The limitations of national innovation systems in transition economies

Evidence from Albania

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Abstract: Albania is an eastern European and post-socialist country which has shown interesting patterns in terms of economic growth and innovative activity. At the beginning of the 90s, the country shifted from a centrally controlled and isolated economy to an open market economy. The GDP growth in Albania, prior to the 2008 financial crisis was one of the highest in Europe at 6 percent and during the past decade, the country has reached to maintain economic stability despite the global crisis. However, Albania has shown very little progress in science, research and innovative activity during the past 2 decades of capitalism. Thus, this study seeks to discover what constrains the development of the Albanian national innovation system (NIS) by analyzing system failures in the country. Although the socialist governance in Albania was based upon the Soviet-type socialism, the country was characterized by extreme isolation and a harsher communism. Our main findings on the systemic failures of the Albanian NIS include the lack of national and international linkages, low engagement of the private sector in R&D and an undeveloped ICT infrastructure.

Keywords: Innovation, NIS, systemic failures

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1 Introduction

Innovation and technology development results from the complex interaction between economic actors that include universities, industries and the government otherwise known as the Triple Helix (Etzkowitz & Leydesdorff, 2000). In these terms, the analysis of national innovation systems can help to determine system failures that with the right intervention can increase innovative performance. Researchers depict different ways of analyzing national innovation systems. Firstly, innovation surveys in the firm-level aim to discover knowledge sources which are more important to innovative activity. Secondly, cluster analysis studies the relationships among firms, sectors, and industries based on their characteristics. The main aim of this type of analysis is to discover how knowledge flows change between different clusters. Lastly, the analysis of these systems can be also conducted according to different levels such as the sub-regional level, national level, pan-regional level and international. Due to the relevance of the country innovation-related characteristics in innovation activity, the national level of analysis is the most important.

The NISs in developing countries have been mostly defined by focusing on economies that are catching up with developed countries. The implementation of this concept on less successful transitioning economies has to follow a different approach which adapts it to the specific characteristics of these countries. Transition economies include countries which have recently transformed their institutions and switched to a market economy. Typical examples of these countries are found in central and eastern Europe.

Nowadays, evidence has proved that socialism has a restricting role in innovative activity. Centrally planned economies provided no incentives whatsoever for knowledge production and innovation. Instead, the primary focus was meeting targets of production, setting prices and creating a solid hierarchical system that would allow the center to control all activities (Schroeder, 1989). Thus, as it will be explained later, these characteristics of the system contributed to a serious lagging behind of socialist economies, despite their resources.

A relevant theory that describes innovation processes is named as Innovation Diffusion and is a theory of social sciences developed by Rogers (2002). In simple terms, the theory explains how a product, idea or concept develops and is distributed in the market to penetrate different social systems and contexts. The theory divides economies into four categories which are: the inventors, early adopters of the idea, late adopters, and laggards. This introduction was to say that Albania in the global context of innovation is in the last wave of diffusion or rather in the fourth stage, that of the laggards. We have reason to believe this position of the country has been seriously affected by its socialist past. The Albanian system during the communist period was inspired by the Stalinism ideologies and even after the Soviet-Albanian split in the 1950s the same model of governance was kept. However, after the interruption of the relationship with the Soviet Union, Albania followed the same ideologies and remained extremely isolated.
The central planning system which was controlled by the state party in Albania cannot be compared to other Eastern European countries. The split from the Soviet Union and the extreme isolation of the country during the 1970s stopped the financial support from other countries and restricted every possibility for capital accumulation (Kume & Llaci, 2000). Eventually, the dominance of old technologies and undeveloped agriculture sector led Albania to a major crisis in the 90s which caused a high growth of unemployment, inflation, a decline of the GDP and the collapse of the foreign trade balance.

Albania represents an interesting case in the group of transition economies. Therefore, this paper aims to answer what are the limitations of this country NIS which will contribute to finding leverage points that will increase its performance. Moreover, by answering this research question, our findings will help to understand the constraints of NIS in transition economies.

The system failures framework that is provided in the literature, will be applied to the Albanian context where we will analyze different indicators. Throughout our analysis, other countries (Germany, Estonia, Slovenia) will be used to compare the situation of Albania. Germany is selected as an advanced economy representing the Western countries while Estonia and Slovenia as ex-communist countries which have shown significant progress in terms of innovation and technology. Additionally, the latter have similar characteristics with Albania in terms of population and size. It must be noted that these countries will be used only as a yardstick in our indicator analysis to show how Albania is positioned.

This study starts with the description of the methods that are used in this research. Then, a theoretical framework section is going to provide the essential concepts and notions that we need for the analysis of our case study. In this section, after reviewing the literature on NIS and socialist economies, the main concepts to be introduced are organisational and institutional thickness/thinness and system failures. After providing a general overview of Albania the next chapter will present the analysis of system failures in the country in order to depict the limitations. Finally, the last section will describe the findings of this study and the conclusions.

2 Data and Approach

This is a descriptive study which will follow a qualitative approach with the main goal of depicting the constraints of the Albania NIS. The research is based on secondary data sources, mainly reports, databases, statistics and relevant literature. The selection of the data was made according to its availability and relevance and its gathering is combined in order to form a comprehensive picture of specific aspects the contribute in answering the research question.

The selected data for this analysis are obtained from organisations such as the World Bank, World Economic Forum and Erawatch due to their high reliability. The majority of studies on innovation
in Albania focus their analysis on the firm level by conducting surveys with managers to determine their approach to innovation. Therefore, the analysis of innovation activity at a macro level is limited and mostly conducted by the Albanian responsible institutions such as the Ministry of Innovation. However, these studies focus only on the initiatives that the Albanian government has undertaken and their objectives. Thus, the results of these initiatives and the progress of Albania in innovation is left unexplained. For this reason, this study uses reliable international sources to discover whether these government initiatives have been effective.

Throughout this analysis, multiple indexes have been used. Their decomposition is explained in the respective chapters but only the most relevant indicators which show interesting patterns, have been presented in this paper. It must be mentioned that the comparison between Albania, Estonia, Slovenia, and Germany has not been consistent throughout this paper but rather In certain indicators, the comparison between these countries has been replaced by a ranking of multiple countries and in other cases, the regional mean and the EU average have been used as yardsticks. These changes have been made in order to create a better picture of the situation of Albania.

3 Theoretical Framework

The first author that introduced the concept of “National Innovation Systems” was Christopher Freeman in 1987 and later on, it was elaborated by Bengt-Åke Lundvall in his book in 1992. According to Lundvall (1992), this concept dates back to the notion of “The National System of Political Economy” presented by Friedrich List (1841), which could also be recognized as "The National System of Innovation". The concept is based on the idea that understanding the relations among the actors involved in innovative activity has a major impact on the improvement of technological performance. The complex linkages between these actors which produce different types of knowledge result in the innovation and technological progress of a country. The performance of an economy depends greatly on the relationships among these actors which are part of the knowledge production system, and also the technologies that are used. Actors in an innovation system are public organizations, universities and private companies which are otherwise known as the government, academia, and industry in the triple helix model (Etzkowitz & Leydesdorff, 2000).

The analysis of technology development from a national innovation system perspective has gained relevance for multiple reasons. Firstly, the importance of knowledge in the economy is being recognized by researchers. Knowledge which is represented by patents, scientific publications and other, has to be evaluated and compared at the national level in order to identify tailbacks in the system and make policy suggestions for improvement. In other terms, this means to analyze the linkages in the triple helix model, which will lead to a better measurement of knowledge in a national innovation system which is the main driver of economic growth and competitiveness.
Secondly, the national innovation system perspective is also a consequence of the increase in systemic approaches to the analysis of technological advancement. For instance, the linear model of innovation explains that an increase in the scientific inputs will bring new innovation because science is seen as the main driver. However, innovations can emerge from multiple sources and can take different forms such as product adaptations and incremental process innovations, which are reflected in the new systemic approaches. Lastly, the increase in the number of organizations which are involved in knowledge production and diffusion has also affected the view of innovation systems in a national perspective. These institutions provide knowledge for national economies and the performance of these economies is dependent upon the efficient use of this knowledge. Private enterprises, the public sector, and universities form the institutional profile of a country which is distinctive and this explains the researchers focus on the country level of analysis.

3.1 Socialist economies

Karl Marx believed that socialist countries provided an environment that spurred technological progress. Oskar Lange also agreed with this point of view. He argued that firms operating in a socialist economy, different from capitalist firms, had no reason to hold back innovation in order to maintain the old assets value. Other authors claim that centrally controlled economies have features which allow them to be better administrators of the innovation process. Thus, the centralization of research and development will decrease the mistakes by avoiding their duplication, the elimination of barriers will provide better circulation of the information and resources will be directed to the implementation of the best technologies.

However, evidence from Eastern Europe countries shows that centrally planned economies have restrained the development of innovative activity (Schroeder, 1989). By comparing these countries with Western economies there is a notable technological lag which limits their capacity to increase living standards and restricts international trade.

According to Schroeder (1989), the biggest restriction of innovative activity in socialist economies was found in the enterprises' behavior. Socialist firms were typically unwilling to take risks because they did not have to. Since these firms were state-owned, they do not have the need to find customers to sell their products and neither suppliers. The government was the only provider of capital and the one that took the investment decisions. In addition, the firms did not decide on the product prices and the allocation of profits was managed by central planners. Due to the lack of competition, firms did not risk their market shares and the sales of obsolete products were made possible by the allocation processes. These firms faced no budget constraints because they could easily rely on banks even if they had no profits. Thus, it is clear that this institutional environment provided no incentive whatsoever to enhance innovative activity in business firms (Schroeder, 1989).
Besides the analysis of enterprise behavior regarding the institutional framework, Schroeder (1989) emphasizes also the role of the manager's behavior in the development of innovations. He claimed that in socialist economies, authorities did permit the engagement of firms in innovative activity. However, innovations in these firms were mostly coping with supply-chain issues and their successful implementation was certainly dependent upon the manager abilities. The process was constrained by the lack of information about technological opportunities and the unavailability of inputs which supported the adoption of new technologies. Even in the case of a new patentable product, bureaucracies in the system slowed down the implementation process significantly. The introduction of new technologies to the firms was often associated with malfunctions in the plant and the inability of employees to use it which required appropriate training. All these problems contributed to the lack of interest from managers for engaging in innovative activity.

Another great limitation to innovative activity in socialist economies was found in their system of incentives (Schroeder, 1989). The bonuses of the staff in these firms were determined by the ability of the workers to reach the output targets. In case of failing to do so, the staff received heavy penalties and when surpassing the target the reward was significantly small. Moreover, when new technologies were introduced, production routines were disrupted and as a consequence, the production targets remained unfulfilled. Thus, the receipt of bonuses from the staff was threatened and the managers faced large risks and small rewards which decreased their motivation to fulfill the plans.

As noted earlier, in Soviet-type economies prices were controlled by the respective institutions and this did not allow firms to evaluate the real payoff. The pressure towards managers to introduce products induced them to make small changes to existing products and present them as new. This eventually led firms to bogus innovations, but the increase in profits due to the high prices of "new" products, was the main focus of managers in the first place.

Finally, Schroeder (1989) notes that the lack of domestic and foreign competition was one of the biggest constraints for the development of innovations in Socialist countries. The center controlled foreign trade and consequently, firms did not have the necessity to compete for exports. Additionally, imports were also planned to increase the number of available products and not to substitute the existing ones.

### 3.2 Reforms undertaken

In the 1960s and 1970s, Eastern European countries undertook reforms which aimed to modify institutions in order to overcome the above-mentioned constraints. The main objective of the reforms was to improve and accelerate the process of introducing and adapting to new technologies. During this period, socialist governments understood that they were not taking advantage of the technological revolutions that happened in the West (Schroeder, 1989). Moreover, except technological borrowing, these new policies and regulations focused also on the
enhancement of domestic innovations. Despite the different time and specific regulations, the reforms followed the same approaches towards making innovation more efficient, in all socialist countries. A similar approach was to organize administrative structures dealing with technological progress more efficiently. Another approach was the design of measurement tools that would predict technological improvements and prepare the adoption process. Thirdly, all the reforms focused on creating a system of incentives that would provide the necessary motivation for researchers. Lastly, incentives were aimed also to risk-averse managers at the enterprise level. According to Schroeder (1989), these reforms were often subject to modification due to the lack of progress in the implementation of new technologies and the promotion of innovative activity. Before Schroeder, in 1981, A. Abonyi concluded in his work that these economic reforms were unsuccessful in creating three fundamentals for innovative industries. Firstly, they failed to create an environment that provided the essential technological and scientific resources. Secondly, the reforms did not stimulate in-house R&D in the private sector and lastly, linkages did not support innovation with complementary technological levels.

In the 1980s, socialist countries in Europe experienced another wave of reforms. The most notable is the program launched by Mikhail Gorbachev in 1985 that aimed to tackle the problem of technological lag in USSR countries. These reforms were designed to give businesses more freedom that would allow them to engage in foreign trade, set up in-house R&D and manage their investments. Although the state still continued to fix prices for the main products, firms were allowed to set prices for a specified range of products. However, firms still remained owned by the state and reported their activity to the ministries. The government formulated new laws and created councils to enhance the autonomy of the firms, but this was not effective according to Schroeder (1989). Although the state took relevant initiatives in spurring innovative activity, the main constraints were still existent. Institutions that hindered technological progress were still operating and overall the system remained too centralized.

The main restrictions that did not allow Soviet-type economies to catch-up with the technological progress of the West were certainly the lack of liberty and the institutions that better represent these countries. Bureaucracies and multiple levels of the hierarchy created barriers that fettered technological progress and created inefficiency in the national system of innovation.

3.3 Organisational and Institutional thickness/thinness

Trippl, et al. (2015) in their attempt to identify regions with less developed innovation systems, review different conceptual approaches in order to build a framework for analysis. Dimensions such as knowledge base, organizational thinness, and system failures are used to discover the limitations of regional innovation systems. These concepts were originally designed for the analysis of RIS but they are significantly useful even when applied at the national level. They describe important aspects of the NIS and thus, our study will use these concepts to depict the limitations of the innovation system of our case study at the national level.
According to Tripl and Todling (2005), there are three important deficiencies that limit the progress of a regional innovation system. First, there are organizational thin RIS in which fundamental elements are not fully developed or absent. Such elements are the country resources, key institutions that regulate innovative activity, clusters etc. These regions exhibit low R&D intensity and technological progress as a result of a high presence of SMEs, low levels of knowledge diffusion and a weak structure of institutions. They are typically found in peripheral areas. The second deficiency is named as negative lock-in. The regions that exhibit this pattern have high levels of specialization in mature industries and obsolete technologies. Firms and supporting institutions that are located in these regions are slanted towards outdated technologies and therefore, their ability to produce innovations is restricted. Locked-in regions are often found in industrialized areas. Lastly, the authors depict fragmented RIS as those regions which have weak linkages between the actors in the system and low levels of networking which lead to little knowledge exchange and suboptimal levels of innovative activity. The absence of related variety and high diversity of firms are the main drivers of the region fragmentation which hinder technological progress, despite the resources and strong institution which operate in these areas. These regions are found in metropolitan areas.

Recent literature emphasizes the notions of organizational and institutional thickness/thinness in the analysis of RIS. Zukauskaite et al. (2017) provide a clear difference between the dimension of thickness from the organizational and institutional approach. Organisational thickness denotes areas with a high presence of firms, research institutions, universities, supporting organizations etc. Institutional thickness refers to the presence of formal institutions that include laws, regulatory agencies etc. and informal institutions such as the cultural approach to innovation, values, and norms that enhance knowledge production and circulation.

Table 1 RISs classification according to organizational/institutional thickness/thinness

<table>
<thead>
<tr>
<th>Institutional thickness</th>
<th>Organisational thickness</th>
<th>Organisational thinness</th>
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<tbody>
<tr>
<td>Metropolitan regions in Northern and Western Europe.</td>
<td>e.g. Peripheral regions in northern Europe which have strong government institutions but weak or absent innovation organizations.</td>
<td>e.g. Peripheral regions which lack both innovation organizations and government institutions that support innovative activity.</td>
</tr>
<tr>
<td>e.g. Regions in Southern or Eastern Europe which have a high presence of research institutions and other organizations that support innovation but they are restrained by the inexistence or low quality of government institutions.</td>
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3.4 RIS and path development

Path development is an important notion that provides insights into the way how regions develop over time. The understanding of these concepts is essential due to their interrelation with different types of ISs. The literature depicts three distinctive shapes of path development that are found in regional industries. First, regions may engage in path extension through process and incremental innovations in existing firms. This can lead to a low competitiveness in the region, limited opportunities and few radical innovations which eventually will eventually cause a stagnation (Hassink, 2010). Secondly, firms located in a region may shift towards diverse but related sectors. This is known as path renewal and is strongly related to the notion of related diversification (Boschma & Frenken, 2011). Lastly, path creation takes place when firms engage in new and unrelated sectors. It involves relevant changes in the economy which require adequate policies and institutions that support unrelated diversification (Boschma, 2014).

Several researchers claim that the institutional structure of a country is strongly related to the aforementioned notion of path development. For instance, Boschma and Capone (2015) conclude in their work, that institutions which operate in liberal markets, enhance unrelated diversification which is otherwise known as new path creation, while centralized economies promote path renewal. Isaksen and Trippl (2014) analyze how different types of RIS relate to the path development of regions. They classify IS in three categories: organizationally thin; organizationally thick and specialized; and organizationally thick and diversified. These RIS types differ from their ability to enhance new path development (Isaksen & Trippl, 2014).

Organisationally thin regions do not possess the necessary preconditions that support path renewal. Therefore, weak innovation structures and poor knowledge endowments can lead these regions to path exhaustion. In other terms, this is the concentration in traditional technologies which limits the opportunities for radical innovations. Organisationally thick and specialized RIS exhibit similar characteristics. These regions cannot develop new industrial paths due to the absence of diversity in the industrial base, supporting institutions and knowledge bases. Lastly, organisationally thick and diversified RIS have a high presence of related variety which is a good condition for new path creation and path renewal (Isaksen & Trippl, 2014). The large number of diversified industries and supporting organizations enhance innovative activity and regional transformation in these areas.

3.5 System Failures

The identification of less-developed innovation systems has motivated researchers to look for different approaches and typologies. The most relevant approach is focused on malfunctions of the innovation system which are otherwise known as system failures. There are multiple typologies in the literature which address the concept of system failures but we are going to use in our study, the framework that was developed by Klein Woolthuis et al. (2005). After analyzing multiple
contributions to the literature, the authors differentiate between infrastructural failures, institutional failures, interaction failures and capabilities’ failures.

3.5.1 Infrastructural failures

Infrastructure includes the utility networks which are located in an area and make possible the proper function of an economy. These networks can be organizational and physical structures, facilities and services.

Physical infrastructure has typically received little attention from researchers. Yet, it has a relevant role in supporting businesses operations and their development in the long-run. Edquist, et al. (1998) differentiated between communication and energy and science and technology infrastructure. The former refers to the energy supply, efficient ICT infrastructure, broadband connection etc. The latter includes mainly the availability of research institutes that allow scientific knowledge production and transfer. Besides these important elements, Klein Woolthuis et al. (2005) add the role of additional infrastructure such as transportation, as a constraining factor to innovation development. The low quality of roads, few numbers of laboratories, science facilities etc. can hinder the innovative activity that takes place in a country.

3.5.2 Institutional Failures

The institutional context is certainly the most relevant element that defines a national system. Thus, it has received great attention from scholars which have categorized institutional failures in different ways. For instance, Edquist et. Al. (1998) differentiate between consciously created and spontaneously evolved institutions while Carlsson & Jacobsson (1997) separate them into hard and soft institutional failures. Additionally, Johnson & Gregersen (1994) refers to them as informal and formal institutions. However, all the above mentioned can be categorized into two comprehensive groups. There are hard institutions which include the formal ones which are intentionally created and soft ones which represent informal institutions.

Firstly, hard institutional failures involve mechanisms such as regulatory frameworks which can constrain innovative activity (Klein Woolthuis, et al., 2005). These regulations can be the laws on labor, technical standards, regulations on safety and also the legal system of an economy (Smith, 1999). Additionally, although there are exceptions, poorly developed and implemented intellectual property rights can become a great limiting factor of innovation. Moreover, laws and regulations might be too stringent and this can seriously restrict the technology diffusion capacity of a country. Malerba (1997) depicts this phenomenon as the appropriability trap. In order to arrive at successful innovations, failures at this level must be avoided as they can hinder the innovative capabilities of the economy.
On the other hand, soft institutional failures include informal rules of the society, its norms, values, and culture that can be inadequate to encourage knowledge exchange and innovation. Risk-taking behavior, the entrepreneurial spirit within firms, social norms etc. are all part of the soft institutional failures that can obstruct the innovativeness of a firm, region or country (Klein Woolthuis, et al., 2005).

### 3.5.3 Interaction failures

Market relationships such as the interactions between different NIS actors are considered a relevant factor when analyzing system failures. Relationships between firms, institutions, the government, stakeholders etc. can lead to systemic failures. Interaction failures, otherwise known as network failures can evolve from too little or too much interaction. Thus, Carlsson & Jacobsson (1997) differentiate between weak and strong network failures which can both hinder innovative activity.

Despite being very effective in some cases, the intensive collaboration of actors in an economy has its drawbacks. Strong interactions between actors can fail to generate the necessary knowledge because they can lead each other in the wrong direction (Carlsson & Jacobsson, 1997). In addition, Klein Woolthuis, et al. (2005) emphasize other cause that leads to strong network failures. Firstly, long-established relationships may lead to the lock-in within a certain group which is referred by the authors as myopia. As a consequence, firms will be too concentrated on existing technologies which restricts their development opportunities. Secondly, the authors emphasize the lack of weak ties as a hindering factor to generation and exchange of new knowledge. Strong internal orientation will block collaboration with firms of other industries and backgrounds since they cannot enter the “inner circle”. Lastly, dependence on dominant partners is also considered a strong network failure. In other terms, firms may be unable to switch to new partners due to high costs or even the lack of alternative firms e.g. monopolies (Klein Woolthuis, et al., 2005).

On the other hand, weak networks can also lead to interaction failures. Since innovation results from the interaction of actors, poor connectivity between firms hinders learning activities and prevents innovation. The lack of collaboration can block the firms’ vision regarding future developments and therefore restrict the organization of research activities (Carlsson & Jacobsson, 1997).

### 3.5.4 Capability Failures

Firms can also be restricted by their lack of capacity and resources to handle new technology transitions. The capabilities of firms include their resources, learning abilities, the flexibility that allows them to adapt to new market needs. The adaption to new technologies and market is seriously hindered in case these capabilities are absent and cannot be obtained from interfirm relations. This is otherwise known as transition failure by Smith (1999) and learning failure by
Malerba (1997). In simple terms, capability failures take place when firms do not have the necessary abilities to shift to new technologies and end up being locked-in into existing ones.

4 General Overview of Albania

Albania is a small country with a population about 2,886,026 inhabitants and average income of 324 euros per month, making Albania one of the least developed regions in Europe (INSTAT, 2016). Usually, the low income serves as an excuse for the lack of investments in multiple sectors, including R&D and Innovation. Nowadays, there are 152,288 enterprises in Albania, of which 98.9% are small and middle-class businesses (INSTAT, 2015). The technology used in these businesses is mostly low, and regarding export activity, it remains low in relative and absolute terms at about 178mln euro (INSTAT 2016).

Research and Innovation are not being seen by policymakers as factors of growth and development, which means that the policies involved in these two factors have a lack of public and private engagement (Prifti, 2017). Even though numerous policies have been implemented, it is clear that every action has been influenced by the politicians in power, and there is a lack of long-term vision. As we will see later, despite some government initiatives no significant progress has been made. Today, Albania is far behind the other countries of Western Balkan and other EU countries regarding the Research and Innovation capacity. Referring to the Global Innovation Index (2017), the country has the lowest index of innovation, with a value of 28.38 points, meanwhile, the index level in other countries in the region is respectively: Bulgaria 41.42, Greece 39.75, Macedonia 35.4, Serbia 33.75, Bosnia 29.62. This low performance happens because of the bad infrastructure, the lack of sophisticated market, human research, low-quality products and services, co-operation of industry and universities, and the low commitment of interest groups,
where the lack of involvement of the private sector is noticed, and Albania is often not included as a country which is trying to take actions to plan and perform policies which promote a progress in R&D and Innovation, even though Albania is a country that wants to be a part of EU.

In 2009 the “Ministry of Education and Science 2015” was established, with the long-term goal of achieving a high level of research to support the three educational levels, and also the focus of supplies which are necessary, and the guarantee of a systematic support towards Innovation and technology which will fulfill the needs of the manufacturing sector. This strategy consists of three main points which are: scientific research, technology development, and Innovation support. In 2010 the “ASZHI" was founded. It is one of the main agencies which seeks to promote Innovation in Albania and it is followed by “QNI", “AKSHI" and so on. These policies have brought some changes to existing laws such as the law of electronic communication, etc. Even though the Ministry of Innovation and other small agencies are trying to promote the tech and Innovation, the performance is still too low in comparison to the other countries of the region, let alone the countries of EU.

Referring to The Global Innovation Index 2017, we are able to identify the main indicators which determine the index of Innovation, starting from the institutions, human resources, and research, infrastructure, market sophistication, tech, and products.

The elements in which Albania has a very low position are: human resources and research, business sophistication, tech, and products, ranked respectively 91th, 102th, 106th, 119th, from 128 countries in total. According to Ranga & Etzkowitz (2013), the development of a strategy which is supported by the triple helix: state-education-industry, would help to create a society that is familiar with the development of Innovation.

These are the three sectors where Albania is underdeveloped, and the strengthening of co-operation between these three institutions means a reinforcement of the triangle: education-research-innovation. Higher education, scientific research, and innovation are the key elements of social and economic development for a knowledge-based economy (Meek & Kearney 2009).

Different education reformations have pointed to the positive change that would be made if the universities were divided in different profiles according to the needs of the labor force, reevaluation of the tuition fee, and the improvement of the internal governance of the universities, combining autonomy, responsibility and fair governance (Prifti, 2017). Research and Development in Albania shares a very small part in the high education sector, and this has to do mostly with the lack of financing during the transition period, and the lack of available human resources nowadays.

According to The Global Innovation Index 2017, Albania has a 28.4 innovation index, ranked 93th from 128 countries. The R&D expenses share only 0.2% of GDP, ranking Albania in the bottom of the region (Greece 0.6, Bulgaria 0.5, Montenegro 0.4, Macedonia 0.3) and only 3.3% of the GDP is used for education expenses.
To point out the importance of base infrastructure of research in universities, and the growth of scientific excellence in different research fields, the Agency of Research, Tech and Innovation was founded, which serves as an institution that supports R&D and innovation by financing it.

The low performance of R&D does not relate to the number of PhD, but it is strongly connected with the quality of graduate students, the qualities of R&D that are provided at the end of studies, and if we would refer to the number of Ph.D. (3203), nowadays we would have about 3000 scientific studies that would serve to plan new strategies that would identify the strengths and weaknesses of different sectors.

Pointing out the necessity of high education reforms, these reforms did not provide the required results, making it one of the most problematic fields. The effort to give everyone the chance to choose the desired education as a legitimate right has brought a massive high education capacity, more than can be offered, which has affected the quality of provided education. Today in Albania there are a lot of graduate students, but few of them are properly educated. Creating a lot of studying fields that do not have a proper study of what it is going to produce in the end, has brought a lot of students who do not have a specific educational profile. The higher education system still does not give a solution to the needs of the society and economy of Albania. The provided education does not fulfill the different dynamics of Albanian society and European trend. A proper ranking of universities and an evaluation system of personal performance does not exist. Old methods of teaching are still being used, which need to be reformed according to the last developments in science, tech, market, management, etc.

The liberalization process and the expansion of high education have been chaotic and did not cater to the requests of the labor market. A big challenge for the high education in Albania is exactly the need of dimensioning the roles of universities, in keeping with the social and economic needs, universities focused by the scientific research and innovation, and as enterprising universities.

5 Infrastructural Failures

Infrastructure is certainly an essential element in supporting innovation activity in a NIS. The lack of research infrastructure makes an important system failure and thus, we will look at the ICT infrastructure in Albania as well as the higher education system as important elements in this aspect.

5.1 ICT infrastructure

ICT infrastructure plays clearly a major role in the infrastructure failures of a country. ICT impacts the absorbing capacity and therefore the economic development of a country. In economies with good ICT infrastructure, there is a greater presence of new technologies, higher productivity and
generally a perfect environment for businesses to thrive. Due to this relevance of ICT as part the infrastructure that supports innovation, we will present two indicators which evaluate the ICT infrastructure of Albania compared to Estonia, Slovenia, and Germany.

It is clear that the wide use of internet started in the mid-90s and this is shown in Figure 2. Even in Germany, there is only an insignificant percentage of the population up until the late 90s that were using the internet. However, Albania experienced a substantial increase only after 2005, which clearly shows a low performance even when compared to Slovenia which exhibits double the rates. In 2016, 66 percent of the population used the internet, while in Estonia and Germany the rates are almost 90 percent.

**Figure 2 Individuals using the Internet (% of the population)**

![Figure 2](image)

*Source: Own calculation using data from the World Bank*

Figure 3 shows the number of secure internet servers per 1 million people in our chosen countries. As it is shown, Albania is ranked far below Estonia and Slovenia and it exhibits a slow increase from the first server in 2005 until 2016. Although Estonia and Slovenia are both transition economies they exhibit a significant incline throughout the years and are located not too far from the German levels.

**Figure 3 Secure Internet servers (per 1 million people)**

![Figure 3](image)

*Source: Own calculation using data from the World Bank*
Albania has to pay more attention to the access of the population on the internet. When it comes to obtaining information, Albania is still relying on traditional practices which date back to socialism periods and are preventing its modernization and technological catch-up. Its low performance in these indicators shows a low consumption of information technologies which affects knowledge diffusion and circulation. In a globalized economy which relies heavily on online information, the inability of the population to access the internet must be the main issue that must be addressed with appropriate policies.

5.2 Higher education system

The features of the higher education system are a relevant part of the infrastructure which supports innovation activity. In the case of Albania, these particularities form an infrastructural failure due to the low performance as shown in the indicators. There are currently 41 universities in Albania, out of which 15 are private universities and 26 are public (ASCAL, 2018). The establishment of private universities is seen as an achievement by the government although there is a great discussion amongst actors about their quality of education. In 2011-2012, 20 percent of the students were enrolled in private universities but one year later the share of students fell to 14 percent due to the closure of multiple higher education institutions from the government (Erawatch, 2013).

The assurance of quality of higher education in Albania is enabled by the Accreditation Agency on Higher Education and the Accreditation Council that was established in 1999. The former is the institution responsible for the evaluation of the quality of universities and programs which after completing the procedures, wait for the final decision of the council. The efficiency of these institutions is controversial since multiple accredited universities were closed in 2013 for not fulfilling the criteria as mentioned above.

Albania exhibits a steady increase in enrollment rates during the past decade (Figure 4). Although it started at low levels compared to Slovenia and Estonia, Albania almost reaches the rate of Slovenia in 2015. Due to missing data, the German ratios in this figure have been interpolated from the year 1998 to 2013.

Important developments in the higher education system in Albania involve the improvement of youth access in universities and the successful implementation of the three-cycle study otherwise known as the Bologna system. This process transformed the current curriculum of universities and added new programmes that were mainly oriented towards ICT and adapted to the labor market demands (Erawatch, 2013). As shown in Figure 4, the reforms seem to have been successful since, after 2004, the enrollment rates increase significantly.
Recently, efforts are being made by the government to improve the education system towards the incorporation of more technical skills. In 2015, the government developed a reform which addressed systematic failures and focused on five main goals: the integration of teaching with research, linking financing with performance-based indicators, increased autonomy and competitiveness and most importantly, providing higher education as a public good (ITU, 2016).

Lately, the government is providing training in Albania and abroad to the academic staff in order to implement western teaching methods and to introduce them to new technologies on teaching. European programmes such as Erasmus Mundus are increasing the mobility of students and academics and Albanian academics with international experience are now returning to give lectures in Albanian universities (141 lecturers according to Erawatch (2013)).

The education system is a relevant part of the macro analysis in Albania since the majority of innovation and research activities is developed in universities (Erawatch, 2013). A relevant indicator of educational capabilities is the percentage of the population who has completed the tertiary education. Albania lags behind when compared to the regional levels and shows a less educated population. However, as it is shown above, the enrollment rates in tertiary education have increased significantly which indicates that Albania will have a more educated population in the years to come.

**Table 2 Population with completed tertiary education**

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>ABSOLUTE NUMBER (PER THOUSANDS OF PEOPLE)</th>
<th>AS A PERCENTAGE OF ACTIVE POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population with completed tertiary education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albanian mean</td>
<td>139</td>
<td>0.07</td>
</tr>
<tr>
<td>Regional mean</td>
<td>1.334,92</td>
<td>0.17</td>
</tr>
<tr>
<td>EU 28 mean</td>
<td>86.939,93</td>
<td>0.26</td>
</tr>
</tbody>
</table>

*Source: Pacinno (2016)*
6 Institutional Failures

It is clear that the institutional context of a country shapes the environment where firms operate and thus, it can become an incentive as well as a hindering factor for the innovative activity that takes place in an economy. Institutional structure in Albania has changed substantially since the fall of the socialist system in 1991. Generally speaking, post-communist countries have undergone through institutional transformation processes in their transition periods and the establishment of effective institutional frameworks has proven to be a struggle for them. The formation of new institutions in the early 90s was meant to assist the private sector and the privatization of companies that were previously state-owned was an encouraging factor for the entry of firms. However, the development path of post-socialist economies is different and this is mainly a consequence of their socialist history but also a result of the political decisions taken by their government. Thus, we will take a look at the institutional context in Albania by analyzing hard and soft institutional failures.

6.1 Historic Perspective

The structure of the government during the 90s in Albania had a limited flexibility and was unable to develop necessary political changes that were undertaken by other post-communist countries (Kume & Llaci, 2000). After the fall of communism, the legal frameworks developed by the government as well as the founded institutions aimed to reach the standards of Western economies. However, the country failed at the implementation of these laws and policies which led to malfunctions in the system. Moreover, in the early stage of transition, new firms started rising and due to the lack of competition they immediately gained monopolist positions which eventually triggered the creation of inefficient business networks. Actually, the economy still suffers from these consequences as the first monopolists are still existent in today’s market but have taken the form of oligarchs. Therefore, this is one of the main reasons why Albania is characterized by high rates of corruption in the public administration as we will see later.

Additionally, the capital that was left from the socialism period was not easily adaptable to the new market economy. On the other hand, the dominance of poverty and the lack of resources in the country led to the extensive migration of the human capital which started seeking for opportunities in the neighboring countries. During the early 90s, the Albanian economy was characterized by a weak institutional structure as well as a lack of intervention in the economy from the state. Therefore, the informal sectors were prevailing and the people did not trust the government. The banking system was also not showing enough progress and this also created the lack of trust from businessmen who chose to transfer money through informal channels (Kume & Llaci, 2000).
6.2 R&D Institutions in Albania

The main institution responsible for coordinating innovative activity in Albania is the Ministry of Education and Sport (MES) which has been re-organized recently to adapt to European models. Other relevant institutions are the Agency for Research, Technology, and Innovation (ARTI) and since 2014, Albania has also a Ministry of Innovation. The most important agencies that are designed to implement the policies created by MES are ARTI, The Business Relay and Innovation Centre (BRIC) and National Agency for Information Society (NAIS).

The Ministry of Education and Sport (MES) is the main governing body responsible for research and development policy. MES is tasked with the role of drafting and approving national programs and allocating the respective budget. MES is also responsible for implementing R&D programs at the national level and it coordinates the implementation of R&D programs developed by other ministries. The Department of Higher Education and Science in MES is designed to deal directly with national research policies.

Agency of Research, Technology, and Investment (ARTI) is a public institution which was founded in 2010 and is dependent upon the Council of Ministers. ARTI aims at building a modern science system, empowering scientific and technological research, and integrating them into the higher education system. ARTI facilitates the exchange of knowledge, joint activity and partnerships at home and abroad, in order to strengthen research in the country and the region. The vision of ARTI is the establishment of a coordinating and guiding structure that cooperates with institutions in the field of science and technology serving the country's sustainable development. These processes are carried out in accordance with national priorities, the development of scientific and technological policies and management of Research and Development of the line institutions. ARTI is also responsible for the allocation of funds for small and medium-sized business projects with the aim of renovating their technological equipment.

The Business Relay and Innovation Centre (BRIC) is an independent institution that was founded in 2011 with the main objective to provide technical support and other services to private organizations. Another responsibility of the agency is the execution of the Business Innovation and Technology Strategy 2011 and thus, it must perform periodic supervising of the policies included in this Action Plan (World Bank, 2013).

National Agency for Information Society (NAIS) is responsible for the coordination of activities that relate to the ICT sector. The agency interacts closely with other public institutions, ministries and also private enterprises in the sector.

We can note based on Figure 4, a more decentralized character of the NIS structure in Albania compared to other post-communist countries such as Moldova. Soviet-type economies are characterized by a dominance of the Academy of Science in their NIS governance structure and all other research institutions operate under its jurisdiction. This is not the case in Albania, where this academy plays the role of an advisory body and it was also reduced in size in 2009 and
therefore decreasing its importance. Moreover, the institutional structure in Albania can be compared to successful models from other transition economies such as Estonia. This country made research institutes independent from the Academy of Sciences and connected to the universities which is the same change that was undertaken by the Albanian government (Figure 5). However, this does not verify the efficiency of the Albanian institutions as other factors such as corruption and bureaucracy hinder the proper functioning of the system (Prifti, 2017).

**Figure 5 NIS governance structure in Albania**

```
\begin{center}
\begin{tikzpicture}[level distance=1cm, sibling distance=2cm, level 1/.style={sibling distance=3cm}, level 2/.style={sibling distance=1.5cm}]
  \node {Parliament}
    child {node {Council of Ministers}}
    child {node {Albanian Academy of Sciences}}
    child {node {Council of High Education and Science}}
    child {node {Ministry of Education and Sports}}
    child {node {Ministry of Economic Development, Tourism, Trade and Entrepreneurship}}
    child {node {Ministry of Innovation and Public Administration}}
    child {node {Other Ministries}}
    child {node {Directory of Higher Education and Science}}
    child {node {Agency of Research, Technology and Innovation}}
    child {node {Research Institutes in Universities}}
    child {node {Private Enterprises}}
    child {node {Non-governmental Research Units}}
\end{tikzpicture}
\end{center}
```

*Source: Own presentation of Prifti, 2017*

Despite having a variety of higher-education institutions and scientific research institutes that are engaged in the research system, Albanian businesses are not significantly involved in knowledge production and R&D activities. Thus, although new private institutions have been established, research activity is still highly concentrated in public institutions. Higher educations institutions in Albania result the most productive according to the World Bank (2013) but still, the number of scientific publications is low compared to other countries and their citations rate also indicates a low quality.
As it is shown in Figure 6, Albania is ranked low when compared to other countries on the quality of institutions. WEF evaluates the quality of institutions based on the absence of corruption, the efficiency of the public sector, cooperation (formal aspects) as well as on norms of corporate governance and behavior (informal aspects). It must be noted that there are significant fluctuations in the given period while other countries have maintained a more stable ranking and this indicates unstableness in Albanian institutions.

![Figure 6 WEF ranking on the quality of institutions (2006-2017)](image)

Source: WEF, 2017

### 6.3 Smart Specialization

The concept of smart specialization is relatively a new concept for the Albanian economy. The concept is defined as the identification of sectors or technologies that can increase the competitiveness of a country in the international arena by providing an advantage (Gulc, 2014). Since smart specialization is part of the initiatives that are taken from the government it can serve as a relevant indicator of institutional failures.

The first event that introduced the notion of smart specialization in Albania was held under an international platform on Western Balkans and took place in 2012 in Tirana under the organization of ARTI. This event aimed to encourage collaboration between the region by basing on the comparative advantage of the countries. The most recent event regarding smart specialization in Albania was a workshop on Research and Innovation in Smart Specialization Strategy (RIS3) in 2016. Representatives of the Ministry of Education, ARTI and Agency for Regional development aimed to develop a national strategy of smart specialization with technical assistance from the European Commission Joint Research Centre (JRC) (S3platform, 2017). Until then, no initiatives
were taken to develop such strategies that would give a competitive advantage to Albania in the region.

After the S3 workshop took place, the Albanian Council of Ministers approved a grant named “Digital Agenda” that aimed to fund the projects on smart specialization. Moreover, other action plans that were developed by the government aimed to develop policies and legal measures that would encourage innovation in booming sectors. However, Albanian economy has been historically dominated by the agricultural sector. Recently, not much work has been done to increase the level of technology in this sector and therefore create an advantage compared to other country-level producers. Additionally, being known for a country rich in resources, Albania is not investing enough in resource extraction and processing technologies (Prifti, 2017). This can be a great area of specialization but it is not getting the adequate attention from policymakers (Prifti, 2017).

6.4 National Strategy

The lack of legislation and policies that encourage and support innovative activity is clearly a relevant institutional failure. In the last decade, emerging economies have acknowledged the role of innovation in enhancing growth and therefore they are putting a strong emphasis on the development of national strategies on innovative activity. Effective initiatives of the government can help to overcome the restrictions of institutional thinness and increase the competitiveness of the country. The first national strategy of innovation in Albania was developed in 2009 by the Ministry of Education and Sport. It was called the National Strategy of Science, Technology, and Innovation (NSSTI) and its implementation would finish in 2015. The strategy aimed to increase the efficiency of the Albanian innovation system and make the economy more productive through these objectives (World Bank, 2013):

- Increase public R&D expenditure to 0.6 percent of GDP by 2015.
- Attract more international donors to fund 40 percent of the expenditure on research through this period.
- Establish four Centres of Excellence in Science (CES) with laboratories that can be utilized for testing and certifications for new firms.
- Increase the number of researchers by encouraging “Brain Gain” initiatives, opening new graduate schools and creating more doctoral programs.
- Increase investments in R&D laboratories for 100 selected companies.

The Albanian government concentrated significant efforts to increase the collaboration with the European Union and other important stakeholders. However, the application of the NSSTI strategy was not effective and this was mainly because of the lack of research capabilities in the country. The lack of human resources, low levels of public funding, inadequate policies and the absence of
infrastructure and researchers were all constraining factors for the implementation of this strategy (World Bank, 2013).

Along with the national strategy, Albania developed other reforms that aimed to improve the research and innovation performance of the economy (World Bank, 2013). An important measure is the enhancement of higher-education autonomy, the reassessment of education standards and the implementation of quality auditing instruments. Additionally, the government focused on the integration of research institutions with universities to augment research activity. Other reforms put an emphasis on human resources, mainly by increasing the interest of youth in science and technology. Thus, policies aimed to improve and expand academic curricula to make it more comprehensive regarding mathematics, science and the use of ICT. The government also created “The Excellence Fund” which is a program designed to support Ph.D. students to finish their studies abroad by providing scholarships.

Relevant measures include also the establishment of a brain gain program which is a collaboration between the Albanian Ministry of Education and the United Nations Development Program (UNDP). This is an ongoing program which started operating in 2006 with the purpose of creating a policy framework that will encourage the Albanian diaspora to participate in the scientific research and economic progress of their home country. This project provided financial support to 137 individuals in a three-year span who returned to the country temporarily or permanently and started contributing in academic institutions. The program is administrated through a special unit which operates under the jurisdiction of MES. In the recent years, the program has not shown to be effective since a high number of students which complete their studies abroad, choose to start a career abroad. In these terms, the government is not providing the right environment for potential researchers to return home by causing in this way a brain drain in the country. This may indicate for a thin institutional structure and injustice in the system which has led young and talented Albanians to seek for better opportunities abroad.

Despite the implementation of a few innovation policies as mentioned above, Albania has shown a low performance in the recent years (Prifti, 2017). Among the most recent legislative developments related to this issue were the changes in existing laws such as the changes in the Law on Electronic Communications in the Republic of Albania, the law on electronic signatures (E-signature), electronic commerce (E-commerce) and others. Over the past three years, there have been no relevant developments in terms of innovation policies, legislation, and concrete measures with economic impact (Prifti, 2017).

6.5 Private Sector R&D

The political framework and the governments’ approach to innovation impact the level of research also in the private sector. Thus, inadequate policies can hinder R&D in the business sector and this can be regarded as a strong institutional failure.
Back in 2008, UNESCO evaluated that 80.8 percent of R&D expenditure was from the public budget, 8.6 percent from higher education institutions and only 3.3% of the total was from the private sector (Erawatch, 2013). The research was concentrated in public institutions, line ministries, and higher education organizations and this is often considered as the key factor that causes low performance in terms of innovation. Recent data shows that Albania is still in the same position exhibiting very low rates of gross R&D expenditure funded by the private sector (Table 3). By looking at the data on private sector expenditure on R&D, it is noticeable Albania clearly lags behind compared to the region and the EU mean. However, the public sector show an advantage compared to the yardsticks and according to Pacinno (2016) this is a result of the policies and initiatives that are undertaken in this sector. To add up, we must admit there might be a limitation of the data since the National Institute of Statistics (INSTAT) in Albania does not regularly gather data in this area and thus, they might not represent the real situation.

Table 3 R&D expenditure

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>MIL. EUR</th>
<th>% OF GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross R&amp;D expenditure in the country funded by the private sector (BERD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albanian mean</td>
<td>0.37</td>
<td>0.033</td>
</tr>
<tr>
<td>Regional mean</td>
<td>1.680,46</td>
<td>0.63</td>
</tr>
<tr>
<td>EU 28 mean</td>
<td>145.381,16</td>
<td>1.13</td>
</tr>
<tr>
<td>Gross R&amp;D expenditure in the country (GERD) funded by the public sector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albanian mean</td>
<td>1.03</td>
<td>0.808</td>
</tr>
<tr>
<td>Regional mean</td>
<td>1.608,50</td>
<td>0.61</td>
</tr>
<tr>
<td>EU 28 mean</td>
<td>87.441,19</td>
<td>0.68</td>
</tr>
</tbody>
</table>

Source: Pacinno, 2016

Albania exhibits a lower share of SMEs compared to the region and the EU but not with a great difference (Table 4). However, the data can be biased since Paccino (2016) conducted interviews with a sample that was represented by innovative companies.

Table 4 Share of innovative SMEs

<table>
<thead>
<tr>
<th>% of total SMEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albanian mean</td>
</tr>
<tr>
<td>Regional mean</td>
</tr>
<tr>
<td>EU 28 mean</td>
</tr>
</tbody>
</table>

Source: Pacinno, 2016

The aforementioned NSSTI program was the only initiative from the Albanian government to encourage innovation in the private sector. The project required strong collaboration between the actors of the innovation system and awareness raising from the government. The absence of these
factors led to the inefficiency of this program as we can see that the figures do not represent an improvement. Additionally, BRIC is also responsible for the coordination of business innovation and other initiatives regarding the private sector. By basing on the indicators above, BRICs measures are also showing to be ineffective. Despite these dedicated programs and initiatives, business R&D is not showing progress and this requires more attention from policymakers. In these terms, it is notable that some policy areas that stimulate business R&D are not being properly addressed. For instance, there are no incentives that encourage the business sector to purchase advanced technologies, perform regular training and operate in international standards (Erawatch, 2013).

6.6 Economic freedom, government integrity, and property rights
Economic freedom is defined as “the fundamental right of every human to control his or her own labor and property” (IEF, 2018). Economically free societies allow the free movement of people, capital and also provide an environment that encourages the generation of innovative activity. The index of economic freedom is a good indicator of the proper functionality of institutions and therefore, it can form a soft institutional failure.

The index of economic freedom is measured based on four pillars: Rule of Law, Government Size, Regulatory Efficiency, Open Markets. These four categories are graded according to 12 quantitative and qualitative variables on a 0 to 100 scale. The countries are ranked as repressed for scores up to 49, mostly unfree for scores 50-59, moderate free for scores 60-69, mostly free for scores 70-79 and economically free countries for scores more than 80. Albania scores higher than Slovenia after 2005 and is classified as a moderate free economy according to IEF (2018) (Figure 7). As we noted earlier this is the year when most reforms took place in Albania and apparently these changes might be somehow correlated. However, in comparison to Estonia, there is no significant improvement in the index of economic freedom in Albania. New policy initiatives and reforms might have impacted the economic freedom but yet, indicators which relate to the stimulation of innovative activity have stagnated as we will see below.

The country scores low in the area of rule of law which represents the influence of the government and laws in the society. This might be inherited from the socialist period and the civil war in 1997 might also have impacted the lack of trust and cooperation between the society and the juridical system. In Albania, limited reforms have been implemented to improve judicial effectiveness, government integrity and property rights (IEF, 2018). There is also a high rate of informal employment in the country despite some recent reforms that were designed to tackle this issue. The low performance of Albania in these indicators shows a discouraging environment for entrepreneurial activity and actions have to be undertaken towards these indicators.
The government integrity index represents the perception of corruption in the country. High corruption rates indicate economic insecurity and instability which leads to a low economic freedom. Figure 8 shows that Albanians consider government corruption as a major problem in the country and even in the recent years the score is significantly lower than Germany. Despite the improvement in the last decades, Albania scores lower even in comparison to Slovenia and Estonia. Systemic corruption in the country, which is more evident in the judiciary system, impacts heavily the government credibility. The Albanian judiciary system is prone to the pressure from politics, oligarchs, and unavailability of resources (IEF, 2018). Despite the recent initiatives such as the vetting reform which aimed to investigate judges and prosecutors capital, no progress has been made in this direction. Corruption may be considered a disease in the system which is affecting every branch of the economy. It results in a lack of meritocracy which restricts talent development and therefore innovative activity. The presence of corruption makes certainly an institutional failure in Albania which is impacting the functionality of the system.
The property rights indicator evaluates the scale of protection towards private property from the country’s laws (IEF, 2018). The higher the score of this indicator, the more protection of property is offered by the country. Protection of property remains still a problem in Albania after the socialist period (Figure 9). Citizens encounter difficulties in obtaining titles to their properties and this threatens ownership which is a key factor to capitalism and democracy. There are insufficient reforms regarding this issue and the institutions that protect these rights are weak (Erawatch, 2013). Such issues impact negatively innovative activity in the country due to the lack of protection of intellectual property and ideas.

Figure 9 Property Rights 1995-2018

![Graph showing property rights index from 1995 to 2018 for Albania, Estonia, Germany, and Slovenia.](image)

Source: Own calculation using data from IEF 2018

6.7 Scientific publications and patents

Scientific and technical journal articles are a good indicator of the research activity that takes place in the higher education. Additionally, it is clear that the number of patent applications reflects the intensity of innovative activity. However, the level of patenting might also lead to wrong conclusions since it is strongly dependent on the application cost, bureaucracy, and accessibility. These two indicators can point out institutional failures in the system and therefore they are worth analyzing.

As it is shown in Figure 10, the number of scientific articles in Albania is substantially lower than the other transition economies of Estonia and Slovenia. These countries have taken a rising trend in the last decade, while Albania seems to have stayed at the same low levels. Since the research activity in Albania is concentrated in public institutions and mainly in universities, the figures indicate the inefficiency of these institutions in producing the necessary output. This situation is a consequence of the lack of funding, researchers and proper R&D centers.
Patenting activity is also weak in Albania as shown in Figure 11 and Figure 12. There were only three patent applications at WIPO from residents of the country in 2011 and in 2016 the amount increased up to 21. However, patent applications from non-residents seem to have been significantly higher with up to 386 in 2005. This indicates high levels of technology transfers from other countries towards Albania but yet, the figures show instability in the number of applications throughout the years. International technology transfer can be a relevant element in emerging economies since they decrease the technology cap. Thus, more initiatives must be directed towards the attraction of international innovative firms in the country by creating a more favorable business environment.
7 Interaction failures

The innovative and economic performance of a country has been traditionally measured by focusing on inputs and outputs. However, interactions between actors in the economy have proven to be a relevant measure of the performance of a national innovation system and they also have an important role in translating inputs into outputs.

Weak interaction failures include the lack of national and/or international cooperation between actors in the innovation systems. The lack of interaction limits the possibilities for knowledge exchange, the diffusion of new technologies and restricts innovative activity. Thus, it is important to analyze certain indicators that show the lack of linkages both nationally and internationally. In 2013, Albania had one of the lowest scores in the world for university-industry collaboration in R&D and was ranked 139th out of 142 countries (Erawatch, 2013). There was limited cooperation between the public and private sector and also between the higher education institutions. Therefore, the government took initiatives such as the NSSTI strategy as mentioned above, which aimed to encourage the collaboration between these actors. However, the implementation of these strategies was slow and additionally, as we saw earlier, the private sector in Albania is not engaged enough in research activities.

Recent years Albania seems to have experienced a substantial improvement in the university-industry collaboration indicator. In 2017 Albania was ranked 69th with a score of 3.4 as shown in Figure 13. Although far from advanced economies, Albania shows significant progress and a better performance in promoting the cooperation between higher education institutions and the private sector. However, these collaborations are mainly public events, conferences, and seminars (Vladi & Agalliu, 2014). There is a lack of collaboration in research which links student and researchers from universities with innovative companies. Such collaborations are more effective for interactive learning and knowledge exchange. A relevant initiative in these terms is the partnership between Deloitte and the University of Tirana which opened in 2015 two Master programmes in close cooperation with Deloitte’s team members and the universities’ lecturers. The program is designed to enhance the development of talents in the field of business IT and auditing by providing the experience of a world leader company.

Figure 13 Score for University-Industry collaboration in R&D, 2017

![Score for University-Industry collaboration in R&D, 2017](image-url)

Source: Own calculation using data from WEF, 2017.
The lack of national or international linkages is an important indicator of interaction failures. Thus, we will look at the share of scientific publication with at least one foreign co-author which shows the degree of collaboration that exists between Albanian researchers and their foreign counterparts (Table 5). It is clear that these partnerships stimulate learning and knowledge exchange and in the case of Albania, this indicator ranks Albania below the regional and EU 28 mean. Since scientific publications in Albania are already low as we saw earlier, the amount of collaborations with foreign researchers shows an alarming situation. Despite the recent initiatives that encourage the international exchange between academics such as the Erasmus Mundus program, the Albanian research system seems to have no significant linkages abroad compared to other countries (Table 5).

<table>
<thead>
<tr>
<th>Table 5 Share of scientific publications with at least one foreign co-author</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Albania mean</strong></td>
</tr>
<tr>
<td><strong>Regional mean</strong></td>
</tr>
<tr>
<td><strong>EU 28 mean</strong></td>
</tr>
</tbody>
</table>

*Source: Paccino, 2016*

Albania has a higher share of firms engaged in collaboration nationally and internationally compared to the region but lower than the EU average (Table 6). As we saw earlier, the share of innovative firms in Albania is low but however, a relevant share of these firms seems to be engaging in collaborations and linkage creation.

<table>
<thead>
<tr>
<th>Table 6 Share of innovative firms with National and International collaborations for Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Albania mean</strong></td>
</tr>
<tr>
<td><strong>Regional mean</strong></td>
</tr>
<tr>
<td><strong>EU 28 mean</strong></td>
</tr>
</tbody>
</table>

*Source: Paccino, 2016*

8 Capability Failures

These types of failures refer to the lack of capacity in the innovation system actors to diffuse new technologies and to generate innovative activity as it was mentioned in the theoretical framework. These capability failures also known as transition failures, restrict the ability of firms to produce and exchange knowledge and therefore their ability to innovate. These failures arise from organizational and institutional thinness and are closely related or derived from the other
aforementioned failures in this study. Due to their relevance in a NIS, we will analyze the availability of research personnel as well as the innovation culture in Albania.

8.1 Research and Development Personnel

It is clear that without R&D personnel, it is difficult for innovative activity to prosper in an economy. The performance of a national innovation system is certainly dependent on the quantity and quality of its research staff. Thus, the availability of researchers is an important indicator when analyzing capability failures in a given country such as Albania.

Data on R&D personnel in Albania is difficult to obtain and this can also serve as an indicator of the situation of the country. It is almost impossible to gather data on researchers not only for the communist period but also in the transition years after the 90s. It is possible to obtain data from the national institute of statistics only for the recent years and as a consequence, this limits the opportunities for a comparison over time. Until recently, these data were not gathered according to international standards.

Human resources that are engaged in research in Albania can be divided into two indicators as the number of R&D personnel and the number of Ph.D. graduates (Pacinno, 2016). The number of R&D personnel includes all staff that is engaged directly on R&D as well as indirectly such as administrative and office staff and managers who supply services to R&D. The indicators show that Albania is positioned significantly lower than the region and the EU in terms of total R&D personnel and new Ph.D. graduates (Table 7). Especially the total R&D personnel shows a low engagement of employees in R&D activity and this is mainly because only a few companies have an R&D department (Pacinno, 2016). By taking into account the small country size, the number of Ph.D. graduates might seem acceptable but yet, it shows to be lower than the region and the EU even in percentage terms.

Table 7 Researchers in Albania

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>ABSOLUTE NUMBER</th>
<th>AS A PERCENTAGE OF ACTIVE POPULATION (PER ONE HUNDRED PEOPLE AGED 15-64 YEARS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total R&amp;D personnel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albanian mean</td>
<td>2892</td>
<td>0,15</td>
</tr>
<tr>
<td>Regional mean</td>
<td>67,609</td>
<td>0,82</td>
</tr>
<tr>
<td>EU 28 mean</td>
<td>3,966,295</td>
<td>1,18</td>
</tr>
<tr>
<td><strong>Total number of new PhD graduates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albanian mean</td>
<td>400</td>
<td>0,02</td>
</tr>
<tr>
<td>Regional mean</td>
<td>2,178,43</td>
<td>0,03</td>
</tr>
<tr>
<td>EU 28 mean</td>
<td>119,713,00</td>
<td>0,04</td>
</tr>
</tbody>
</table>

*Source: Pacinno, 2016*
There are reasons to believe that the low number of researchers is a problem inherited from the socialist period. Until 1991, Albania was considered as one of the most isolated countries in the world, resembling the nowadays North Korea. The curriculum was selected to match the propaganda of the dictatorship and there was no freedom of word. The only researchers were academics and they were forced to follow strict guidelines and their connection with the West was prohibited since they were considered as a threat. Thus, the ability of researchers to access knowledge was restricted and after the 90s, the same few researchers that continued their work were still facing the lack of essential research material. Therefore, development of research started later than in other countries and was mainly in academia.

As shown in Figure 14, Albania has a low score in the availability of scientists and engineers compared to other countries in 2017. As mentioned above, this is also related to the low number of firms that dedicate their departments on R&D activity. According to the World Bank, scientists in Albania are either part of the Academy of Sciences or other public institutions which might confirm the argument that there are no researchers on in the private sector.

**Figure 14 Availability of scientists and engineers, 1-7 (best) - Score, 2017**

![Graph showing availability of scientists and engineers](image)

*Source: Own calculation using data from WEF, 2017*

The low number of researchers and people that engage in R&D in Albania is strongly affected by the Brain Drain which has been a rising phenomenon in the country (Erawatch, 2013). During the past transition decades, almost half of the intellectuals, researchers, and professors who studied abroad decided to stay outside the country and this was mainly because of the lack of research infrastructure, career opportunities and poor living conditions (World Bank, 2013). In the 1990s, the University of Tirana lost nearly half of its academic personnel, of which 90 percent were under 40 years old (UNESCO, 2007). Another estimation is that 2000 to 4000 students leave the country each year to continue their studies abroad and this is a threat to the human capital in Albania. Despite the government initiatives such as the NSSTI strategy which aimed to double the number
of researchers through the “Brain Gain” program, Albania continues to lose significant shares of students and academics from immigration.

8.2 Culture

Cultural and social factors are definitely important elements of a system that provide a strong foundation which supports interactions among actors and the continuity of innovation activity. An efficient innovation framework requires a sustainable innovation culture and therefore, we will look at this important aspect in the Albania context.

A set of cultural values that embraces risk puts an emphasis on job creation and has a strong interest in creating new things is an essential element in promoting innovation and entrepreneurship. This innovation culture is an important pillar of the society that affects positively multiple other elements and helps to build a cohesion between innovation actors to create. According to the Global Entrepreneurship Index, Albania was ranked 76th based on cultural support, risk acceptance and opportunity perception (Figure 15). The figures indicate a high-risk aversion among investors and a generally weak entrepreneurial culture. However, the young generation has been showing an increasing interest in entrepreneurship and this mainly because of the high rates of unemployment (ITU, 2016). Additionally, migration is also seen as a solution to unemployment but not a sustainable one and therefore, these factors are contributing to the growth of entrepreneurial activity. There is an ambition among the youth to engage in these activities but yet, certain characteristics are restricting the spread of innovation culture in the country. In addition to the aforementioned aspects treated in the Global Entrepreneurship Index, the lack of collaboration among institutions that we saw in interaction failures is also a restraining factor.

Figure 15 Global Entrepreneurship Index, Albania

Source: GEI, 2016
In 1991, after the communism fell in Albania, an entrepreneurial culture prevailed in the country (Nientied & Karafili, 2016). However, this culture was not encouraged by the government which was characterized by high rates of corruption and bureaucracy, as well as by the unfair competition in the market. Entrepreneurs had to figure out informal and illegal ways such as bribing to support their initiatives. Consequently, resources were allocated to unproductive activities which threatened entrepreneurial activity. Such issues are still present in Albania, as we saw in the institutional failures.

9 Discussion

The purpose of this study was to determine the limitations of national innovation systems in transition economies by taking evidence from Albania. This country represents a perfect example of a transition economy which has shown interesting patterns and is struggling in building an efficient NIS. Therefore, we consider this case study as a relevant contribution to the field.

As discussed in the theoretical framework, organisational thickness/thinness denotes the presence or absence of research organisations, universities, firms and support organisations (Trippl, et al., 2015). On the other hand, institutional thickness/thinness refers to formal regulatory institutions and informal institutions such as innovation culture, values, and norms.

Based on our findings in this study, Albania can be defined as a thin system both institutionally and organisationally. Despite having a modern and decentralized governance structure, R&D in Albania is concentrated in the public sector and mainly in universities. Higher education institutions are evaluated as the most productive among sectors in Albania (World Bank, 2013) but, as we saw in our analysis, the number of scientific publications is significantly lower than other countries. Additionally, there is a low school enrollment ratio and population that has completed tertiary education despite the high number of public and private universities. Among other, a tentative argument for the lack of productivity in Albanian public organisations would be the low R&D budget as we saw earlier. Moreover, another indicator of the organisational thinness is the lack of R&D activity in the private sector. The share of innovative firms is quite low and business R&D expenditure is almost half the rate of the regional mean.

Albania is characterized by a low quality of institutions based on both formal and informal aspects as we saw using the data from WEF (2017). The low level of government integrity might be one of the main reasons for the institutional thinness of Albania. Corruption decreases investment incentives, encourages inappropriate government spending and lowers tax revenue. However, one of the most important drawbacks that corruption causes in innovative activity is the misallocation of human capital. Corruption creates a lack of meritocracy in the system which has a negative impact on talent development. Regarding informal institutions, we saw earlier that there is a lack of innovation culture in Albania based on the GEI indicator. However, more research has to be
conducted in this field, in order to evaluate the norms of behavior, corporate governance etc. in Albania.

An important aspect to be discussed in the case of Albania is the allocation of R&D institutes to universities. Examples from other countries such as Estonia have shown that this is an effective action for different reasons (Tartes, 1999). Firstly, students can get more involved in research activity and this increases the attractiveness of universities. Consequently, there will be higher enrollment rates and an increase in the quality of education. Secondly, by allocating research centers to universities there are more opportunities for collaboration between students and the private sector and research will be more orientated to the market needs. Therefore students will be more connected to the industry and research will be more applied. Lastly, R&D centers in universities can create important linkages between the public and the business sector which will result not only in more efficient innovations but also in better policy frameworks and a supportive environment for the business to thrive. However, we saw earlier that this effects did not take place in Albania. Enrollment rates are low and also the score for university-industry collaboration is one of the lowest in the region. This might be a consequence of the low funding which leads to an insufficient infrastructure to support effective research activity in universities. Additionally, another reason might be that the positive effects of allocating R&D institutes to universities might take more time to become visible.

An important action that the Albanian government has failed to take, is the support of private sector to engage in R&D. This is typically a characteristic of socialist economies which differentiate R&D from enterprises and contribute to institutional failures. Despite the NSSTI program which was mentioned earlier, no initiatives have been taken to promote research in the business sector. The solution to this failure might be the creation of governmental bodies which are designed to support and encourage research in this sector.

Geographical proximity might also be a restraining factor to the Albanian NIS. Being located in a lagging behind region such as Balkans certainly does not have a positive impact on innovation in Albania. However, this is not considered a system failure. An important failure of the government is taking advantage of the country strategic location to encourage international trade. Although located far from advanced economies, Albania serves as a bridge between Northern and Southern Europe and also as a transit corridor between western Mediterranean countries with Asia. Trade encourages innovation through spillover effects, technology transfers as well as by exposing domestic firms to international competition. Thus, Albania can take advantage by eliminating trade barriers to make the country more attractive to international enterprises and investors. Joining the European Union can also have a positive impact on this perspective but also in the receipt of funds, support, and guidance which would improve not only the NIS but also the economy in general.

Linkages between the public and private sector are also an important element for effective NIS. In socialist economies, there was a strong separation between R&D institutions and firms. The former decided what to produce while the latter performed the production activities. A step towards the
creation of linkages and the overcoming of interaction failures is the integration of R&D centers into universities. However, despite the improvement that Albania has shown, it is ranked as one of the lowest for university-industry collaboration, as we mentioned earlier. Moreover, international linkages are also a crucial element in NIS. Therefore, more attention has to be paid to international exchange programmes for both academic staff and students in Albania.

Smart Specialization must also be in the focus of policymakers. Since Albania is not a country rich in resources to support NIS, concentrating the factor of production in those sectors where they have more capabilities might give the country a competitive advantage.

Lack of economic freedom might be one of the most serious drawbacks not only for the Albanian NIS but also for economic progress. As we decomposed in our analysis, the lack of government integrity is one of the main systemic failures in Albania. This phenomenon is possibly inherited from the communist period since it is a characteristic for those type of countries.

An important issue for the analysis of innovative activity in Albania is the lack of data. Since you cannot improve what you cannot measure, the lack of data on innovation must become a main concern for the respective authorities. From the national institute of statistics (INSTAT), it is possible to obtain data only for the recent years and their quality is debatable since the gathering is not done according to European standards. Studies on innovation in Albania are done only in the firm level and therefore they do not present the full picture of the situation of the Albanian NIS. Thus, there should more work in reporting the data from research institutes and collecting it form statistical centers. Lastly, in Albania, more research has to be conducted for innovation activity in the macro-level.

10 Conclusions

Albania is a transition economy in the western Balkans which has shown interesting patterns in the last decades. Despite the stable economic progress, the country has shown no significant progress in innovative activity. Therefore, this study has examined what characteristics of the country represent its systemic failures which hinder the development of the Albanian NIS. The paper considers Albanian socialism as soviet-type since its model of governance was the same as these countries.

In this study, we saw that certain particularities of transition economies are inherited from socialism. First, we identified that there is a lack of infrastructure to support R&D activity. Secondly, there is lack of collaboration and links between the private and public sector. Thirdly, there are low levels of both public and private funding for R&D activity. Fourthly, we identified a lack of capabilities such as research personnel and entrepreneurial culture. Lastly, another particularity of socialism is the lack of research activity in the private sector. However, despite these characteristics which are all present in the Albanian NIS, there are certain system failures
which they have managed to defeat. Such action is the decentralization of the NIS governance system and the allocation of R&D centers to universities. The main findings on the limitations of the Albania NIS in this paper are presented below.

We saw that the ICT infrastructure in Albania is still undeveloped with only a low share of the population that has access to the internet and few internet servers. Albania still relies on traditional methods of obtaining information and this is affecting knowledge exchange. Despite the high number of universities for the country’s size, there are low enrollment rates and population with completed tertiary education. Albania clearly lags behind in providing a strong ICT infrastructure for both the public and private sector. Additionally, not enough emphasis is being put on smart specialization from government initiatives. Despite recent workshops, no significant progress has been made in this direction.

The NIS governance structure in Albania has been centralized and the Academy of Science plays only an advisory role. This structure has shown to be efficient but certain factors can limit its effectiveness. Such factors are the lack of economic freedom and government integrity which are strongly present in Albania. Moreover, despite the good institutional structure to support innovation activity, there is a low engagement of the business sector in R&D. This is a particularity of socialist economies which has been inherited in Albania. Government initiatives have not focused adequately on this failure and in addition, firms are not exposed to international competition.

Linkages between the public and business sector are also absent in Albania. Interaction failures form a crucial hindering factor for the Albanian NIS due to the strong separation between universities and the industry. Despite the allocation of research centers to universities, there is a lack of collaboration and a rupture between the two sectors.

Lastly, there is also a presence of capability failures in Albania. In addition to the significant lack of research personnel, innovation culture is also absent in the country. Entrepreneurial activity is being hindered by malfunctions in the system such as the lack of government integrity and not enough emphasis is being put on the promotion of an entrepreneurial culture.

Albania represents certainly an interesting case in the group of transition economies. This study aimed to provide insights in the NIS that are contributing to its systemic failures. We hope that these findings will help to understand weak points in the system which require intervention. Consequently, our findings aim to contribute to the transformation of the Albanian NIS into an efficient and modern system. However, more research has to be conducted on innovation activity at the macro level in Albania.
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