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## **THE ECONOMIC GROWTH AND LABOR MARKET UNDER THE INFLUENCE OF GLOBALIZATION AND INNOVATION**

### **Abstract:**

The globalization reveals a number of socio-economic perspectives and challenges to the countries. The technological progress and innovation are essential elements of the globalization leaving their indisputable mark on the economic system. Because of this fact, the main objective of this study is to evaluate the effects of the innovation on the economic growth and the labor market (in particular on employment and the dynamics and nature of job positions) and to analyze the social and fiscal state policies. The research methodology includes time series analysis through descriptive, graphical and cross-correlation analyses by major macroeconomic indicators related to the labor market, economic growth and innovation. The results of the study indicate the changes in the nature of the work/ job positions at sectoral level in Bulgaria and the EU. Innovations demonstrate a significant positive link, both with employment and economic growth, and a negative such with unemployment. Specific features and general trends are reflected in changes in employment, innovation and economic growth in Bulgaria and the EU. This requires a reconsidering of the public policies in the social sphere and the tax policy.

### **Keywords:**

globalization; innovation; economic growth; labor market; employment; nature of jobs; social and fiscal policy in EU and Bulgaria

**JEL Classification:** A10, E01, J01

## 1 Introduction

In the age of the Fourth Industrial Revolution and Industry 4.0, where technology and innovation are the driving force, there is a transformation in the global market where a lot of countries are transforming their production from low-value and labour-intensive to highly skilled, technological one.

The UN sustainable development policy sets 17 essential goals, where, again, the focus is on innovation, found in part of Objective 9 'Building sustainable infrastructure, promoting inclusive and sustainable industrialization and promoting innovation' of the UN Sustainable Development Goals.

The link between innovation and economic growth, as well as between innovation and employment, has been particularly relevant in recent years, as there are divergent views on their study. On the one hand, it is accepted that innovation and technological change are a major driver of economic growth and employment. (Freeman et al. 1982; Romer, 1986, 1989; Lucas, 1988; Aghion, et al.1990; Verspagen, 1992; Ulku, 2004; Galindo, et al. 2014; Pradhan, et al. 2020). On the other hand, some authors support the view that innovation is responsible for reducing the lives of many professions and for the elimination of existing jobs, which ultimately reduces employment. (Keynes, 1930; Frey, et al., 2013; Stiglitz, 2014).

In spite of numerous studies examining the link between innovation and economic growth, as well as between innovation and employment, there is a scarcity in literature regarding the effects of innovation on the economic growth and employment at EU and Bulgarian level.

Precisely for this reason, the purpose of this study is to assess the effects of globalization and the resulting technological advancements and innovations on the economic growth, the labor market and in particular on employment and the nature of jobs in the EU and Bulgaria, and to conduct an assessment of the possibilities of the implemented policies in the field.

The modern occupations which have been established under the influence of globalization require, in addition to different skills and competencies, an alternative form of public policy management. One of the oppositions is related to the skilled workers. On the one hand, they will continue to be hired and their salaries will increase due to the contemporary requirements for skills. At the same time, their share of the total income will nevertheless decline as the return on capital accumulated for the owners of innovative equipment will increase even faster than wages. On the other hand, Ford (2015) warns of the risk of the perfect storm as the effects of the technological unemployment and the rapidly increasing inequality develop in parallel with climate change and resource depletion. In case that machines could more easily replace highly skilled workers who perform cognitive tasks, acquiring qualification through education would be futile, since the only vacancies available would not require specific skills. In such a scenario, wage inequality will actually decrease. However, inequalities between owners of capital and workers can increase dramatically unless profits are channelled to employees in the form of dividends or through redistribution. The aforementioned would lead to a lack of economic growth, insufficient budgetary revenues, given a lack of financial policy reform, and hence the impossibility or severe

restriction of sickness or unemployment benefits payment, that is, the whole social system will be at serious risk from multiplying the effect of inequality. An even greater contradiction happens among proponents of the unconditional basic income and those of other mechanisms.

The structure of the current research work is as follows: Section 2 covers the basic concepts revealing the link between innovation and economic growth, and between innovation and employment, as well as social and fiscal policies; Section 3 presents the methodology; Section 4 covers the data examined and the empirical results obtained; and Section 5 includes the conclusion.

## **2 Literature review**

### **2.1. The role of innovation for the economic growth and the labor market (employment)**

An adequate opportunity to clarify the nature of innovation is to analyze the contemporary theoretical approaches in the written sources which determine the link, on the one hand, between innovation and economic growth, and on the other, between innovation and employment. For the sole purposes of our literature review, we accepted that we should equalize the technological advancements and the innovations, and as well the fact that there is a causal link between the factors under consideration.

#### *Role of innovations (technical progress) for the economic growth*

The relation between innovations and economic growth is particularly visible in concepts concerning growth theories, which show precisely the impact of technological advancement or innovations on the long-term economic growth. These concepts have been subjected to certain modifications over time.

The innovative theory of growth is a continuation of the neoclassical theory of growth. What is distinctive about it is that it adds even more emphasis to technical advancement and innovation, since they are integrated into the models themselves, i.e. technical progress is seen as endogenous. It is a major driver of the economic development, so the models of endogenous growth theory seek explanation for the nature and essence of the technological progress, as well as for the underlying factors which trigger it. Technical advance is explained by knowledge, innovation activities or investment in research and development (R&D), which, on the other hand, are the result of the development of the human capital. It should be noted hereby that the accumulation of knowledge and the improvement of human capital are a major driver for long-term economic growth. (Romer, 1986, 1989; Lucas, 1988; Grossman, Helpman, 1994).

The increase of the human capital, on the other hand, can be an indirect factor in stimulating the economic growth. The reason for this is that the human capital is a source for the creation of innovative entrepreneurs and products, which in turn are factors to stimulate the economic development (Diebolt, et al., 2019).

Another fact arising from the analysis of the sources is that the driving force for long-term economic growth is the effective unification of production factors such as labor and capital and

the increment in their productivity, which is made possible by the use of technology. Innovation, and in particular innovation in product and processes, which help to reduce production costs and improve product quality, is a key element of the technological advancement worldwide (Anger, et al. 2015). In addition to technical innovation, organizational, social and political innovations also make a significant contribution to economic growth (Hilger, 2014). Innovation as a whole is a prerequisite for increasing competitiveness and achieving sustainable economic growth (Pece et al., 2015; Anger, et al., 2015; Broughel et al., 2019).

On the other hand, 'the increase in labor productivity depends on the ability of the economies to invest more in the available capital per worker (capital intensity) and to increase efficiency in combining production factors (multi-factor productivity).' (EC, 2017). All the above can be achieved through the effective management and diffusion of innovation, which is also a prerequisite for achieving sustainable growth.

The empirical sources on the impact of innovation on the economic growth contain diverse views. On the one hand, certain empirical models are known to confirm that the diffusion of innovation stimulates economic growth (Pradhan, et al. 2019) and establishes a causal link (Maradana, et al. 2017; 2019). On the other hand, there are models, the result of which is that greater innovation and more innovative entrepreneurship related to the creation of innovative companies do not contribute to accelerated economic development. The reason, for example, may be the variations in entrepreneurs' motivation (Crudu, 2019).

#### *The role of innovation (technological advancement) in the labor market (employment)*

The issue of the impact of innovation on employment has been relevant ever since the time of the capitalist mode of production, during the Industrial Revolution, until today. A number of economists are faced with the dilemma of whether innovation supports or threatens the labor market, and in particular employment. Two basic hypotheses are prevalent. On the one hand, technology (innovation) is seen as a factor in the emergence of unemployment, and on the other, it creates employment. The direction of the impact of innovation on employment depends largely on the way innovation is managed and disseminated.

Empirical literature sources are of particular interest for the application of a new methodology for estimating the likelihood of automation of a large range of professions and jobs. The positions with the highest risk of automation are in the field of transport and logistics; in administration and in manufacturing. Subsequently, jobs which require low skills and feature low salaries carry the lowest risk of automation (Frey, et al. 2013).

From the perspective of other economists, innovation is a means of expanding employment (Freeman et al. 1982; Blechinger, et al. 1998; Zimmermann, 2014).

According to Kapeliushnikov (2019), the effects of the introduction of innovation are manifested for all economic agents who are involved in innovation. Employees who use innovation in the work process receive higher salaries, which also increases their income. As a result of higher incomes, household consumption increases and this leads to an increase in GDP and, consequently, more vacancies are created in the economy, i.e. employment is also increasing.

Other authors argue that innovation and automation are equalized and that the initial effect of automation is unemployment, but at the same time the automated manufacturing process requires highly skilled human labor. The application of more qualified labor, on the other hand, causes an increase in salaries and employment activities, which ultimately expands employment (Nakamura, 2018).

Empirical studies confirm a positive relationship between innovation and employment: 'innovation has positive effects on employment, both in the shrinking and growing companies, with innovation in already growing companies having a significantly stronger impact on the number of employees' (Zimmermann, 2014).

## **2.2. Assessment of and change in the social and tax policies**

Traditional social security systems, labor market regulations and tax policies will no longer fulfill their functions, facing the new reality. Otherwise, there is a risk of increasing poverty and hence inequality. Governments can no longer postpone reforming the systems, but must seek new opportunities to ensure transfer efficiency and economic growth. Social protection and insurance are on the agenda. Moreover, the banking system will also be subject to adaptation. Otherwise, inequality will rise, which is one of the leading problems facing today's society. The effects of deepening inequality affect all spheres of public life. One of the most effective tools for influencing it is social transfers. Hence, the consequences of globalization are flowing mainly in two directions. On the one hand stand the development of technology and on the other - the decreasing social transfers. The two are interconnected and bond into a system. Low-skilled workers can be completely or partially replaced by manufacturing robots. As a consequence, their salaries will decrease and they can reach a critical point where they would neither be able, nor willing to work. The new digital economy is already a fact, including the multitude of employees in digital platforms. This provokes the need for the governments to take action, as called for by the EU, and to adapt tax and social systems to the new reality.

With regards to innovative changes, some observers are concerned that these will lead to a 'race against the machine' (Brynjolfsson and McAfee, 2015) or a 'jobless future' (Ford, 2015). Others point to the adaptive capacity of societies to respond to these alterations and opportunities. However, there are concerns about the increasing polarization of societies, with a sharp rise in low-income workers and households facing even higher levels of insecurity, a shrinking middle class, and the further rise of a minority of wealthy people at the top of the income scale (Degryse, 2016). Digitization and automation, on the other hand, allow for better economic opportunities and greater flexibility (Hill, 2015) such as employment for women raising young children. At present, a number of countries are struggling to determine the status of these workers and to create adequate protection, given that the boundaries between labor and commercial law have been blurred. These 'new' forms are growing exponentially. Others believe, though, that the informal economy is characterized by a lack of productive development, a large shortage of labor and a lack of both labor and social security for the majority of workers, leading to low incomes and high levels of income insecurity (ILO, 2016). The existing labor relations authorities face difficulties in meeting these challenges and finding alternative ways of summarizing workers' interests (Hayter, 2015a; Hyman, 2015; Sen and Lee, 2015). If legal and institutional frameworks are perceived to

be dysfunctional and inefficient and the tax system does not have a recognized and effective mechanism for financing collective benefits, compliance with the legal frameworks will remain low. Informal employment remains a major challenge for the social security systems and leads to greater attempts to close gaps in coverage and to build social security layers. To meet these challenges, some of the advanced countries are introducing policy innovations such as development of new capacities in the social security systems in order to adapt to the changing circumstances. A number of countries have begun to introduce tailored social protection mechanisms for self-employed workers as simplified tax collection and contribution mechanisms, with the aim of, firstly, to serve as a measure to curb disguised employment and, alternatively, to protect all workers and guarantee fair competition for the businesses (ILO, 2018). The measures also include registration adjustments, collection of contributions and benefits-payment mechanisms, depending on the circumstances and the needs of specific categories of workers; tailored solutions for multi-employer workers; measures for the particular situation of employees on digital platforms, many of whom combine this occupation with their regular jobs in which they can benefit from some social security coverage (Berg, 2016; Forde et al., 2017). Efforts to improve the design of social security systems to respond to the specific circumstances and needs of particular types of workers in informal employment not only increase the scope of social protection for them, but also help to create fair conditions for employees and employers and support the transition from informal to formal economy.

The adaptation of the social security systems to the requirements of the innovation processes, as well as to the demographic challenges, can also benefit from technological improvements such as digital communication and automated procedures to ensure that administrative proceedings are more efficient and effective. In such circumstances, social security shows signs of erosion and more attention will be needed, especially with clear trends towards population aging and higher unemployment rates. Efforts to create fairer conditions for various types of employment by adapting contributory mechanisms to facilitate coverage can help suppress such erosion, but we will have to deal with evaluation of the future needs and their funding. Capital coverage schemes are emerging.

Recurrently, the ongoing debate on unconditional basic income comes to the fore. Some are supporters of this scheme, but its impact on people, inequality, social security systems, economic growth, and work itself cannot be estimated at this stage. Others offer innovative ways to provide social security. For instance, it is argued that it is necessary to reconfigure the unemployment insurance as an employment insurance (ILO, 2017), which would include a system of qualification rights which are individually owned and not of the company. This would support workers with the greatest need for continuing education who often do not have the resources to pay for it themselves, especially when unemployed, and workers in small and medium-sized enterprises who are less likely to benefit from training funded by employers.

All of the aforementioned, however, could lead to higher taxes to fund the programs. The suggestion to burden the rich with a higher progressive tax is not an optimal option. As an alternative, governments could consider the creation of a fiscal space for public financing of human capital development and social security. Property taxes in large cities, excise taxes on sugar and tobacco, as well as carbon taxes, are among the ways to increase government

revenue. Another goal is to eliminate the tax evasion methods a lot of companies use to maximize their profit. Governments can optimize their tax policies and improve tax administration to increase revenue without resorting to tax rate increase.

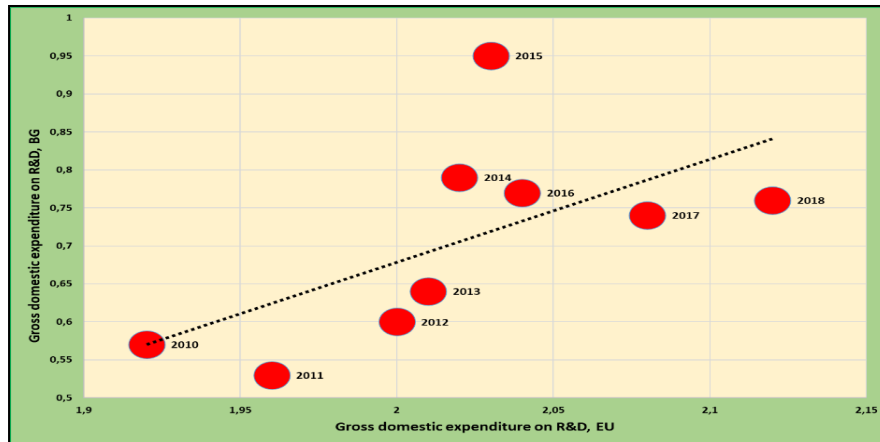
### **3. Methodology**

Globalization and its impact on the economic system, with its economic and social dimensions, also raise the question of redefining the place and role of the state on the economic and social stage, which manifests itself most directly on the economic growth, on the labor market, on the dynamics and alterations in the jobs' nature and the employment structure. It is precisely the labor market with its specific nature and essence which emerges as a fertile soil for the manifestation of the basic economic dilemma, respectively for the study of the effects and defects of the free market and state intervention in the context of the new challenges faced by the economic theory and practice arising from the globalization.

### **4. Conducting research and results**

Figure 1 shows the total, public and private, gross domestic expenditure on R&D in Bulgaria and the EU28 for the period 2010 - 2018 as a percentage of GDP. Overall, the data indicate that there is a positive trend in the change in R&D expenditure in Bulgaria and the EU28 over the period in scope. In Bulgaria and in the EU28 the values are gradually increasing, with a sharper change in Bulgaria than in the EU28. In Bulgaria, the values are lowest in the first three years of the surveyed period, 2010 - 2012, with 0.53% of GDP in 2011, followed by a gradual increase in the following years, with its peak in 2015 - 0.95% of GDP. In 2017 and 2018 there is a decrease in R&D expenditure, compared to 2015, to values of 0.74 and 0.76% of GDP. Despite this decline, the values are significantly higher than those at the beginning of the research period by about 0.2 percentage points. In the EU28, R&D spending shows a very consistent increase compared to Bulgaria, from the lowest value in 2010 - 1.92%, to the highest such in 2018 - 2.12% of GDP. Another substantial difference is the range of change in values. If for Bulgaria the range is 0.42 percentage points (0.53 - 0.95%), then in the EU that is only 0.2 percentage points (1.92 - 2.12%). Moreover, the R&D expenditure in the EU28 is significantly higher than in Bulgaria during the whole spotlight period.

**Figure 1 Total, public and private, gross domestic expenditure on R&D in Bulgaria and the EU 28 2010 – 2018**



**Source: Own data.**

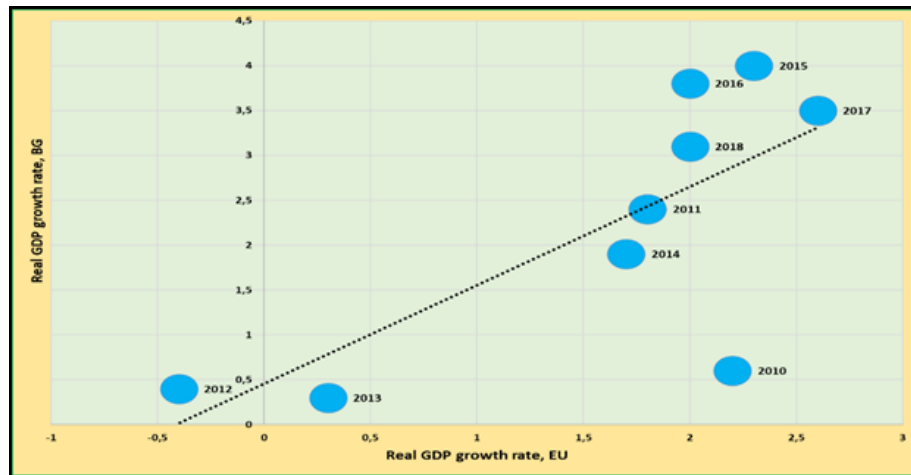
Figure 2 shows the real GDP growth rate in Bulgaria and the EU28 from 2010 to 2018 as a percentage change from the previous year. Economic growth is essentially important to society, not only because of its purely economic effects, but also because of its social repercussions. It undoubtedly reveals, not only the upsurge in economic activity, full utilization of production factors, optimal use of labor, high incomes, etc., but also the individuals' sense of contentment from the security of their lives, of a lack of poverty or material deprivation, a sense of well-being and of fair and correct functioning of the economic and political systems. The data in Figure 5 indicate a more complex relationship between the economic growth in Bulgaria and the EU28, in terms of R&D spending, but it is nevertheless positive. In Bulgaria, there is a decline in economic growth since 2010, with an exception in 2011, as the lowest values are in these years (in 2013 the economic growth is only 0.3%). Since 2014, there is a rise to 4% in 2015, followed by a fall in the following years, reaching 3.1% in 2018. In the EU28, the fluctuations are similar, but with few exceptions. Since 2010, the economic growth drops from 2.2% to -0.7% in 2012. Since 2013, there is an increase in values, a year before Bulgaria, to 2.7% in 2017. If for Bulgaria the level from 2010 is reached and surpassed in 2014, then in the EU28 the level of economic growth from 2010 is reached only in 2015, as in the last year of the study period it is lower, 2.1% in 2018, compared to 2.2% in 2010.

The link between innovation, which is an essential element of globalization in the context of technological change, innovative approaches, the knowledge economy, etc. and the labor market/economic growth is theoretically clear and beyond doubt. The adaptation of each national economy to the economic realities of modern globalization, under the increasing and dynamic influence of international trade, foreign direct investment and labor migration, necessitates a radical change in the transformation of resources into final goods or a radical change in the use of the production factors. This change consists of precisely the innovations in every production sphere, whether in the form of technological, organizational or managerial, etc. innovative methods and approaches. This adaptation to new realities helps to represent the sectors and the economy as a whole, which is reflected in the economic growth. Unfortunately, despite the clear



theoretical impact of innovation on the labor market and the economic activity, it is difficult to summarize unilaterally its influence in the context of the cyclical development of the economy, especially in the background of the 2008 global crisis. However, through cross-correlation time analysis, attempts are made to highlight and empirically support the theoretically determined role of innovation and globalization on employment and economic growth as a whole.

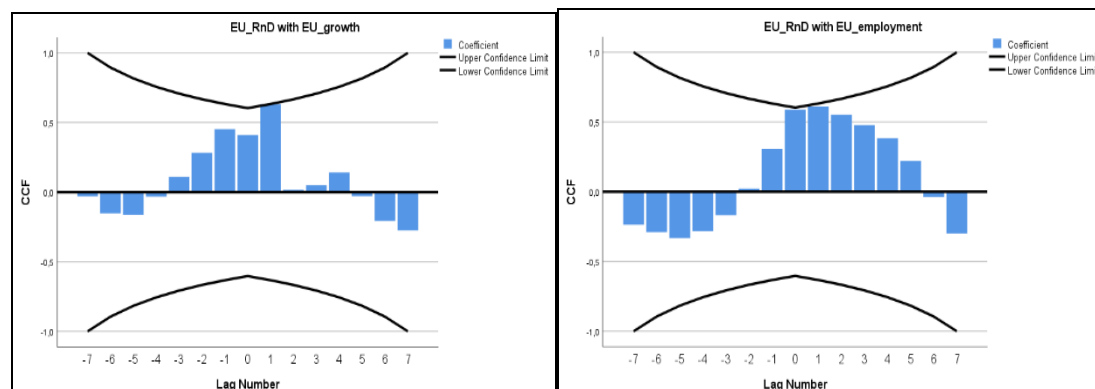
**Figure 2 Real GDP growth rate in Bulgaria and the EU28 from 2010 to 2018 as a percentage change**

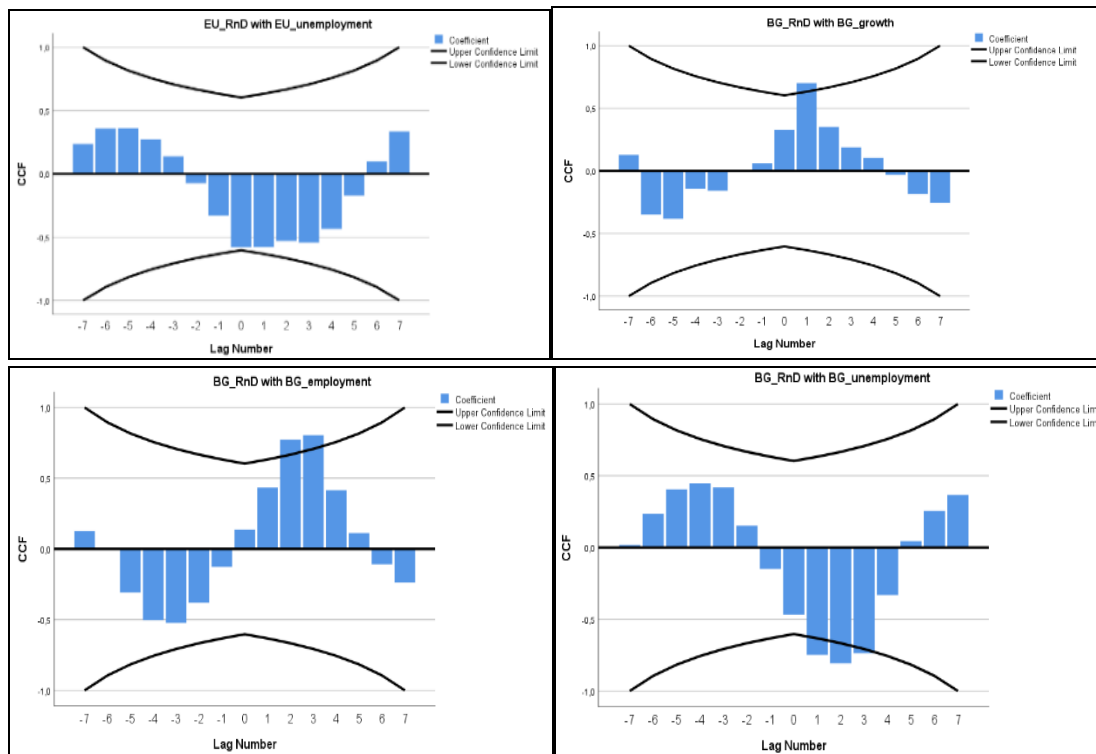


Source: Own data.

The information in Figure 3 graphically presents the correlation between time series of R&D expenditure, real GDP growth, employment and unemployment rate in Bulgaria and the EU28 for the period 2010 - 2018.

**Figure 3 Correlation between time series of R&D expenditure, real GDP growth, employment and unemployment rate in Bulgaria and the EU28 2010 – 2018**





EU_RnD with EU_growth	EU_RnD with EU_employment	BG_RnD with BG_growth	BG_RnD with BG_employment	BG_RnD with BG_unemployment																																																																																																																																																																																																																																																
<b>Cross Correlations</b> Series Pair: EU_RnD with EU_growth <table border="1"> <thead> <tr> <th>Lag</th> <th>Cross Correlation</th> <th>Std. Error<sup>a</sup></th> </tr> </thead> <tbody> <tr><td>-7</td><td>-.030</td><td>.500</td></tr> <tr><td>-6</td><td>-.152</td><td>.447</td></tr> <tr><td>-5</td><td>-.163</td><td>.408</td></tr> <tr><td>-4</td><td>-.032</td><td>.378</td></tr> <tr><td>-3</td><td>.110</td><td>.354</td></tr> <tr><td>-2</td><td>.282</td><td>.333</td></tr> <tr><td>-1</td><td>.451</td><td>.316</td></tr> <tr><td>0</td><td>.411</td><td>.302</td></tr> <tr><td>1</td><td>.630</td><td>.316</td></tr> <tr><td>2</td><td>.016</td><td>.333</td></tr> <tr><td>3</td><td>.049</td><td>.354</td></tr> <tr><td>4</td><td>.141</td><td>.378</td></tr> <tr><td>5</td><td>-.029</td><td>.408</td></tr> <tr><td>6</td><td>-.207</td><td>.447</td></tr> <tr><td>7</td><td>-.275</td><td>.500</td></tr> </tbody> </table>	Lag	Cross Correlation	Std. 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Error <sup>a</sup>	-7	.127	.500	-6	.004	.447	-5	-.308	.408	-4	-.503	.378	-3	-.523	.354	-2	-.380	.333	-1	-.127	.316	0	.135	.302	1	.435	.316	2	.773	.333	3	.804	.354	4	.414	.378	5	.113	.408	6	-.110	.447	7	-.238	.500	<b>Cross Correlations</b> Series Pair: BG_RnD with BG_unemployment <table border="1"> <thead> <tr> <th>Lag</th> <th>Cross Correlation</th> <th>Std. 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Source: Own data.

The information which Figure 3 contains shows that when examining the existence of time correlation within the EU28 for the impact of innovation on the market and economic growth, we observe a very weak dependence at lag +1 with a correlation coefficient of 0.41. Unfortunately, only the value of economic growth is partially statistically significant, while of employment and unemployment there is no statistically significant dependence. The values for Bulgaria indicate more clearly a statistically significant relationship between the time series of R&D expenditure and GDP growth, also at lag +1 with a correlation coefficient of 0.70. Unlike the EU28, in Bulgaria, the correlation between innovation and the labor market in terms of employment and unemployment is clearly distinguishable and statistically significant at lags +1, +2 and +3, with employment correlation coefficients of 0.77 and 0.80 and unemployment correlation coefficients of 0.81 and 0.74. In summary of the data, we could say that there is a correlation between innovation and economic growth/ labor market, when it is logically positive with the economic

growth and employment and negative with unemployment. The dependence is most pronounced at a positive lag of 1 to 3 years, i.e. with a certain delay, with the correlation dependence for the EU28 being rather statistically insignificant, in contrast to the one for Bulgaria, which is distinctly statistically significant. As an explanation for the difference between the statistical significance in the EU28 and Bulgaria, we could highlight the much stronger influence of external and internal factors on the growth of the whole European Union, which leads to minimization of the impact of innovation and makes it more difficult to distinguish them individually. By contrast, within Bulgaria, the role of innovation is clearly distinguishable and has a positive impact on the economic growth and the labor market.

## 5 Conclusion

As a fundamental conclusion, it can be claimed that globalization brings to the fore new economic paradigms, knowledge economy, green economy, sustainable development and growth, circular economy, etc., which shape the structure of employment, the nature of jobs and the economic activity and growth. Knowledge, as a leading factor, investment in research and development, lifelong learning as a social philosophy and economic necessity, education and science, are vital both for the labor market and for the whole economic system.

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