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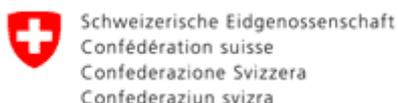
CATALYST FOR CHANGE

GENDER EQUALITY IN IT SECTOR IN BOSNIA AND HERZEGOVINA

Sarajevo, May 2016

Research conducted by:

Kolektiv Ltd. (Posao.ba)

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Contents:

Abstract

The Study on gender equality („Study") in the IT sector in Bosnia and Herzegovina (BiH) is created on the MarketMakers' initiative, a project supported by the Swiss Government through the Swiss Embassy in BiH and the Swiss Agency for Development and Cooperation (SDC). The project is part of contribution of Swiss Government towards socially included market, and a decentralized, democratic political system, as well as long-term perspective for accession to European Union. MarketMakers project is implemented by a consortium consisting of Helvetas Swiss Intercooperation and Kolektiv Ltd. (Posao.ba), based on the research conducted by Kolektiv (Posao.ba).

The development of the Study is motivated by an effort to enable a quality empirical basis for implementing policies and measures to increase the number of women in the IT sector, in accordance with the appropriate strategies for promoting gender equality. The aim of the Study was to establish the factors that can be tackled to increase the number of women, which has been done through the concrete objectives, and the issue is tackled from multiple sides – IT companies and their businesses, employees of IT companies, jobseekers in IT sector and general population of BiH. In order to achieve the objectives, we set the criteria such as available possibilities for women in IT sector, the corporate philosophy of IT companies, interests of women in IT sector and attitudes of general population towards the IT sector. The research was conducted on a sample of 305 women and men (women: 156; men 149), individuals and companies' representatives, so it is possible to make conclusions on the level of BiH. The data were collected not only for women, but also about the characteristics of their working environment, IT companies, and general population and jobseekers, which enabled us to analyze important determinants of gender inequality in the IT sector. Gender equality is considered one of the fundamental values of modern democratic societies. The concept of gender equality assumes that all human beings have the right to develop their skills, improve and implement their personal capacity and that no one is allowed to block them by pushing them into predefined gender roles. Gender equality entitles the right to equality and the right of being different.

According to the key factors while considering this issue, we separately questioned representatives of IT companies, employees of IT companies, jobseekers and students of IT related professions, as well as general population.

Key terms:

IT sector, BiH, women in IT sector, gender equality, workforce

1. Introduction

The main objective of the research was creation of a baseline study on the obstacles which prevent women to step into the IT sector, and which can be impacted systematically and thus contribute to the long-term increase in the employment rate of women in the IT sector in BiH.

This thematic focus of the Study has come from the insight of the gender inequality of the sector, which result in disadvantaged position of women in other areas of social life. In order to accurately identify the real number of employed women in IT sector, barriers faced by women, and factors that can be tackled for improving the situation, the Study had several key objectives:

1. To analyze the existence of available opportunities for women in IT sector (number of IT companies currently employing, number of open vacancies, etc.),
2. To analyze the specifics of the business of IT companies as a possible reason for the lack of women in IT sector (analyzing attitudes towards employment of women and practices of employment),
3. To explore whether there is an interest to work in IT sector by women, as well as their attitudes towards the IT sector (find out the number of women in IT sector, frequency of female applicants, number of application for IT jobs, number of enrolled in IT colleges, etc.),
4. To check the perception of women employed and seeking employment in IT sector towards the sector,
5. To examine the perception of general population towards women in the IT sector, and IT sector in general (whether there is discrimination of women who work in IT sector, or lack of support for women choosing this profession), and
6. To give recommendations for increasing the number of women in the IT sector.

The information presented the Study give a brief summary of the research, and the full results are available on request. The information presented in the Chapter 4 are valid during the preparation of the research and will not be updated after the publication of the Study.

2. Research methodology and sample choice

For the purposes of this research, a special methodology has been developed. The main premise on the inequality in the labor market, combined with the need to include the economic position of women and their social context, as well as the intention to ensure the recommendations, resulted in the combined strategy of gathering information. Four questionnaires were created: first for the companies operating in the IT sector (including the composition and size of company, number of employees and information related to business policies and attitudes towards gender differences); second for the workforce in IT sector (employees, their position in the company and society, attitudes towards the IT sector, experiences on the IT companies); third for jobseekers and students of IT skills (on their characteristics and attitudes towards the IT sector); and fourth for the general population (attitudes towards the IT sector and perception towards women in IT sector).

Data collection was conducted from April 27th to May 17th 2016 for all the participants except the companies, which lasted until May 20th. It was performed through an online survey promoted through social networks. In addition to that, follow-up phone interviews were done for companies and employees in order to clarify any misinformation. Moreover, a number of jobseekers were phoned from *Posao.ba* database randomly. In this way, we created conditions for unhindered research on issues that are considered sensitive and that require a special approach of a researcher.

Besides the online survey and telephone interview, a secondary desk research has been conducted. We used the archived information on the analysis of the number of companies in BiH, number of women in the IT sector, as well as the number of students and graduates of IT faculties in the last three years to get an insight on the interests on high school students as well as the success of enrollment and graduating the IT faculty.

Selection of sample was primarily determined by the size of the minimum sample for entire population needed for the statistical data analysis (n=60; 30 men and 30 women). When it comes to the companies of IT sector, we started from a TRON database[1]. Out of all the companies registered under software programming we excluded all of those which did not have income during April, as well as those which have less than 5 employees. The final companies' participants were chosen randomly. At the same time, we asked companies to delegate four employees (2 female and 2 male) to participate in the survey.

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[1] TRON Business Intelligence System is designed as the biggest and the most accurate database of financial and other companies in BiH.

The sample for IT jobseekers/students and general population was collected through an online survey. The first question for jobseekers was DQ which immediately excluded people who were not our target group. The survey was published on the social networks channels, as well as *Posao.ba* website, and respondents were located throughout BiH.

3. IT sector in Bosnia and Herzegovina

IT sector in BiH has been expanding in the recent years, and since 2010 it has achieved growth of 72%.[2] During the last few years, IT experts are among the most needed professionals.[3] The sector is characterized by young companies and small enterprises. IT companies in BiH are mostly young, established from 2005 till 2014.

Despite the growing number of companies and increasing demand for IT professionals in the sector, there are many obstacles that are on its way of development. Some of those are lack of legal regulations concerning the export of software products, inconsistency and incompatibility of national legislation with EU standards regarding online marketing, high fiscal costs, lack of funding for research, development and training of the IT professionals, lack of clear vision and strategy, and brain drain of young professionals from our country. There is no clear strategy for determining the direction of development of the IT sector in our country, nor creating a supportive environment for local IT companies. Lack of awareness on information technology as a strategic sector for the future of our economy slows down its development. It is evident to facilitate rigid and inadequate legislation which hampers the progress of the sector, as well as strengthen state's role in the industry which is related to the promotion of the employment in the local IT companies, in order to foster their development and prevent the brain drain of high quality professionals.[4]

BiH is not behind the global trends and the labor shortage in the IT sector. The annual analysis of the labor market by Posao.ba 2013-2015 has shown that the number of vacancies in IT sector grows every year and that the number of skilled workers is decreasing, and that the trend remains the same on the list of most desired occupations in BiH. Programmers, web developers and other IT related skills remain among the scarce in the BiH market.

In BiH, companies point to the constant difficulties in finding suitable workforce, so it can be assumed that there is a serious imbalance of supply and demand in the labor market. A major problem of the sector is that the youth applies their knowledge beyond the borders of BiH, due to the fact that there is deficit in the sector worldwide. Although the salaries and working conditions in BiH IT sector are better compared to the rest of the economy, they are behind the conditions offered elsewhere, so it is hard to keep young experts in the country. In general, we can say that one of the key issues of the industry is investment in the education and constant improvement as well as harmonization of our education system with the needs of the market.

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[2] http://novovrijeme.ba/it-sektor-u-bih-prilika-za-mlade-ljude/
[3] Kolektiv/Posao.ba; Annual analysis of labor market 2013, 2014 and 2015.
[4] http://novovrijeme.ba/it-sektor-u-bih-prilika-za-mlade-ljude/

3.1. Gender equality in IT sector in BiH

In 2015, 25% of the total workforce of IT sector was female.[5] Considering the importance of the technical areas in the modern economy and the rapid expansion of the employment opportunities in technical professions, lack of women in them is puzzling from a research perspective. This trend is also interesting from a policy perspective because it suggests that even though there is a massive demand for IT professionals, we fail to properly respond to the needs.[6]

Having all this in mind, there is a significant disparity between the percentage of men and women, which is consistently repeated in all age groups. Throughout the country, a total of 65.7% of men participate actively in the labor force, compared to 41% of women from the same age group, indicating a difference of 24.7%. Gender differences are somewhat reduced in the younger age group (age 15-24) to about 17%, but continuously increases in older age groups and reaches a level of 27.2% for people aged 25-49. Participation of women is significantly lower than which could be expected at this level of development. Even though the participation in the labor market is low for the both gender than European, Central Asia and OECD average, the gender gap is even higher than in those countries.[7]

Strategies which are related to active employment policies (Employment Strategy BiH 2010-2014; Employment Strategy FBiH 2009-2013; and Employment Strategy RS 2010-2014) recognize women as excluded and vulnerable groups, and measures are given to increase female employment, keep statistics based on gender, establish indicators which will follow the implementation of strategic documents for both genders, prevent grey economy and alike.

In BiH there is still a strong link between the social role of women, her education, profession and position in the labor market, which directly impacts the number of women in IT sector. The labor market analysis shows that in BiH there are typically male and female professions, and that there is a difference in the salary in the private sector, where men earn more than women. Discrimination is reflected through differently regulated maternity leave policies in different parts of the country, and by fact that maternity leave is not always paid makes women lose their jobs while pregnant. This issues need to be addressed in the

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[5] https://www.ncwit.org/
[6] The importance of workforce diversity from political perspective is mirrored through many programs offered by National foundations for science for increase of women and minority participation in technical subjects. More on this topic has been done by Xie and Shauman (2003, str. 4-6).
[7] Source: Survey on labor force BiH, 2013.; Available at: http://arsbih.gov.ba/wp-content/uploads/2016/03/WB-Rodne-razlike-u-iskoris%CC%8Ctavanju-prava.pdf

educational policies as well as in the implementation of the laws, combined with an increase in the monitoring of law enforcement.[8]

If there are obstacles preventing economic and social development, it is absolutely necessary to remove them and secure their entrance in the IT sector. If the barriers continue existing, women continue to be marginalized. There are many who neglect the gender differences of IT sector in developing countries such as BiH, pointing out that the development should be focused on more basic needs. However, there should not be a choice between the one and the other. IT sector can be a major instrument in recognizing the basic needs of women and can provide resources to reduce poverty of women as well as their removal from the marginalized groups.[9]

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[8] http://yep.ba/izvjestaj-o-stanju-ravnopravnosti-polova-visoke-rodne-razlike-u-stopama-nezaposlenosti/, 30.3.2016.

[9] As European Commission stipulates: "A study on women active in the ICT sector (…) found that allowing more women to enter the digital jobs market can create an annual euro 9 billion GDP boost in the EU area. A policy change is needed particularly because of an alarming drop in ICT female graduates." https://ec.europa.eu/digital-single-market/en/women-ict
The Atlantic emphasized on the importance on having more women in the company, which shows results in income and innovation: "(…) several empirical studies finding that people with more diverse sources of information generated consistently better ideas. (…) Facebook's COO, Sheryl Sandberg, and Yahoo's CEO, Marissa Mayer, have demonstrated that women can be a driving force for innovation and ideas in technology." http://www.theatlantic.com/technology/archive/2013/10/we-need-more-women-in-tech-the-data-prove-it/280964/

4. The results of the research

4.1. Characteristics and business practices of IT companies in BiH

The total number of IT companies participating in the research is 21. Sample is finalized by reviewing TRON database (409 companies registered as computer programming by April 2016). We excluded companies with no revenue or with less than 5 employees, which led to a sample of 154 companies. 57 companies were invited to participate in the research, and contacted by phone to obtain feedback whether they are interested in participating in the research. 63.16% were not interested, due to their commitments or lack of time. Final number of participants was 21, while 20 correctly filled the questionnaire.

Companies which participated are mostly young, the youngest established in 2014, and the oldest in 1990. 21 company jointly employs 916 people during research period. Total number of female employees is 264 (28.82%), and male employees 652 (71,18%). The highest number of employees of a company is 209, and the smallest is 4.[10] The average number of employees is 43, with significantly lower number of women.

Graph 1 Number of employees in IT companies based on gender
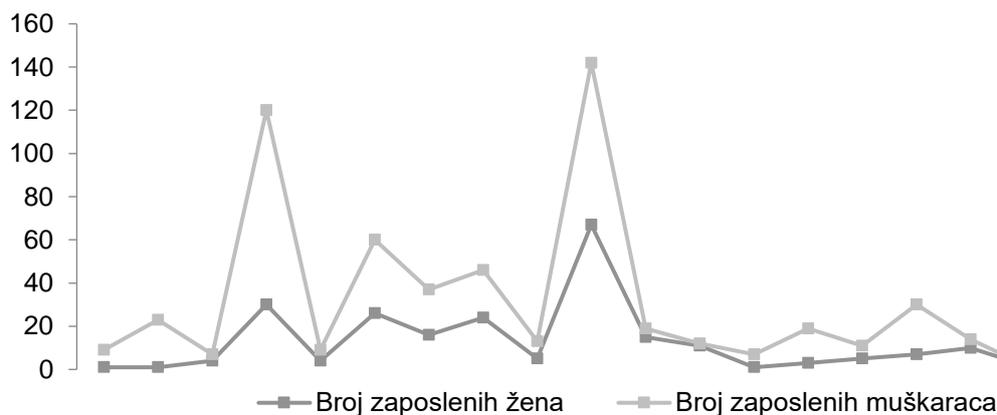
IT companies actively looked for the new workforce in the last year. 85% of them searched for the new employees. Since April 2015 until the same period this year, 20 companies searched for 200 new employees. One company explained how they constantly have an open call for interesting candidates. A company with the smallest number of vacancies searched for 2 new employees, while the company with the biggest number of vacancies searched for 158 employees. On average, one IT company annually searches for 17 new employees.

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[10] Even though during selection of sample, companies with less than 5 employees at the moment of downloading data from Tron base have been excluded, company stated that it has 4 employees. The reason for this may be that the number of workers decreased in the period of creating a sample in base to gathering data in the field. Despite this difference the company was taken in the analysis of the results.

There are many problems in finding new workforce. Only 10% of the companies said they have no issues in finding new people. The most common issue is the lack of skilled workforce, i.e. there is lack of candidates with relevant working experience (75% companies), lack of skilled workers (60%), and lack of candidates with necessary foreknowledge (50%).

Besides the abovementioned, companies emphasize the lack of candidates committed to work (20%), and lack of candidates ready for continuous education (15%). Additional mentioned reasons are lack of candidates with English language skills, and those who are flexible and ready to travel.

Considering the abovementioned problems, IT companies have different means for finding new workforce, including the recommendations of the employees (90%), media advertising (85%), and recommendations by acquaintances (70%). Since there is lack of IT experts, some companies organize and participate in job fairs, try headhunting, and organize events for interested candidates.

Final decision on employment of the new workforce is made by the CEO/director (52,38%), a committee of experts in the required position, team manager, HR team and a team which needs a new person (9,52%). 14,29% of the companies have an HR team which makes a decision on employment, and in rare cases the decision is made by the board of directors and co-founders.

4.1.1. Encouraging and promoting diversity in IT companies

Some factors that can impact the number of women in IT sector are the characteristics of doing business of IT companies, i.e. their employment practices and current policies and attitudes towards hiring women. Since it is difficult to find adequate workforce, IT companies try to give different benefits to their employees. Some of the benefits are work from home and flexible working time (75%), frequent weekend events organized by the company (65%), free drinks at work (60%), sick leave (50%) and additional annual leave days (45%).

25% companies said they have other innovative and stimulating measures such as support for sports activities, play room, parking ticket, free fruit and food, paid overtime, paid trainings and education (internal and external), per diems and fully covered travel expenses, fully covered insurance, trips and excursions organized by the company, bonuses for the best employees, free gym and resting room as well as team building activities.

40% of them claims that they have differentiated themselves from other companies on the market based on the benefits they offer to their employees. Companies emphasize that they offer education for all employees, international career and worldwide travelling, fully covered parental leave, individual trainings and development, additional annual leave days (5

days), working on the projects and equipment they prefer, 13th salary, regress salary and money for religious holidays. Besides that, some companies add free healthy meal, fruits and refreshments, gym, and unlimited vacation. According to the answers by IT companies, 80% of male employees use flexible working time, while none of the female employees uses this benefit.

While researching the attitudes and opinions of the IT companies, what mostly occurred as a disadvantage of IT sector is overtime work. Companies claim that overtime depends on the position, and 55% of them agrees with this statement. 40% of the companies said that overtime happens a couple of times per month, while 5% of the companies do not have the overtime.

In the last year, IT companies god 589[11] applications for open vacancies of which 35.32% by women. IT companies said that they do not encourage women to apply, while only 5% do so sometimes. Only 5% of the companies always publishes that they encourage female applicants.

> **Companies on the reasons on the lack of women in IT**
>
> Company 1: „IT is still considered a 'male' profession and female are considered to be bad programmers and engineers."
>
> Company 2: „IT is a specific industry in which the affection towards work plays a higher role than gender, so there are no obstacles neither for men nor for women who like programming or IT sector."

20% of the companies said that they have campaign for attraction and retention of the female employees, such as support during maternity leave (salary while on leave, inclusion after the leave), and giving the same opportunities for the career development (education, travelling, international career).

Upon returning from maternity leave, employees have flexible working time, and until the child is 7, they have additional days of annual leave. Some of the companies participated in the campaigns "I look like an engineer" and "IT girls".

40% of the companies offered recommendations and inputs for increasing the number of women in IT sector, and all agreed that they need more women in the sector, including the higher number of candidates applying for vacancies. In addition to that, higher quality educational system is needed, as well as encouraging women to follow the career path of their choice and different possibilities offered to them. The concrete recommendations were:

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[11] Applications to open vacations were taken in consideration, but also individual applications not considering whether the vacancy is open or not.

- "Fostering higher number of women in IT sector will result in higher employment of women."
- "We should constantly encourage more females to apply for our vacancies."
- "It is the most important to get high quality applicants regardless of their gender, which has never been a criteria for our employment."
- "Encouraging women to choose IT career and different opportunities, as well as additional education in English language."
- "Higher quality of education system."
- "We do not perceive gender, it is unimportant. Other qualifications are more important."
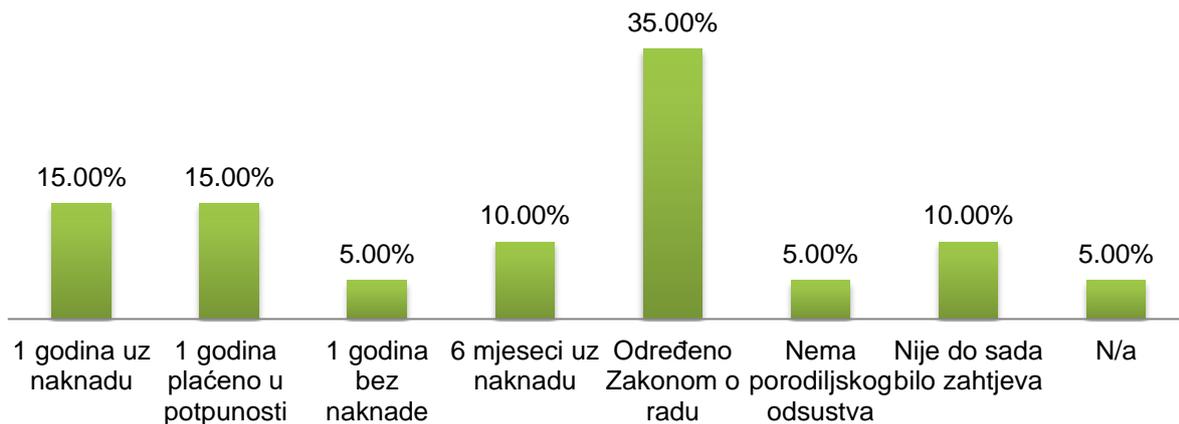
55% of the companies believe that it is important for the business to employ people of different gender, age, experience, etc., while 35% of them think it is only partly important. None of the companies think that it is unimportant, while 10% says that they are not sure or do not know the answer.

4.1.2. Gender equality in IT companies

IT companies can significantly improve the number of women and men in the sector with their way of business and attitudes towards gender differences. When asked what can be the reasons for lack of women in the IT, 70% of the companies said they do not know the reason. The remaining 30% indicated the following: poor working environment, prejudices (e.g. women are weaker than men), lack of acceptance of women, lack of societal education on gender differences, division of labor on male and female jobs, women's higher commitment to family in relation to IT career which requires a lot of dedication and time.

Participating IT companies have different rules regarding maternity leave. 35% of the companies follows the Labor Law, while 5% said that they have no maternity leave as an option in their company. 15% of the companies offer one year leave with full salary paid.

Graph 2 Duration and salary benefits for parental leave in IT companies

| 15.00% | 15.00% | 5.00% | 10.00% | 35.00% | 5.00% | 10.00% | 5.00% |

| 1 godina uz naknadu | 1 godina plaćeno u potpunosti | 1 godina bez naknade | 6 mjeseci uz naknadu | Određeno Zakonom o radu | Nema porodiljskog odsustva | Nije do sada bilo zahtjeva | N/a |

Total of 75% of the companies reported that men do not use parental leave. The remaining 25% reports that men sometimes use certain form of parental leave. The companies claim that men usually have seven days of parental leave, with additional leave if necessary. Some companies state that parental leave for men usually takes a couple of days. Parental leave is not common in every company; in case an employee wants a leave, they should submit a request for it and wait for its approval.

Participating companies do not face any administrative burdens in regulating maternity leave. 95% said that there are no obstacles, while 5% indicated there is significant number of documents that mothers are supposed to acquire from various locations. 90% of the companies believe that they foster a culture of gender equality, 5% remains neutral, and 5% stated that this culture is not a case within their company. In 50% of the companies, men occupy the highest positions, and 10% of them has a woman in a managerial position. 95% of the companies consider that women can take highest position in the company, while 5% said that women are already on the top positions. Only 5% claims that women cannot be in the company's managerial position.

4.2. The characteristics of IT workforce and their business/social contexts

Total 73 employees of participated in the survey, and 65 correctly completed the questionnaire (38 men and 35 women). The highest percentage of participants were in 26-30 age group (45.71% women, 42.11% of men) and 31-40 age group (31.43 women; 36.84% of men).

Graph 3 Age group of workforce in IT
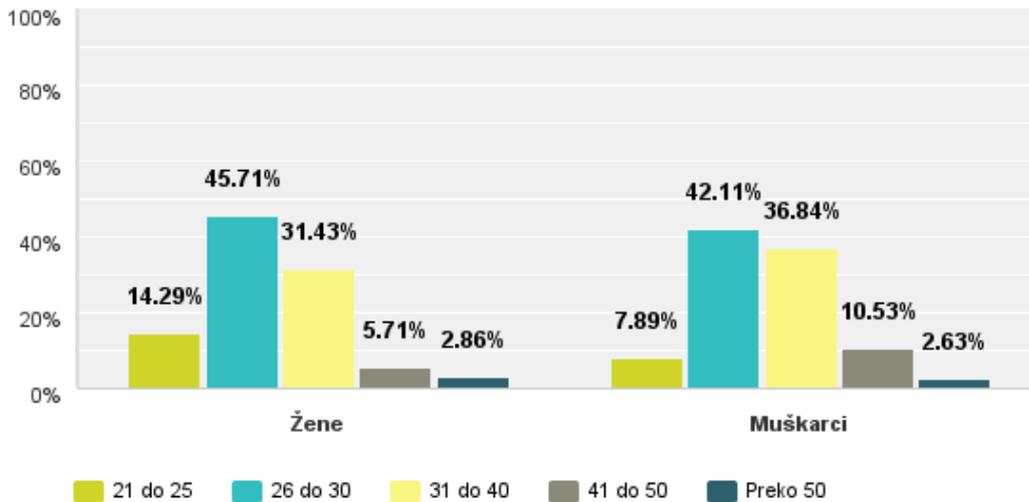
The sample showed that there is a larger number of men who have completed high school (28.95%), than women, who tend to have an undergraduate or graduate degree (91.42%). More men are in the PhD. studies or have already obtained their Ph.D. (2.63%), compared to none women in our sample. The study showed that women in the labor market generally enter after graduation, compared to men who regardless of the level of education seek and find their way into the IT sector.

The results showed that more men (50%) are married than women (31.43%), while more women are single (37.14%) compared to men (23.68%). None of the men is divorced, while 2.86% of women are divorced.

Most employees have no children, and the proportion is almost the same for women and men (68.57% women; 68.42% of men). Employees with children tend to have one child, where this percentage is higher when it comes to women (28.57%) than men (10.53%). On the other hand, a higher percentage of men has more than one child. Two men from the complete sample have three children, while none of the women in the sample has three children. Men who have three children are married, and their partner is not employed. There are no employees with more than three children, although this is a trend that is present in society in general. There is a higher percentage of women who have employed partners (95%), while 30.77% of men have an unemployed partner.

Most of the respondents are employed on a full time basis (indefinite contract), both for women and men (women: 85%, m: 88.45%). Employees have different work experience. It is interesting that more women (10%) than men (0%) are employed with work experience less than 1 year, while 50% of men (but only 10% of women) are employed with over 10 years of experience. The situation is a consequence of the fact that women are entering the market in later years in the IT sector, while men enter the market earlier.

More men work as software developers than women. From the sample, most men work in this position, and smaller group at the position UX developers, while none of the women in the sample works on the UX position. More women (22.58%) work on the position of HR and administration compared to men (8.57%).

Men work longer on one the same position compared to women (20% of men working in the same position for more than five years, and 16.13% women). 11.43% of men work more than 10 years in the same position, compared to 3.23% of women. The highest percentage of men and women work from one to three years in the same position.

The survey gave information that women are more likely to advance in their career compared to men, or 37.14% of men said they did not yet advanced, compared to only 16.13% of women.[12] All respondents were generally satisfied with the opportunities for promotion only smaller percentage is not satisfied with current capabilities (f: 16.13%; m: 17.14%). The highest percentage of employees have a monthly salary of 1.000 to 1.500 BAM. Research shows that there are more men who have a salary from 2500 to 3000 KM (m: 11.43%, w: 3.23%), while more women have salary from 1500 to 2000 KM (22.58%), compared to men (14.29%).

Men are mostly employed through recommendation (60%), and the least men are hired through a Recruiting Agency. Women also find jobs through recommendations, and then through job ads. Not a single woman got her job through a Recruiting Agency. Most employees got employed immediately after studies, i.e. when they start looking for a job (45.45%). The longest period of looking for a job was 1 to 6 months (40.91%), while men (63.33%) more than women (36.67%) said that they got job immediately. The analysis has shown that men apply less for job ads than women. More men applied for only one job ad (42.86%), while 40% applied for two. On the other side, the highest percentage of women applied on two job ads (35.48%), then none, i.e. they got job immediately (29.03%).

Total of 22.58% female respondents thinks that during hiring process men have higher chances, and 11.76% of men think the same.[13]

4.2.1. The promotion of diversity and gender equality from employees' perspective

Employees participating in the research are happy with a current job. Slightly more men (80%) than women (77.42%) expressed their satisfaction. Total 70.97% of women said they attend additional education even though they are employed, compared to 88.57% of men.

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[12] Highest percentage of women has advanced once or twice (61,29%), three or more times (22,58%). Men have advanced once or twice the most (45,74%), and only 17,14% progressed three or more times.
[13] Highest degree of participants stated that they are not familiar with these information (f: 51,61%, m: 61,76%).

More women improve their skills only during work (70.97%) compared to men (5.71%). Employees mostly did not attended additional training before getting a job in an IT company. 16.13% of women attended additional training before employment, and 28.57% of men said the same. Most IT employees are not engaged in free-lance jobs, even 69.70% said that they do not perform IT jobs in addition to their regular work. Fewer women (22.58%) than men (37.14%) perform these tasks.

Employees stated and why they have chosen IT profession, and is among the most common reasons is that the IT sector is an interesting area that matches their skills. Women emphasize the work on modern technology, and opportunities for advancement. The next most common reason is the salary. Women report that they stay in the IT companies because they have the ability to get promoted, and because IT is an interesting area, while men report that they, in addition to IT being an interesting area, are attracted to work on modern technology. All agree that in BiH there are plenty of open vacancies for IT sector.

The reasons why IT professions are attractive, employees list challenging tasks (68.18%), a positive working environment and good relations with colleagues (65.15%), and a good working environment (63.64%). Of all the reasons the lowest percentage of IT employees chose the high salary (45.45%).

The highest percentage of women stated that they were attracted to work in IT companies for the following: good working environment and a positive environment in terms of relationships with colleagues. Men say that the biggest reason was work on challenging work assignments, good working environment, and good cooperation with colleagues. A higher percentage of men (51.43%) than women (38.71%), cited high salaries as one of the reasons.

Employees listed several shortages in the work within the IT companies. The first reason is stressful working environment (43.94%), followed by frequent overtime (28.79%). A large percentage of employees in IT companies said that they have no information about the disadvantages of working in IT companies, which may indicate that they do not see the shortcomings of the IT sector or that this question cannot be applied to their working environment. Both men and women equally agree on the disadvantages of the IT sector. The only difference is that the higher level of women reported overtime as the lack of IT sector (35.48%) compared to the level of men (22.86%). 3,23% of women and 5.88% of men claim that overtime happens every day.

The need for flexible working hours is higher in women than in men, and 58.06% of women said they would like to have flexible working hours, while only 35.29% of men said the same. Total 28.81% of the women asked for flexible working hours, compared to 17.65% of

men. In addition to this benefit, other benefits of working in IT companies for women are: free drink at work (70.97%), work from home (61.29%), sick leave and weekend gatherings organized by the company (58.06%), additional days of annual leave (41.94%), and mobile phone for private use (38.71%). Women cite a number of other benefits: compensation for accommodation, meal allowances above the legally prescribed, private pension insurance, car for personal use, covered part of the additional health insurance, partially paid medical services, and help in child-care.

Exposure to gender discrimination at work

22.8% of women stated that they had experienced offensive comments based on gender, and 16.13% said that they are prevented from promotion at work because of gender. 12.90% female employees state that have lower wages than their male colleagues who do the same work, 9.68% had been denied training, and a high percentage of women (6.45%) were fired because of gender. Even 3.23% of women experienced sexual harassment at work.

2.94% of men said that they were not hired, got fired or experienced offensive comments based on gender, while 5.88% received a lower salary than female colleagues for the same job.

For the most often benefits men refer to sick leave (67.65%), flexible working hours (58.82 %) , weekend gatherings organized by the company and free drinks at work (44.12 %) , and work from home (35.29 %) , and more vacation days (26.47 %) . Men say that they have other benefits such as fees for accommodation , meal above the statutory , mobile phone for personal use , a car for personal use , covered part of the additional health insurance , paid for some medical services , any kind of help in taking care of children of employees . Unlike men, no woman has stated that they have no additional benefits, while men did in total of 14.71 %. IT workers (over 70 % of men and women) are not familiar with information about whether other IT companies have some benefits that their company does not have.

Analysis of the results showed that 38.71 % of women think that it is completely important to work in an environment of people of different sex, age and the like. As the highest level of men think that this is of little importance. Interestingly, the higher level of men (23.53 %) believe that diversity in the workplace is completely unimportant, compared to the small number of women (12.90 %). Total 87.69 % of both genders considered that their companies foster gender equality. A higher percentage of women find that their companies do not foster gender equality (12.90 %) than men (5.88 %).

64.52% of women think that maternity leave is not hindering woman's career, and 82.35% of men think the same. Only 41.94% of women are informed on the regulations regarding parental leave, as well as only 11.76% of men.

4.3. The characteristics of future IT workforce and their business/social contexts

Participants of this research were mostly students of IT faculties or possess IT skills and are seeking job in the sector, as well as attending training in this area to find work. A total of 140 people participated, of which 63 are properly filled out the questionnaire (44.32% men and 55.68% women). Most respondents in the age group of 21-25, with secondary education (50%) and university degree (30.68%). The highest percentage of respondents have no work experience (43.18%), while 32.96% have experience of one to three years.

For the purposes of this research, we investigated the number of students enrolled in the IT faculties from 2012 to 2014, where we saw that the number of enrolled students increases, and for the first time, in the school year 2014/2015 we witness the significant increase in the number of women, which means that women are increasingly opting for a career in the IT sector. The future workforce gets information on IT sector through social networks (80.65%) and the media (70.97%).

Table 1 Percentage of enrolled female students on IT faculties in FBiH compared to the total number of enrolled students[14]

IT faculties	Enrolled students (f) 2012/2013	Enrolled students (f) 2013/2014	Enrolled students (f) 2014/2015
Electrotechnical faculty	37,11%	37,66%	38,79%
Faculty of information technologies	10,67%	14,52%	14,97%
Faculty of engineering and computer science	18,88%	18,28%	21,58%
Technical faculty	34,26%	36,71%	46,75%
Sarajevo school for science and technology	46,18%	40,64%	45,42%
Faculty for engineering and information tech.	33,64%	36,69%	36,67%
Faculty „American school of technology"	15,38%	12,50%	14,55%
Faculty of business informatics	8,57%	8,24%	5,93%
Faculty for technical studies	18,71%	15,32%	16,30%
TOTAL	**28,96%**	**28,95%**	**30,68%**

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[14] Federal agency for statistics FBiH; HIGHER EDUCATION IN FEDERATION OF BOSNIA AND HERZEGOVINA, STATISTICAL MAGAZINE 2012/2013., 2013/2014, i 2014/2015.; Available at: www.fzs.ba

The total number of enrolled students for the same school years were as follows: xxxx (2012/2013), xxxxx (2013/2014) and xxxx (2014/2015).

Participants listed their reasons for choosing IT career. Highest percentage of participants think of IT as interesting (38.64%), that the sector matches their skills (18.18%), and that there are many vacancies for this sector (14.77%). One of the reasons is the possibility of promotion, and work on modern technology. The reasons for women are mostly that the sector is interesting (46.15%), and that there are many vacancies in BiH for the sector (28.21%). It is interesting that none of the women listed the work on modern technology as the reason for choosing IT, while men think of it as one of the main reasons.

Namely, men list the following reasons: IT sector is interesting (32.65%), matches their skills (22.45%), and high salary (14.29%). In addition to these reasons, men cite the possibility of promotion, modern technology, and plenty of open positions in the field (4.08%).

The analysis of the result showed us that the highest percentage of job seekers thinks of IT jobs as positively challenging (80.65%), interesting (70.97%) i appealing (64.52%), and demanding (35.48%). Men do not think of IT jobs as complicated, but women (13.33%). Also, women (46.67%) claim that IT jobs are demanding in higher percentage than men (25%).

As disadvantages of IT sector, the future workforce emphasizes the stressful working environment (51.61%), overtime (38.71%), or that they do not have such information (32.26%).

The highest number of participants would like to work as *Software developer* (51.61%), a trend present for both genders. Similar trend is for the companies they would like to work with, with the most prominent answers being: Authority Partners Inc., Mistral Technologies, Google, AtlantBH, Microsoft, DevLogic, Nsoft, Lanaco i Infobip. Other attractive companies, though in a lesser percentage are: Bravo

> **Future workforce on their choices:**
>
> „AtlantBH, for favorable working conditions, mission and vision of the company. Mistral Tech, for rapid growth, clear objectives and the possibility of giving job to inexperienced young engineers."
>
> „Klika i DevLogic, I like the atmosphere and the possibility of advancement."

Studio, Spin, Siemens, Apple, Connect, IMTEC, Infinum, OSS, Team Consulting, Almy, Klika, T-Com, IMB, Cisco, ComTrade, Blackberry, Degordian, Spark, Code Centric, Mozilla, RT- RK Computer Based Systems, Ministry of Programming. The main reasons are the information obtained from their friends and acquaintances: excellent working atmosphere, motivating work environment, good interpersonal relations, high value of knowledge and creativity, high salary, possibility of promotion, good working system, working on new technology, company's sucess and interconnection of information technologies and marketing.

4.3.1. Promotion of diversity and gender equality from perspective of future workforce

The respondents believe that there is no division of labor on male and female jobs in the IT sector (78.57%), men more than women (m: 81.25% f: 75%). 81.25% of the sample was not exposed to discrimination only on the basis of gender, but 16.67% of the women reported that they had experienced some kind of injustice only on the basis of their gender, and 8.33% of them experienced negative attitude of teachers, lower salary than colleagues for the same work, denied education, disabled advancement, received offensive comments or experienced sexual harassment.

> **Exposure to gender discrimination**
>
> 18.75% of men reported they have been denied a job or training because of gender. Total 12.50% of men stated that they were exposed to the negative attitude of professors, prevented them from advancing, or receiving offensive comments only on the basis of gender. 6.25% of men (0% women) have suffered violent behavior and dismissal because of gender.

31.25% men and 41.67% women stated that there is a difference in gender representation in the IT sector, and 19.05% of all respondents believe that women and men have equal opportunities for employment in the IT sector, and 77.78% think both genders have equal opportunities for advancement. 34.37% of men think that maternity leave hinders woman's career, and 51.61% of women agree with the statement.

90.48% of men and women stated that the family and the community have never tried to prevent choosing IT sector as a career. Looking at the individual sample of men and women, there are major differences.

Total 12.90% of women declare that the community or relatives tried to stop them in choosing this sector, while only 6.25% of men declare the same.

4.4.　IT sector from perspective of general population

123 individuals participated in the research, 82 filling out the questionnaire correctly. The largest percentage of them gets information about IT sector through social networks, internet portals and among their peers (m: 56.41%; w: 31.37%)[15]. It is interesting that a very small percentage never encountered terms from IT sector (men: 2.56%; women: 7.84%).

In terms of potential role models, the general population recognizes more men than women in the IT sector[16]. A higher percentage of men equally knows men and women. For example, a total of 23.53% of women (33.33% of men) are recognized Marris Mayer as an IT person.

Most of the general population has never heard of Bit Alliance (41.11%), 40% of them have heard through Facebook and 37.78% over other Internet sources. The difference between men and women is such that a higher percentage of men has been informed on the internet (female 31.37%, male 46.15%). More women have never heard about the Bit Alliance than men (women 45.10%, 35.90% men), while more men got the information through Facebook (43.59%) compared to women (37.25%). Men also found out about Bit Alliance through LinkedIn, on television and in the newspapers more than women. Men have not heard information on the radio but 1.96% of the women did.

For the benefits of working in IT companies, general population states in the highest percentage: opportunities for advancement (76.67%), satisfaction of work at the modern technology and the ability to work from home (64.44%), high salaries (60%), flexible working hours (58.89%) and modern working environment (55.56%). Men believe that the next important factor of IT sector is the modern working environment (74.36%), followed by the opportunity to work from home and pleasure to work on the latest technology (71.79%). Women as the next most important factor listed pleasure of working on the latest technology, high wages and the ability to work from home (58.82%).

For disadvantages of working in IT companies, the general population mostly states stressful working environment (64.44%), overtime (36.67%), and a small number of used vacation days (13:33%). Total 25.56% of the population is not aware or does not recognize the shortcomings of the IT sector.

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[15] Research participants most often find IT information on social network Facebook (f: 64.71%, m: 69.23%) and internet portals (f: 54,90%, m: 69,23%). After these two sources, women most often follow LinkedIn and TV (23.53%), while men get information through acquaintances and in work environment (38,46%).

[16] Mark Zuckerberg 93.33%, Steve Jobs 88.89% and Bill Gates 82.22%

4.4.1. Promotion of diversity and gender equality from the perspective of general population

The majority of the population in BiH is generally considers that there are no divisions between male and female jobs. Analysis of the results showed that all the men who participated in the survey believe that there is no division between male and female jobs, while 30.61% of women think that this division exists. Men and women are different when it comes to exposure to gender discrimination. The highest level of men (87.88%) stated that it has never experienced some of the unpleasant events based only on gender and not experienced sexual discrimination. A somewhat smaller percentage of men said that they are prevented from advancing to higher position only on the basis of gender (9.09%), and that they didn't get the job or that they had been denied training only on the basis of gender (3.03%).

The highest percentage of women stated that they experienced some form of sexual discrimination (59.18%). A somewhat smaller percentage of women (16.33%) didn't get the job and received a lower salary than their colleagues who do the same job just because of gender, 20.10% of women were prevented from advancement to a higher position because of gender, and 16.8% of women at work / college experienced sexual harassment. Total 8.4% of women experienced at work / college offensive comments. Total 96.97% of men have never experienced or participated in gender discrimination, while a total of 14.29% of women reported that they had witnessed or experienced sexual discrimination.

The highest percentage of men and women believe that women maternity leave does not affect the career (women 67.35%, 63.64% men). 22.45% of women believe maternity leave affects a woman's career, while a total of 15.15% of men considered the same.

More than half of men (51.52%) said they did not know whether in IT men have a higher chance of getting a job than women, while only 9.9% men consider men have a better chance of getting a job in the IT sector than women.

Total 39.39% think men don't have a higher chance of getting a job in the IT sector than women. On the other hand, a total of 46.94% of women said they did not know whether men have a higher chance of getting a job in the IT sector than women, a total of 34.69% of women stated that when hiring, men have a better chance of getting a job than women, and 18.37% think that men have a better chance of getting a job in the IT sector than women. The analysis showed that the highest percentage of men (84.85%) and women (81.63%) believe that women can advance equally as men in the IT industry. A smaller percentage of both genders thinks that men and women can't equally advance (f: 4.08%, m: 3.03%).

5. Recommendations for increasing the number of women in IT sector

Based on the research and its results, we have noticed the following **obstacles** for the increase of the number of women in IT sector:

a) The companies are not ready to proactively work on increase of the number of young people, women especially, in the IT sector (63% were not interested to partake in the research);

b) IT companies are not creative in finding new workforce (90% of the companies finds workforce based on the recommendations of the current employees);

c) The employees (female and male) do not use the benefits offered by the IT companies (none of the women from the research use flexible working time);

d) Overtime is integral part of working in IT, and a general belief is that it negatively impacts the balance of private life and work;

e) IT companies do not have the clear policy while searching for new employees (90% of companies do not encourage women to apply; 80% do not have campaigns to attract and retain female employees);

f) Internal procedures of companies are not gender-sensitive (only 55% said that it is important to employ people from different backgrounds and experiences, which employees also noted down);

g) The alarming information is high percentage of experiencing or witnessing discrimination (22% of women have been offended based on their gender; 3% have been sexually harassed; 19% of women witnessed sexual harassment);

h) Women enter later in the labor market, usually after graduation, while men enter after high school; and

i) General perception of women is that they are not „IT material".

In order to address some of these obstacles, we **recommend** the following:

i. Informing the public about the IT sector and good practices of the IT sector, with a focus on benefits and gender equality – IT companies are not able adequately to brand themselves, and often their benefits are considered to be obstacles;

ii. Informing IT employees on the rules of the company, especially benefits, and encouragement to use them;

iii. Informing companies how to share information, how to attract more potential workforce through new methods and channels;

iv. Companies need to encourage women to apply to their vacancies;

v.   Companies need to encourage professional recruitment (HR team needs to conduct the recruitment process and participate in decision-making, and the whole process should be more transparent – 13% of women think that they do not have the equal opportunities in finding a job as men);

vi.   Reduce prejudices towards women in IT sector in the general public (inform the public about the results of the research, potential and benefits of the IT sector and companies);

vii.   Actively participate in the dissemination of information on discrimination, sexual harassment, and prevention of the same in the IT companies and general public;

viii.   Informing high schools about the potential and benefits of the IT sector while focusing on girls (reasons for choosing IT sector as a profession: modern technology, modern working environment, excellent benefits, wages and plenty of vacancies).

6. Conclusion

The research on gender equality in the IT sector conducted by MarketMakers was initiated based on the assumption that there is potential to increase the number of women in the IT sector, as well as there are certain obstacles that prevent women to enter this sector. The aim of the research was to develop a list of barriers that prevent young people from entering the IT sector, as well as the guidelines/recommendations for ourselves and our partners. Research has provided us with important findings that enables us to understand the gender equality in IT sector, and based on that to create and implement adequate measures. The recommendations were done by a working group taking into consideration the results of the research as well as the current economic and regulatory framework.

The results have shown that the IT sector offers a multitude of benefits for young people, but benefits are identified as the obstacles that prevent them in choosing IT sector. In addition to the societal pressure and division of labor between genders, where IT is seen as "male sector", the main obstacles are overtime, inability to balance private and professional life, as well as the small number of used days of vacation.

It is important to note that IT companies are not creative in finding their workforce – they are finding potential employees through referrals of already employed people, thus there is significant potential for improvement in this field. IT companies can expand their base of potential workforce through organizing and participating in job fairs, adapting their vacancies, and making HR team who will actively participate in finding new workforce.

In addition, it is necessary to encourage girls to enter into labor market earlier through organizing summer internships, Hackathons, and mentoring session. In collaboration with IT companies, MarketMakers plans to work on discrimination against women and men in the labor market. The research gave an alarming information that 22% of the female respondents witnessed or been subject to gender discrimination, which creates space for project activities – informing the IT companies about the results and the measures that can be taken shall result in adequately addressing this issue.

The research gave a brief overview of the workforce in IT sector in BiH, and what 305 participants think about diversity and gender equality, and gives the possibility for further research. Till the end of the first phase of the project, MarketMakers will actively work on certain obstacles and recommendations, and for additional information and suggestions, as well as possible cooperation in these fields, we remain at disposal.

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Annex: Sample questionnaires

Questionnaire 1: Companies

1. Name of the company
2. Date of establishment
3. The position of the contact person (who is filling the questionnaire)
4. Total number of employees
5. Total number of female employees
6. Number of persons on IT jobs (male/female)
7. Who is deciding on employment in your company?
8. What is the position that women mostly work on in your company?
9. Do you face problems in finding new employees?
10. Total number of IT vacancies in the last year?
11. How many people applied on the vacancies during the last year?
12. What are your methods of finding new employees?
13. During advertisement of new job, do you encourage women to apply?
14. Do you have special campaigns which aim to attract and retain women?
15. Do you think that something could help your company to employ higher number of women? What?
16. How important it is for the company to employ people of different age, gender, experience and alike?
17. What is the gender of employees taking the top 10 positions in the company?
18. Do you think that a woman could take a managerial position in your company?
19. Do you think that you encourage gender equality within your company?
20. What are the benefits you offer to your employees?
21. Do you offer any benefits that other companies do not, according to your knowledge?
22. The need for overtime in your company is…
23. Who uses more the benefit of flexible working time in your company (men/women)?
24. According to your experience, what are the reasons that prevent women from choosing IT sector as a career?
25. What are the maternity leave policies and regulations in your company?
26. Do men use maternity leave in your company?
27. Do you encounter administrative barriers when regulating maternity leave for your employees?

Questionnaire 2: Employees

1. The name of the company you are currently working with?
2. Age
3. Gender
4. City
5. Level of education
6. Do you have kids?
7. Marital status
8. Is your partner employed? If yes, in which sector?
9. Are you supported by your partner, family and friends in the activities beyond your work?

10. Current work status?
11. Years of experience?
12. The position you are working on?
13. The length of work on the current position?
14. Your monthly salary?
15. Are you satisfied with your current work?
16. How many times have you been promoted?
17. Are you satisfied with the possibility of promotion within your company?
18. What are the reasons for choosing your field of work?
19. What motivates you to stay in the same field?
20. How were you employed on the current position?
21. For how long were you looking for a job?
22. How many IT jobs have you applied for while you looked for a job?
23. Did you attend any informal trainings to get the current job?
24. In your free time, do you attend any informal trainings for improving skills related to your job?
25. Do you work as a freelancer in addition to your everyday work?
26. What has attracted you to the IT sector?
27. What are the disadvantages of work in IT companies?
28. Is it important to you to have colleagues of the different age, gender, experience and alike?
29. Have you experienced any discrimination based on your gender?
30. Have you witnessed any gender discrimination in your workplace?
31. Is your company fostering the culture of gender equality?
32. Does your company have campaigns to attract and retain female employees?
33. Do you think that maternity leave hinders women's professional career?
34. What would you recommend to IT companies to attract more female employees?
35. What benefits do you have as an employee?
36. Does your company have any benefits for employees which other companies don't?
37. The overtime work in your company is…
38. Would you like to have flexible working time?
39. Have you asked for flexible working time in the last year?
40. Are you familiar with the regulations regarding maternity leave in your company?
41. Do men use parental leave in your company?

Questionnaire 3: Students/jobseekers

1. What is your relationship with the IT sector?
2. How old are you?
3. What gender are you?
4. Where do you live?
5. Your education (Full faculty or high school name)?
6. What is the level of your education?
7. What are the main reasons you choose this school/faculty?
8. How many years of work experience do you have?
9. What is your current working status?
10. What is the sector of business you work currently?
11. Name the position you work on currently.

12. How long are you working on this position?
13. What is your current pay?
14. Are you satisfied with your current job?
15. Do you have children?
16. What is your marriage status?
17. Is your partner employed?
18. What is your perception on IT positions and IT in general? From your point of view the IT positions are what?
19. How are you keeping up with the news from IT sector in B&H and beyond?
20. What do you thing are the benefits of working in IT companies?
21. What do you think are the disadvantages of working in IT companies?
22. What IT positions would you like to work at?
23. What is good working environment in your opinion? (Describe shortly, e.g. good pay, flexible working hours…)
24. Have you ever apply for the position in IT Company?
25. Name companies you would prefer to work for. (Name the company and the main reasons)
26. Do you think the male and female job exists?
27. Do you feel that you have been exposed to some situations only based on your gender? (Negative attitude of professor towards you, you got fired etc.)
28. Have you ever had experienced or attend negative situations based on your gender during your time at faculty/school?
29. Do you think there is smaller number of women than men in IT sector?
30. Do you think men have more job opportunities in IT sector than women?
31. Do you think men and women have the same opportunities in career advancement in IT sector jobs?
32. Do you think the maternity leave effects women career?
33. Did your surrounding (family or friends) ever tried to stop you in choosing the IT sector as a future career?
34. Would you recommend your sister/daughter career in IT sector?

Questionnaire 4: General population

1. Age
2. Gender
3. Where do you currently live?
4. Level of education
5. Work experience?
6. What is your current work status?
7. What sector do you work in?
8. Position you work on?
9. Your current pay?
10. Are you satisfied with your current position?
11. Name the companies you would like to work for?
12. What are the reasons you choose this field of work?
13. Do you have kids?
14. Marital status?
15. Is your partner employed?

16. How do you hear news and information on the IT sector in BiH and abroad?
17. What are the media you follow on the information about the IT sector?
18. What are the people from IT sector you recognize?
19. Have you heard about BIT Alliance/BIT Camp/HUB387 and how?
20. What are the advantages of working in IT sector?
21. What are the disadvantages of working in IT sector?
22. Is there division of labor on male/female jobs according to your opinion?
23. Do you feel you have been exposed to discrimination based on your gender?
24. Have you witnessed or been exposed to gender discrimination on the workplace?
25. Do you think the maternity leave effects women career?
26. According to your opinion, do men have more job opportunities in IT sector than women during employment processes?
27. Do you think men and women can equally advance in the IT sector?
28. Would you recommend your sister/daughter career in IT sector?