Rochester Institute of Technology

RIT Digital Institutional Repository

9-2022

Skills Gap in the Information Technology Sector in Kosovo

Erze Ahmeti
ea7981@rit.edu

Follow this and additional works at: https://repository.rit.edu/theses

Skills Gap in the Information Technology Sector in Kosovo

An Honors Society Project

Erzë Ahmeti

Advisor

Venera Demukaj

Second Readers

Kamal Shahrabi, Blerim Jahiu

Abstract

The main focus of this research project is to identify the extent to which companies in the IT

sector in Kosovo are being affected by the skill gaps and the ways through which they are trying

to bridge these skill gaps. While the IT industry in Kosovo shows great growth potential, the skill

gap appears to be a prevailing problem that hinders this sector's development. The study

analyzes the implications of the skill gap for the growth of private companies and the sector in

general; as well as the ways used by the sector to narrow the skill gap. To analyze both the

demand and supply side of the gap, primary quantitative and qualitative data collected during the

end of the year 2021 and the beginning of the year 2022 are collected from the IT companies,

employees, education institutions, and training sectors. Analyzing data through different aspects

allows for the study to reach conclusions and give recommendations that should serve all

members of the IT industry, starting from enterprises as the main focus of this study, to

education organizations, and finally, individuals working on or seeking to join this sector. From

a broader perspective, this study contributes to the existing literature on the skill gap in different

sectors in Kosovo and specifically in the IT sector.

Keywords: Skills gap, skill mismatch, Information Technology, IT sector

Acknowledgments

This study would not be possible without the help and support of many people around me. The biggest contributor to the success of this study is my mentor Dr. Venera Demukaj, who gave me all the needed support throughout this entire process of research. Her guidance was not only highly insightful but also always inspiring to move forward. I also want to thank the second readers of this paper for their help and advice throughout.

I appreciate all the support that was given to me by different parties and members of the IT community whom I had the chance to contact throughout the research. The willingness of this community to help and motivate young researchers like me to move forward is something that made me proud to have chosen IT as my career path. I am glad to have met inspiring women entrepreneurs in the sector who will serve as role models for me as I gradually join this industry.

Sincere thanks go to my family to whom I attribute all my successes in life. They are the force that always keeps me going, and I am more than grateful for their continuous support.

Contents

List of Figures

Introduction

The skill gap, as a form of skill mismatch, is a phenomenon present in different industries of the economy. A skill gap is identified when employers identify a lack of workers with adequate skills that would make them qualified for the needs of the job market (Sodhi, 2014). The impact of a skill gap is noticeable at three levels: individual, company, and country level. At an individual level, the skill gap presents issues related to the employability and career advancement of the individual (Barthel et al., 2016). At the level of a company, the skill gap sets a barrier to development by a decrease in productivity, which can result in an increase in costs and a decrease in quality (Barthel et al., 2016). According to a study by the European Economic and Social Committee, 67% of ICT enterprises stated that their human resource policies are highly affected by the skill gap (2018). The way the skill gap affects the workforce goes to length such as "poorer scope for progression, higher stress levels, fewer training opportunities, greater risk of unemployment and lower earnings" (van de Worp, 2020). Additionally, the skill gap is identified to be the cause of an increase in employee turnover and efficiency within an organization. Both these factors then lead to a "loss of profits and markets" (ILO, 2020). The skill gap also lowers investments, which implies a loss of opportunities for job creation (ILO, 2020).

Finally, at the country level, we see the negative effects of a skill gap in a country's competitiveness and potential for growth (Barthel et al., 2016). Based on the results of Cedefop's European skills and jobs survey, 40% of EU employers face difficulties when trying to find qualified workers at a time when unemployment was only increasing (2018). Skill gap causes a loss of 2% in their productivity yearly in European countries, which "means a loss of 80

Eurocents for each hour of work" (EESC, 2018). Figure 1 shows that all the above-mentioned

actors need to work toward matching occupational requirements, the impact of which will be

seen in different aspects of the economy (ILO, 2014). If no measures are taken and following the

trends of technological developments it is predicted that the situation will only worsen (EESC,

2018).

Figure 1

Economic context and skills mismatch
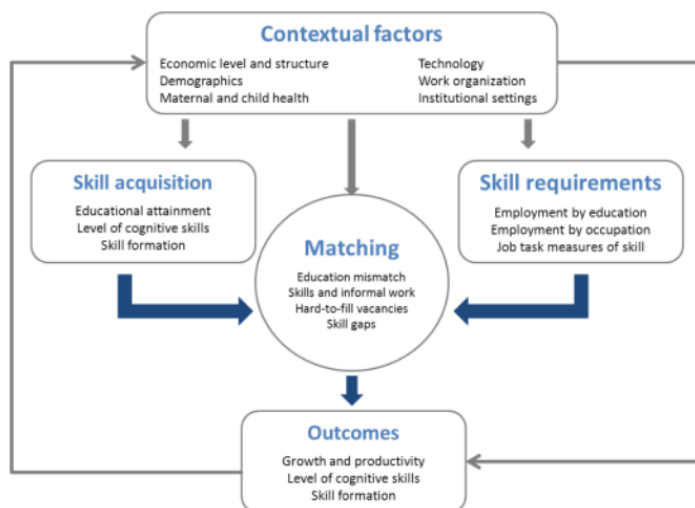
Source: ILO (2014)

A study conducted by Udemy found that 83% of employees around the world believe

there is a skill gap, and 62% feel affected by it on a personal level (Udemy, 2020). When we

look at a global overview of skills compared to their level of importance versus the level of

satisfaction, we notice that the gap between importance and satisfaction is lower for technical

skills compared to soft skills such as problem-solving and creativity which are generally

evaluated as key skills for employees in the IT sector (ISE, 2018).

While the skill gap in any industry poses issues for economic development, the skill gap in the IT sector is especially important to be analyzed because of the growing role this sector is playing in the economic growth of a country. Therefore, the future economy requires an approach that puts human capital at its core (Puckett et al., 2020). The field of Information Technology (IT) is in continuous need of updated skills for the workforce. The fast-growing sector of IT is impacting different spheres of life. While this sector plays an important role in Kosovo's economy, it is not able to reach its fullest capacities because of the lack of a skilled workforce (European Commission, n.d.).

When we analyze the skill gap in this sector of the economy, it is important to incorporate in this analysis all the actors involved in this phenomenon. Many actors play a role in the skill gap including governments, companies, employees, and education institutions (ILO, 2014). The education system is developing at a rate that does not match that of the developments of the sector. The government of Kosovo has put a special focus on addressing the skill gap in different sectors of the economy through its National Development Strategy. As part of this strategy, the linkage between education and the labor market is set to be supported by having qualifications frameworks in place for institutions of professional development, aiding Vocational Education and Training (VET) and research at the university level (Office of the Prime Minister - Republic of Kosovo, 2016). When compared to other countries of the region and those of the EU, Kosovo is behind in labor market performance while "the weak link between the education and labour market remains an important challenge" (Government of the Republic of Kosovo, 2021). This was also highlighted in an institutional paper of the European Commission, whereby one of the main challenges facing Kosovo is the education system which does not provide students with the skills needed from the labor market (2021).

This study will focus on the skill gap in the IT sector in Kosovo. The data collected is mainly on the skill gap effects over the year 2021 and the beginning of the year 2022. This study helps clear the factors causing the skill gap and the effects it has on the sector, while also suggesting ways to mitigate it. While there is research done on the skill gap in all sectors of the economy in Kosovo the latest study which focuses on the skills gap in the IT sector in more detail is of the year 2019. Knowing how fast this sector evolves while also considering the changes coming from the pandemic, we can confidently say a lot has changed in the IT sector since 2019. This study will collect information from both the demand side (IT enterprises) and supply side (IT employees, formal education institutions, training centers).

Statement of the problem

The IT sector as one of the fastest-developing sectors in Kosovo is facing various challenges hindering its development. One of the main factors that are preventing the IT sector from reaching its full capacity is the lack of qualified workers. While the sector is growing at a fast pace, the skills sought by employers are not the ones individuals are developing, thus resulting in a skill gap. Different organizations have made several attempts to alleviate this skill gap and help businesses in the sector by suggesting changes in policies and education programs, but not much improvement has been made (Personal interview).

Closing the gap between the skills required from the market and those offered by the labor force in IT would help not only the sector itself in great length but also the entire economy of Kosovo as the IT sector already contributes to the overall economy with 9.5% share of the GDP on average over the years (WBIF, n.d.). To be able to intervene in this aspect, in-depth research of the skill gap and implications is crucial.

Understanding the situation in detail can pave the way to helping different stakeholders, including education institutions, the private sector, students/individuals, and governmental institutions, with the aim of developing the sector and addresing this skill gap. This study aims to provide insight into the impact of the skill gap in the IT sector and methods used to narrow it which should serve useful for all the previously mentioned stakeholders.

Literature Review

While it is the topic of many recent studies, the skill gap is not a new concept, as it has been the center of many studies in different parts of the world over time. There are two major approaches to how literature analyzes the skill gap, the macro-economic approach which looks at the available vacancies and individuals seeking employment, and the on-the-job approach which focuses on the mismatch of already employed individuals and the jobs they have (Vandeplas et al., 2019). The literature identifies two main factors that affect the levels of skill gap to be education (the productivity-enhancing effects of schooling) and innovation (Vandeplas et al., 2019). The higher the level of schooling the more developed the skills of an individual, and thus, the lower the skill gap (Brun-Schammé & Rey, 2021). On the other hand, we have innovation and new technologies being developed continuously which lead to new jobs and also a widening of the skill gap (Avram et al., 2019).

The IT sector, as one of the fastest-growing sectors of the economy (ECIKS, 2020), has been the focus of many studies in Kosovo. The factors that have helped this sector thrive and the great potential of this sector have been researched on different levels. This has been the focus of research, especially for foreign investors, funders, and donors who see potential in this industry (IFME, 2020). However, as this sector grew, the focus of the research shifted to the challenges this sector is facing in terms of its development.

As identified by a large number of studies, a skills gap is evident in this sector and poses one of the main challenges to its development. A study conducted in 2020 by PwC in North Macedonia, Albania, and Kosovo, found that 83% of Kosovar ICT companies face a skill shortage when seeking qualified employees. Results of this study also show that 70% of companies rate the quality of schools and training in IT in their local area with three or less on a scale from one to five (with one being unsatisfactory and five being satisfactory). When asked about the factors that hinder a company's growth, "non-harmonized education programs, lack of skilled workforce, employee turnover rate" are listed among other factors (PwC North Macedonia, 2020). A study conducted by Open Data Kosovo in 2019 compared skills demanded by the sector to those supplied by the labor market. The findings of this study suggest that there are skills for which there is a lack of supply ("such as PHP, Javascript, HTML, SQL and CSS"), and skills for which there is a lack of demand ("such as LAN/MAN/WAN/, C++, and C"). Finally, the yearly study done by the Kosovo ICT Association STIKK gives a broader view of the IT sector in Kosovo. The results of this study support those of previous literature whereby the share of companies facing a shortage of qualified workers surpasses 80%. The impact of the pandemic in the sector in 2020 based on the results of the study goes more on the negative side even though in moderate amounts.

A study from the Ministry of Trade and Industry reports that "business perceptions on the skill level of the workforce are fairly positive since only 19% of companies responded that employees with the right skills are in low supply." (2014). However, this study was mainly focused on the completion of formal education to evaluate the skill level of the workforce in the IT sector. On the other hand, the study reports that more than 80% of all IT companies provide internal training which might be in contrast with the previous result.

While the main focus of the studies in this sector is its potential and challenges to growth and identifying the skill gap as a key challenge for development, not many have focused on studying the attempts being made to hinder the effect of the skill gap. Until now, the focus of research has been on start-up factories as one of the main organizations that directly help the development of the IT sector in Kosovo, and less on training centers as a tool for narrowing the skill gap. When analyzing the skill gap, most studies focus primarily on technical skills and do not focus sufficiently on soft skills. Having analyzed existing literature, this study fills these identified gaps in the literature in the Kosovo context and serves as a complement that adds more insights on the developments of the past year and gives further recommendations.

Methodology

This explanatory research uses various methodologies to identify the causes and consequences of the skill gap as well as techniques used to close this skill gap in the IT sector in Kosovo. Primary data were collected through a combination of qualitative and quantitative methods of research.

Interviews

Interviews were used as a qualitative method of collecting data from the IT industry and universities offering programs in this field. Purposive sampling was used when choosing the participants. Seven semi-structured interviews and two structured interviews were conducted in total, of which two were with IT companies in Kosovo (see Appendix D for interview questions), one with an association of IT companies in Kosovo, two with training-providing centers (see Appendix E), and four with university representatives (see Appendix F). Questions were mainly open-ended and gave insightful information in addition to what the initial expectations of the

research were. Of the nine interviews that were conducted, five were done in person, two via an online meeting platform, and two via email. The interviews ranged from 20 minutes up to an hour, with the average length of the interview being 30 minutes. All the oral interviews were also voice-recorded with consent. Before the meeting, a consent form was sent to the interviewees (see Appendix A) via email for them to read carefully. For in-person interviews, a hard copy of the consent form was signed by the interviewee beforehand, whereas for online and written interviews the consent form was signed electronically. All nine interviewees were offered a copy of the signed consent form.

Since there is not a list of registered IT companies operating in Kosovo made available to the public, I used purposive sampling to select two major IT companies that are influential players in the industry and two training centers which give one of the biggest contributions to IT training provision. I chose seven universities around Kosovo which offer IT study programs as part of my sample. Four of these universities accepted to be interviewed, two of which asked for the interview questions to be sent via email.

Details about the interviewees are presented below:

Interviewee A: CEO of a medium-sized digital communication agency that operates in Kosovo for more than two decades.

Interviewee B: CEO of a medium-sized software company in Kosovo that continuously invests in employee professional development.

Interviewee C: Executive director of an IT association in Kosovo which gives a great contribution to the development of the IT sector.

Interviewee D: Professor at a private university in Kosovo which offers one program in the field of IT.

Interviewee E: Academic advisor at a private university in Kosovo which offers one program in the field of IT.

Interviewee F: Dean of the school of computer engineering in a public university in Kosovo.

Interviewee G: Head of IT Office of the school of computer engineering in a public university in Kosovo.

Interviewee H: Regional coordinator at an IT training center in Kosovo.

Interviewee I: Training Facilitator at an IT training center in Kosovo.

Surveys

Quantitative data were collected through two self-administered online questionnaires, which were prepared through online questionnaire platforms. The language of the questionnaires was Albanian as the respondents were all employees/employers of companies operating in Kosovo.

The first questionnaire had a total of 25 closed-ended questions and six sub-questions. The questionnaire could only be filled out by employers or employees in managerial positions in IT companies in Kosovo. Questions were formulated to collect nominal as well as ordinal variables. Questions varied from multiple choice, multiple select, and Likert scale. Likert-type questions were also part of the questionnaire mainly to understand the changes employers expect to see in their companies in the future (See Appendix C for a copy of the questionnaire).

Technical skills required by IT companies for their staff were divided into seven

categories in the questionnaire: operating systems, programming languages, backend

frameworks, frontend frameworks/libraries, database technologies, e-commerce platforms, and

other technical skills grouped. Respondents were able to answer multiple-choice questions with

different options listed based on the data gathered from interviews as well as the most required

skills worldwide. For each technical skill category, the respondents had the option to add any

additional skill they might require from their staff. The skills that were selected by at least 50%

of the respondents are analyzed in the results section.

A participating pretest of the survey was done with two employees of IT companies and

feedback was gathered to develop the questionnaire. The sampling method chosen for the survey

was a combination of purposive and snowball sampling. Based on purposive sampling,

companies that are more developed and play a bigger role in Kosovo's economy were chosen.

The number of employees, years of operation, and membership in national IT associations were

taken into consideration when doing purposive sampling. Through snowball sampling,

participants were added to the sample as IT companies that were already surveyed would suggest

other companies that would provide resourceful information.

The survey was distributed to 50 IT companies in Kosovo via email, of which 18 filled

out the questionnaire completely. The questionnaire was sent to an employee with a managerial

role in the company, either CEO, CTO, HR Manager, or IT Project Manager. Responses were

collected over a period of two weeks.

The second questionnaire had a total of 21 main questions and 18 additional ones that

were added or not depending on the selection of the respondents to a previous question. There

were 31 closed-ended and eight open-ended questions. The questionnaire could only be filled out

by people who are employed or self-employed in the IT sector in Kosovo. The questionnaire

could only be filled out if the respondent confirmed they fulfilled this criterion at the beginning

of the questionnaire. Questions were formulated to collect nominal as well as ordinal variables.

Questions varied from multiple choice, multiple select, text entry, and Likert scale. Likert-type

matrix tables were also part of the questionnaire to understand the details of the training

respondents have gone through. The answer to this table defined the flow of the succeeding

question blocks (see Appendix B for a copy of the questionnaire).

A participating pretest of the survey was done with three employees of IT companies and

feedback was gathered to develop the questionnaire. The sampling method chosen for the survey

was a combination of convenience and snowball sampling. I have used my network in the field

of IT as well as different IT communities I am part of on social media to share the questionnaire.

Through snowball sampling, participants were added to the sample as employees of IT

companies that were already surveyed would share the questionnaire with other colleagues in

this sector. The questionnaire was filled out voluntarily by 198 respondents. Responses were

collected over a period of one week.

Two surveys were conducted to analyze the demand and supply side of skills in the IT

sector separately. While employers have a clear idea of what their employees' qualifications and

needs are, they can be better understood by asking employees themselves. The purpose of the

two surveys is to gather information in detail about employers' struggle to find skilled workers

and the ways they deal with this problem on one hand, and the employees' struggle to attain the

demanded skills in the market and ways they deal with that on the other hand. The findings from

both surveys complement one another and help reach conclusions with more certainty.

Results and Analysis

Results of the two surveys and interviews support one another and give a general idea of the situation with the skill gap in the IT sector in Kosovo.

Overview of the skills gap in the IT sector

To analyze the impact of the skills gap in the IT sector in Kosovo, it is important to first analyze the extent of this skills gap. While previous research shows that there is a lack of skills in the IT industry, this sector is constantly growing and the skills required to be a part of it change rapidly as well. IT companies demand certain qualifications when hiring their staff. Based on the results of the survey, it is shown that employers are focused more and more on skills (soft and technical) and experience rather than diplomas of formal higher education as indicated in Figure 2.

Figure 2

Criteria for employment in the IT sector

What were the criteria for your current employment?
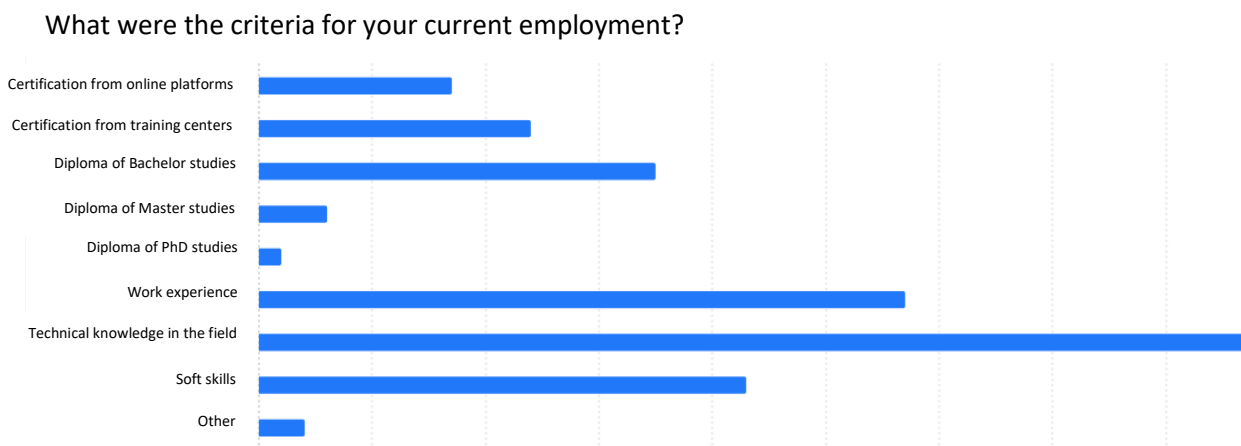
Source: Survey with employees of IT companies (2022)

When it comes to the skills required in this sector technical and soft skills were looked into separately. Technical skills are separated into seven main categories to show the skills required from employees in these key areas. As can be seen in Figure 3, the top five operating systems used by IT companies are Microsoft Windows, iOS, Android, macOS, and Linux. The top three programming languages that companies require their employees to know are HTML, CSS, and JavaScript. The top backend framework used by IT companies is Laravel, whereas the top frontend frameworks/libraries are Angular, Vue.js, Bootstrap, React.js, and React Native. MS SQL Server and MySQL are the two main database technologies IT companies use. While more and more companies in this sector work with e-commerce platforms, WooCommerce and Shopify are the top-used ones. Other technical skills were grouped in one category and the main ones required by IT companies resulted to be Node.js, DevOps, AWS, and UI design.

Figure 3

Main technical skills required by companies in the IT sector
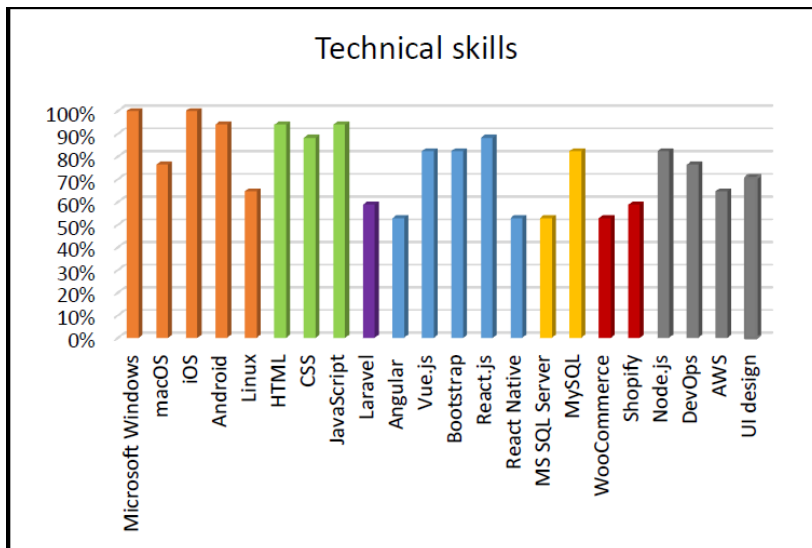
Source: Survey with employers in the IT sector (2021)

What can be seen from these results is the popularity of JavaScript and many of its

frameworks and libraries in the IT sector. These results give insights into the main technical

skills IT companies look for when hiring employees.

While technical skills are very important in the IT sector, without adequate soft skills, an

employee cannot be considered qualified for the job. Respondents declared all the soft skills they

require from their employees and Figure 4 presents those that were declared by at least 50% of

the respondents. Problem-solving, critical and creative thinking, innovation, and fast learning are

all soft skills that enable employees to be better programmers. Whereas, communication and

teamwork enable them to be better colleagues and help the overall culture of the organization.

Figure 4

Main soft skills required by companies in the IT sector
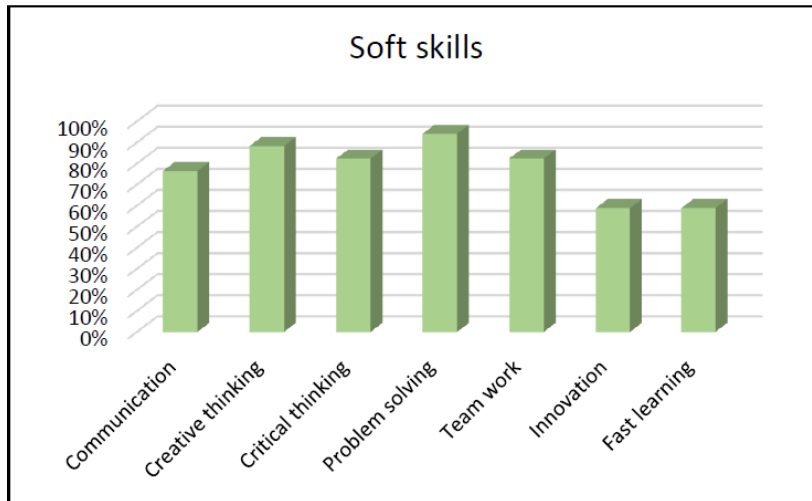
Source: Survey with employers in the IT sector (2021)

While companies have clear criteria for the skills they demand from employees, they are

not met with a supply that meets those criteria. As shown in Figure 5, more than 80% of the

surveyed companies reported that they currently face a deficit of qualified workforce, and around

90% of them declared to have at least one open vacancy in their company.

Figure 5

Lack of qualified workforce as declared by IT companies

Does your company currently face a lack of qualified workforce?
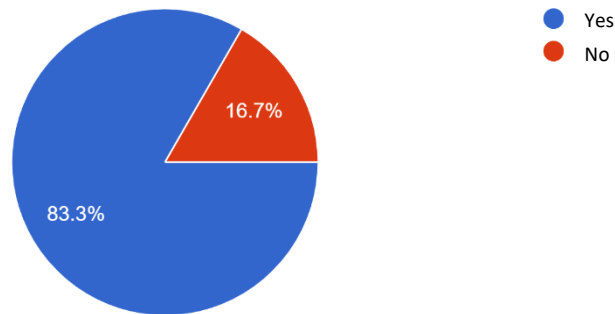
Source: Survey with employers in the IT sector (2021)

Challenges posed by the skills gap to companies

The high demand for certain skills in the IT sector combined with a low supply for those

skills poses a lot of challenges for both employees and employers in the sector. This situation

gives the opportunity for employees who possess the demanded skills in the market to have more

freedom in the workplace they choose and the work conditions they require from their

employers. On the other hand, this makes it much more difficult for employers to keep these

qualified workers in their company. As Figure 6 shows, 27.8% of the surveyed companies have

declared an employee turnover rate of over 10%. Employers identify the main reasons for this

rate to be the wage, better living conditions in other countries, the global trend of frequently

changing workplaces, and the high demand and low supply of skills. These factors will be

presented in more detail individually.

Figure 6

Employee turnover rate of IT companies

What is the employee turnover rate in your company?
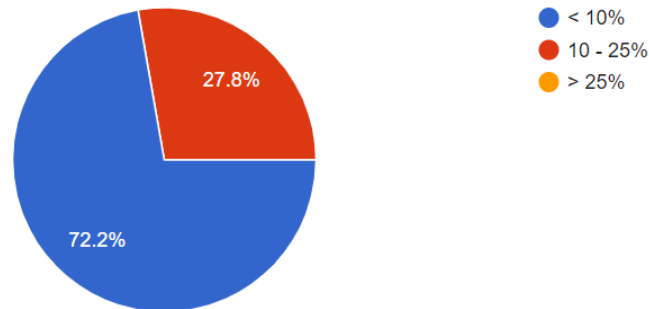
Source: Survey with employers in the IT sector (2021)

Wage

The fact that there are not as many qualified workers as required by the market and workers are aware of this, allows for the qualified workers to have more freedom when choosing the company they want to work for and demanding better work conditions. This gives workers more leverage to ask for higher pay among other demands they may have for their work. As declared by employers, the main factor employees leave their work is for a company that offers them a higher wage. More than 70% of surveyed employees also chose higher wages to be one of the main factors that would make them leave their current job.

When we look at the categories of these startups of 2021 we have a lot of international companies opening their headquarters in Kosovo, but also an increase in registered individual businesses (Personal interview). As explained by Interviewee C, until the last year most freelancers in Kosovo operated without officially being registered as a business, but this has started to change in 2021. Both these categories pose challenges for most existing IT companies

in the market. If the skill shortage was prevalent only in Kosovo it would be much easier for local companies to deal with it, but this skill shortage is now a global problem.

Companies from around the world are facing shortages of qualified IT workers. With international companies opening headquarters in Kosovo or simply hiring remote employees, the supply of available skilled workers gets smaller and smaller (Personal interview). International companies that employ Kosovar workers are mainly coming from developed countries which find the labor in Kosovo cheap. These companies paying higher wages than the local standard is a great incentive for many employees to join them. In this case, it is very difficult for local companies to compete with international companies because of the lack of resources. Local companies are having to train employees with their resources just to see them leave the job for a higher paying one (Personal interview). Interviewee B elaborated on the method they are using to try and keep the employees inside the company. Each staff member in the company is provided with a career plan which combines a financial and growth plan. The employees of the company can set specific goals on how they can improve their skills, get evaluated, and potentially increase their wages quarterly. Since this is a newly-adapted technique, the company has yet to see how effective it proves to be (Personal interview).

Better living conditions in other countries

Companies are faced with many problems related to the cooperation with governmental institutions, starting from the lack of support they receive up to the living standards offered in the country (Personal interview). There is only so much companies can do to improve the living conditions for their employees and as faced with a workforce who is migrating to countries that they believe will offer them a better life. There are many barriers to movement for citizens of Kosovo and they only increased during the pandemic. Even with all these restrictions on

movement, 44.4% of the surveyed companies declared that they had cases of employees leaving

their work to migrate to a foreign country in 2021. When employees were surveyed, 40.3%

stated that better conditions in foreign countries are a key factor that incentivizes them to leave

their jobs. This only adds to the problem of the low skills supply in this sector.

A factor that companies appear to have the least control over is brain drain. It is the

citizens' dissatisfaction with the lifestyle and governance that motivates them to seek habitation

in other countries (Personal interview). With IT being one of the sectors giving the biggest

contribution to the economy, not much support is being given to it directly by the government

either. (Personal interview)

The global trend of frequently changing workplaces

The trend of employees changing workplaces more frequently and driving their careers

on their own has been noticed especially among millennials and gen z members (Personal

interview). As per the information shared by Interviewee A, it is not likely for employees in this

sector to be employed in the same workplace for more than two years. Over 80% of the surveyed

employees stated that they have had their job for less than two years. Figure 7 shows that when

asked how often they change workplaces on average, 75.8% of the respondents stated they do so

in less than two years.

Figure 7

The trend of changing workplaces

How often have you changed your workplace on average?

< 1 year

1-2 years

3-5 years

>5 vite
> 5 years
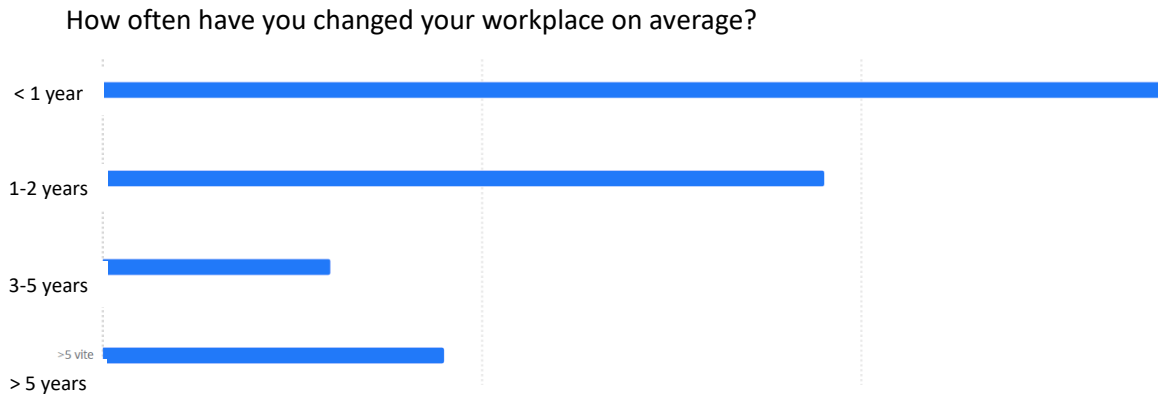
Source: Survey with employees of IT companies (2022)

Covid-19 pandemic

Similar to many other sectors, the pandemic has added new challenges to the workplace in the IT sector as well. Companies had to function remotely and even when the option of going back to the office was available, the transition was not easy. Companies reported in the interview that many employees were more reluctant to work only from the office and preferred working from home. This was confirmed from the results of the survey with employees as well. Only 28.2% of the respondents stated they preferred working entirely from the office. While employees were working from home during the pandemic, they used the extra time that was made available to them by not spending time on their commute to work and other work-related activities to get employed in other companies and work for more than one company simultaneously. Interviewed companies saw this as a problem because this often meant their employees working for their competitors as well. Even though this is not allowed by the work contract it is also costly for companies to go through law even when they find out that this is happening. This is another consequence of the lack of skilled workers. Out of the surveyed

companies, 16.7% declared that they had employees leave their job during 2021 because they preferred working from home but that was not allowed for them. Since employers have to utilize the limited skilled workforce that is available, they had to change their concepts of a standard working environment. Companies have had to adapt to the new workplace and are offering remote work for their employees more and more (Personal interview). For managers of IT companies, it has been more challenging to build team coherence when some employees work from home and some work remotely (Personal interview).

Overall, the skill gap is posing limits for companies to develop as they are having to hire unskilled workers or even lose clients because they do not have the required human resources to keep those clients (Personal interview). While the demand side is negatively affected by this gap, the supply side faces challenges as well. The obstacles employees face because of the skill gap are analyzed in the next part.

Challenges for employees

Employees are met with a market that requires skills that they do not possess. This makes employment more difficult for workers seeking jobs in this sector. As can be seen in Figure 8, almost 45% of the surveyed employees reported that it took them more than three months to get a job from the moment they started seeking employment.

Figure 8

The time it takes jobseekers to find a job in the IT sector

How long did it take you to get a job from the moment you started looking?

< 3 months	
3-6 months	
6-12 months	
> 1 year	
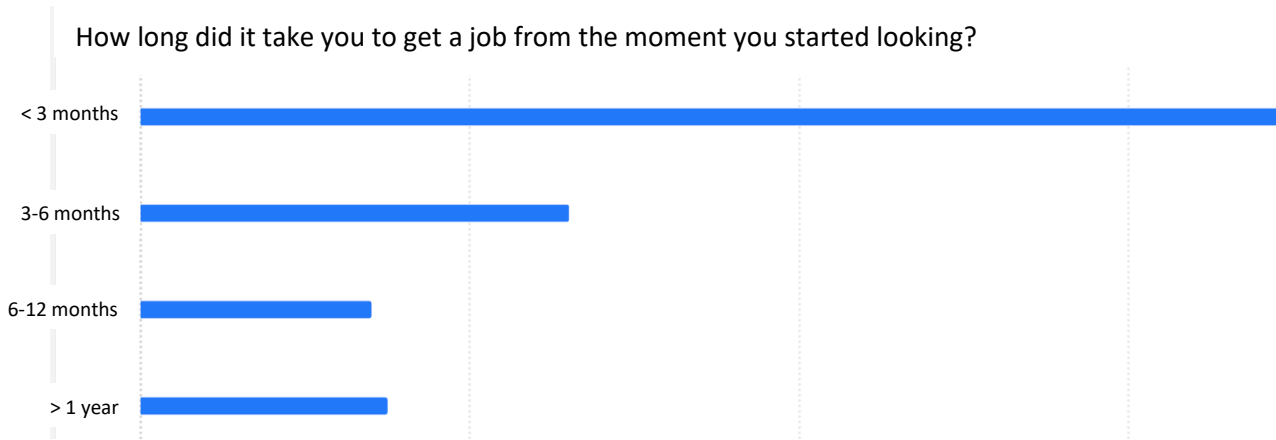
Source: Survey with employees of IT companies (2022)

While only 28.2% of the surveyed employees declared they would prefer working only from the office, 46.8% declared that they indeed work only from the office (see Figure 9). As per the responses of the survey, employees prefer hybrid or remote work over work only from the office for reasons such as more flexibility, more time available and fewer costs from lack of commute to work, more time to spend with family, more space for productivity, more comfortable work, less stress, and fewer distractions. The pandemic also posed new problems for employees in this sector. Around 40% of the respondents declared that employment was made more difficult for them during the pandemic.

Figure 9

The work environment in the IT industry

Do you work from the office or from home?
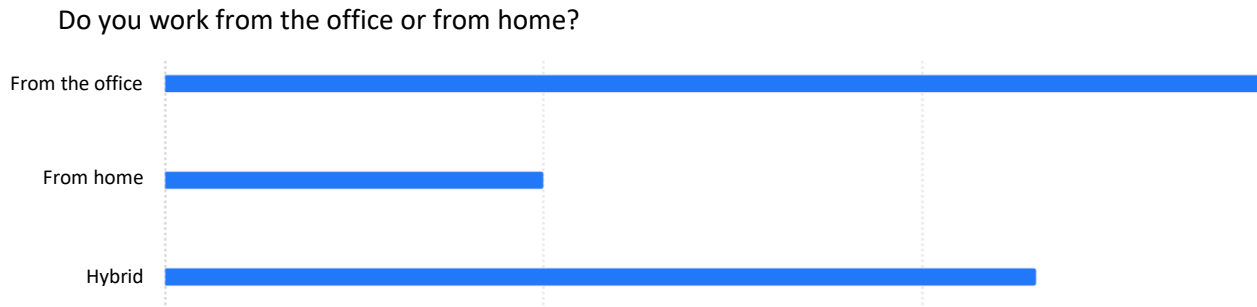
Source: Survey with employees of IT companies (2022)

Formal versus non-formal education

Out of the surveyed employees, 16.8% had finished graduate studies, whereas the rest of the respondents were either undergraduate students or had finished their undergraduate studies. It is important to note that all respondents were studying or had finished their studies in an institution of formal education as I analyze their path to employment and the means used by employees to gain the necessary skills for their jobs.

Almost 80% of the respondents stated that they took additional training besides their formal education, as shown in Figure 10. Out of all the respondents who are graduates of private institutions, 72% underwent additional training outside their formal education, and out of all respondents who are graduates of public institutions, 81.7% took additional training.

Figure 10

Additional Training Employees Undergo

Did you have to undergo training besides your formal education?

Yes	
No	
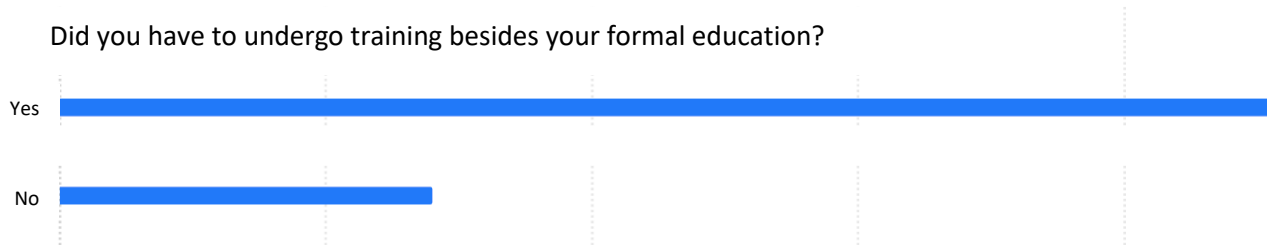
Source: Survey with employees of IT companies (2022)

When asked about the importance that this training had on their employability, 70.8% of the respondents selected a value of eight or higher on a scale from one to ten with one being not important at all, and ten being very important for them getting employed (See Figure 11).

Figure 11

The role of training in employability

How important have these trainings been for your employability?

1	
10	
2	
3	
4	
5	
6	
7	
8	
9	

0%   10%   20%   30%   40%

■ Not at all important – Very important
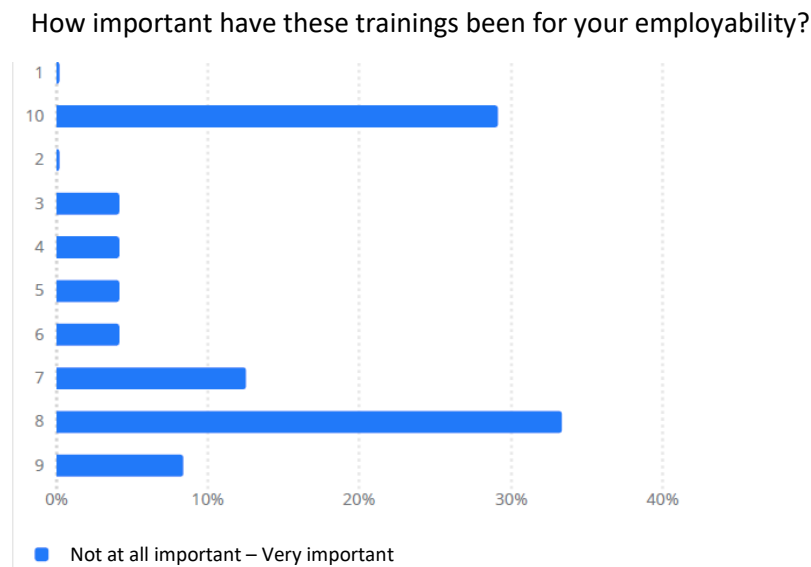
Source: Survey with employees of IT companies (2022)

These results indicate that institutions of formal education are not offering all the necessary skills required for students to get employed and, thus, they seek additional training to increase their chances of getting employed. Universities have also stated through interviews that they do face challenges when it comes to aligning program curriculums with market needs because of how fast this sector grows and its needs change. IT companies are constantly seeking to cooperate with institutions of formal education to offer them insights into the sector's needs (Personal interview). The role of these institutions is very powerful when it comes to alleviating the problems posed by the skill gap in the sector. They reported great cooperation with the private sector, but also find it challenging to meet the needs of the industry. Even though the industry's needs are taken into consideration, changing study curriculums as fast as the market needs change in the IT sector is unattainable for universities (Personal interview). Universities stated that it takes around one year to make changes to their program curriculums and in the IT sector a lot can change in that time (Personal interview).

What companies are doing to bridge the gap

After companies stated through the survey that they face a deficit of qualified workforce, they reported how they deal with this deficit. As presented in Figure 12, more than 80% of the companies declared that they organize in-house training, 22.2% organize external training, 33.3% organize special certification programs, and 50% practice job-shadowing for training their employees. Companies are focused on training their newly-hired employees so that they can gain the necessary skills to properly perform their jobs. Results of the survey also show that employers are not oriented towards diplomas and academic degrees, but rather certifications or simply expertise and skillset as criteria for hiring employees. This is another indication that employees do not see formal education to be the provider of the necessary skills for this industry.

Figure 12

IT companies' methods of dealing with the skill gap

If so, how do you deal with the lack of a qualified workforce?

Category	Value
In-house training	15 (83.3%)
Outsourced training	4 (22.2%)
Special certification programs	6 (33.3%)
Job shadowing	9 (50%)
Hire qualified workers from other countries	2 (11.1%)
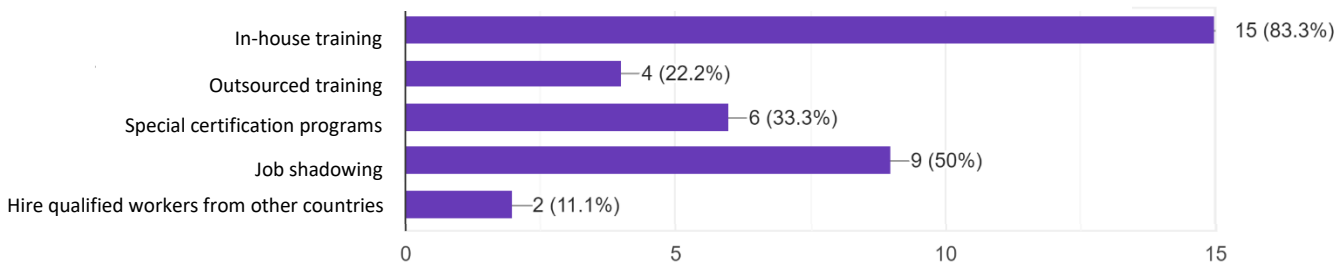
Source: Survey with employers in the IT sector (2021)

While in-house training is a solution for utilizing the talent of the workforce it comes with many costs. Figure 13 shows that almost 70% of the surveyed companies reported that they have to train their newly-hired employees in more than 50% of the cases, out of these 11.1% of the companies reported that they have to train their newly-hired employees in 100% of the cases.

Figure 13

Percentage of newly-hired employees trained by companies

What percentage of your newly-hired employees do you have to train?

- 0% of the cases
- <50% of the cases
- >50% of the cases
- 100% of the cases

55.6%
27.8%
11.1%
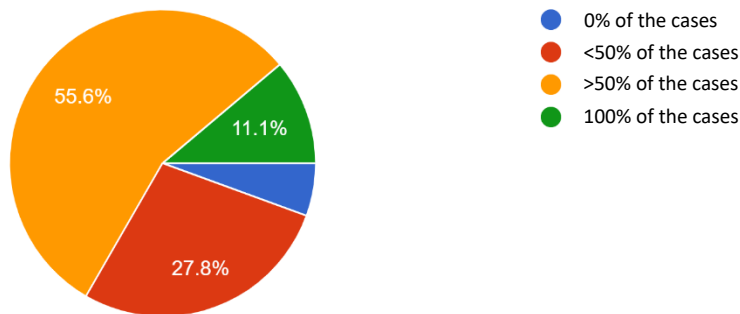
Source: Survey with employers in the IT sector (2021)

Surveyed companies declared that the training can last from one up to twelve months and that does come with a lot of costs attached to it (Personal interview). Even after undergoing all the training, employees are not likely to stay in that company for more than two years, as stated by the interviewed companies. After an employee leaves their job, it takes companies additional resources to hire someone new and then train them and start the cycle once again. As shown in Figure 14, more than 40% of the surveyed companies declared that it takes them more than three months to replace an employee.

Figure 14

The time it takes to replace an employee in the IT sector

How long does it take for you to replace an employee?

- < 3 months
- 3 – 6 months
- 6 – 12 months
- > 1 year

38.9%

55.6%
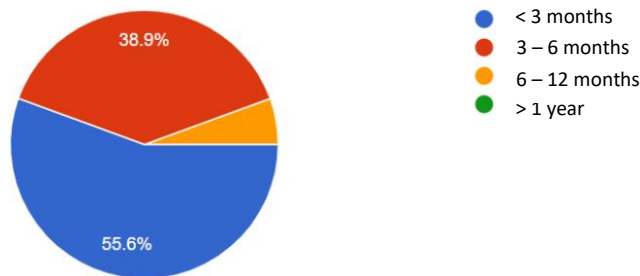
Source: Survey with employers in the IT sector (2021)

Bridging the skill gap through training centers

The IT sector is known for bringing innovation to the table and as seen in previous sections of this paper, this sector requires constant utilization of problem-solving skills. As such, we would only expect companies in this sector to find innovative solutions to the challenges at hand. More and more companies have started their own training centers/schools/programs that offer courses that provide students with the skills that the company needs.

Interviewee H: Profile of a successful training center initiated by an IT company

Interviewee H is an employee of a prominent IT company in Kosovo and a coordinator for the training center initiated by this company. Interviewee H's company was faced with a lack of qualified workforce for many years. Their company tried various training programs to deal with the skill gap they were faced with, but because of the costs that came with that, the company decided to start an entire training center that would function on its own.

Two years of market research was done before the training center was opened, so that the company could understand what the needs of this sector are in terms of work skills. Based on the findings of the research, courses were offered to match those needs. The training center was successfully opened and now offers various trainings as per the company's needs. Applications for these trainings are open to everyone. Applicants who pass a test of basic IT knowledge are accepted.

While technical knowledge is required to enter, attention to soft skills and their development is paid by instructors throughout the training. By the end of the training, certain classes are dedicated specifically to soft skill development of the trainee. Training programs range from two to three months. Students are expected to attend the course lectures, and complete weekly quizzes and assignments. By the end of the program students go through an exam and get certified if they meet a certain exam score. After being successfully certified, the student is offered internship in the company. Thus far, 90% of the interns have been hired as interns. Once a training program is completed, its curriculum is updated to match any new need of the company. The center has been functioning successfully for two years now, and they only plan to grow and expand their work and realm of trainings they offer.

The company has benefited from this initiative because they do not have to carry the costs of training every intern that joined their company as they used to, and now interns are trained and thoroughly tested on their skills and capabilities before joining the company.

Implementing such training centers can be very useful for companies that require certain junior-level jobs to be filled. Companies that require employees to have skills that take longer to be developed on the other hand, also require longer training and a more extended curriculum. As an example, we have one of the most developed IT companies in Kosovo which opened its education institute at the beginning of 2022. This institute offers intensive training for nine months with a focus on DevOps, front-end, and back-end development and while the training is offered for free, trainees must commit to working for partner companies for a minimum period of two years. One observation that can be made is that this institute is yet another attempt of an IT company to close the skill gap in the IT sector. While we have yet to see the results of this training institute, this instance, like many others, shows the focus of IT companies on initiating training centers that prepare the workforce for the needs of the market.

Conclusion and Recommendations

The skill gap that the IT sector in Kosovo faces has many implications. The sector is not able to reach its full potential because of the effects of this skill gap. Most companies in the sector face a deficit in the skilled workforce. The skill mismatch is noticed in both technical and soft skills. The phenomenon does not pose problems for companies only when recruiting new employees because its effects lead to other problems that make it ever so challenging for companies to operate efficiently. While the interest for students to study in the IT field increases, university programs are not preparing students with adequate skills for joining the IT labor market. This makes it more challenging for job-seekers to find employment in the sector. Companies have to continuously invest in their employees through training programs either inside the company or from external sources. Furthermore, IT enterprises have to be very careful when investing in their employees because of the tendency for them to leave the job shortly after

they have gained the necessary skills and experience. Employers identify the main reasons for their employee turnover rate to be the wage, more desirable living conditions in foreign countries, the global trend of frequently changing workplaces, and the high demand and low supply of skills. The Covid-19 pandemic also added unique challenges to this sector as the work environment and dynamic had to change. As a means of narrowing the skill gap, companies in this sector have started their own initiatives with training programs open to all interested candidates in the industry. These programs have shown to be successful in preparing trainees for the job market. While institutions of formal education cannot keep up with the fast pace of changes in the industry, different training centers focus on updating their programs as the industry changes its demands. As many job-seekers undergo training supplementary to their formal education, they report that the training has increased their chances of getting employed.

Recommendation for IT companies: Focus their attention on training centers and ways these centers can be utilized as a less-costly way of training people seeking to work in this sector.

Recommendation for IT students: The high demand in this sector and its fast pace of growth offer a lot of opportunities for career paths and development. Formal education in combination with additional training courses should offer students an advantage in the job market.

Recommendation for universities: While entire institutions take a long time to be updated, offer extracurricular courses and add practical sections to regular courses based on the industry's needs.

Future research steps in the area concern the long-term effects of training centers as a relatively new actor in the process of closing the skill gap in the IT sector. In future work, I

would also try to gather more information from formal education institutions as a means of

getting more insights into the skill supply side. I would also modify the questionnaires to be able

to gather the desired information in as few questions as possible with the assumption that a

shorter questionnaire would encourage a larger number of IT company representatives and

employees of the sector to fill it out.

References

Avram, A., Benvenuto, M., Costin, D. A., & Gravili, G. (2019). Assuring SME's Sustainable
 Competitiveness in the Digital Era: A Labor Policy between Guaranteed Minimum Wage
 and ICT Skill Mismatch.

Barthel, F., Witthöft, S., Baic, A., & Strack, R. (2016). Bridging the skills gaps in developing
 countries: A practical guide for private-sector companies.

Brun-Schammé, A., & Rey, M. (2021), A new approach to skills mismatch. OECD Productivity
 Working Papers.

Cedefop. (2018). Insights into skill shortages and skill mismatch: learning from Cedefop's
 European skills and jobs survey. Luxembourg: Publications Office. Cedefop reference
 series; No 106. http://data.europa.eu/doi/10.2801/645011

ECIKS. (2020). Supporting Kosovo Growth: The role of the ICT sector.
 https://eciks.com/supporting-kosovo-growth-the-role-of-the-ict-sector/

European Commission (n.d.). Kosovo; EU Support for the Competitiveness of Kosovo's ICT
 Sector

European Commission Economic and Financial Affairs (2021). 2021 Economic Reform
 Programmes of Albania, Montenegro, North Macedonia, Serbia, Turkey, Bosnia and
 Herzegovina and Kosovo: The Commission's Overview and Country Assessments.

European Economic and Social Committee [EESC] (2018). Skills Mismatches – An Impediment
 to the Competitiveness of EU Businesses.

Government of the Republic of Kosovo (2021). ECONOMIC REFORM PROGRAMME (ERP)
   2021-2023.

Institute for Free Market Economy [IFME]. (2020). Comprehensive Analysis of the ICT Sector
   In Kosovo: Changes in the ICT eco-system since the approval of the IT Strategy.

Institute of Student Employers [ISE]. (2018). The Global Skills Gap in the 21st Century.

International Labour Organization [ILO]. (2014). Skills mismatch in Europe.

International Labour Organization [ILO]. (2020). What is skills mismatch and why should we
   care?

Ministry of Trade and Industry, Republic of Kosovo. (2014). Sector Profile of ICT: Business
   Process outsourcing and customer support centers sector.

Office of the Prime Minister, Republic of Kosovo (2016). NATIONAL DEVELOPMENT
   STRATEGY 2016 – 2021 (NDS).

Open Data Kosovo [ODK] (2019). The Future Workplace in the Kosovo ICT Market

Puckett, J., Boutenko, V., Hoteit, L., Polunin, K., Perapechka, S., Stepanenko, A., Loshkareva,
   E., & Bikkulova, G. (2020). Fixing the Global Skills Mismatch.

PwC North Macedonia (2020). ICT Sector study North Macedonia Albania Kosovo

Sodhi, J. S. (2014). A Study of Skill Gaps in the Informal Sector. Indian Journal of Industrial
   Relations. http://www.jstor.org/stable/24546990

Udemy. (2020). 2019/2020 Skills Gap Report.
   https://research.udemy.com/research_report/2019-2020-global-skills-gap-report/

Van de Worp, S. (2020). The skills mismatch: Half of employees are working at the wrong skill

   level.

Vandeplas, A., Thum-Thysen, A., & Economic and Financial Affairs (2019). Skills Mismatch

   and Productivity in the EU.

Western Balkans Investment Framework [WBIF] (n.d.). Development of ICT Infrastructure in

   Education.

Appendices

Appendix A

Interview Consent Statement

Capstone Project Thesis Consent Statement

Title of the Thesis: Skill mismatch in the IT sector in Kosovo

Main Researcher: Erzë Ahmeti, student at RIT Kosovo
                                               Germia Campus Nazim Gafurri, 21
                                               Dr. Shpëtim Robaj, Prishtinë 10000
                                               +383 44 889 586
                                               erze.ahmeti@gmail.com; ea7981@g.rit.edu

1. **Purpose of the study:** The purpose of this research is to understand more fundamentally the challenges of employers in the IT sector in the context of hiring qualified and skilled staff who meet the requirements of this sector.

2. **Procedures to follow:** You are required to answer about ten (10) questions throughout the interview. The interview will be recorded and transcribed for analysis by the researcher.

3. **Duration:** The interview is expected to last about 30 minutes.

4. **Statement of Confidentiality:** Your participation in this research is confidential. The data will only be used by the researcher as part of the thesis. In any report of the results of this research, your identity will remain anonymous. Your name as well as other details of the interview that may reveal your identity or that of the persons you are talking about will not be disclosed. The signed approval statement as well as the original audio recording will only be accessible by the researcher and the work mentor.

5. **Voluntary Participation:** Your decision to participate in this research is made on a voluntary basis. You can stop at any part of the interview. You do not have to answer questions that you do not want to answer. You can contact the researcher with any questions you may have for further clarification or additional information about this research.

You must be at least 18 years old to participate in this research. If you agree to participate in this research as well as the information mentioned above, please sign in with your name and indicate the date below.

You will also receive a copy of this statement.

_____   _____
Participant Signature   Date

_____   _____
Researcher Signature   Date

Appendix B

IT Employee Questionnaire

Q1
Questionnaire for the workers in the IT sector

Capstone Project Thesis Consent Statement

Title of the Thesis: Skill mismatch in the IT sector in Kosovo

Main Researcher: Erzë Ahmeti, student at RIT Kosovo
                                Germia Campus Nazim Gafurri, 21
                                Dr. Shpëtim Robaj, Prishtinë 10000
                                +383 44 889 586
                                erze.ahmeti@gmail.com; ea7981@g.rit.edu

1. Purpose of the study: The purpose of this research is to understand more fundamentally the challenges of workers and employers in the IT sector in the context of hiring qualified and skilled staff who meet the requirements of this sector.

2. Procedures to follow: You are required to answer the questions in this questionnaire.

3. Duration: The questionnaire is expected to take about 10 minutes to complete.

4. Statement of Confidentiality: Your participation in this research is confidential. The data will only be used by the researcher as part of the thesis. In any report of the results of this research, your identity will remain anonymous.

5. Voluntary participation: Your decision to participate in this research is made on a voluntary basis. You can stop at any part of the questionnaire. You do not have to answer questions that you do not want to answer. You can contact the researcher with any questions you may have for further clarification or additional information about this research.

You must be at least 18 years old to participate in this research. If you agree to participate in this research as well as the information mentioned above, please answer "Yes" below.

Q2 Do you agree to participate in this research as well as the information mentioned above?

    Yes

    No

Q3 You are required to be an employee or self-employed in the IT sector in order to complete this questionnaire.

Q4 Are you employed in the IT sector?

Yes

No

Q5 You are …

An Employee

An Employer

Self-employed

Q6 Which age group do you belong to?

18-24

25-29

30-34

35-40

Other _____

Q7 Which gender do you identify with??

Woman

Man

Other _____

Q8 What is your role in the company where you work?

    Software engineer

    Web developer

    Quality assurance engineer

    DevOps engineer

    Technical support engineer

    Network engineer

    Blockchain engineer

    System administrator

    Database administrator

    Data scientist

    AI engineer

    UI/UX designer

    Project manager

    Social media manager

    Other _____

Q9 What is your work schedule?

    Full-time

    Part-time

    Freelancer

    Other_____

Q10 How many companies do you currently work for?

    I work for one 0company

    I work for two companies at the same time

    Other_____

Q11 How long has it taken you to get hired from the moment you started looking for work?

    < 3 months

    3 - 6 months

    6 - 12 months

    > 1 year

Q12 What were the criteria for employment in your current job? (You can select more than one criterion)

- ☐ Ph.D. Diploma

- ☐ Master's Diploma

- ☐ Bachelor's Diploma

- ☐ Certification from the training center

- ☐ Certification from online courses

- ☐ Work experience

- ☐ Specific technical knowledge of the field

- ☐ Soft skills

- ☐ Other _____

Q13 Do you work from the office or from home?

    From the office

    From home

    Hybrid/From both

    Other _____

Q14 Do you prefer to work from the office or home?

From the office

From home

Hybrid/From both

Other _____

Q15 Brief description of why you prefer the choice in the preliminary answer:

_____

Q16 How long have you been in this job?

<1 year

1-2 years

3-5 years

>5 years

Q17 How often have you changed jobs, on average?

<1 year

1-2 years

3-5 years

>5 years

Q18 Please select the THREE main causes that would make you quit your current job.

☐   The trend of more frequent job changes

☐   Higher salary

☐   Better opportunities abroad

☐   Studies

☐   Career advancement

☐   Better working conditions

☐   Other _____

Q19 During the pandemic, you consider employment opportunities became

	Very difficult	Slightly difficult	Did not change	Slightly easy	Very easy
Employment					

Q20 What is your level of education?

High school diploma

Bachelor's diploma

Master's diploma

Ph.D. diploma

Other _____

Q21 Field of completed education

_____

Q22 Institution of education

   Public

   Private

   Other _____

Q23 Did you have to receive additional training in addition to your formal education?

   Yes

   No

Q24 If so, when did you attend and how was the training funded?

	With self-financing/self-initiative	From the employer/company	Self-financed and by the employer	I did not hold any training
Pre-employment/during the internship				
On-the-job training				

Q25 What are the self-financed trainings you attended before your employment?

   _____

Q26 Where did you attend these trainings?

   _____

Q27 How long did training last on average?

   1-3 months

   4-6 months

   7-12 months

   Over a year

Q28 How much did you pay for training on average?

Training was free

< 100€

100 - 300€

300 - 500€

> 500€

Q29 How important has training been for your employment?

	1	2	3	4	5	6	7	8	9	10	
	1	2	3	4	5	6	7	8	9	10	
Not important at all											Very Important/ Decisive

Q30 What are the trainings you have attended throughout the internship?

_____

Q31 How long did a training last, on average?

1-3 months

4-6 months

7-12 months

Over a year

Q32 What kind of training has it been?

- [ ] In-company training

- [ ] Special certification program

- [ ] Learning by working with experienced employees (job-shadowing)

- [ ] Cooperation of the company with training centers

- [ ] Other _____

Q33 How important have these trainings been for your employment?

	1	2	3	4	5	6	7	8	9	10	
	1	2	3	4	5	6	7	8	9	10	
Not important at all											Very Important/ Decisive

Q34 What are the self-financed trainings you attended while employed?

_____

Q35 Where did you attend these trainings?

_____

Q36 How long did a training last, on average?

1-3 months

4-6 months

7-12 months

Over a year

Q37 How much did you pay for training, on average?

Training was free

< 100€

100 - 300€

300 - 500€

> 500€

Q38 What was the purpose of attending these trainings?

o For holding the position

o For promotion

o For updating specific knowledge of the field

Other _____

Q39 What are the trainings you have attended on the job?

_____

Q40 How long did a training last, on average?

1-3 months

4-6 months

7-12 months

Over a year

Q41 How often do you attend on-the-job training?

Every year

Every second year

Every five years

Other _____

Q42 What kind of training do you attend on the job?

☐   In-company training

☐   Special certification program

☐   Learning by working with experienced employees (job-shadowing)

☐   Cooperation of the company with training centers

☐   Other _____

Q43 Feel free to share additional comments or information in this section:

_____

Appendix C

IT Companies Questionnaire

Questionnaire for companies in the ICT sector
Capstone Project Thesis Consent Statement
Title of the Thesis: Skill mismatch in the ICT sector in
KosovoMain Researcher: Erzë Ahmeti, student at RIT Kosovo

Germia Campus Nazim Gafurri, 21
Dr. Shpëtim Robaj, Prishtinë 10000
+383 44 889 586
erze.ahmeti@gmail.com; ea7981@g.rit.edu

1. Purpose of the study: The purpose of this research is to understand more fundamentally the challenges of workers and employers in the IT sector in the context of hiring qualified and skilled staff who meet the requirements of this sector.

2. Procedures to follow: You are required to answer the 25 questions in this questionnaire.

3. Duration: The questionnaire is expected to take about 10 minutes to complete.

4. Statement of Confidentiality: Your participation in this research is confidential. The data will only be used by the researcher as part of the thesis. In any report of the results of this research your identity will remain anonymous.

5. Voluntary participation: Your decision to participate in this research is made on a voluntary basis. You can stop at any part of the questionnaire. You do not have to answer questions that you do not want to answer. You can contact the researcher with any questions you may have for further clarification or additional information about this research.

You must be at least 18 years old to participate in this research. If you agree to participate in this research as well as the information mentioned above, please answer "Yes" below.
* Required

1.   Email *

_____

2.   Do you agree to participate in this research as well as the information mentioned above? *
Mark only one oval.
◯ Yes   *Skip to question 3*

◯ No

3.   How many ICT workers are employed in your company? *
Mark only one oval.
◯ 1-5

◯ 6-10

◯ 11-15

◯ 16-20

◯ 20+

4.   What service does your company offer?? *
Check all that apply.
☐ Software products
☐ Software services/TI
☐ Hardware products
☐ Services for hardware products
☐ Other: _____

5. What is the average age group of IT staff in your company? *
   Mark only one oval.
   - ◯ 18-24
   - ◯ 25-29
   - ◯ 30-34
   - ◯ 35-40
   - ◯ Other: _____

6. How many vacancies for IT staff do you currently have in your company? *
   Mark only one oval.
   - ◯ 0
   - ◯ 1-5
   - ◯ 6-10
   - ◯ Other: _____

Technical and soft skills	The following questions will be about operating systems, programming languages, backend frameworks, frontend frameworks, database technology, e-commerce platforms, other technical skills and soft skills required by the IT staff at your company.

7. Please select from the list below or add to the list all operating systems used by your company! *
   Check all that apply.
   - ☐ Microsoft Windows
   - ☐ macOS
   - ☐ iOS
   - ☐ Android
   - ☐ Linux
   - ☐ UNIX
   - Other: ☐ _____

8. Which of the following programming languages are used by your company? *
   Check all that apply.

	HTML	CSS	JavaScript	PHP	Python	C#	C	C++	Jav
Usage	☐	☐	☐	☐	☐	☐	☐	☐	☐

   ◀ ▬▬▬▬▬▬▬▬▬▬▬ ▶

9. Is any other programming language used within your company? If yes, which one(s)?
   _____

10. Which of these backend frameworks are used in your company? *
    Check all that apply.

	Django	Ruby	Express.js .NET on rails	Laravel	Flask	Symfony		None of these
Usage	☐	☐	☐	☐	☐	☐	☐	☐

11. Is any other backend framework used within your company? If yes, which / t?
    _____

12. Which of these frontend frameworks / libraries are used in your company?

Check all that apply.

	Angular	Vue.js	Bootstrap	React.js	Ember.js	Svelte	React Native	Flutter	Back
Usage	☐	☐	☐	☐	☐	☐	☐	☐	☐

◀ ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬ ▶

13. Is any other frontend framework / library used within your company? If yes, which one(s)?

_____

14. Which of these database technologies are used in your company? *

Check all that apply.

	MS SQL Server	MySQL	Apache Derby	Microsoft Access	Oracle BDatabase	MongoDB	None of these
Usage	☐	☐	☐	☐	☐	☐	☐

15. Is any other database technology used within your company? If yes, which one(s)?

_____

16. Which of these e-commerce platforms are used in your company? *

Check all that apply.

	WooCommerce	BigCommerce	Shopify	Magento	Asnjëra nga këto
Usage	☐	☐	☐	☐	☐

17. Is any other e-commerce platform used within your company? If yes, which one(s)?

_____

18. Which of these other technical skills are required by the IT staff at your company?? *
    Check all that apply.

	Machine learning	Deep learning	Computer vision	Node.js	DevOps	Wordpress	AWS	UI design
Required	☐	☐	☐	☐	☐	☐	☐	☐

◄ ▬▬▬▬▬▬▬▬▬▬▬▬▬ ►

19. Are any other technical skills required by the IT staff in your company that have not been mentioned so far? If yes, which one(s)?

_____

20. Which of these soft skills are required by the IT staff at your company? *
    Check all that apply.

	Communica tion	Creative thinking	Critical thinking	Problem solving	Team work	Leadersip	Customer service
Kërkohen	☐	☐	☐	☐	☐	☐	☐

◄ ▬▬▬▬▬▬▬▬▬▬▬▬▬ ►

21. Are any other soft skills required of the IT staff at your company? If yes, which one(s)?

_____

22. Which of these are the employment criteria for the IT staff in your company? *
    Check all that apply.
    ☐ PhD diploma
    ☐ Master's diploma
    ☐ Bachelor's diploma
    ☐ Certificate from a traning center
    ☐ Certificate from an online course
    Other: ☐
    _____

23. What percentage of newly hired staff do you need to train? *
    Mark only one oval.
    ◯ 0% of cases

    ◯ less than 50% of cases

    ◯ over 50% of cases

    ◯ 100% of cases

24. How often should you train existing IT staff due to changing requirements for their skills? *
    Mark only one oval.
    ◯ Every year
    ◯ Every two yeara
    ◯ Every five years

    ◯ Other: _____

25. How long does the average training of an IT workshop in your company take?? *
Mark only one oval.

⃝ 1-3 months

⃝ 4-6 months

⃝ 7-12   months

⃝ Over a year

⃝ Other: _____

26. How long does an average IT worker stay in your company?? *
Mark only one oval.

⃝ <1 year

⃝ 1-2 years

⃝ 3-5 years

⃝ >5 years

27. How long does it take you to replace a worker? *
Mark only one oval.

⃝ < 3 months

⃝ 3 - 6 months

⃝ 6 - 12 months

⃝ > 1 year

28. What is the employee turnover rate within your company? *
Mark only one oval.

⃝ < 10%

⃝ 10 - 25%

⃝ > 25%

29. Please select the THREE main causes for the employee turnover rate in your company? *
Check all that apply.

☐ High demand and low supply

☐ The global trend of frequent workplace change

☐ High demand from workers for work from home Puna në

☐ More than one company

☐ Best Opportunities Abroad - Salary

☐ Dissatisfaction with the leadership of the company

Other: ☐ _____

30. How many of your company employees have left during 2021 due to: *
Mark only one oval per row.

	0	1-5	5-10	10+
Preference to work from home	⃝	⃝	⃝	⃝
Emigration to a foreign country	⃝	⃝	⃝	⃝

31. Is your company currently facing a shortage of skilled labor?? *

Mark only one oval.

◯ Yes

◯ No

32. If so, how do you cope with this shortage of skilled labor? *

Check all that apply.

☐ In-company training

☐ External consulting based trainings

☐ Special certification programs

☐ Lesson working with experienced employees (job-shadowing)

☐ Employment of skilled workers from abroad

Other: ☐ _____

33. How do you expect the number of employees within the company to change in 2022? *

Mark only one oval per row.

	Lower <50%	Lower 25-50%	Lower <25%	Not change	Increase up to 25%	Increase 25-50%	Increase over 50%
The number of employees will	◯	◯	◯	◯	◯	◯	◯

34. How has your business been affected by the pandemic in general? *

Mark only one oval per row.

	Big negative	small negative	No impact	Small Positive	Big Positive
Impact	◯	◯	◯	◯	◯

This is the end of the questionnaire.

You can go back to change any answer, or you can submit the questionnaire. Thank you for your time and information!

Appendix D

Interview questions for IT Companies

- What are the main technical skills that you as a company require from your IT staff?

- Do you focus more on a diploma, different certifications, or skillset as job requirements when hiring employees?

- How often do skill requirements change for employees of your company?

    - Do you hire new employees or train current ones in those cases?

- In general, what are the challenges you are faced with when hiring new employees in your company?

- Is there e mismatch between the skills you require and those that job-seekers possess? If so, for which skills do you notice a larger gap?

- What challenges does this skill gap present and what methods do you use to deal with it?

- How long does it take for you to train your employees?

- What are the costs of training employees (either monetary costs or costs to productivity)

- What is your company's employee turnover rate?

    - What challenges does this rate pose in the company's functioning?

    - What are the causes of this rate?

    - Do you think that migration to western countries for employment affects this rate?

    - What changes did you have to make to maintain a low turnover rate?

- How much has the pandemic impacted/changed your employee structure?

- What changes do you expect to see in your employee structure next year?

Appendix E

Interview questions for training centers

- When did you start operating and how does your center operate?

    - Do you have partnerships with other companies?

- What training programs do you offer at the moment?

    - Are they all in the field of IT?

- What do base your programs and curriculums on?

    - How much are market needs taken into account?

- How often do you make changes to the training programs you offer and their curriculums?

    - What are the challenges of doing so/making these changes?

- What skills do these training programs aim to develop?

- How much do you focus on soft skill development?

- What is the demand for these training programs?

- What are the demographics of a typical trainee in your center? Are they students? Are they employed? Have they attended university education?

- After the completion of a training program, what is the typical route trainees take? Do they continue their training? Do they continue their formal education? Or do they get employed?

- How difficult is it for you to find qualified trainers for the training programs you offer?

- Have you faced any challenges during the pandemic in particular?

- What changes do you expect in the future in terms of training programs you will offer and the demand for them?

Appendix F

Interview questions for universities offering study programs in the field of IT

- How many study programs does your institution offer in the field of IT and which are they?

- What was the number of graduates in these programs in 2021?

- What are the main technical skills do IT students develop at your university?

- What are the main technical skills do IT students develop at your university?

- How often do you change/update your programs and curriculums?

> - How long does it take for you to make these changes/updates?

> - How much are market needs taken into consideration when formulating curriculums, extracurricular programs/elective and optional courses, and practical components of a course?

> - Do face any challenges when cooperating with companies in the IT industry?

> - What are the main challenges for continuously making these changes/updates?

- How difficult is it to find qualified staff to teach these programs?

- What is the demand of students to attend Bachelor's, Master's, and Doctoral studies in the field of IT?

> - What do you think is encouraging this (low or high) demand in all three levels of higher education?

> - How do you expect this demand to change in 2022? Do you expect it to increase or decrease?