

Identifying the potential of the North-West planning region in Bulgaria to create innovation-based incubators

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Abstract. Traditionally, innovations have been in the focus of researchers since their introduction, as a concept by Schumpeter, to the present days. In the last decade, these trends have intensified, and more and more researchers are directing their research into the innovation field. The connections of innovations with the results of companies, the success of innovations, the environment for innovations, etc. are investigated. The main goal of the present study is to reveal the potential of the North-West Planning Region in Bulgaria to create an innovation-based incubator/s, that will be part of the innovation environment, support companies in their innovation activity and thus contribute for economic growth in the region. The main methods used are the office survey, statistical methods /collection of statistical information/, trend method, factor analysis and scenario method. Based on the collected statistical information and its secondary processing, certain regularities and trends have been deduced for the potential for creating innovation-based incubators. Through the method of scenarios, the potential usefulness of such structural elements of the innovation environment for increasing the innovativeness of the companies of the region has been determined.

1 Introduction

Nowadays, everyone talks about innovation, but whether the essence of the concept is understood from its economic and technological point of view is a completely separate issue. Traditionally, innovation has been seen as a generator of success and growth for companies, generating greater wealth and improving the living environment in regions/countries. However, not all innovations are true innovations, and not all innovations are those with the highest degree of novelty, usefulness and high added value. Stimulating the development, deployment and diffusion of innovations of the latter kind would contribute most to ensuring economic growth and rising living standards in given regions. This is particularly relevant for regions that are significantly lagging behind in their economic development, of which there are not a few in the country. It is no coincidence that the North-West region in Bulgaria was chosen for this purpose, as it is one of the most seriously economically lagging regions

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in the European Union. Such regions need to have a pace of economic and innovative development to catch up with the European average. In the context of the basic postulates that innovation is a generator of economic growth, our main thesis is set. In order to provide sufficiently good conditions for innovation, it is necessary to build an appropriate innovation environment, and innovation-based incubators are just such an element of the overall innovation environment (together with all other elements of a country's National Innovation System).

2 Innovation-based incubators

A number of forms of support for start-ups are known in theory and practice, and incubators are one of them. A number of types of incubators are also known - starting with traditional business incubators, moving through academic/university incubators, virtual incubators and so on. However, all of them aim to encourage and support entrepreneurs to create businesses, and an innovative one is of the highest importance for an economy, as mentioned in the introduction of this article. In the context of the title of this article, it is also necessary to define what we mean by the term innovation-based incubator, as a collective and functional summary of the existing types of incubators.

Innovation-based incubators will be considered as a type of incubators that concentrate on promoting and supporting the creation of new, innovative and especially innovative companies (business organizations) and/or support the development of innovation in existing small and medium-sized companies /business organizations/. Innovation and entrepreneurship have gone hand in hand since Schumpeter's theories and in this respect the essential characteristics of an innovation-based incubator should be sought at this intersection.

In the context of the development process of a highly innovative firm with exponential growth potential, the main contours of an innovation-based incubator can be outlined (Fig. 1).

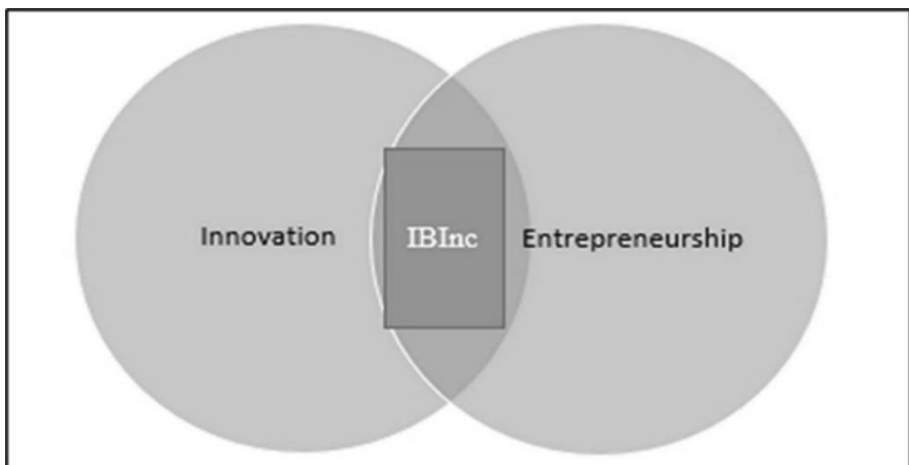


Fig. 1. Innovation-based incubator (where entrepreneurship meets innovation).

Scholarly discussions on the value and utility of incubators are numerous [1-3, 5, 7]. While some authors [4-5] argue for the need for measures and programmes to help start-ups and enterprises and to steer (direct the business climate in the desired direction) the overall business climate, other authors [8] take the opposite view. They argue that such organizations (incubators) are too closed a system, are flawed in their operations and seize the initiative (or at least blunt it) from the start-up (Startup) team. At the same time, recent and growing

scholarly claims [6] focus on the fact that the enterprises of the future will be those that can innovate and create meaningful value for their shareholders, customers and other stakeholders.

In any case, the creation and operation of innovation-based incubators is not an easy task. There are a number of prerequisites for this, the existence of which we will try to identify in the subsequent study using the example of the North-West planning region in Bulgaria.

3 Economic characteristics of the North-West region of Bulgaria

In the North-Western region are the districts of Vidin, Vratsa, Lovech, Montana and Pleven, as the district centers are also the largest cities of the district.

The geographical extent of the region is 19 070 sq. km or 17.18% of the country. In order to present the basic information about the planning area in a more concise way and considering that this information represents a part of the general environment in which the innovation-based incubators would operate, we will focus on aggregated data of some of the key indicators of the state of the environment, namely: number and structure of the population of the region /by district centres/, size of the generated GDP and GVA, size of foreign direct investment (FDI), structurally defining enterprises /firms/ in the region /as a prerequisite for ensuring economic growth in the region/.

The EU's Regional Innovation Scoreboard [9] identifies the North-West region of Bulgaria as an emerging innovator, with regions that fall into this group being the least innovative regions in the EU. Overall, there is no concentration of leading high-tech industries and innovative business organisations in the region. Alongside the demographic crisis, the North-West is experiencing serious problems with the quality of education. In general, there is a lack of a strong, modern and integrated education network to supply businesses with the necessary medium- and high-skilled personnel [10].

3.1. Population

Table 1. Population of the North-West region 31.12.2021.

№	Municipality	Population / souls /
1.	Vidin	78 814
2.	Vratsa	153 700
3.	Lovech	119 780
4.	Montana	122 179
5.	Pleven	228 300
Total:		702 773

Source: NSI data and own calculations and summaries.

The population of the district represents 10.3% of the total population of the country (6 838 937 people), which is the most depopulated region in Bulgaria. The population in the district is distributed without relatively large disproportions, but with a superiority of Pleven and Vratsa, as the centers with the largest number of attracted population. For the purposes of this study, the age groups of interest are those who are potentially the largest participants in innovation processes (and specifically in innovation-based incubators) and/or are in the so-called "youth" category, according to the EU classification and definition of this population category, namely - age up to 35 years. The hypothesis here is that this category of the population will be the most creatively active in its totality and will benefit fully from the services that an innovation-based incubator can offer. Structurally, based on these criteria, the population of the North-West region of the country has the following parameters (Table 2).

Table 2. Population of the North-West region 31.12.2021 by age /15-35 years/ and gender /men, women/

№	Municipality	Men /15-35/	% of total population	Women /15-35/	% of total population
1.	Vidin	6 786	9%	6 176	8%
2.	Vratsa	14 916	10%	13 814	9%
3.	Lovech	11 120	9%	10 091	8%
4.	Montana	11 828	10%	10 859	9%
5.	Pleven	21 906	10%	20 875	9%
Total:		66 556	9%	61 815	9%

Source: NSI data and own calculations and summaries.

The statistics show that the region has absolute parity in terms of the percentage distribution of the population by gender in the 15-35-year-old category and this age group represents 18% of the total population of the North-West region of the country.

3.2. GDP and GVA

One of the main indicators (at least as accepted among the general public and much of the economic community) is the volume of Gross Domestic Product (GDP) and Gross Value Added (GVA) generated by the region and/or country concerned. In the context of the research questions and frameworks outlined above, the change and volume of these two indicators over a 20-year period is tracked for the North-West region of the country (Fig. 2).

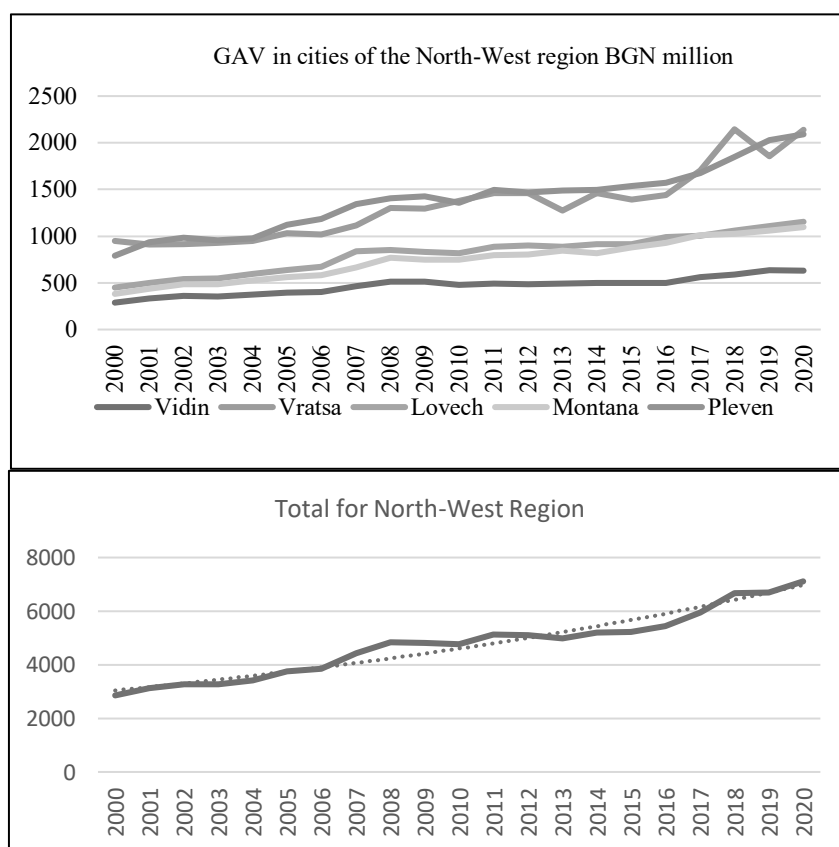


Fig. 2. Dynamics of GVA by regional centre and for the North-West region in Bulgaria.

Source: NSI and own groupings and calculations

The dynamics of GVA and GDP (Fig.2 and Fig.3) show that the North-West is developing at two speeds. On one side are the regional centres of Vratsa and Pleven, which have significantly better indicators in absolute terms, and on the other side are Lovech and Montana, which have a commensurate rate and volume of economic development. The third speed here belongs to Vidin, which during the observed period lags behind almost 4 times in the volume of GDP and GVA generated.

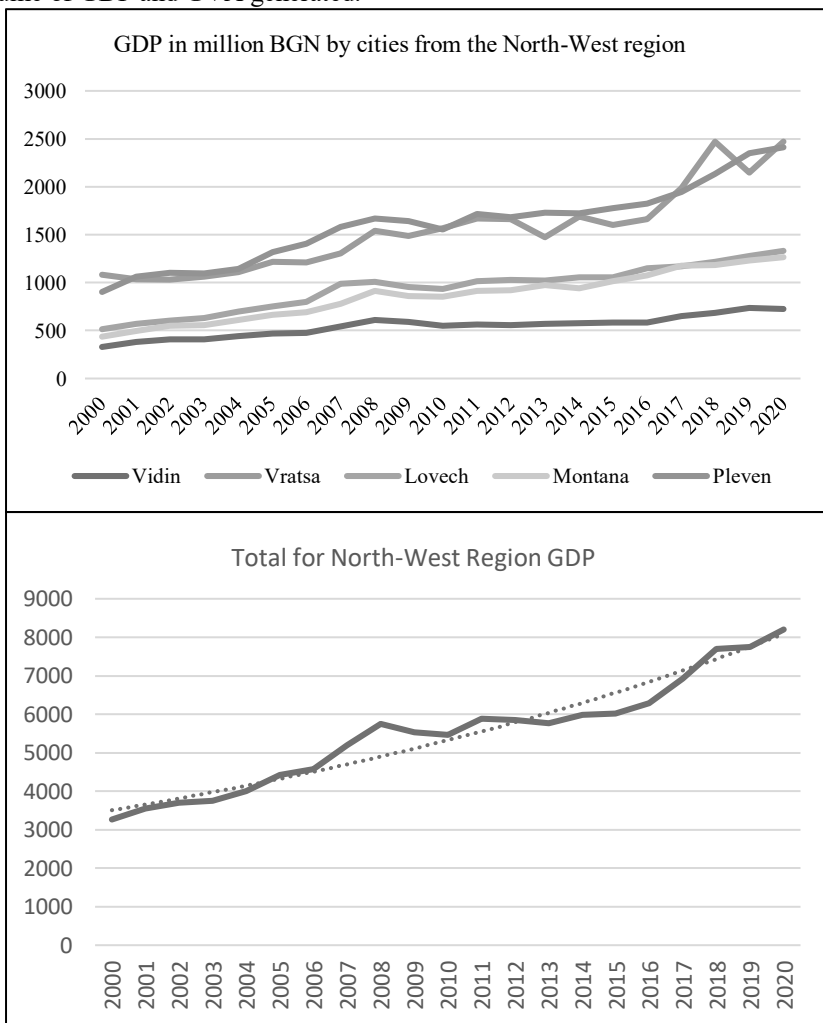


Fig.3. GDP by district centre and total for the North-West region in Bulgaria

Source: NSI and own groupings and calculations

It can be said that the main drivers of the economic and social development of the North-Western region are mainly Vratsa (mainly because of Kozloduy NPP) and Pleven (as a city with traditions in the industrialization of the country) and they would be a center of attraction for the ongoing urban processes in the region.

Given the structural disparities of both the economy of the individual NUTS 2 regions of the country and the structure and composition of the population, which was tracked above, not only the absolute value of the indicators, but also per capita /so-called translated values/ are observed (Fig.4). Here, things now look considerably more equal between the district centres of the North-West region. The statistics show that most of them are moving at

commensurate rates of development. Vratsa is again an exception. It stands out with a relatively higher volume of generated GDP per capita. This is mainly due to Kozloduy NPP, as mentioned above, but also to some other industrial features. The graph also shows an interesting trend. The relatively lower GDP in Vidin district is mainly due to the depopulation of the area. Based on the value of the per capita indicator, it can be seen that Vidin is almost catching up with the other cities and there are no particular disparities.

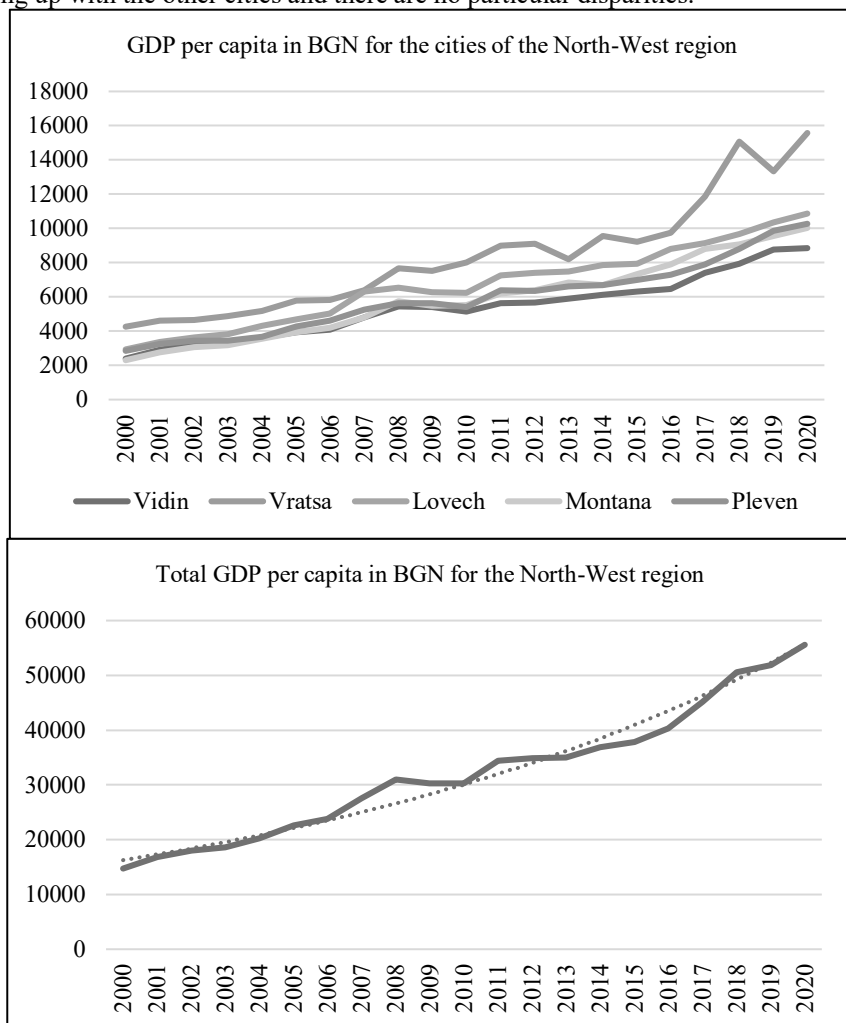


Fig.4: GDP per capita, by district centre and total for the North-West region of Bulgaria.
 Source: NSI and own groupings and calculations

3.3. Foreign Direct Investment (FDI)

Traditionally, foreign direct investment (FDI) has been considered an indicator of a region's development potential. Along these lines, their consideration here in terms of their status in the region's cities is naturally conditioned. The search for linkages and dependencies with other indicators of the economic development of regions is an important factor in proving the theses previously set and formulated.

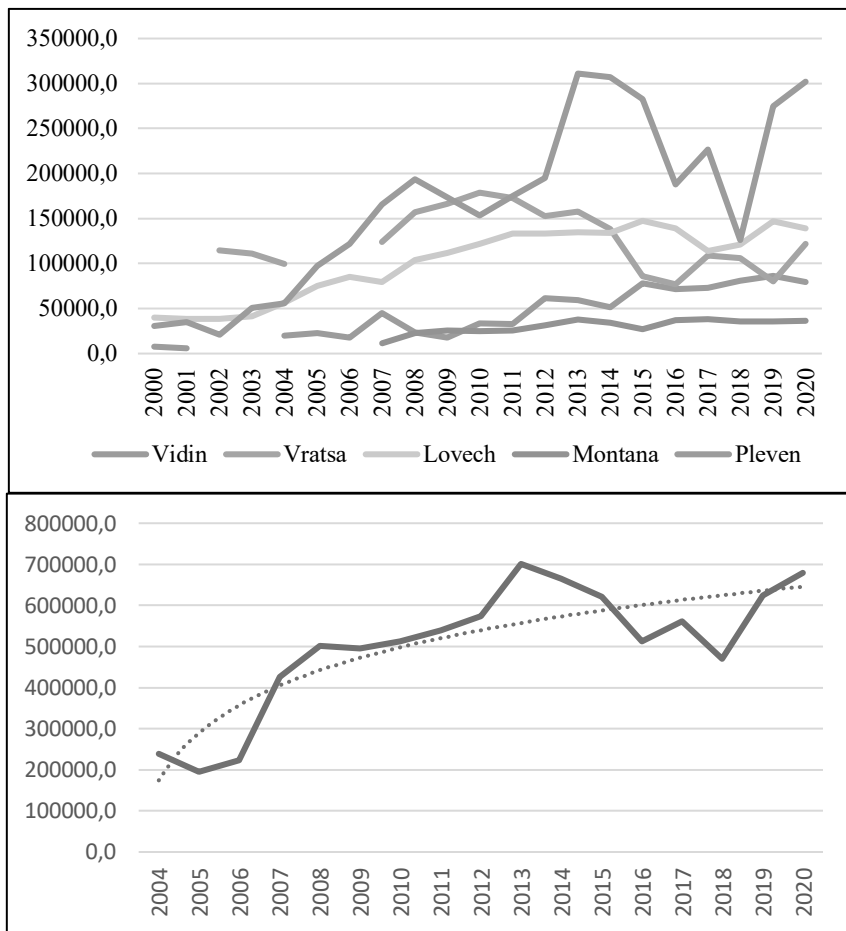


Fig.5: FDI dynamics in the districts and in the North-West region as a whole
 Source: NSI and own calculations and summaries

Over the period under review, the pace of FDI in the region has been upward though not very dynamic. Not all districts in the region contribute equally to the availability and increase of FDI. The statistics show that two districts (Montana and Vidin) have seen a marginal increase in investment over the 20-year period, while Vratsa has seen a downward trend. Although this district was an economic leader in terms of GDP and GVA generation. The most economically active district in terms of attracting FDI to the region is Pleven. Pleven had the highest growth rate for the period under review. This is perhaps one of the reasons for its leadership in certain periods over Vratsa (where we mentioned that the only NPP in the country is located). Despite the upward trend of FDI over the period, it is still not enough to take the region out of the last place of the poorest regions in the EU.

3.4. Structure-defining Enterprises/Companies

The North West region specialises in industries such as optics, communications equipment, pharmaceuticals, non-plastic materials, clothing, textiles and woodworking. The region is home to the largest power plant in the Balkans, the Kozloduy nuclear power plant (NPP), and the region attracts specialist engineering companies to maintain it.

In the following lines will be mentioned the main companies /enterprises/ operating in the North-West region. They are the basis of the economic results and growth generated in recent years.

GIPS AD

The mine near the village of Koshava is the only underground gypsum deposit in Southeast Europe. The gypsum extracted at the plant is 100% natural product and its purity reaches 95% (in case of gypsum extracted from open cast mines it is up to 50%). GIPS AD is a major supplier of raw materials in the cement industry and in the production of gypsum binders and aerated concrete products. Since 2006, over 22 million BGN have been invested in the reconstruction, modernization and upgrading of the technological process with the purchase of a complex for mechanized underground extraction of natural gypsum, the construction of two new production lines for the production of dry gypsum and cement-based construction mixtures, a plant for drying and separation of sand and a complex plant for calcination of natural gypsum.

In October 2012 a new plant of GIPS AD was opened in the village of Koshava. This is the first plant in Bulgaria with a complex installation for calcination of natural gypsum. The equipment of the new plant has a capacity of 80 thousand tons per year. The supplier of the equipment is Claudius Peters Projects.

"EL BI BULGARICUM"

"El B Bulgaricum EAD is the only state-owned company in the dairy sector in Bulgaria with many years of experience in the production and export of dairy products and technologies. The company also provides know-how and technologies for the production of original Bulgarian dairy products abroad through licensing agreements. It has two production divisions - in Vidin and in Sofia. In September 2015, a new production line for fresh milk and probiotic beverage production was designed and put into operation at the production facility in Vidin.

The region has its traditions in the production of wines and spirits and therefore the next few representatives are from this sector of the economy.

"MAGURA AD

Magura Winery was established in 1967 in the village of Rabisha. The winery is equipped with the most modern equipment in the field of winemaking and complies with all European standards. Part of the Magura Cave - the Bat Gallery has been turned into a place for aging fine wines for decades. Due to its soil and climatic conditions, the area around the Rabik Mound is similar to those of the French Champagne region, which is why the best natural sparkling wine in Bulgaria is produced here using classical technology. Besides its natural sparkling wine "Magura", the winery specializes in the production of high quality red and white wines and brandies. In 2008, the winery began to establish its own vineyards in the village of Rayanovtsi and v. Rabisha from the varieties Pinot Gris, Vrachanski Misket, Chardonnay, Riesling and Gamza.

"NOVOSELSKA GUMZA" AD

The winery Novo Selo was built in 1946 and specializes in the production of quality red and table regional wines. It also produces white wines, grape and fruit brandies. Mostly in the recent past, production has been oriented towards both domestic and foreign markets such as the Czech Republic, France, Germany, Poland, England, Sweden, Canada, Angola and Latvia.

The winery in Novo Selo processes mainly red wine grapes. There is also a bottling line for thermally stabilized wines with a capacity of 1500 bottles per hour. The capacity of the production facilities for processing raw material in annual volume is 20 000 t of grapes, and as finished products the volume is from 1 500 000 to 2 000 000 bottles of wine.

BONONIA ESTATE

Bononia Estate is a producer of high quality Bulgarian wine, concentrating its strength in the typical for Northwest Bulgaria white wine and rosé and in the lighter red wines. The family-owned company is named after an ancient Roman fortress located along the Danube, Bononia - today's town of Vidin. The vineyards are located between the villages of Gomotartsi and Koshava, in the Vidin region on the banks of the Danube. In 2013, the first 400 acres of young vines were planted, and now the vineyards are about 1500 acres. In 2016, the vineyards were planted in the village of Vinohrady. Gomotartzi (Gomotartzi), Istar (Istar), Ooh La La (Ooh La La) and Bononia Estate (Bononia Estate).

KNAUF BULGARIA LTD - GYPSUM PHASER BOARD PLANT

Knauf Bulgaria was established in 1993 with Knauf - Austria as the founder. In 1997 it took over and reconstructed the gypsum phaser board plant in Vidin. Located in a triangle between three countries (Bulgaria, Serbia and Romania), directly on the Danube, the plant is one of the largest employers in the region. Equipped with state-of-the-art production equipment in line with quality and environmental requirements, the plant operates at European level. Around 3 million square metres of gypsum fibre boards for dry floors and walls are produced in Vidin under the brand names Vidiwall and Vidifloor. The most important customers include the ready-built and prefabricated house industry in Austria, Switzerland and Italy, with 90% of production exported to these countries.

"BDINTEX" LTD.

An established tailoring company specialising in the production of men's shirts and ladies' blouses. Finished products are sold entirely on the foreign market. Works about 99% for Germany and about 1% for England. The company is equipped with the latest generation of machinery and equipment. It employs 260 persons. The company has an established name in the garment industry [11].

Advantages and disadvantages of the area [10]

Advantages

- Maintaining a stable economic activity of the population aged 15 and over in recent years. However, further efforts are needed to raise it and prevent population decline.
- Increase in the amount of foreign direct investment in non-financial enterprises in recent years.
- Increase the number of SMEs with their own innovation activity by prioritising EU funding for the area.
- A large number of enterprises have introduced product innovations developed by themselves, although they mainly implement them on the domestic market in Bulgaria.
- Development of niche specialisation in some promising industries such as the automotive industry.

Disadvantages

- Population decline and increase in the average age of the workforce.
- Rising unemployment.
- The lowest average wage in the country.
- Low GDP growth.
- Low-tech innovation activity in terms of product innovation.
- Small number of enterprises in the region with their own R&D units.
- Small number of research and university units and low level of knowledge and technology transfer.
- Declining employment and R&D funding.

4 Conclusions

The main conclusions derive from the advantages and disadvantages of the region defined above as well as from the economic and demographic characteristics presented. The North-

Western region of the country is not characterized by a particular potential for the creation and functioning of innovation-based incubators due to: (1) with the exception of the city of Pleven, the remaining cities lack established sustainable educational and/or research organizations; (2) a declining population with an increasingly poor demographic structure; (3) the majority of firms in the region produce relatively low value-added products and have almost no R&D and innovation units; (4) poor infrastructure and connectivity with the rest of the country and with other regions of the country. However, it is these deficits of the region that suggest the need to build specific infrastructure to stimulate innovation and high value-added production. As an element of innovation infrastructure, innovation-based incubators are an important element to overcome some of the region's shortcomings. They would attract more FDI and together have a catalytic effect in improving the business and general living environment of the North West region in Bulgaria.

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