

# OPPORTUNITIES AND RESTRICTIONS OF INNOVATION IN BULGARIA

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**Abstract:** *In the adopted in 2015 and updated in 2017 „Innovation Strategy for Smart Specialization 2014-2020”, the Bulgarian state sets ambitious goals and undertakes serious commitments to encourage and more decisively support innovation. The main objective of this paper is to investigate certain structural features and indicators of innovation and as a result on this basis to summarize some adopted opportunities and existing constraints on innovation in the private and public sectors at the end of the programming period. As a result of the analysis, both stimulating and retaining factors are synthesized in the context of the size (scale of activity) of the predominant part of the companies, the sectoral company and innovation concentration and the size and structure of R&D expenditure in the private and public sectors. During the study methods of analysis and synthesis, induction and deduction, as well as methods of descriptive analysis were used.*

**Keywords:** *Innovation, Innovation Firms, R&D Expenditures*

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## 1. INTRODUCTION

In recent years innovation has become a growing priority of policies at European and national level, which focus on both the private and public sectors. Their role is emphasized in the conclusions of the European Commission’s analysis, which accounts for about two-thirds of the European Union’s economic growth, and about one-fifth of global R&D investment in the EU (European Innovation Scoreboard 2018). The need to improve these indicators across the EU has been transposed into the adopted strategic documents, into measures and policies taken in the field of innovation in each member state.

Accordingly, in 2015 the „Innovation Strategy for Smart Specialization of the Republic of Bulgaria 2014-2020 (IS3)” was approved and in 2017 the parameters of its key objectives were updated. They envisage a qualitative leap in the country’s innovation performance in the EU; a strategic goal is to be reached so that by 2020 Bulgaria is to move from the group of „modest innovators” to the group of „moderate innovators”, i.e. move one position forward on the EC’s annual charts and classifications. However, according to the latest report from 2019, Bulgaria still remains in the last group of „modest innovators” together with Romania (European Innovation Scoreboard 2019, p. 7) and the end of the programming period approaching, it is of interest to summarize the achievements done so far as well as the delays in relation to some innovative indicators.

In this context the main objective of the report is to identify the opportunities and/or constraints to innovation in Bulgaria by looking at the structure, i.e. mainly the size and sectoral distribution of companies, investments, innovations and R&D expenditure in the private and public sectors. On this basis similarities or differences with the structure of GDP can be identified as indicative of untapped potential for acceleration or of obstacles to innovation in certain areas.

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Methods of analysis and synthesis, induction and deduction as well as methods of descriptive analyses are mainly applied in the study. NSI statistics data and calculated by the author derivative indicators are used.

## **2. NEW SECTORAL MEASURES OF GDP AND INNOVATION**

In recent years, there has been a steady irreversible trend of change in the sectoral structure of Bulgaria's GDP. After a consistent and rapid expansion in the period preceding 2017, the service sector has the largest relative share of more than 71% of GDP, the industry is already second and generates about a quarter (24.7%) of the GDP, the share of rural, forestry and fisheries accounting for only 4.1%. These changes are a consequence of the accompanying market reforms processes of privatization, closure or transformation of ownership and activity of state-owned companies and the development of an entirely new field of private entrepreneurship - which favors many activities in the service sector. As a result, the public sector was limited, the private sector became dominant and the sectors and industries key to the economy were gradually rearranged. The joining of the EU in the beginning of 2007 has greatly contributed to these changes, which in turn has given impetus to Bulgaria's strengthening integration with other EU countries.

The different new structure of the economy reflects on the structural characteristics and the priority orientation of investment, innovation and growth. They manifest themselves in two main directions:

Firstly, with the limited share of the industry and the faster development of the service sector, further encouragement of investment and innovation in the material production sector is required. There are opportunities to introduce more technological product and process innovations. The rate of return on this type of investment can be higher and long-term, their effects on the growth of companies and the economy are more secure and more sustainable, leading to an expansion of production potential. The modernization of the industry sector through the introduction of numerous new production methods and products has revitalized its role as a stable source of economic growth in the present as well as in the future, despite it being pushed to the second position in the GDP structure.

Secondly, the changing sectoral profile of investment and innovation is also influenced by a greater number of opportunities for new ICTs to become more widespread and faster in the service sector than in industry, for example. However, this is typical not of all, but of certain activities in the service sector. For example, according to A. Dinkin (2008) in the beginning of the 21st century, ten industries have a high share of ICTs in the United States, with eight of these being in the service sector. In particular, they are wholesale, business services, education, financial services and insurance, retail, healthcare and legal services. Their development is further stimulated by new technologies, given the fact that they require other qualitative characteristics of labor and human capital and new organizational and managerial models. This induces a stronger impetus in the implementation of organizational and marketing, i.e. non-technological innovations, which in many cases prove to be financially advantageous, more easily applicable, more often preferred and prevalent.

The sectoral focuses and the dynamics of investment and innovation are also influenced by the different sensitivity and response to internally or externally induced crises displayed by the economic sectors. The impulses of the 2008-2009 global crisis, for example, had a specific depth and duration of recovery across sectors. In Bulgaria, this crisis manifested itself with a one-off GDP

fall of 4% in 2009, covering almost all sectors. However, the service sector (and the financial and insurance activities) being in top place was more strongly and long-term affected by the crisis. One of its activities noted a series of irregular downturns and weak gains that continued well into 2016. Unlike services, the industry emerged as a relatively more stable sector. It reported a one-off decrease in production, it restored its growth back in 2010 and maintained a positive growth rate until the end of the period. They were aided by both domestic and foreign direct investment, which diverted from the previously dominant financial sphere to the manufacturing industry. In 2018, for example, this sector attracted over 73.5% of FDI inflows. However, the country's economic growth in 2018 was due to other activities - the highest growth rates were reported by real estate operations (9%), financial and insurance activities (7%) and construction (4%).

In the context of these new developments and differentiated peculiarities in the dynamics of the sectors, there is a need for further analysis.

### **3. MAIN STRUCTURAL CHARACTERISTICS OF COMPANIES AND INNOVATION**

In the complex conditionality of investment, innovation and growth, the size and sectoral distribution of firms and their innovative activity, as well as the size and structure of R&D expenditure, play an important role.

In terms of investment and innovation activity, there are tangible differences between operating small and large companies. Smaller firms are well-suited and able to thrive in certain activities and industries, mainly in the services sector and partly in the manufacturing industry. They have more flexibility and simpler management; counteract unemployment by providing employment and income to the owner and his family members. But they are financially and economically unsustainable, have limited capital and growth opportunities, find it difficult to access bank loans and target European programs and funds. Their efforts and activities are focused mainly on current results, providing the necessary financial resources to maintain production (in most cases on the same scale), focused mainly on the internal market and demand, to overcome irregularities and to gain more revenue and profits. Many of these companies do not have strategic plans in place for their future development; they are lagging behind in technology. Most of them lack sufficient financial and human resources to carry out their own research and innovation.

Due to larger scales of activity, revenues and profits, better resource availability and economies of scale, easier access to credit and other sources of finance, most often the potential for innovation and growth is concentrated in larger companies. Greater access to both internal and external markets guarantees a better realization of traditional as well as newly created products; this justifies and accelerates the return on investment in research, development and experimentation. It is large and to some extent medium-sized companies in particular that strategically, consistently and systematically plan future investment projects, give priority to maintaining and expanding their already existing market positions and shares, as well as to their competitiveness, which is enhanced by the creation and implementation of more innovative products and technologies. Otherwise, they run the risk of being left behind by the more competitive national and foreign companies and of inducing development delay.

Advantages and disadvantages, differences between large and small companies in the field of investment and innovation have been identified in a number of studies. For example, J. Wein-

berg (Weinberg, (1994), comes to conclusions and evidence of such specificity, which he binds predominantly with the life cycle of companies. Iv. Kitov (Kitov Ivan) reveals significant differences in the development of size distribution of companies across different industries in the US, which has an effect on the growth model of firms and serves as a solid basis for the development and implementation of selective investment strategies. Famous economists such as D. Evans (Evans, (1987), Robert Lucas (R. Lucas, (1978), Franco Modigliani (Fr. Modigliani, (1958), Joseph Stiglitz (J. Stiglitz, (1981) also come to similar conclusions. At the same time, emphasis is placed on the innovative characteristics of investments made by larger and smaller companies (Symeonidis G., (1966). The provided summaries show that R&D costs and innovation rates are explained by a number of company characteristics. Thus, D. Shefer and A. Frenkel (Shefer, A. Frenkel, (2005) suggest that they relate to varying degrees to firm size, organizational structure, type of ownership, industrial branch, and location of firms (in larger cities or small towns). Feedback-focused research is also being conducted to clarify the impact of innovation on the average size of businesses. By focusing on the differences between product and process innovation, N. Bosma and G. de Wit (N. Bosma, G. de Wit, (2004) clearly demonstrate the explicit positive impact that innovation has on the average size of the firm.

In addition, there are analyzes proving the opposite thesis - of the more important role played by the flexibility and innovation of small businesses. W. Dolfsma and G. van der Velde investigate the introduction of new products and discover that those industries that are dominated by small firms are consistently and significantly more innovative than those dominated by large ones. They take into account the role of both the structure of the industry concerned and the dynamic levels of competition, referring their findings to industries with high and increasing levels of new entrants. In this case, the crucial role is given to the activity of performing the so-called. „Entrepreneurial Function”, a term coined by J. Schumpeter. However, in conclusion they emphasize that the contribution of small firms to industrial innovation is different from that of large and new firms.

In more recent studies, the focus has shifted from manufacturing to the already prevailing service sector (Audretsch D., (2018). The three main aspects of innovation are analyzed - R&D costs, innovative output and productivity as they are manifested in knowledge-intensive services. By combining the models of Crepon et al. (1998) and Akerberg et al. (2015) we can prove that intensive knowledge services benefit from innovative activities and this can lead to increased productivity of labour. An interesting fact is that the advantage of firm size is of importance to the sphere of production, but it does not manifest itself and almost disappears from services that require knowledge.

In the context of the predominant part of the conclusions about the role of their size, the structure of the companies that operate in Bulgaria creates certain obstacles to the intensification of innovation and growth.

Among the companies operating in the country those that are small have the greater advantage. Out of the total number of non-financial corporations, which are 406 310 altogether according to the latest NSI data for 2017, over 99 percent are small and medium-sized enterprises (SMEs), and over 92 percent of them are even micro-enterprises (with a number of employees from 1 to 9 people). Over the years, their numbers have varied, but their share in the total number of companies has remained relatively constant. The process is characterized by the continuous closure of some, but also the registration of other new companies, which in most cases are small. It is

clear that there are very few (only about 6%) medium-sized companies working in the country - employing 10 to 49 people, a negligible share of large companies (employing between 50-249 people or over 250 people employed), a significant portion of which are private.

With such a size structure of companies, the innovation process is difficult given the limited financial, production and technological capacity available to the vast majority of firms. Both the allocation of funds and the undertaking of R&D, their own research, development and experimental work, as well as the supply of these companies with high-tech advanced technology and equipment through their purchase from the domestic or foreign markets are obstructed. Due to lower pay and the mostly lacking additional rewards and incentives, small businesses often attract and retain on a permanent basis less qualified personnel. This creates obstacles to the level of awareness, to management as well as to making use of the opportunities that innovation brings about.

It is of importance to note in which sectors and industries the concentration of large, medium and small companies is highest, and thus where the innovation potential is mostly concentrated.

Sectoral concentration of companies in Bulgaria according to their size is one of the driving forces behind innovation. A large part of micro-enterprises carry out activities in the field of trade and repair, a smaller part are in „Professional Activities and Research” and in the manufacturing industry (see Table 1). The sectoral distribution of small enterprises is similar. With reference to the medium, large and largest companies, the manufacturing industry is in first place, with far too great an advantage over the other activities. Therefore, the best potential for innovation and investment stands out in the latter industry. It is more favorable not only in terms of its predominantly large companies, but also in view of the broader possibilities of this sector for technological and product innovation. In spite of the overall progress in the field of services, which are assisted by the rapid introduction of new information and communication technologies, their potential cannot be fully unlocked due to the limited size of the companies operating in them.

**Table 1.** Number of non-financial Enterprises by Economic Activity Groupings and Size in terms of employed in 2017

SECTIONS BY NACE Rev.2	Total	Size classes of number of persons employed				
		0-9	10-19	20-49	50-249	250+
Mining and quarrying	342	215	51	35	28	13
Manufacturing	31 272	23 615	2 960	2 686	1 724	287
Electricity, gas, steam and air conditioning supply	1 679	1 541	63	32	26	17
Water supply; sewerage, waste management and remediation activities	793	542	73	77	60	41
Construction	19 889	16 772	1 585	1 004	493	35
Wholesale and retail trade; repair of motor vehicles and motorcycles	141 059	133 180	4 600	2 412	783	84
Transportation and storage	23 191	21 056	1 178	649	261	47
Accommodation and food service activities	27 096	24 131	1 739	886	319	21
Information and communication	13 471	12 257	560	399	211	44
Real estate activities	22 396	21 864	343	155	..	..
Professional, scientific and technical activities	44 394	43 087	842	..	115	..
Administrative and support service activities	11 414	10 119	547	443	236	69
Repair of computers and personal and household goods	3 491	3 450	31	..	..	-

Source: NSI data as of 13.10.2019, <http://www.nsi.bg/bg/content/7697/брой-на-предприятията>



A significant proportion of medium and large enterprises, functioning in different industries which are relatively more resilient, contribute to the weaker and shorter-term impact of the global crisis on the industry sector. During the first years following the 2009 crisis, more FDI inflows turned to this sector, both because of the higher stability of investment in it and because foreign investors prefer larger enterprises and avoid higher risk SMEs. The sectoral performance of medium and large companies is a sign of the corresponding sectoral focus of investments and innovations in Bulgaria in recent years. However, the notable variance as compared with the GDP-leading service sector, together with the predominantly small number of Bulgarian companies explain the weaker effect of the relatively good innovation dynamics and the limited potential for long-term and lasting growth stabilization.

This conclusion is confirmed by the statistical data on the amount of investments, innovations and R&D expenditures undertaken in the country, as well as by their basic structural features.

Investment in the country in recent years is not among the leading, consistently emerging and stable sources of growth. Over the period 2008-2017, firms' fixed tangible assets (FTA) expenditures have not shown steady increase, but have volatile, mixed dynamics instead. They collapsed in the crisis year of 2009 as well as during the next year. Decrease is witnessed also in 2016 and 2017. Therefore, as of 2017, the last year reported, they are over BGN 11 million less than the year before the crisis. With regard to this indicator there is a certain lag in the service sector. Although FTA expenditures are allocated to more types of activities within the services provided, they are highest in industry (over 31%) and in trade, transportation, accommodation and food service activities (almost 26%). Therefore, it becomes evident that the real GDP growth achieved in the 2010-2018 period, though at lower rates, is based on other preconditions and not uniquely defined by investment.

Data on innovation, which is quite insufficient in volume and characterized by unfavorable structure of type and economic sector, lead to similar conclusions and observations.

Industry has the highest relative share of innovative enterprises (31.6%), while in the service sector they are about one fifth (22.1%). These shares have remained relatively constant over the last few years. A significant proportion (almost 82%) of the companies that identify themselves as innovative are large - they belong to the group of companies employing up to or over 250 people (see Table 2). For example, in the SME group they are much less in number; only about one fifth of the companies employing 10 to 49 people can be termed as "innovative". Due to the lack of specific information, it can be assumed, but with a relatively high degree of certainty, that among the prevailing number of micro-enterprises (with the number of employees from 1 to 9 people) the share of innovative companies is negligible. In general, the share of innovative enterprises is growing, roughly doubling, by movement on the upward scale of the size of firms according to the number of employees in them - with transition from small to medium-sized and from medium to large companies. Low innovation activity of the prevailing number of small companies impedes and slows down the impact of innovation on GDP growth.

Unsatisfactory effects in support of growth are generated by the relative share of firms that have made the respective type of innovation. Although all types of innovation contribute to the growth of companies and the economy as a whole, in Bulgaria only 19.8% are enterprises with technological (product and process) innovations and 17.3% of the companies have undertaken non-technological (organizational and marketing) innovations. Companies with technological

innovations in the industry sector (which are almost 25%) are overwhelmingly ahead of those in the service sector (which are only about 14%); still both of these parameters are too low. In both sectors the share of non-technological innovation enterprises is also low and of similar value, with a difference of less than one percentage point. Therefore, there is a need for additional stimulation and there are certain opportunities to increase innovation activity of companies, both in industry and in the service sector with relation to both technological and non-technological innovations. The focus should be primarily on the SME group, which is far behind the innovative larger companies.

**Table 2.** Innovative Enterprises, as a Share of all Enterprises, 2016\*

Industries (NACE rev. 2) Size class (by number of employees)	2016		
	Innovative enterprises (%)	Enterprises with technological innovation (%)	Enterprises with non- technological innovation (%)
Total	27.2	19.8	17.3
Industry <sup>1)</sup>	31.6	24.9	17.9
Services <sup>2)</sup>	22.1	14.1	16.7
10 - 49 employees	20.5	15.2	12.7
50 - 249 employees	44.3	32.9	28
250 or more employees	81.9	50.6	62

**Source:** Latest NSI data as of 13.10.2019; <https://www.nsi.bg/en/content/6787/innovative-enterprises-share-all-enterprises>

<sup>1)</sup> Included are NACE sections B, C, D and E.

<sup>2)</sup> Included are NACE sections H, J and K, and NACE divisions 46, 71, 72 and 73.

In addition, trends in dynamics and some basic structural features of R&D spending can be derived as well. Following a steady increase in R&D spending over a period of a few years, they sharply decreased in 2016 and 2017. The shrinkage covers all observed sectors - it is manifested simultaneously in enterprises, the public sector, higher education, and partly in non-profit organizations. At the same time, their structural distribution is unfavorable - a huge part of these costs is current, with only 9% being allocated for the acquisition of FTA. In sectoral terms, in 2017, most of the R&D expenditure was incurred in the manufacturing industry, followed in second place by „Creating and Disseminating Information and Creative Products, Telecommunications”, followed by „Professional Activities and Research” in third place. The enterprises’ performance in relation to their size is similar to the already identified innovation trends. More than 40% of R&D expenditures are made by large companies with up to and over 250 employees, nearly 25% are due to the activity of companies with 50-249 employees, only about 7% is the share of micro enterprises with 1-9 employees and no employees. Uncharacteristic of the growth conditions is the consistent decline in R&D spending in enterprises, the public sector and higher education over the last three years (2015-2017). It has a deterrent effect on the innovation process and the rates of economic growth.

The trends in the dynamics of budget allocations for R&D and their targeting towards the main socio-economic goals can be traced separately. They largely determine the ability to achieve the strategic goals set out in the „Innovation Strategy for Smart Specialization of the Republic of Bulgaria 2014-2020“, adopted in 2017.

Budget expenditure on R&D cannot be characterized by a consistent increase over all years. In 2011 and 2016 they are less than in the previous year. For the rest of the period, their annual increase is different in degree and amount, but relatively small. Therefore, for 2018 the amount of

budget expenditures for R&D exceeds only by BGN 28 153 thousand the budget allocations in 2010. There are fluctuations and inconsistencies in the percentage of expenditure by individual socio-economic objectives, which does not make it possible to identify their priority areas. What is striking is the steady decrease in the percentage of education development expenditure as well as the almost continuous reduction in its absolute size (with one exception in 2015). As a result, in 2018, only slightly more than BGN 9.3 million was spent on the education sector, compared to more than BGN 23.6 million in 2010. Although the development of this area is also based on funds from the private sector, it should be above all the responsibility and serious concern of the state. Innovation needs to be encouraged and applied in the training process to enable the formation of highly qualified professionals capable of developing, managing, using and serving innovative products, processes and technologies in the business practice. This will also create the preconditions for the realization of one of the key sub-goals of IS3, related to the development of quality human resources and capital who will create and work with the technologies of the future.

Therefore, it is necessary to conclude that with regard to the dynamics, the features of the volume and basic structural indicators for investment, innovation and R&D expenditures, it can be observed that there are insufficient conditions and untapped opportunities in relation to the potential of accelerated economic growth in Bulgaria at this stage and in the near future also.

#### **4. CONCLUSION**

In summary, a conclusion is drawn about the manifestation of some retarding factors in the future intensification of innovation in the context of the size and sectoral distribution of Bulgarian companies, innovation and R&D expenditure. In addition, some of the structural parameters indicate the presence of underutilized opportunities for innovation in certain economic sectors and in the group of medium and small companies as well. Opportunities to give a moderate impulse of innovation and growth in the coming years can be created by stimulating and boosting the orientation of SMEs and new companies towards more innovative products and technologies, increasing domestic investment, attracting more FDI.

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