



Research Article

© 2023 Teuta Xhindi, Ermela Kripa & Mauro Gianfranco Bisceglia
This is an open access article licensed under the Creative Commons
Attribution-NonCommercial 4.0 International License
(<https://creativecommons.org/licenses/by-nc/4.0/>)

Digital Innovation in Small and Medium-sized Enterprises: A comparative analysis between Albania and EU countries

Teuta Xhindi

*Faculty of Engineering, Informatics and Architecture, European University of Tirana,
Albania*

Ermela Kripa

*Department of Economic and Entrepreneurship Sciences, Catholic University 'Our Lady of
Good Counsel', Albania*

Mauro Gianfranco Bisceglia

Faculty of Economics and Finance, Aldo Moro, Bari Italy

DOI: <https://doi.org/10.2478/ajbals-2023-0005>

Abstract

Innovation has always been one of the drivers of competition and for the long-term success of companies. The implementation of new digital technologies stimulates the development and acquisition of new skills, competences and knowledge, which are relevant factors in companies' innovation activities, especially in SME's.

Albania stays between the first 10 European Countries where its citizens take 95% of public services online. Also, Albania is the first country not only in the region but also in Europe to have a dedicated law for the development of start-ups. The study purpose is to present a comparative analysis for the level of digital innovation for EU Countries and Albania.

The research question is: Are there differences between Albania and European Countries regarding the Key indicators of Digital Economy and Society Index?

We have conducted a review of the literature and a secondary data analysis. This study has a descriptive nature, and its main contribution is to present the comparative results between EU Countries and Albania regarding digital innovation. The results show that there are differences between Albania and European Countries regarding these indicators.

Keywords: Digitalization, innovation, SME, human capital, ICT.

1. Introduction

Nowadays, consumers are keenly aware of the profound shifts occurring on both technological and social fronts. A more globalized and interconnected world has significantly impacted society and the economy over the past two decades. This change can act as an exceptional drive towards innovation and technological progress, obviously creating new problems and challenges along the way.

Facing challenges and difficulties that derives by global changes is not easy, especially for small and medium-sized companies that need careful and accurate planning to manage the various risks they face.

In many countries, especially in some non-EU such as Albania, most of the working class still refuses to adapt to this process of evolution towards the adoption of these new tools and devices that strengthen the organization in which they work and that could even determine their future.

Not keeping up with the latest trends and technological advances can lead to disastrous results, which will obviously produce negative effects on the economic and social context.

For this reason, our work focuses on the main opportunities and challenges that Small and Medium Enterprises (hereinafter SMEs) in the EU and non-EU region are facing in a process of digital transformation, or rather innovation.

Also, as part of Berlin process, it is necessary to advance inclusive regional mobility and catalyzing mobility - driven innovation and knowledge transfer for six Western Balkan countries (WB6).

This emphasis arises because scientific research, innovation, and the transfer of knowledge & technology are considered a priority for the sustainable economic development of Balkan nations. Considering the social and economic developments in the region and concerns about brain drain, fostering regional cooperation is vital. Moreover, of imperative importance is the collaboration between institutions in the region with those in the EU, which could potentially lead to talent recruitment from the region, diaspora, or even the EU. In the pursuit of progress, it is crucial that nations come together to nurture innovation and facilitate the flow of knowledge across borders.

Our destinies are interlinked, and our prosperity relies on our ability to collaborate and empower each other through the sharing of knowledge and innovation.

To advance research and innovation collaboration between the WB6 and the EU, it is necessary for WB6 countries that first to strengthen the regional cooperation and to address the need for more mobility programs in the region which are based on long-term results.

To fully understand the topic under investigation, it may be useful to start from a detailed description of what Innovation is and how SMEs are classified under the EU regulation. In our study, we have taken inconsideration EU countries and Albania, traditionally characterized by a large prevalence of SMEs. This work will focus on SMEs since it is the type of company that faces the biggest problems and challenges in terms of innovation.

2. Literature review

The word “innovation” derives from the Latin verb *Innovare*, which means to renew. Innovation means improving or replacing something, such as a process, product, or service. In the context of companies, innovation definition is suggested by the US Advisory, Committee on Measuring Innovation which defines innovation as:

“The design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational structures or business models for the purpose of creating new value for customers and financial returns for the firm.”

Value creation is a distinctive feature of innovation. Finding ideas is relatively easy, fast and cheap, but then those ideas must be realized. This is where companies often fail, not providing the level of time and budget required to take a rough idea, refine it, experiment with it, and ultimately turn it into a real solution. Innovation it’s all about the customer’s perceived value: if the customer doesn’t perceive the changes as having value, then they won’t be forced to buy them. According to Skillikorn (2022) innovation is considered as a matter of value perceived by the customer. Organizations have several options to increase their competitiveness: they can choose the price leadership or a differentiation strategy. Companies that choose price leadership strategy must ensure their long-term competitiveness by developing innovative and highly efficient processes. Companies that use differentiation strategy need innovation for developing unique distinguishing features from their competitors. Continuous innovation is, therefore, fundamental for all companies. The main difference lies in the innovation strategy adopted, which varies greatly from company to company.

Numerous studies and publications of recent years show that innovation has always been one of the drivers of competition and has always been a primary competitive dimension, and this makes innovation one of the most important drivers for the long-term success of companies (Jens-Uwe Meyer, 2014). The literature also indicates that there is considerable evidence of the direct contribution of workforce, managerial and marketing skills to innovation, although the literature on SMEs specifically is relatively limited (Leiponen, A. et al., 2005). From the company’s point of view, this process of adapting to environment changes is called strategic management (Garengo et al., 2005). Business performance can be approached from many perspectives, e.g., from an internal (company) or external (environment) perspective. In other words: companies shape their own destiny or are victims of changes in their environment. Now, solid performance is favored over company growth and is the most important pilaster in strategic management and entrepreneurship research. According to (Baldwin & Gellatly, 2003), there is an obvious positive link between innovation and business performance. The link between innovation and business performance of SMEs is only now beginning to attract attention. So far, studies have shown that innovative companies succeed when they align multiple innovations with value-creating outcomes for customer groups. SMEs are fundamentally different from large companies in innovation. This research assumes that innovation is a solid antecedent of business performance (Rhee et al., 2010). However, SMEs usually have

some drawbacks when it comes to innovation compared to large companies. These include, for example, customer dependency and lack of resources such as knowledge, skills, training, networking and finances. Despite these constraints, SMEs usually have a high innovation potential, because they try to ensure success with their fundamental resources such as innovative technology. SMEs have a greater capacity for personalization and can quickly learn and adapt routines to improve performance (García-Morales et al., 2007). Laforet and Tann (2006) found that SME innovation consists mainly of developing new ways of working and incremental product innovations. According to Forsman and Rantanen (2011), incremental innovation in SMEs affects all types of innovation: products, services, processes, production methods and modes of action, while radical innovation usually refers to products, services and modes of action.

In recent years, innovation, especially innovation in technology has received great attention in business as a strategic way for resilience. Monge and Soriano (2023), after reviewing 119 articles published in the WOS over the period 2018-April 2022, provide the most complete and up-to-date review of digitalization from a global perspective, summarizing the current state of knowledge within an integrated framework. Ndesaulwa and Kikula (2016) have considered technological innovation as a major force in economic growth and are focused on some of the most distinctive features of innovation in the highly industrialized economies of the OECD area.

Although the innovation is seen as a driver for economic growth, it is not certain if digitalization and other innovations will lead to full employment or to a long-term mass unemployment (Arsic, 2020). This author adds that “the employment will depend on the speed of adjustment of education system to technological changes and labor market requirements, as well as on the possibilities for vocational education and change in qualifications”.

Finding a digital solution is considered to increase profitability and efficiency. According to *Developing People Globally*, 57% of office workers spend one hour per day searching for documents, which is a significant amount of wasted time. By moving to an electronic document management system (EDMS), the business can improve data quality, increase operational efficiency, standardize inspection checklists, can get real time data, can improve collaboration both internally and externally using web digital tools and workflows, can reduce costs, can improve security and this system improves the ability to properly backup all content (Melo, 2020).

Moreover, a survey conducted with more than 1000 employees in the United States revealed that employees spend, on average, at least two hours a day (25% of their work week) looking for the documents, information or people they need to do their job (Corrigan, 2022).

Another problem in digital sector is gender gap. The distribution of ICT specialists in 2021 in the EU is 81% men and 19% women (Eurostat 2022). Following this, the European Commission set out the 2020-2025 gender equality strategy, which address gender gap, gender pay gap and pension gaps.

The role models positively impact women’s interest in STEM fields (González-Pérez

et al., 2020). Also, the mentorship programs are found to boost women's confidence in engineering (Wu et al., 2022). More specifically, the studies find that, as compared to male peer mentors, it is female peer mentors who positively impact the confidence and the sense of belonging among first year college students in engineering (Dennehy & Dasgupta, 2017).

Consequently, to reinforce the sense of belonging to STEM among female students and the belief that persistence and hard work are fundamental for a successful STEM career, the Higher Education Institutions (HEIs) should implement role model interventions, by organizing regular sessions in person and online with successful women in STEM. The HEIs should simultaneously introduce peer mentoring, especially for the first-year college students in STEM.

Educational events like Students Competitions and Hackathons are another successful way of increasing students' interest and persistence in STEM (Gumina, 2017).

The primary objective is to bolster the capacities of Higher Education Institutions in implementing up-to-date STEM curricula through established contemporary strategies. Additionally, it aims to learn and deploy EU good practices to increase diversity across all STEM disciplines.

Thus, each HEI should have a Gender Action Plan in place so that gender equality issues in college education with specific focus on women as well as other marginalized groups will be addressed.

To challenge the prevailing social norms, the HEIs should also design and implement affirmative measures to create inclusive environments for everybody. One effective approach to achieve this goal would involve creating scholarship schemes that implement positive discrimination in favor of women and students from non-majority communities. These students would then derive significant benefits from these support initiatives.

Furthermore, institutions should establish policies that address the specific needs of student parents, both within and outside the classroom environments.

3. Types of innovation and legal framework related to it in Albania

Companies use modern ideas management software and innovation management software to manage innovation efficiently.

In the context of enterprises, there are different types of innovation according to Zapfl (2016):

- *Process improvement and organizational innovation*: process improvement through continuous improvement and the development of new solutions;
- *Product development*: the development of innovative products or product features;
- *Service innovation*: the creation and introduction of new services for customers and partners;
- *Business model innovation*: the development of innovative business models and new revenue flows;
- *Digitalization and digital transformation* also require companies to rethink and

develop new approaches. Innovation management methods are as diverse as the types of innovation;

- *Innovation processes*, with which developments are guided by a clearly defined procedure through different stages and levels;
- *Open innovation and customer co-creation*: methods that integrate customers directly into the development process;
- *Innovation labs*: business units where employees work on developing innovations outside of day-to-day business;
- *Innovation challenges*: competitions in which employees are asked to contribute solutions to overcome a company's challenges (OECD, 2010).

It is essential to select the right tools for innovation projects and build the culture of innovation to increase a company's innovation capacity.

The Government of Albania has for years prioritized the strengthening of the legal framework and institutional in relation to business development and investment, aiming simultaneously and harmonization of this national legal framework with the international one.

Scientific research and innovation have a wide range of action and intertwined with several areas, and for this reason is drafted *The National Strategy for Scientific Research, Technology and Innovation (SKKSHTI) 2023-2030 at the conclusion of the 2017-2022 cycle of SKKSHTI*. This document is conceived as an umbrella strategy, which it will contain the most important objectives for meeting political goals in the scientific research field, technology and innovation under the direction of the Ministry responsible for Education and Scientific Research.

In 2022, Albania signed the Horizon Europe Association Agreement, which underlines the importance it will play in the future, the cooperation in the field of research and innovation and the transformative power of scientific research policies and innovation in accelerating reforms in the field of research and innovation, digitalization, green economy and technological developments.

In terms of innovation, creating a favorable ecosystem for start-ups has become a priority for Albania. In 2022, the law on innovation dedicated to start-ups was adopted, which provides for a division of the state budget in support of the innovation ecosystem. Numerous initiatives supported by the private sector, offering acceleration programs for high-potential start-ups, technical assistance, mentoring and investor relations training have been established (OECD, 2022). Referring to the Economic Reform program 2023-2025, the estimated budget for the reform of start-up ecosystem in Albania, from the state budget, is 10 million EUR, distributed in a time length of 4 years in the form of grants for start-ups and facilitators of the ecosystem (Council of Ministers, 2023).

The Government of Albania has made a priority to strengthen the legal framework and institutional in relation to business development and investment, considering specifically two guidance documents:

- 1) The Small Business Europe Act (EC 2008) and

2) SMEs Strategy for a Sustainable and Digital Europe (EC 10 March 2020).

The European Union (EU) has long recognized the crucial role of SMEs and innovation as drivers of economic growth, job creation, and competitiveness. Throughout the years, various initiatives, policies, and funding programs have been designed and implemented to support SMEs and foster innovation in member states.

There are many activities undertaken by the EU in relation to innovation and SMEs. We can mention some of them:

- The Horizon 2020 programme;
- EU program for SMEs, COSME, specially designed to support SMEs in their growth and competitiveness;
- In March 2020, the EU launched the EU SME Strategy (European Commission, 11 March 2020).

In conclusion, we can say that countries can unlock the full potential of SMEs as drivers of innovation and fuel sustainable economic growth by addressing challenges, fostering supportive policies, and creating an enabling ecosystem.

4. Data analysis for the SME and innovation for Albania and European countries

Small and medium-sized enterprises (SMEs) are the bedrock of our country's entrepreneurial landscape. In Albania, there are 103,857 SMEs out of a total of 104,031. In both Albania and EU countries, SMEs make up approximately 99.8% of all active enterprises, as shown in Table 1. The most recent publication by INSTAT Albania regarding the innovation activities of enterprises covers the period from 2018 to 2020. According to this publication, 36.6% of the observed enterprises with 10 or more employees are engaged in innovation activities. Innovation activity is more prevalent in the service sector compared to the industrial sector. Additionally, large enterprises with over 250 employees exhibit a higher innovation activity rate at 68.2%. Thus, it can be said that innovation is still underdeveloped among small and medium enterprises in Albania. This is further evident in the analysis of the use of digital innovation among Albanian SMEs using the DESI data.

According to the Digital Economy and Society Index (DESI), created by the European Commission to gauge the progress of European countries in terms of digitalization in their economies and societies, the 55% of small and medium-sized enterprises have achieved at least a basic level of digital technology adoption while in Albania data on the level of digitalization among SMEs are not available. In Albania, 24.8% of enterprises utilized customer relationship management (CRM) software in 2021, up from 22.5% in 2020. Whereas in EU countries 34% of SMEs used CRM systems in 2021.

Before analyzing the level of innovation among SMEs in Albania, it is important to clarify how they are legally classified. The criteria used for categorizing SMEs are consistent between the EU countries and Albania, but the specific values for these criteria result in differing classifications for SMEs in Albania compared to those in

the EU.

For example, in Albania an enterprise with less than 10 employees, with an annual turnover or balance sheet below 10 million ALL (proxy, 95 thousand euro) is considered a micro-enterprise. Meanwhile, for EU countries a micro-enterprise is considered an enterprise with less than 10 employees and an annual turnover or balance sheet below €2 million.

In Albania, the classification of enterprises in micro, small and medium is done according to Article 4 of Law No. 43/2022, "On the development of micro, small and medium enterprises",

For statistical purposes, enterprises are classified into:

- a) microenterprise: 0 to 9 people;
- b) small enterprises: 10 to 49 people;
- c) medium enterprises: 50 to 249 people.

The table below presents the comparison results between Albania and 27 EU countries (2021), regarding:

- 1) the number of enterprises (in %); 2) the number of employees (in %); 3) the added value (in %);

Table 1: The comparisons between Albania and 27 EU countries regarding the number of enterprises, the number of employees and the added value in 2021.

Type of the enterprise	Enterprises (%)		Employees (%)		Added Value (%)	
	Albania	EU*	Albania	EU*	Albania	EU*
All	100	100	100	100	100	100
SME (1-249 employees)	99,8	99,8	81,6	64,4	76,1	51,8
Microenterprise	93,2	93,0	36,9	28,5	22,9	18,3
Small enterprise	5,4	5,9	21,4	20,0	27,0	16,7
Medium enterprise	1,2	0,9	23,3	15,9	26,2	16,8
Big enterprise (250+ employees)	0,2	0,2	18,4	35,6	23,9	48,2
* 27 countries						

Source: INSTAT (2021), Statistics about SME, available at: <https://www.instat.gov.al/media/11355/rezultatet-e-nvm-2021-1.pdf>

From table 1, the percentage of SMEs in Albania and EU countries is equal, while there are differences in the percentage of the employees that are engaged: 81.6% in Albania and 64.4% in 27 EU countries. In general, SMEs face many challenges and threats and have limited number of resources to address these challenges. From the employment point of view, microenterprises represent the biggest source of occupation both in Albania and EU countries, respectively 36.9% and 28.5%.

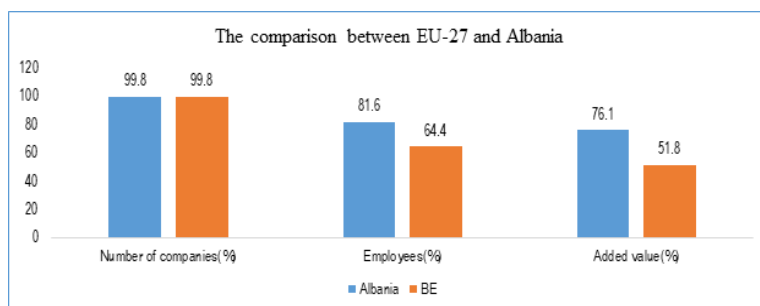
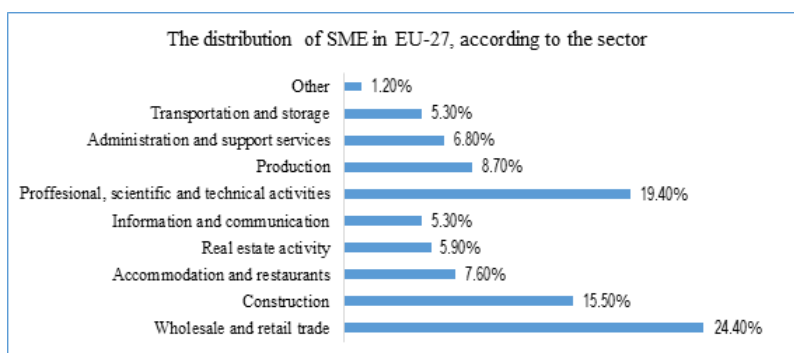


Figure 1: The comparisons between Albania and 27 EU countries regarding the number of enterprises, the number of employees and the added value in 2021. Source: Eurostat (2022) and Instat (2022)



The figures 2 and 3 below, present respectively the distribution of SMEs in EU-27 and Albania, divided by sector.

Figure 2: The distribution of SME in EU-27 by sector

Source: Eurostat 2022

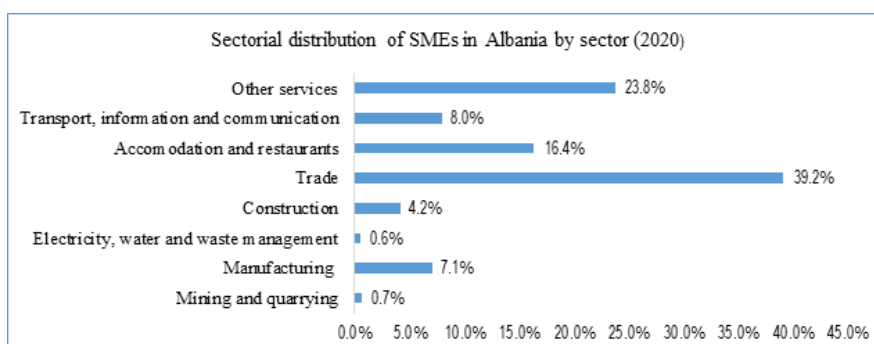


Figure 3: The sectorial distribution of SMEs in Albania by sector (2020)

Source: SME Policy Index: Western Balkans and Turkey 2022: Assessing the Implementation of the Small Business Act for Europe; <https://www.oecd-ilibrary.org/sites/d22fdb37-en/index.html?itemId=/content/component/d22fdb37-en>

Comparing figures 2 and 3, we notice similarities in the sectors: trade; manufacturing/production and transportation, information and communication. But it is worth noting that the sector professional, scientific and technical activities do not exist in Albanian case.

Innovation has been identified as a strategic driver to penetrate to the competitive market to improve resilience. In fact, innovation capacity is the most valuable and inevitable knowledge-based intangible resource for the survival, competitiveness and long-term sustainability of enterprises. Benjamin Talin, the founder and CEO of the MoreThanDigital, defines the innovation as “The process of taking something that already exists and making it better – whether it’s a product, a service, or even a process”.

Digitalization has become an emergency after the COVID-19 outbreak and is a long-term investment that helps enterprises to take advantages against competitors. Since 2014, European Commission publishes Digital Economy and Society Index (DESI), which show the progress that each member state has made towards the key indicators as well as areas requiring priority action by member countries.

The Key Indicators considered are human capital, connectivity, integration of digital technology and digital public services.

Regarding DESI 2022, Table 2 contains the list of digital targets and key performance indicators (KPIs) that the European Commission proposed to contribute to strengthening Europe’s digital capacities and competitiveness.

Table 2: DESI 2022 dimensions and indicators related to the targets of the Path to the Digital proposal.

DESI Dimension	Indicators related to the Path to the Digital Decade proposal
1 Human capital	At least basic digital skills
	ICT specialists
	Female ICT specialists
2 Connectivity	Gigabit for everyone (Fixed very high-capacity network coverage)
	5G coverage
3 Integration of digital technology	SMEs with a basic level of digital intensity
	AI
	Cloud
	Big data
4 Digital public services	Digital public services for citizens
	Digital public services for businesses

Source: DESI 2022 results

The comparative analysis that we will do below on the level of SME digitization in

Albania and EU countries will be based on the indicators in the table above.

5. Research Methodology and Comparative analysis between DESI 2022 results and Albanian data for each indicator

In this article, we have used secondary data from Instat Albania, SME Policy Index, Eurostat, DESI, in order to perform a quantitative comparison between Albania and EU countries. In this comparison, we have met the research criteria that has been used in prior and comparable studies.

The analysis of secondary data for Albania and EU countries yielded some interesting results pertaining to the importance these indicators have regarding the level of digital innovation development for SMEs. The indicators considered regarding digitalization are: Human capital, Connectivity, Integration of digital technology, Digital public services. After analyzing these indicators, we had some unexpected results for Albania. For example, regarding the *digital public services indicator*, Albania has a higher value than EU countries. In EU countries the *Digital public services* use for citizens and *Digital public services* use for businesses scored at 75% and 82%. Meanwhile in Albania, 95% of all administrative services are available online for businesses and citizens.

The results and findings from this analysis, led us to the conclusion that noticeable differences exist between Albania and European countries, particularly in the dimension of human capital. Top of Form

In the section below we have done a comparative analysis for each indicator.

a. Human capital – digital skills

According to Albania Report 2022, by European Commission, Albania's economy showed resilience during the COVID-19 pandemic. During 2013-2018, the average of the real GDP growth was 2.7%. Following a decrease of 3.5 % in 2020, then a stronger-than-expected economic recovery pushed real growth of GDP to 8.3 % in 2021.

Regarding the digitalization, this process was relatively fast in Albania. The process officially started in 2011 but experienced a revolution around 2017. Albanian Government have seen digitalization and innovation to fight corruption. Albania stays between the first 10 European countries where its citizens take 95% of public services online and free.

But regarding the data, how does Albania stand in comparison to EU countries regarding the Human Capital indicator?

Human Capital indicator, is based on some other sub indicators which are:

1. The percentage of people aged 16-74 that use internet regularly;
2. The percentage of people that have at least basic digital skills;
3. The percentage of enterprises that have ICT specialists;
4. The percentage of ICT specialists that are women;

Below are presented the data about each sub indicators in EU countries and in Albania.

In EU countries, while 87% of people (aged 16-74) used the internet regularly in 2021, only 54% possessed at least basic digital skills. The Netherlands and Finland lead the list, while Romania and Bulgaria are the worst performers. Even though most jobs in the EU require basic digital skills, a considerable part of the population still doesn't possess them. According to the proposed 2030 target of the Path to the Digital Decade, at least 80% of citizens should have at least basic digital skills by 2030.

In Albania, based on results of the survey about the use of information and communication technology in 2021, 79.3% of people (aged 16 – 74) use the Internet, of which 91.7% use it every day (Instat, 2022).

Albania ranks last in Europe with the lowest percentage of people aged 16 to 74, who have at least basic digital skills. The latest data demonstrate that only 24% of the population in the country has basic technological skills.

ICT specialists are highly required as there is a general shortage on the EU labor market as the number of vacancies keeps growing. In 2020, 55% of enterprises that recruited or tried to recruit ICT specialists reported difficulties in finding proper candidates to fill the vacancies.

Meanwhile in Albania, during 2020, the percentage of enterprises that have specialists in the field of information technology and communication was 28.2%, from 23.4% in 2019.

In EU countries, there is also a severe gender balance issue, with only 19% of ICT specialists and one in three sciences, technology, engineering and/or mathematics (STEM) graduates being women.

Although in Albania there are no data about the percentage of female ICT specialists, women working in ICT include those with and without technical education and background. So, a considerable part of women is not actually employed in technical/technological positions within these companies, but in other core roles such as human resources, accounting and marketing.

Moreover, the call center sector is also included in ICT. The employees in this domain are primarily women, mostly low-paid and low skilled.

Regarding the data about the number of women graduates in STEM, the figures are satisfactory in natural sciences, mathematics and statistics but more needs to be done in the field of ICT and engineering.

Specifically, during the academic year 2020-2021, 38.4% of graduates in the field of ICT were women and 61.6% were men, while the percentage of women's graduates in natural sciences, mathematics and statistics is 76.2 compared to 23.8% of men. In the field of engineering, manufacturing and construction, the data about men and women are respectively 64.4% and 35.6%.

STEM is a male field: women's confidence to pursue a career in STEM is undermined at an early age.

Table 3: The data about the Human Capital indicator in Albania and EU countries, in 2020-2021.

Human capital		EU-27	Albania
	Regular use of the internet (aged 16-74)	87%	79.30%
	At least basic digital skills	54%	24%
	ICT specialists	55% of enterprises report difficulties in recruit- ing ICT specialists	28.2% of enterprises have specialists in the field of ICT (2020)
	Female ICT specialists	19% of ICT special- ists are women	There are not data

Source: DESI results and Instat

b. Broadband connectivity

While the EU has full coverage of broadband, only 70% of households can benefit from fixed very high-capacity network (VHCN) connectivity with the potential of offering gigabit speeds. In the DESI reports, fixed VHCN includes FTTP (fibre-to-the-premises) and cable DOCSIS 3.1 (data over cable service interface specification) technologies. FTTP coverage grew from 43% in 2020 to 50% in 2021, while DOCSIS 3.1 coverage increased from 28% in 2020 to 32% in 2021. Rural fixed VHCN coverage also improved from 29% in 2020 to 37% in 2021. However, a large gap between rural and national figures remains present.

Moreover, 5G coverage also went up to 66% of populated areas in the EU in 2021. Meanwhile, the percentage of Albanian families that have access to the Internet is 88.3% in 2021, compared to 83.3% a year ago. In Albania, in 2021, fixed internet broadband penetration covered 559.394 subscribers (508.254 household subscribers and 51.140 businesses), which is a 10 % increase from 2020. The penetration rate was about 20 % of the population with 58.7 % of the households being covered.

Also, in Albania, the data show a relatively low rate of Internet penetration through fixed networks in urban areas on average 30% and in rural areas on average 8%.

Table 4: The data about the Connectivity indicator, in Albania and EU countries, 2020-2021.

Connectivity		EU-27	Albania
	Broadband	Full coverage	88.30%
	Fixed very high-capacity network (VHCN) connectivity	70%	58.70%
	Fibre-to-the-premises (FTTP)	50%	56%
	Cable DOCSIS 3.1 technologies	32%	18%
	Rural fixed VHCN	37%	8%
	5G coverage	66%	National Frequency Plan is not yet finalized

Source: DESI 2022 results and Instat

c. Integration of digital technology by businesses

In 2021, only 55% of small and medium-sized enterprises (SMEs) in EU countries, reached at least a basic level in the adoption of digital technologies.

Businesses are getting more and more digitalized, but the use of advanced digital technologies remains low. Although already 34% of enterprises rely on cloud computing (in 2021), only 8% use AI (in 2021) and 14% big data (in 2020). Following the Path to the Digital Decade proposal, at least 75% of companies should take up AI, cloud and big data technologies by 2030.

There is a substantial gap between large companies and SMEs, not only in the use of advanced technologies, but also of basic digital solutions, such as having an enterprise resource planning (ERP) software package and engaging in e-Commerce. In Albania, 24.8% of enterprises used customer relationship management (CRM) software during 2021 from 22.5% in 2020. Cloud services, which refer to services used on the Internet to access computer programs, storage capacities, etc. were used by 20.7% of enterprises that have access to the Internet from 18.2% in 2020. 3D printing, which refers to the use of special printers by enterprises or the use of 3D printing services provided by other enterprises to create three-dimensional physical objects using digital technology, was used by 6.0% of enterprises during 2021, 5.5% in 2020. Although there are no official data about the use of AI and Big Data in Albanian enterprises, based on Tech Behemoths, the top IT small and medium sized companies in Albania specialized in Artificial Intelligence including Machine Learning, Natural Language Processing, Cognitive Computing, Chatbots, Robotics and more, are:

Postjer Group, Henotics, Nullius in Verba and Core Studio (Tech Behemoths, 2023).
Table 5: The data about the Integration of digital technology indicator for Albania and EU countries, 2020-2021.

Integration of digital technology	EU-27	Albania
SMEs with a basic level of digital intensity	55% of (SMEs) reached at least a basic level in the adoption of digital technologies	No official data
AI	8%	No official data
Cloud	34%	20.70%
Big data	14%	No official data

Source: DESI 2022 results and Instat

d. Digital public services

DESI monitors online public services by scoring Member States on whether it is possible to complete each step of key services fully online. The quality scores reached 75 out of 100 for digital public services for citizens and 82 out of 100 for businesses in 2021. Estonia, Finland, Malta and the Netherlands have the highest scores for Digital public services in DESI, while Romania and Greece have the lowest. The Path to the Digital Decade proposal sets the target that all key public services for citizens and businesses should be fully online by 2030.

The Albanian government has introduced 1227 electronic online services via registration on the e-Albania portal. Since May first, 2022, all government institutions have provided their services exclusively online. However, this online system has many shortcomings, especially for those whose abilities and internet access are limited. Meanwhile, online applications for mandatory registrations encounter numerous difficulties. The e-Albania portal is often blocked, inaccessible and users are sometimes penalized when the portal is down and therefore can't access its services on time. According to the Balkan Business Barometer survey, businesses' satisfaction with digital services decreased from 70% in 2019 in 54% in 2021 (OECD 2022). So, although the digital services have increased, an extra effort is needed to improve the quality of services.

Table 6: The data about Digital public services indicator for Albania and EU countries, 2020-2021.

Digital public services		EU-27	Albania
	Digital public services for citizens	75/100	95% of all administrative services had been made available online for citizens and businesses
	Digital public services for businesses	82/100	

Source: DESI 2022 results and Instat

6. Conclusion

Although some of the most relevant and prestigious organizations in the world: CBO, OECD, the US State Department and the EU, have given Albania very high ratings in digital governance, there is still much to do regarding digital skill's education and the gender gap in the ICT sector.

There are some incentives from the Albanian government that promote innovation and digitalization. Even though the corporate income tax (CIT) rate in Albania is 15%, companies that operate in the ICT sector pay a profit tax of only 5%. There are more than 2000 registered companies that operate in the field of ICT. This promotes job creation and aids the process of digitalization.

In the Start-up ecosystem, there's a Start-up passport available: anyone who believes their idea qualifies as a start-up can apply online from anywhere in the world, and within 48 hours, they will obtain a start-up passport. This grants them two years of free assistance from over 18 public institutions and also enables them to apply for grants.

Additionally, a new agency called "Start-up Albania" will be established very soon and will be dedicated to the start-up ecosystem.

In STEM, there is much to be done to identify barriers and opportunities that can help increase diversity. In this regard, role models, mentorships, Gender Policy/ Gender Action Plan, policies and physical environment that can support mothers can be some of the best practices to stimulate women to participate in STEM.

The integration of digital literacy into curriculums for all STEM courses in HEIs is essential for equipping university students with the relevant skills to navigate the digital world. HEIs can ensure adherence to best practices by including media literacy content in the curriculum of STEM courses to teach students to critically assess data from diverse digital sources by:

- Source verification, fact-checking information, and the identification of bias or false information;

- Encouraging students to challenge information, evaluate evidence and assertions, in order to develop critical thinking abilities. Teach them to look at many viewpoints and take into account a variety of sources before making judgments
- Creating and fostering online environments that value: respect, inclusivity, and diversity. Encourage girls to take an active role in online debates, contribute with their viewpoints and ideas, and help one another in online STEM networks.

Career Offices can offer training on resume writing, mock interviews, creating professional online identities and networking techniques workshops to ensure increased employability opportunities to women in STEM by focusing on building strong resumes by highlighting their abilities, achievements, and distinctive value proposition. Workshops on networking techniques can focus on topics such as successful relationship-building, communication, and use of social media platforms. Female students should be taught to optimize their LinkedIn accounts, participate in industry forums, and present their work through individual websites or online portfolios.

HEIs should establish a thorough cyber safety policy that outlines guidelines, rules, and expectations for online behavior and safety in STEM education. Annual courses and workshops in alignment with Digital Safety awareness initiatives, which can be organized by the IT and Computer Science departments of HEIs, could encompass discussions on the importance of privacy settings, sharing of appropriate content, and being mindful about the potential consequences of divulging personal information online.

These workshops could focus on data protection regulations, such as the GDPR, and advise students in the management of their online privacy settings and permissions; instructing students on creating strong, distinctive passwords and the necessity of frequently updating them, encompassing employing two-factor authentication and additional security protocols to safeguard their online accounts; conducting cyber awareness training to help them recognize phishing attempts and possible scams and to avoid suspicious websites. It is imperative to educate them on the significance of promptly reporting any cyber safety incidents through designated channels within the HEI. Moreover, students should be provided with information on helplines, hotlines, and support services available to assist them in case of online threats or incidents.

References

- Advisory Committee on Measuring Innovation in the 21st Century Economy (2008) 'Innovation Measurement - Tracking the state of innovation in the US economy', A report to the Secretary of Commerce, p. i.
- Arsic, M. (2020). Impact of Digitalization on Economic Growth, Productivity and Employment. Economic Themes. Online ISSN: 2217-3668.
- Baldwin, J. R., Gellatly, G. (2003). "Strategie di innovazione e prestazioni nelle piccole imprese", libri, Edward Elgar Publishing.

- Coglianesi, R. (2023). Why Peer Mentors Are Crucial for Women in STEM. Available at: <https://www.insidehighered.com/opinion/views/2023/04/28/why-peer-mentors-are-crucial-women-stem>
- Council of Ministers. (2023). Economic Reform Program 2023-2025. Available at: <https://financa.gov.al/wp-content/uploads/2023/02/Economic-Reform-Programme-2023-2025.pdf>
- De Luca, S. (2023). Women in digital sector. European Parliamentary Research Service. Available at: <https://financa.gov.al/wp-content/uploads/2023/02/Economic-Reform-Programme-2023-2025.pdf>; [https://www.europarl.europa.eu/RegData/etudes/ATAG/2023/739380/EPRS_ATA\(2023\)739380_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2023/739380/EPRS_ATA(2023)739380_EN.pdf)
- Dennehy, T.C. and Dasgupta, N. (2017) 'Female peer mentors early in college increase women's positive academic experiences and retention in engineering', *Proceedings of the National Academy of Sciences*, 114(23), pp. 5964–5969. doi:10.1073/pnas.1613117114.
- European Commission, (11 March 2020). SME strategy launched by European Commission. Retrieved June 02, 2023 from <https://digital-strategy.ec.europa.eu/en/news/sme-strategy-launched-european-commission>.
- European Commission.(2023). The Digital Economy and Society Index (DESI). Available at: <https://digital-strategy.ec.europa.eu/en/policies/desi>
- Freedman, G., Green, M., Kussman, M., Drusano, M., Moore, M. (2023). "Dear future woman of STEM": letters of advice from women in STEM. *International Journal of STEM Education*, volume 10, Article number: 20. Available at: <https://stemeducationjournal.springeropen.com/articles/10.1186/s40594-023-00411-0>
- Freel, M. S. (2005). 'Patterns of innovation and skills in small firms', *Technovation*, 25, pp. 123-134.
- Forsman, H., Rantanen, H. (2011). Small Manufacturing and Service Enterprises as Innovators: A Comparison by Size
- Garengo, P., Biazzo, S., Bititci, U. S. (2005). Performance measurement systems in SMEs: a review for a research agenda. *International Journal of Management Reviews*, 7(1), 25–47. doi: 10.1111/j.1468-2370.2005.00105.
- González-Pérez, S., Mateos de Cabo, R., & Sáinz, M. (2020). Girls in STEM: Is it a female role-model thing? *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.02204>.
- Gumina, J. (2017). Using hackathons as a tool in stem education [Master's thesis, California State University, East Bay]. <https://scholarworks.calstate.edu/downloads/jw827c60c>.
- Instat. (2022). Survey on Information and Communication Technologies (ICT) usage in Households and by Individuals in 2021. Available at: <https://www.instat.gov.al/en/themes/social-condition/information-and-communication-technologies-ict-usage-in-households-and-by-individuals/publication/2021/survey-on-information-and-communication-technologies-ict-usage-in-households-and-by-individuals-in-2021/>
- Instat. (2021). Final results of the structural survey of enterprises, 2021. Available at: <https://www.instat.gov.al/media/11241/asn-2021-1.pdf>
- Knight, G. A., D. Kim. (2009). 'International business competence and the contemporary firm', *Journal of International Business Studies*, 40, 2, pp.
- Laforet, S. and Tann, J. (2006), "Innovative characteristics of small manufacturing firms", *Journal of Small Business and Enterprise Development*, Vol. 13 No. 3, pp. 363-380. <https://doi.org/10.1108/14626000610680253>.
- Leiponen, A. (2005). 'Skills and innovation', *International Journal of Industrial Organization*, 23, 5-6, pp. 303-323.
- Monge, C.E., Soriano, R.D. (2023). The role of digitalization in business and management: a systematic literature review. *Review of Managerial Science*.
- Morales, G. et al., (2007). Gli effetti della leadership trasformazionale sulle prestazioni

organizzative attraverso la conoscenza e l'innovazione.

Melo, S. (2020). Benefits of moving from paper to a digital solution. Available at: <https://datascope.io/en/blog/benefits-of-moving-from-paper-to-a-digital-solution/>

Meyer, J. U. (2014). Strengthening Innovation Capacity Through Different Types of Innovation Cultures. This paper was presented at the 2014 ISPIM Americas Innovation Forum, Montreal, Canada on 5-8 October 2014.

Ndesaulwa, P.A., Kikula, J. (2016). "The Impact of Technology and Innovation (Technovation) in Developing Countries: A Review of Empirical Evidence." *Journal of Business and Management Sciences*, vol. 4, no. 1 (2016): 7-11. doi: 10.12691/jbms-4-1-2.

Skillikorn, N. (2022). Idea to Value: What is Innovation?

Talin, B. (2023). Innovation explained – Definition, Types and Meaning of Innovation. Available at: <https://morethandigital.info/en/innovation-definition-innovation-types-and-meaning/>

Tech Behemoths. (2023). There are 4 Companies in Albania that provide Artificial Intelligence Services! Available at: <https://techbehemoths.com/companies/artificial-intelligence/albania>

OECD (2022), *SME Policy Index: Western Balkans and Turkey 2022: Assessing the Implementation of the Small Business Act for Europe*, SME Policy Index, OECD Publishing, Paris, <https://doi.org/10.1787/b47d15f0-en>, fq 351.

Zapfl, D. (2016). What types of innovation are there? Lead innovation paper.