global Innovation Index, Human Development Index and Gross Domestic Product per capita - Purchasing Power Parity) are represented in table 3. The determination of interrelations between selected indicators was performed by SPSS 23.0 statistical software package.

Table 3 – Correlation matrix for indicators of innovation, well-being, human development and economic growth in the selected advanced and emerging countries

	WBI	GII	HDI	GDP PPP p.c.
WBI	1.000	,785**	,903**	,862**
GII	,785**	1.000	,871**	,825**
HDI	,903**	,871**	1.000	,880**
GDP PPP p.c.	,862**	,825**	,880**	1.000

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Author's own calculations.

Research results demonstrate the powerful and significant interdependence between the factors of innovation, economic growth and development, represented by a group of important and objective indicators. Positive correlations among the Gross Domestic Product per capita and WBI, GII and HDI variables, presented by correlation coefficients 0.862, 0.825 and 0.880, indicate that accomplishing faster economic growth relies on higher innovation performance and better life circumstances in selected countries. Powerful positive interdependence is apparent among HDI variables, GII and WBI variables followed by correlation coefficients 0.903 and 0.871, respectively. The stage of

innovation, well-being and acceleration of economic growth between selected countries by various methodological approaches, recommends that neoclassical economic growth method highly correlates with innovation and human development, represented by very high correlation.

6. Why the Innovation Economics is the Most Appropriate Economic Doctrine for the 21st Century? Recommendations for Policymakers

Established on the theoretical deliberating set out higher in position to connect innovation to crucial aims of policy and the consideration on the policy making rationalization. The following issue is which policies influence the numerous contributing determinants and how policymakers can configure and increase the beneficence that innovation composes to efficiency. However, this is the package of policies that state authorities need to examine when implementing innovation policies. Apparently, these policies packages are wider than the innovation policies in a restricted perception, such as policies to stimulate research and development. These create just one, even though, essential section of the overall package of policies that influence innovation accomplishment. Nevertheless, governments authorities should obligate to investigate how innovation and innovation policies influence other community aims, and the interdependent policies that should be involved to provide that the comprehensive policy aims are being performed, e.g. in concern to economic growth, income allocation, etc. Accordingly, what are the fields of Innovation Economic doctrine that reveal the augmentation of innovation to economic growth?

- *Fields where the Innovation Economics doctrine is valuable and mainly precise:*
 - Innovation economics identifies that numerous markets are featured by almost balanced supply and demand determinants with several market breakdowns, and in those markets the neoclassical counselling could be an appropriate scheme.
 - Anyhow, in markets that are defined by tremendous stages of dynamism and unpredictability, innovation economics suggests a more precise information to policy makers than the neoclassical and Keynesian exemplary. The yardstick on increasing innovation on the supply-side economics has been detected as an appropriate by a numerous economic growth models.
- *Fields where the Innovation Economics doctrine is a defective model to economic policy:*
 - Innovation economics can be a defective approach to economic policy if it employed as a support by policymakers to mediate in markets in ways that

decrease productivity and innovation. Also, if its application is stimulated by political elements rather than utilizing the doctrine to mediate in ways that are useful and established in complete empirical interpretation.

- Innovation economics does not justify policy creators from the relevant assignment of ensuring that markets are accessible and that macroeconomic circumstances are convenient. Accessible markets and a convenient macroeconomic surroundings are fundamental circumstances for increasing innovation and economic growth, but they are insufficient circumstances.

Specific method to acknowledge the diversity among the conservative and liberal neoclassical economics, neo-Keynesian economics, and innovation economics is to contemplate how the economic doctrines accelerate individual innovation policy suggestions for a assortment of actual economic policy matters.

- *Innovation Policy and competitiveness*

While worldwide economic rivalry has raised, the different economies have come under enhancing economic challenges. On this essential matters, followers of neoclassical economics, neo-Keynesian economics, and innovation economics recommend distinctive innovation policies, and have completely different outlook on the economic challenge character. Supply-side economists, as a result of their overall assumptions in the market domination, are mostly doubtful that the competitiveness challenge exists. To the addition that there is any competitiveness challenge, its origins should correspond objectively with government, e.g. in specific, enormous government legislation. Many liberal neoclassical economists are ready to accept that the competitiveness challenge endures. Liberal neoclassicalists do not investigate government help, because of their common belief in the market location and their doubt that government performances will deform appropriate effectiveness. They generally restrain their resolutions to those that support factor circumstances to create easier conditions for companies' competitiveness. Neoclassical economists (both conservative and liberal) are obligated to reveal governmental attempts to support innovative business activities, even though if such attempts are crucial and accomplished in cooperation with industrial sectors. Neoclassical economists assume that government authorities are initially ineffective of achieving an adequate innovation policy. Neo-Keynesian economists are more doubtful of policies that could assure financial stimulus to greater companies.

7. Conclusion

Based on a conducted survey of actual and former theoretical and empirical augmentations of innovation economic doctrine in this disposition of research, the major aim has been pointed to assure comprehension of the new economic growth and its model. In addition, policy fields of importance for the economic growth origins have been argued stressing the significance of a Innovation economics doctrine.

Innovation is an essential determinant of economic growth and intergenerational well-being in the long-run period. Thus, innovation economics does not inevitably investigates each category in the identical way. Moreover, fundamental policies, involving innovation policies, perform an important role in configuring the knowledge-based economy. This paper has attempted to explain the relationship between the most popular measures of economic growth and relevant indicators of innovation, human development and well-being.

The results of research affirm that variations between selected advanced and emerging countries may be correlated with the factors of innovation, well-being, human development and economic growth. Obviously the lessons of the selected advanced countries are constructive for selected emerging countries in booming innovation and productivity. The application of the adequate policies could boost together with creating entrepreneurial surroundings, human development, higher innovative capacity, business sophistication, and rapid economic growth of the selected countries. The WBI, GII and HDI gauges are beneficial tools to encourage cooperation between government, business firms and international organizations. However, application of new economic growth model for calculating above-mentioned gauges stimulates impressive new approach into the determinants of innovations in advanced and emerging countries.

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