

Perspectives of Bosnian Women in the Field Of IT

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ABSTRACT

SUMMARY: Statistics show that men are mainly employees in the IT sector. Even though many IT companies want to employ more women the fact is that, in technology, there are six times less women than men. This article offers an insight onto the current representation of women in the global IT sector as well as in Bosnia and Herzegovina and its neighbouring countries.

KEY WORDS: information technologies, women in IT, woman in IT in BiH

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I. INTRODUCTION

Only 10 percent of start- up entrepreneurs in IT sector are women. Whether it is about application developing or creating internet websites, women are very rarely represented. Even though the development of website start- up projects is in full swing this sector employs only 14 percent of women [1]. In this article we have analysed how often are women represented in the IT sector in BiH, which job positions they usually take and what is their future in this area.

Europe

In European Union men dominate in the field of ICT. Average number of women is around 16, 7 percent [2]. Figure 1 illustrates the status from 2016. The worst situation was in Slovakia where 90 percent of jobs were done by men. However, the fact that gives hope is that, in six EU countries, the number of women in the IT sector is higher than the average. For example, in Bulgaria 30 percent of ICT experts are women, in Latvia and Lithuania almost 25 percent and more than 20 percent in Finland and Sweden.

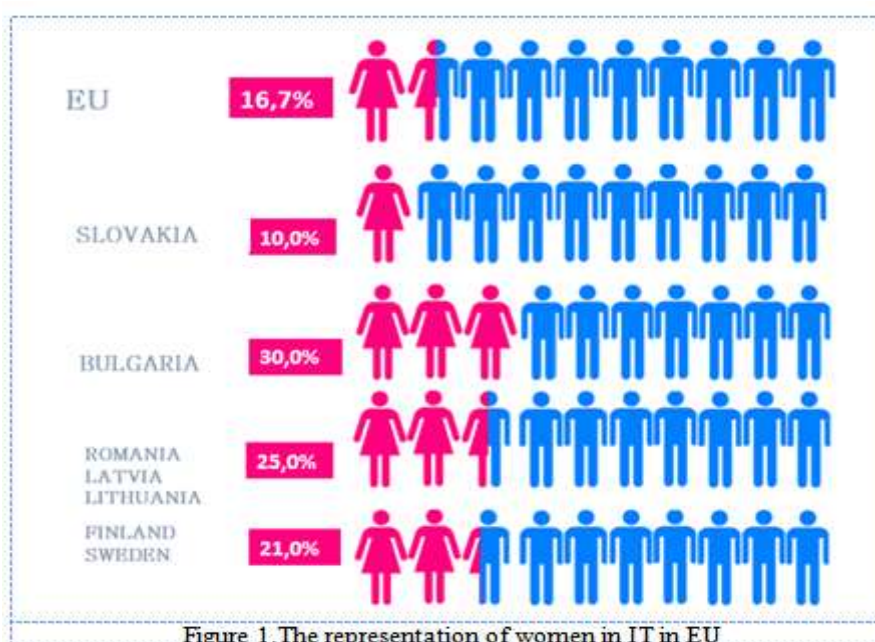


Figure 1. The representation of women in IT in EU

American entrepreneur Jess Erickson founded Greekettes in 2013, a network of women and IT professionals with its headquarters in Berlin. That network is constantly growing and it gathers 700 members. It has seven branches in other cities of the world, including New York and London. “Greekettes wants cultural change. We want women to go to conferences and to speak for the media. We want strong presence of women in technological industry”, says Erickson [1].

Percentage of women who are enrolled in IT studies in German universities has risen up to 20 percent. That is a positive trend. Judging by the information of the German Federal Association for Information Technologies, Telecommunications and Media (BITKOM), only in the last five years there have been more than 100. 000 job positions in the internet technology sector and there are still 40. 000 vacancies, due to the lack of qualified candidates. Whereas the deficit of qualified technology employees in Germany will be even higher, the chances for women with suitable qualifications for obtaining jobs in IT sector in Germany have never been better [1].

USA

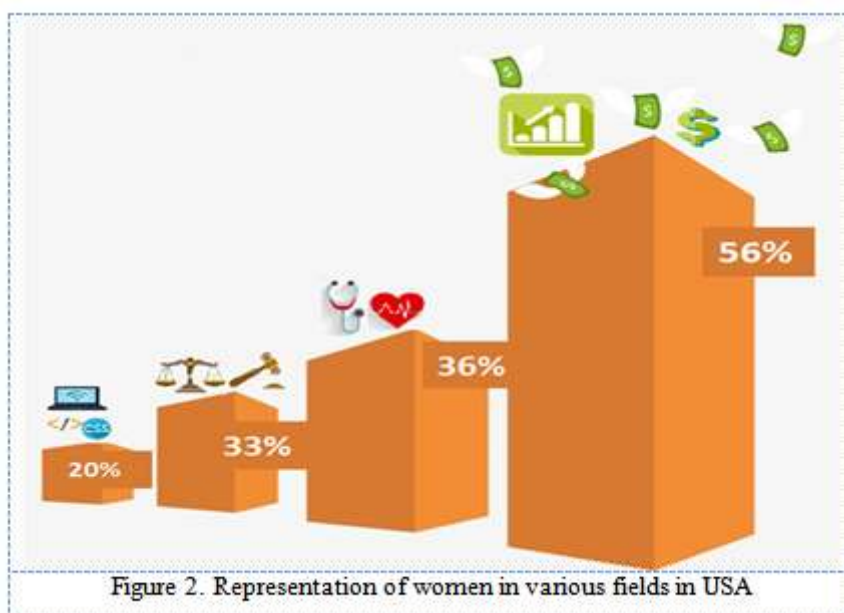
Even though they constitute 51 percent of population, women represent 59 percent of American labour force. However, in the United States, where the headquarters of the most powerful global companies are found, the area of information technologies is still predominantly a job for men.

Regardless of the fact that women represent 30 percent of all employees in technological industries, an insight into women's participation in technological and leadership jobs shows that very few women are in a position to influence the product development or strategic course of their companies.

Official records show that in average, in companies such as Google, Apple, Facebook, Microsoft, Cisco and Twitter, women do 15, 6 percent of technological jobs. Their representation in leadership occupations in these companies is slightly higher and in average it is around 22, 5 percent [3].

What's the problem?

Even though women finish college more often than men, a large number of them today decide to enroll into other highly qualified occupations and less into technology. Women dominate in the area of business and finance, where they represent the majority of 59 percent of the employees, women- doctors 36 percent, women- lawyers 33 percent, while women- software developers constitute only 20 percent, as shown in the figure 2 [3].



What are the causes?

Problem begins early because the experts say that girls from USA lose their interest in science, technology, engineering and mathematics during high school. Today, the situation is far more worse than it was 30 years ago. Percentage of women with college degree in computer sciences in 1985 was 37 percent and in 2013 only 18 percent [3].

Salary increase could be one of the ways of women's higher interest for employment in the IT sector. According to the report made by Joint Venture Silicon valley for 2015, men in Silicon Valley with IT college degree have earned 60 percent more than women with the same level of education [4].

Even though percentage ratio of women in IT sector is still low, the analysis made by GitHub has determined that programmers give positive grades more often for applications made by women than those made by men. As shown in the figure 3, 78, 6 percent application purchasers were favourable towards applications made by female programmers [5].

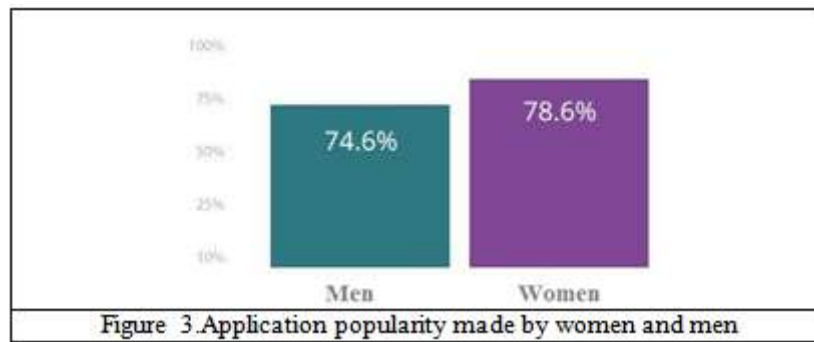


Figure 3. Application popularity made by women and men

National centre for women and information technologies estimated that, by 2022, around 1, 2 million vacancies will be able in IT sector. Universities in the United States currently educate experts who will be able to fill only 39 percent of those vacancies. This should animate girls who decide to enroll for college and women who are dissatisfied with their current jobs to qualify or re- qualify for jobs in the IT sector [3].

Many leading tech companies work on eradicating of gender disparity in their organisations even though progress is very slow. As shown in the figure 4, percentage of women in tech positions in Facebook has risen up to 31 percent, in Microsoft up to 25, 8 percent, in Amazon up to 39 percent and Twitter up to 37 percent, which gives an average of 30, 4 percent [6].

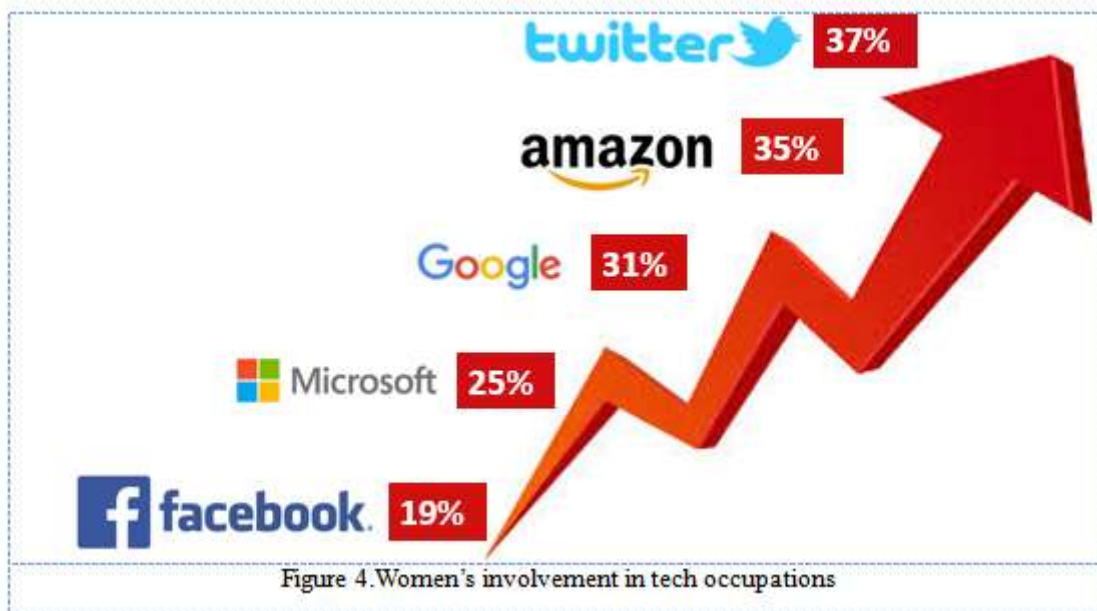


Figure 4. Women's involvement in tech occupations

II. IT SECTOR TODAY IN BIH AND NEIGHBOURING COUNTRIES

Croatia

In Croatia women form 29 percent of all employees in technology and only 19, 2 percent of them work in managerial positions [7].

Statistics for women in science are a bit more positive in broader sense but work still needs to be done for status improvement and visibility of women in the STEM area. Records from 2015 show that the majority of enrolled students are women (57 percent) and that 57 percent of new PhD's are women. However, out of 143 regular members of Croatian Academy of Sciences and Arts only 14 of them are women, or 7, 9 percent [8].

Serbia

Among faculty educated population in Serbia women lead with 58 percent when compared to men. Number of women is the highest in education (87 percent), health care (73 percent), arts (71 percent) and social sciences (61 percent).

Numbers of women in the ICT sector in Serbia vary and some records manipulate with the numbers from 10 to 12 percent and some even up to 40 percent. However, real figure of women's presence in the IT

sector is from 10 to 15 percent. Members of the Serbian Academy of Sciences and Arts in the department of natural sciences and mathematics are mostly men, while the number of women is extremely low [9]. Figure 5 shows the representation of women in the IT sector in BiH and neighbouring countries.

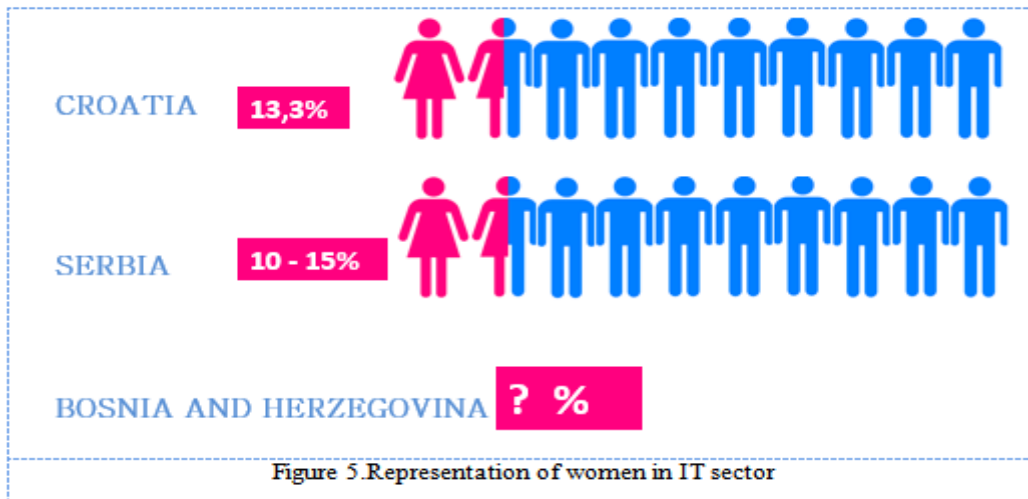


Figure 5 Representation of women in IT sector

Bosnia and Herzegovina

Even though 51,4 percent of working-age population in the entity of Federation of BiH are women, they constitute only 39, 3 percent of the labour force. According to the report of the Federal Institute for Statistics from March, 2017 from a total number of employees in the Federation of BiH 61, 4 percent are male and 38, 6 percent are female. Out of total number of unemployed people 58, 5 percent are male and 41, 5 percent are female (figure 6).

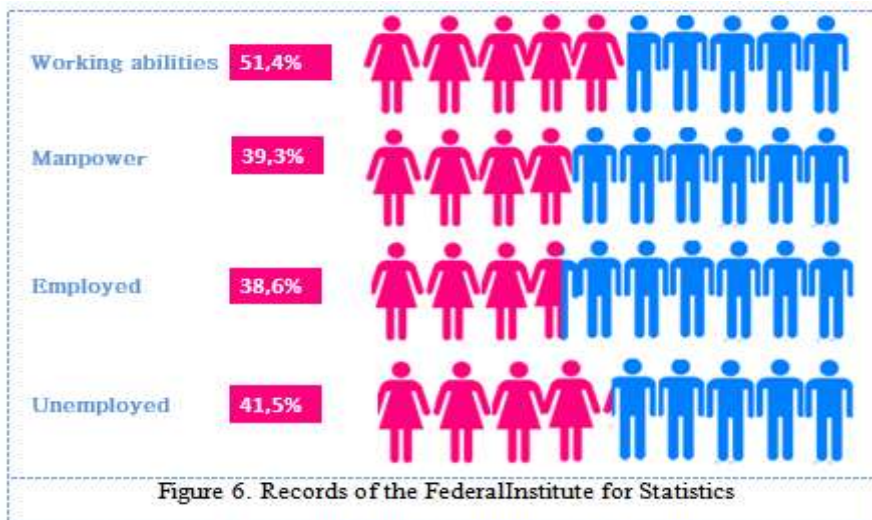


Figure 6. Records of the Federal Institute for Statistics

IT sector in BiH has risen in the last five years for 72 percent [10]. In the last 5 years, the IT sector in Bosnia and Herzegovina has risen up to 72%. According to the report of Agency for statistic of BiH in 2015, 9374 females and 6600 males graduated. In the area of Information and communication technologies has graduated 473 male students. As presented in the figure number 7, the number of females who have graduated in the same areas is 3 times less and it is 151.

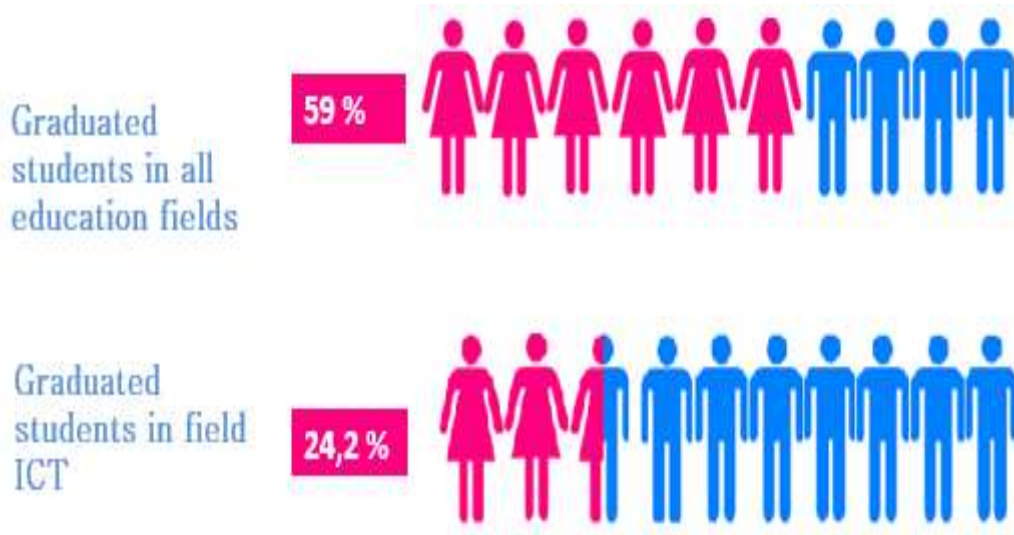


Figure 7. Graduated students based on the area of education in 2015.

According to the records of institutes and job agencies in BiH up until December 31st, 2017 out of total number of people who are in search of employment 54,1 percent of them are women [11].

As shown in the figure8 and according to the record of Federal Institute for Statistics from March 2017 more female have enrolled and finished bachelor studies on higher education institutions in BiH in the academic year 2016/2017, while in the same academic year more male persons have acquired Master's and PhD degrees [12].

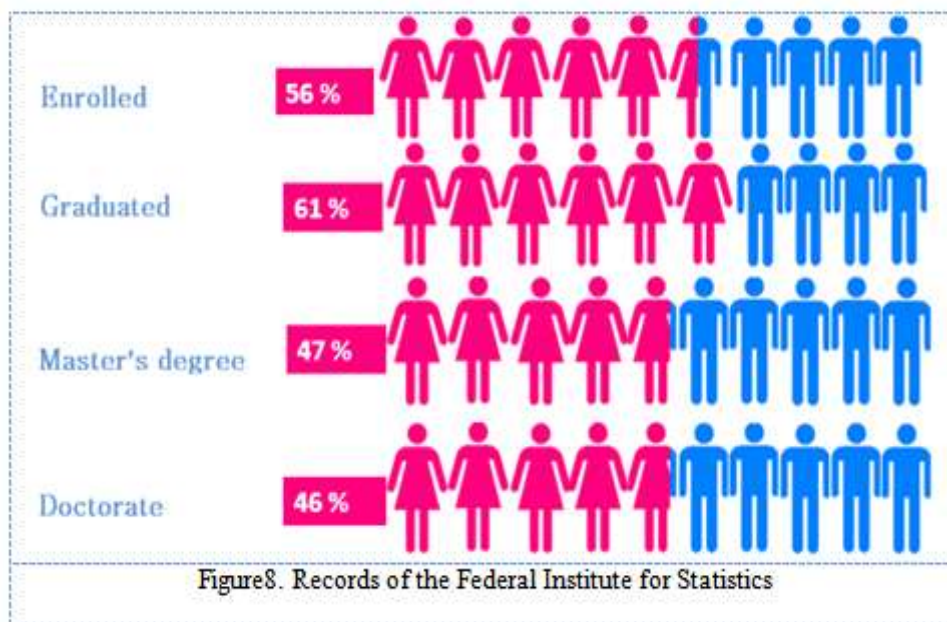
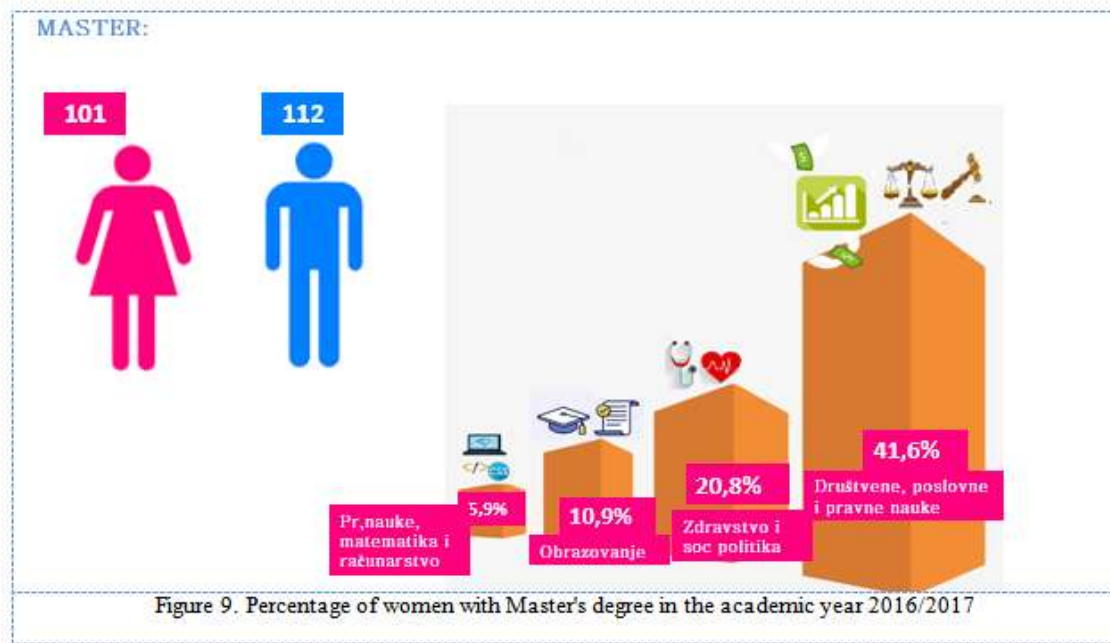
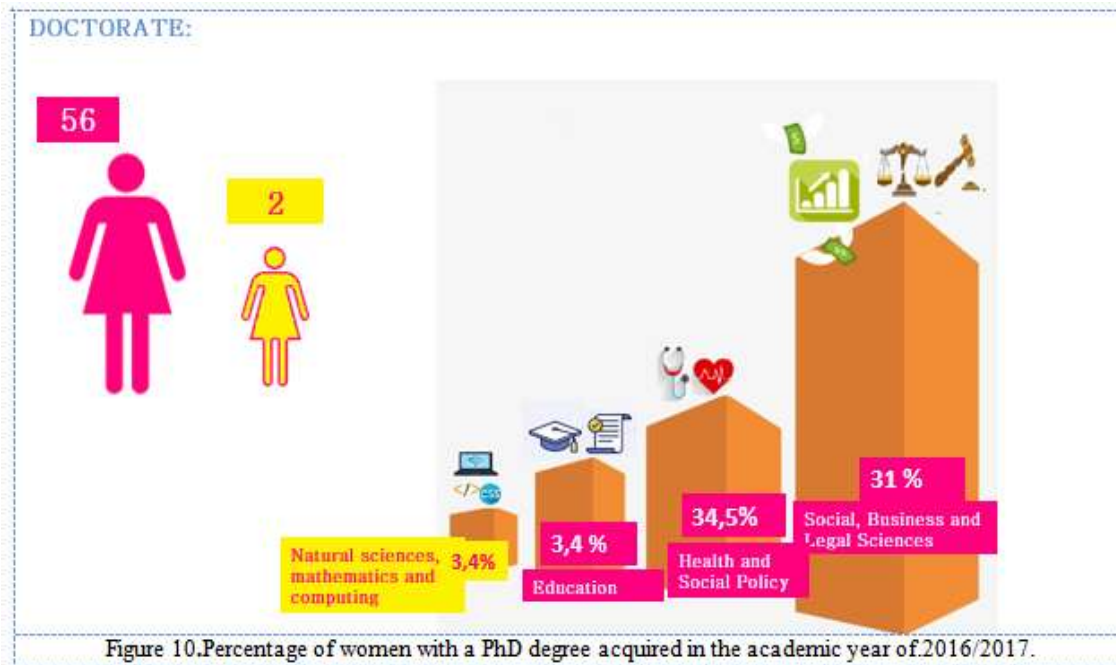


Figure 9 shows that, out of 101 women with a Master's degree in the academic year of 2016/2017 only 5,9 percent of them have acquired their degree in the field of natural sciences, mathematics and computer sciences.



Also, according to the same report, out of 58 women who have acquired a PhD degree only two of them have acquired the degree in the field of natural science, mathematics and computer sciences, which represents only 3, 4 percent of total number of women who have acquired a PhD degree in the academic year of 2016/2017 (figure 9).



Since 2016 a team of Un employees known as IT team works together with young girls in BiH. Their goal is to encourage girls aged 13 to 15 to start programming because in this age they start thinking about their future occupation [13].

According to the research of the Agency for employment and mediation in BiH, diplomas of the faculty of electrical engineering are among those that bring the highest profit and occupations such as software engineers and IT managers are among the best paid jobs. Unemployment rate is the lowest in the IT sector.

Even though more and more girls decide for computer sciences still, when an advert is given for a job position in some of companies in BiH, out of 50 applications only two are made by women [14].

Members of the Academy of Sciences and Arts of BiH are mainly men (62), while a number of women is drastically smaller (10) and only one woman comes from the field of technical sciences [15].

III. CONCLUSION

Lack of women in the field of IT represents a big problem. Current representation and the position of women in IT sector was analysed in this article. Statistics show that men currently dominate in this sector. On the level of European Union out of 1000 women who acquire a higher level of education, 29 of them are with a diploma in informatics or similar field and only four of them work in the IT sector. Situation is not better in the largest global companies. Last year's reports show that an average of 30 percent of employees are women. A common case is that women quit their IT career only after a few years and mostly because they have lower salaries when compared to men as well as a lack of opportunity for career development.

One of the goals of sustainable development encouraged by the member countries of UN, in the frame of global development agenda, is to achieve gender equality and empowerment of women and girls. Regarding the statistic indicators about the representation of women in the IT sector in BiH it is obvious that there is a need for encouragement and motivation of women and girls from higher involvement in the IT so that they could have, as their male colleagues, benefits in this growing sector and to be able to participate actively in its further development. Records that are encouraging are like the ones we unofficially received from an employee at the IT Academy- a school for profitable IT career, who says: "We have no insight in gender statistics but a lot of women are attending IT courses lately at our academy, mainly in programming languages such as Java, PHP but the highest interest is for Design & Multimedia department".

For the purpose of increasing the number of women in the field of IT, it is necessary to do much more on encouraging girls and young women to deal with computers and programming. To motivate girls with an already formed attitude and with a stereotype that programming is a job for men is not an easy task but introducing them to the world of technology and its benefits represents a very good start.

REFERENCES

- [1]. Deutsche Welle. (2014). Network wants to see more women in tech startups. Downloaded 28.1.2018. (<http://www.dw.com/en/network-wants-to-see-more-women-in-tech-startups/a-17863655>)
- [2]. Computer Weekly. (2017). Dame Stephanie Shirley: Entrepreneurs learn to survive. Downloaded 2.2.2018. (<http://www.computerweekly.com/feature/Dame-Stephanie-Shirley-Entrepreneurs-learn-to-survive>)
- [3]. Kiersten.S., (2017).TECH'S GENDER DILEMMA: Where are the women? Downloaded 29.1.2018. (<http://kierstenschmidt.com/586/Project2/>)
- [4]. Silicon Valley Inde. (2015).Jointventure.org. Silicon Valley Institute for Regional Studies. Downloaded 2.2.2018. (<https://jointventure.org/figures/stories/pdf/index2015.pdf>)
- [5]. BCA. (2018).Belgrade Coding Academy – Programerska radionica. Downloaded 2.6.2018. (<http://www.bca.rs/zene-u-it-sektoru>)
- [6]. CNBC. (2017). Facebook on hiring more minorities: 'It's complicated'. Downloaded 29.1.2018. (<https://www.cnbc.com/2017/08/02/facebook-diversity-numbers.html>)
- [7]. Mateja Zbodulja. (2016). Žene u ICT-u: Tradicija se teško mrvi, ali jaki ženski umovi ruše sve stereotipe. Downloaded 20.2.2018. (<http://www.netokracija.com/ada-lovelace-day-zene-it-hrvatska-125183>)
- [8]. MojPosao. (2017). Hrvatska iznad prosjeka EU po udjelu žena u znanosti. Downloaded 20.2.2018. (<https://www.moj-posao.net/Savjet-Za-Poslodavce/76776/Hrvatska-iznad-prosjeka-EU-po-udjelu-zena-u-znanosti/2/>)
- [9]. Branka Malenica. (2015). Istražujemo: Ima li mesta za žene na domaćoj IT sceni? Downloaded 28.1.2018. (<http://www.mojnovisad.com/vesti/istrazujemo-ima-li-mesta-za-zene-na-domacoj-it-sceni-id6104.html>)
- [10]. N1. (2016). Na birou u BiH nema programera: Cijeli svijet je tržište. Downloaded 20.2.2018. (<http://ba.n1info.com/a90310/Vijesti/Vijesti/IT-sektor-u-BiH.html>)
- [11]. FENA. (2018). Na evidencijama u BiH 475.084 nezaposlenih, više od pola žena. Downloaded 20.2.2018. (<https://www.klix.ba/vijesti/bih/na-evidencijama-u-bih-475-084-nezaposlenih-vise-od-pola-zena/180201107>)
- [12]. FZZS (Federalni zavod za statistiku). (2017). Saopćenje God:X Br:12.3 od 3.3.2017. Downloaded 2.2.2018. (<https://view.officeapps.live.com/op/view.aspx?src=http://fzs.ba/wp-content/uploads/2017/03/12.3.xls>)
- [13]. IT Girls. (2018). Downloaded 2.2.2018. (<http://itgirls.ba>)
- [14]. ALJAZEERA BALKANS. (2016). IT Girls u BiH: Programiranje nije samo za dječake. Downloaded 20.2.2018. (<http://balkans.aljazeera.net/vijesti/it-girls-u-bih-programiranje-nije-samo-za-djecake>)
- [15]. ANUBIH. (2018). Akademije nauka i umjetnosti Bosne i Hercegovine. Downloaded 28.2.2018. (<http://www.anubih.ba/index.php?lang=ba>)

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