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GENDER EQUALITY IN THE LATVIAN INFORMATION TECHNOLOGY SECTOR: STUDENT PERCEPTION

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Abstract

This thesis analyses Latvian Information Technology (IT) students' perception of genders, using a laboratory design. IT sector was chosen due to its rapid growth. From 2010 to 2015 the number of IT companies in Latvia increased by 52%, and the number of employees in the sector by 55% (Central Statistical Bureau Database, n.d.a). The sector is involving more men than women, which is critical since equal participation of both genders in the IT field could contribute as much as 9 billion euros annually to the European economy (European Commission, 2013). Students' perception is studied as many of them enter the job market during their studies (Karnītis, 2013). Also, more than a half of IT employees in Latvia are in the age group of 15-34 years olds (Eurostat, 2016b), which includes the biggest group of IT students in Latvia (Central Statistical Bureau Database, n.d.b).

For this study, 229 students evaluated identical CVs and motivation letters, except for the owner's gender shown, for a given job position. The perception of a suitable starting Salary differed for a male and a female applicant. In some of the models studied difference in perceived Hireability and Competence was found. Perception of Likeability did not vary.

Further analysis of possible actions that would balance perceptions of genders is suggested for further studies.

Keywords: Information Technology Industry, Student Perception, Perception of genders, Likeability, Hireability, Competence, Salary, Gender Equality

1. Introduction

Everyone has the right to equal attitude towards them independently from their gender, age, race, sexual orientation, or religion (European Commission, n.d.a). Thus, people with identical abilities should have equal opportunities in the labour market, however, various studies show that it is not always the case in industries such as academia, engineering, and IT (Steinpreis, Anders & Ritzke, 1999; Riach & Rich, 2006).

We focus on the information technology industry that is rapidly growing not only worldwide, but also in Latvia. From 2010 to 2016 the number of IT companies in Latvia increased by 53%, and the number of employees in the sector by 55% (Central Statistical Bureau Database, n.d.a). Despite the prediction of the Ministry of Economics of the Republic of Latvia that by 2020 there will be a noticeable lack of IT experts (Baltic News Service, 2017), it seems that gender biases in the industry persist.

Local media, such as the magazine "Ir Nauda", discusses the low participation of women in the industry and states that one of the possible reasons could be biases and unequal perceptions of the genders (February / March, 2018). Interestingly, Spelke (2005) finds that both genders can perform equally well in mathematics. Despite the finding, recent studies have shown that IT industry employs far less women. For instance, in 2016 women represented 16.7% of IT specialists in the EU, and 24.8% of IT specialists in Latvia (Eurostat, 2016a). It is critical to consider the industry since equal participation of women in the IT field could contribute as much as 9 billion euros annually to the European economy (European Commission, 2013). McKensey & Company (2015) add that if all countries would decrease gender disparities as much as their best performing neighbour, world's GDP would grow by 12 trillion dollars in the next 7 years. Thus, a question arises if women in the industry are perceived in the same manner as men.

We chose to answer the question by surveying Latvian IT students. Their perception is relevant as (1) many of them enter the labour market during their studies (Karnītis, 2013), thus, their view affects the industry's perception of genders. Also, (2) more than 50% of IT employees in Latvia are in the age group of 15-34 (Eurostat, 2016b), which also includes the biggest group of IT students in Latvia (Central Statistical Bureau Database, n.d.b). Next, (3) recruiters from IT companies note that IT employees oftentimes help to choose the best candidates (Zanda Torganova, personal communication, January 12, 2018; Jūlija Grigorjeva, personal communication, February 12, 2018). To add, due to the high demand for IT

specialists, there is a ground to believe that (4) most of them will work in the industry they have studied.

The gap in the research arises due to lack of knowledge about the current situation in the high growth industry, especially among students who are actively involved in the job market. Thus, the research question is:

-*How does Latvian IT students' perception* (Competence, Likeability, Hireability*, and* Salary) *differ between a male and a female applicant with the same qualification and experience?*

We developed a laboratory experiment. We surveyed the students by distributing one of the two CVs that are identical except for personas's gender shown in the CV, a fragment of the persona's motivation letter, and an entry-level job position description. We compared the results for the potential employees' *Hireability*, *Salary*, *Competence*, and *Likeability*, these determinants have been used in other gender studies (Moss-Racusin, Davidio, Brescoll, Graham, & Handelsman, 2012; Moss-Racusin, Phelan, & Rudman, 2010). We find that perception of *Likeability* was the same for both genders. On the other hand, *Salary,* and in some models *Competence* and *Hireability* was evaluated higher for the male persona, showing that perceptions of genders might differ in certain cases.

This paper contributes to the existing literature of gender discrimination in the Latvian IT job market and, thus, raises awareness of the topic. Moreover, it can give an insight to HR specialists and companies operating in Latvia about the possible trends in the job market in the near future. The results may be more pronounced when the students will be fully involved in the job market after their studies. Also, we suggest possible activities to decrease biases in recruitment and education process due to the possible differences in perceptions.

The paper introduces the existing literature about discrimination, the perception of genders, and description of the IT industry in Section 2, followed by the methodology in Section 3. Section 4 describes the results and the discussion of the experiment. Biases and limitation as well as conclusions are in Section 5.

2. Literature review

This section provides an overview of the existing research regarding discrimination and perception of genders. Also, a description of the Latvian and international IT industry is provided, followed by information about the current social activities and events held to promote the topic discussed.

2.1. Discrimination

When one is served in a different way than others due to their race, ethnicity, nationality, religion, age, disabilities, or sexual orientation that affects the person worse, it is considered to be discrimination (European Commission, n.d.a). Discrimination can be experienced throughout a person's life and in various aspects, such as education, communication with government as well as in relationships with friends, acquaintances, and even employers (European Commission, 2007).

2.1.1 Discrimination in recruiting process

It may seem obvious that equally qualified applicants would also have equal prospects in the labour market. According to the European Commission (n.d.a), all EU citizens have rights to an equal treatment in employment and training, and hiring decision cannot be based on, for example, person's race, gender, or age. Thus, discrimination is present in recruitment process if an identical applicant is treated differently based on one of the above-mentioned virtues, and if the virtue does not directly affect the productivity (Heckman, 1998).

Studies have shown how one's gender, age, and race can alter the job prospects. For example, Bendrick, Brown, and Wall (1999) showed that when two equally qualified people applied for the same position, a 57 years old person was almost two times more likely to be rejected than a 32 years old one. When identical resumes with different names (white-sounding and black-sounding) were sent out to numerous positions in the US, white names received half as much response calls as black-sounding ones (Bertrand & Mullainathan, 2004).

2.1.2 Gender discrimination in recruiting process

Several studies have concluded that gender of a name on a resume severely affects a person's opportunities to land a job. After more than 200 academics received identical CVs of

either a male or a female persona and filled a questionnaire, it was concluded that male applicants were treated more favourably (Steinpreis, Anders & Ritzke, 1999). Neumark, Bank, and Van Nort (1995) proved gender discrimination in the restaurant business, when men received more invitations to interviews and job offers despite equal qualifications. Additionally, female applicants had an extremely low probability of being hired in high-price restaurants suggesting that gender can affect earnings. Interestingly, Johnson, Hekman, and Chan (2016) concluded that when there is only one woman in the candidate pool, her chances of being hired is statistically zero.

Discrimination can depend on the position. While studying England's labour market, Riach and Rich (2006) noted discrimination against men in "female position" such as secretary, and discrimination in "male position" such as engineer. Interestingly, discrimination against men was noted when applying for a computer analyst programmer position, thus, it is critical to study IT industry and see if both genders are perceived equally.

When faculty members were asked to evaluate identical male and female applicants' CV for a lab-assistant position, the male was rated as more competent and offered higher starting salary (Moss-Racusin et al., 2012). Both Steinpreis et al. (1999) and Moss-Racusin et al. (2012) conclude that men and women are equally likely to exhibit bias against female applicants. Regarding students' perception, in research done at Columbia Business School (CBS), students were asked to evaluate a person's CV with a male or a female name. CBS students evaluated the personas equally competent, but the female persona was perceived as more overbearing (Symons & Ibarra, 2014).

It is found that despite new diversity policies implemented by IT companies, recruitment process still remains challenging. First, advertisements are tailored in such manner so as to target men. Research suggests that gendered wording (using masculine or feminine themed words) is widely used in job advertisements and maintain gender imbalance in various fields. Masculine themed words such as *leader*, *dominant*, and *competitive* are employed in fields where the majority of workers are men. While feminine themed words such as *support* and *understand* are used across industries. Moreover, female applicants found advertisements with masculine words less appealing (Gaucher, Friesen, & Kay, 2011).

Women are 45% more likely to leave a job during the first year than men due to pay issues, lack of promotion opportunities, and hostile or sexist environment (Deloitte, 2016). Similarly, results of survey conducted by ISACA (n.d.) show that the main barriers faced by women in IT industry are lack of mentors and female role models, gender bias in the workplace, and unequal growth opportunities.

2.2 Information technology sector

2.2.1 Information technology sector development in Latvia

The IT industry in Latvia covers the creation and distribution of information products, such as data gathering and data analysis, and all of the necessary materials needed to develop the products (Central Statistical Bureau of Latvia, n.d.).

From 2010 to 2016 the number of IT companies in Latvia increased by 52%, and the number of employees in the sector by 55% (Central Statistical Bureau Database, n.d.a). It is important to research the industry more as it has been growing in the recent years, and is expected to be prevailing in the future. For example, the Ministry of Economics of the Republic of Latvia mentions that by 2020 there will be a lack of 16'000 professionals in industries such as natural sciences, information and communication technologies (Baltic News Service, 2017). Similar information mentions Kasjanovs (2016), adding that lack of employees is already recognized in the programming field. Already now IT professionals are highly demanded as 41% of EU and 47% of Latvian enterprises were struggling to fill the IT vacancies in 2016 (Eurostat, 2016e).

Employees in the sector are mainly male. In 2016 24.8% of employed IT specialists in Latvia were women (Eurostat, 2017b). To compare, in 2015 women represented only 16.7% of IT specialists in the EU (Eurostat, 2017b).

2.2.2 Overview of Information Technology students and education in Latvia

In 2018, there were 83 thousand students in Latvian higher education institutions (Central Statistical Bureau of Latvia, 2018). There were 6'995 natural sciences, mathematics, and information technology students in Latvia at the beginning of academic year 2017/2018 (Central Statistical Bureau of Latvia Database, n.d.d). In 2017 IT students in Latvia were able to choose between 19 higher education institutions (Nacionālā Izglītības Iespēju Datubāze, n.d). Programming has been among the most popular study programmes in Latvia during the period from 2010 to 2017. During the time frame, Computer sciences at LU was among the most popular study programmes for potential students (Latvian State Portal, n.d.). To compare the interest in IT with other study areas, in 2015 natural sciences (including IT) was the 5th most popular choice among EU students (Eurostat, 2017c). In 2016 in Latvia the proportion of women IT students was 18%, that is above the EU average - 17% (Eurostat, 2017d).

2.2.3 Women in the Information Technology Companies

Gender disparity in IT companies remains despite finding that women can perform in math and science field as good as men (Spelke, 2005). Mainly women were employed in the IT industry during the WWII and up until the late sixties (Brewer, 2017), however, the situation has changed since then. Despite all the efforts, the proportion of women entering IT jobs has stagnated or even decreased in some countries, for example, in the US and Sweden (Deloitte, 2016).

Enterprises are focusing on the issue as it is found that top 25% of the most diverse companies are more than 30% likely to have larger financial returns than others (Diversity In Technology, n.d.). One of the reasons for the finding could be the broad perspective diverse teams can provide. For example, Deloitte (2009) states that diverse opinions are critical for innovation and problem solving, adding that employers should not choose between applicants but aim to ensure that both genders are involved in decision making. It is especially important in IT sphere as most of the employees are white male, considering the impact IT companies have on consumer daily lives, too much power to a single demographic could increase gender, race and age disparities (Winning, 2018). Similarly, Fox (2016) notes that products, services and ideas founded by diverse teams will have higher success rate. Moreover, the level of job satisfaction corresponds with perceived gender equality in the company, diverse leadership teams, and family-friendly atmosphere (Huang, 2017).

Companies must also take into account the opinion of potential employees. For example, millennials are recognized to care about their employers' values more than the previous generations and stress the importance of respecting all of the individuals (Johansson, 2017). Thus, employers have to react accordingly to be attractive for the potential candidates in the labour market with a shortage of specialists.

At the same time, world known technology companies such as Twitter, Yahoo, Google, Uber, Facebook, and Microsoft have been sued for paying less to female workers than to their male employees for a similar job (Larson, 2017; Glaser & Molla, 2017). To be more precise, Google has paid 16% higher wages to their men employees, and Facebook - almost 10% (Ram & Wisniewska, 2018). One of the most recent cases looks into Google pay gap, as they are said to be ignoring the Equal Pay Act that requests both genders to receive an equal wage for the same job (Larson, 2017). The lawsuit was initiated by three former employees of the company in Autumn 2017 (Wiessner, 2017).

Also, the former head of HR at Netflix, McCord (2017), reminds managers to frequently evaluate if they are are paying men and women the same wage for the same job done as, from her experience, it is the most common bias that affects salary systems. Currently companies in UK with more than 250 employees are required to report the wage difference between male and female workers. The latest figures show that in the UK in the information and communication sector man are paid by 17.4% more (Wisniewska & Ram, 2018). What is more, in 2016 pay gap across all industries in Latvia was 17% (Eurostat, 2018).

2.3 Social events

2.3.1 Social activities supported by the European Union

To ensure fair treatment of women the EU has implemented laws that tackle equal treatment when applying for a job and at work, protection of pregnant and breastfeeding employees, and rights to maternity and parental leave (European Commission, n.d.c). There have been different Europe-wide actions held, such as EU policy plan "Strategic engagement for gender equality 2016-2019" which calls for a reduced pay gap, better inclusion of women in the labour market, and equality in decision making (European Commission, 2015b). Also, EC (n.d.b) organized "Equal Pay Day", an annual event that raises awareness of the pay gap between genders despite equal education level. The last "Equal Pay Day" in Latvia was organized in 2013 (European Commission, n.d.b). In 2016 and 2017 EC marked "Girls in ICT Day" which is a celebration of women in the computing industry (European Commission, 2017).

The EU supports education programs related to IT also in Latvia, focusing on programming, entrepreneurship in IT, or even specific software usage classes (Latvijas Informācijas un komunikācijas tehnoloģijas asociācija, 2017a; Latvijas Informācijas un komunikācijas tehnoloģijas asociācija, 2017b; Baltijas Datoru akadēmija, n.d.).

2.3.2 Social activities in Latvia

The topic of women in the IT industry is discussed and promoted in Latvia. For example, "Riga Tech Girls" promote women participation in the IT industry (Gulbinska & Kropa, 2017). "Riga Tech Girls" together with TWINO Group in Spring 2017 organized a list of events for students and professionals to promote and educate women in forming an IT

company (Treija, 2017).

National level IT contests that host high school students from the whole country are held in Latvia, for example, the 2nd Olympiad of the Information Technology in 2017 (Latvijas 2. atklātā datorikas olimpiāde). In 2017 in all age groups the best ones were male participants. The female participants were supported by Tele2 Shared Service Center (Tele2 SSC) in order to promote women in the IT industry and encourage them to keep studying the subject (Rīgas Tehniskā universitāte, 2017). Celebrating "Girls in ICT Day" Tele2 SSC also organized event "Girls Make IT Happen" and ensured programming classes to 100 girls (Vīlands Associates, n.d.).

Recently the University of Agriculture opened Elīna Baranovska's exhibition "Girls - Engineers" with photos of girls from the IT faculty of the University (Informācijas Tehnoloģiju fauktāte, n.d.).

It is believed that the activities promoting participation of both genders in Latvian IT industry are crucial as they draw attention to the current issues and can make young female professionals feel more welcomed in the industry. Also, this way women may find their role models in the industry and feel more confident about their opportunities. This is important as lack of female role models is one of barriers women face in the IT industry (ISACA, n.d.).

2.4 Existing research in Latvia

Several studies discuss the presence of gender discrimination in Latvia. EC states that Latvians are among those who are the least likely to agree that equality between men and women is a fundamental right. 54% of respondents also believed that gender inequalities in Latvia are rare. Additionally, 33% of respondents concluded that tackling gender inequality should not be an EU priority (European Commission Directorate-General for Justice and Consumers, 2015).

Society Integration Foundation (SIF) concludes that Latvians change opinion about gender stereotypes slowly. Almost half of the respondents agreed that men have more opportunities in the labour market, and that unequal treatment is present due to the difference in salary for the same amount of job, social benefits, and more responsibilities at home. Interestingly, when comparing survey results from 2001 and 2014, the number of respondents who believed that men have to face more restrictions of their rights increased from 3.6% to 6.5%. Results also show that stereotypes regarding appropriate field for each gender persist (Dienas Bizness, 2014).

Similarly as in SIF research, also EY and Snapshot find that more than a half of respondents in Latvia stated that women have the same opportunities as men in the labour market. Also, more than a half of respondents said that women and men receive an equal salary for the same amount of work and have an equal chance of being promoted (Neatkarīgā Rīta Avīze, 2016). It is believed that the difference in salary arises due to careers chosen by each gender. Additionally, research shows that women from IT sector in Latvia see men as their competitors, while men do not see the opposite sex in the same way (Latvijas Organizāciju psihologu biedrība, 2006).

In order to achieve equal treatment, effective law enforcement is crucial. Since 2008, the number of cases discussed in courts regarding gender discrimination has increased. Still, it remains significantly lower than in other EU countries (Latvian Centre of Human Rights, 2011).

All in all, previous research has shown that there is gender discrimination in various sectors, such as academia (Stenpreis, Anders, & Ritzke, 1999) and restaurants (Neumark, Bank, Van Nort, 1995). Interestingly, several authors (Stenpreis, Anders, & Ritzke, 1999; Moss-Racusin et al., 2012) have found that discrimination against women is introduced by both genders, thus suggesting that there might be some cultural or historical biases that persist till nowadays. Also, it is found that for high-level positions, students, who will soon enter the job market or are already involved in it, perceive women as less likeable than men (Symons & Ibarra, 2014). Thus, a question arises if students in Latvia, who are already actively involved in the job market and occasionally participate in recruitment decisions, also show biases against their peers.

3. Methodology

This section describes plan of the fieldwork as well as preparation for it, and development of the necessary materials. Also, description of the sample and data analysis is introduced.

3.1 Fieldwork plan

In order to answer the research question, Latvian IT students' perception was studied. Laboratory design was chosen to gain sufficient sample size and to obtain information from the survey that would be unrealistic in a field experiment for the given research question. Laboratory design allowed us to identify the group of people we wish to study. With this research design, it was easier to recognize potential biases and limitation than with fieldwork approach. The drawbacks of the method are lack of ability to track long-term reactions or changes, and also the surroundings during the experiment can create biases, such as the day, place, and peers feedback about the survey, if they have already filled it (Blank, Dabady, & Citro, 2004). Pre-planned laboratory design has been used in studies about discrimination by Reuben, Sapienza, and Zingales (2014); Moss-Racusin et al. (2012); Taylor and Ilgen (1981); Bendick, Jackson, Reinoso, and Hodges (1991); and Bendick, Jackson, and Reinoso (1994).

Researchers have previously used field experiments that are conducted in real life situations, such as audit studies, in order to obtain information about discrimination (Pager, 2007). However, Anderson, Fryer, and Holt (2005) pointed out that field experiments might raise ethical issues as the respondents are not aware that they are studied.

Both qualitative (interviews with industry representatives) and quantitative research (survey-based experiment) were performed. First, during semi-structured interviews, together with industry specialists and representatives, a CV, a fragment of a motivation letter, and a description of an entry-level job position (materials) were created. The materials were later adjusted for a male and a female persona, and distributed to students who had to evaluate one of them randomly. Similarly as Moss-Racusin et al. (2012) and Steinpreis et al. (1999), we used experimental laboratory design to collect data if the respondents were willing to (1) hire the given person (*Hireability*); and their (2) evaluation of the given person's competence (*Competence*); (3) level of salary they would expect the person to receive in the company (*Salary*); (4) if they like the persona (*Likeability*). The questionnaire was adjusted and translated in Latvian from the one Moss-Racusin et al. (2012) have developed. We distributed two types of CVs (both with identical content, but different gender persona) to Latvian IT

students together with the fragment of motivation letter, and the job description. To decrease biases from laboratory design, the respondents were allowed to answer the questions in their chosen place and time.

Lastly, during the second round of interviews, the results obtained were discussed with industry specialists and recruiters. This method is used in order to explain the collected results more precisely and gain industry insights and opinions about the reasons for the results from various perspectives.

All in all, various data collection methods were used. Eisenhardt (1989) stated that using both, quantitative (e.g. experiment based on a survey) and qualitative (e.g. interviews with industry specialists) research methods, is often suggested. Similarly, Hague, Cupman, Harrison, and Truman (2016) stated that the research methods are often complementary, and qualitative data is helpful for interpretation and understanding of the quantitative data; while the hard data can lead to specific recommendations or determine the effect of some specific actions.

3.2 Purpose of studying Latvian Information Technology students

It is crucial to study students' perception as (1) more than 50% of ICT employees in Latvia are in the age group of 15-34 years (Eurostat, 2016b), and the main part of IT students in Latvia is between the age of 19 to 24 (Central Statistical Bureau Database, n.d.b). Also, (2) the majority of Latvian IT students enter the job market during their studies (Karnītis, 2013). Once the students are in the job market, their opinion might be asked due to the fact that (3) skills of computer science professionals might be hard to evaluate for HR department employees or recruiters, thus, team leads' and other IT employees' opinions matter (Zanda Turgonova, personal communication, January, 2017; Jūlija Grigorjeva, personal communication, February 12, 2018). As the Latvian job market demands more IT specialists every year, it could be more likely that (4) computer science students will enter the job market in positions relevant to their field of studies. This is the reason to believe that the opinion showed during the experiment might reflect the IT job market in Latvia now and in the nearest future. Next, it is found that (5) almost every fourth of political science papers are examining students' opinion during the period from 1990 to 2006 (Druckman & Kam, 2011). Widespread usage of students' opinion in political science, gives a proof that the opinions are relevant, and could be considered also in other fields, such as social sciences. For example, Depositario, Nayga, Wu, and Laude (2008) find that students bidding behaviour is similar to

the inhabitants of a city they are studying. These findings can be interpreted in a way that students might not be more homogenous in their examined behaviour than the more diverse group of people - the inhabitants of the city. Still, we did not aim to generalize the results of this thesis to the overall society.

3.3 Interviews

To create a description of an entry-level position in the IT sector and a CV, we interviewed a Human Resources professional with experience in the IT industry, two IT students, and an employee from the IT industry. Bertrand and Mullainathan (2004) have stated that creating a CV that would seem realistic can be challenging, thus, the involvement of IT field representatives is crucial. In order to gain the information needed, semi-structured interviews were held. This interview design allowed us to learn much of the information needed and understand the ideas shared by the interviewees. We approached HR specialists from the Latvian Information and communications technology association listed companies (LICTA) (n.d.), however, due to the low response rate, we invited representatives also from other IT companies operating in Latvia. We invited IT students suggested by the universities surveyed. This way both, various experience and opinions were observed. In a similar study, Moss-Racusin et al. (2012) mentioned the involvement of industry representatives in their CV and job description creation, yet did not provide a specific number of them.

After obtaining the results we again invited IT students, employees, and recruiters to share their views and to gain useful insights for the discussion. For this, we again used the LICTA list to invite the HR specialists and suggested students by the universities surveyed. As it is found that in the first five to six interviews the most common views and examples (approximately 70% of all of the possible opinions) are arrived to (Morgan, 2002; Baker & Edwards, 2012; Francis et al., 2010), we interviewed 6 people for the second round of interviews. During this round of semi-structured interviews, we focused on the possible reasons for significance found for some of the variables, as well as the recruiting process in their organizations. The full list of interviewees can be found in Appendix B.

3.4 Creation of CV, Job Description, and Fragment of Motivation Letter

To successfully perform the experiment planned, materials were developed - a CV, a fragment of job description, and a motivation letter. Similarly as Moss-Racusin et al. (2012), we created a CV and a job description for an entry-level position due to the fact that it marks

the beginning of a person's career that can develop further if the person is accepted in the position. Also, we aimed to focus on a position that can be considered as equally popular among male and female IT specialists. This is particularly important as Riach and Rich (2006) have shown that there is an IT position where male employees are discriminated.

Steinpreis et al. (1999) and Symons and Ibarra (2014) for a similar experiment used real, slightly adjusted CV. To add, Steinpreis et al. (1999) admit that they might have chosen a CV with too little experience for the given position, thus, it might have affected the reliability of the CV. Also, they find that a CV that shows more experience or competencies than needed for a particular position might decrease the gender bias shown. Taking into consideration the given findings, a CV was created together with industry specialists, similarly as Moss-Racusin et al. (2012), making sure that the CV gives a room for thought for the IT student, if the applicant is good enough for the position or not.

First, a CV draft was developed with the assistance of two students, Elisa Dreilinga and Liene Bērziņa. The names of the personas created for the CVs were Elīna Jansone and Artūrs Jansons. The names were chosen as they were among the 5 most common names in Latvia in 1995 (Central Statistical Bureau Database, n.d.c). The year 1995 was chosen as the largest age group currently studying IT related subjects is 21-24 year-old (Central Statistical Bureau Database, n.d.b).

The surname Jansons is among the 5 most common Latvian surnames (Noskaidroti Latvijā populārākie uzvārdi, 2015). This CV was further developed together with Austris Cīrulnieks in order to check that the information reflects a real CV and is similar to the ones he has received as a recruiter and a team lead. Next, the CV was adjusted by Zanda Torgunova from the HR and a recruiter's perspective taking into consideration her experience in the field. Lastly, the CV was reread during pre-testing phase in order to make sure that there were no issues.

The first draft of the job position was suggested by Austris Cīrulnieks, later it was adjusted from the HR and a recruiter's perspective by Zanda Torgunova. As it was critical to choose a position that is as gender neutral as possible, we asked Cīrulnieks and Torgunova to focus on such position. They focused on junior web developer. In this position globally 34% of the specialist are women, and only a few of the positions in IT field have more women specialists (Ir Nauda, February/March 2018).

The fragment of motivation letter was developed together with recruiter Zanda Torgunuva. This document was slightly adjusted by the students participating in the pre-

testing phase. These adjustments were made based on their comments about the need for a person's hobbies or interests as well as the style of writing.

3.5 Testing the draft questionnaire

The pre-test of a survey is crucial as it ensures that the questionnaire works in a manner as intended and provides valid and reliable responses. It is suggested to perform the pre-testing on respondents similar to those who will be surveyed in the main study (Czaja & Blair, 1996). Hague et al. (2016) state that half a dozen respondents are sufficient for testing a questionnaire. Also, the testing should be done in the same manner as the main study, meaning that the survey should be tested Online.

Czaja and Blair (1996) state that there are numerous methods available for pre-testing, but there is no clear conclusion which method works best for each situation. We chose to use post-questionnaire interviews where respondents were asked about the meaning of the questions and encouraged to discuss any issues noticed.

We invited six IT students to pre-test the survey, they were given the same amount of information about the survey as the respondents would receive. All participants were bachelor level students. Some of the students were already involved in the job market. Also, the students interviewed in the pre-testing phase were different gender and representing different universities. The students were interviewed according to the topics suggested by Hague et al. (2016). Participants were asked to comment on the instructions provided, the flow of the survey, ease of answering, length, and comprehension of the questions. Most of the participants suggested paraphrasing questions regarding variable *Likeability*, as they were too vague and unclear, as a result, one more question was added (Appendix A, Question 8). The students also suggested adding a comments section at the end. Additionally, the participants mentioned that the scale was easy to understand and the survey had an optimal number of questions.

3.6 Survey

The respondents of the Online survey, Latvian IT students, were asked to evaluate the CV of an entry-level applicant. Together with the CV and the survey, participants received part of the person's motivation letter and a description of the position (Appendix C), this controlled for different expectations regarding skills and experience an applicant should have.

At first, the participants were introduced to the survey, the purpose of it, and the overarching topic of the thesis - IT job market. Other authors, such as Moss-Racusin et al. (2012), in their survey indicated that the results of the applicants' evaluation will be shared with the given persona as a feedback. In our case, as students are surveyed, the reliability of the survey would not increase if we indicated that the results would be shared with the peer who owns the CV.

Next, the participants were asked 11 questions (Appendix A) that were modified from the previous studies by Moss-Racusin and Rudman (2010) and Moss-Racusin et al. (2012). These modifications were done taking into consideration pre-testing feedback based on topics suggested by Hague et al. (2016).

Each question was developed regarding one of the dependent variables: *Competence*, *Hireability*, *Salary*, and *Likeability*. To obtain the evaluation of the applicant's *Competence* respondents assessed applicant's skills, experience and qualification for the given position. Regarding *Hireability*, respondents looked if they would be willing to hire the given person (if had an opportunity to do so) or suggest the applicant for the given position. *Likeability* factor assessed if the applicant strikes as someone respondent would enjoy working with and like to get to know better as an acquaintance or even a friend, and would fit in the new workplace easily. *Salary* represented the starting salary the respondent perceived as suitable for the applicant given the position.

Altogether there were 11 questions regarding dependent variables (Appendix A), for which the answers were provided using a Likert scale. Three questions were related to *Competence*, three to *Hireability*, four to *Likeability,* and one to *Salary*.

To choose the optimal number of points for the scale, previous research was examined. A 7-point point scale was chosen as previous research suggest that almost everyone can easily point out their feelings in 7 positions (Krosnick & Presser, 2010). 5-point scales might not cover the difference between feelings well enough, for example, slightly, moderately, and extremely sad. At the same time, scales longer than 7-point might be too confusing and hard to differentiate (Krosnick & Presser, 2010). Also, Krosnick and Presser (2010) inform that if more than 4 points are used, it is reasonable not to explain each of them, due to lack of words or common understanding using a given language.

Only for Question 10 (Appendix A), we chose to have an infinite number of points to allow the respondents to choose as precise *Salary* as possible. The decision is based on Moss-Racusin et al. (2012) regret about grouping salary levels and thus having less precise average salary than it could be. The minimum point on the scale is a common internship salary after

tax for Latvian IT students in Latvia - 360 EUR (Kārtība AS "Latvenergo" praktisko iemaņu veicināšanas stipendiju piešķiršanai, n.d.; prakse.lv, n.d.). The maximum on the scale is 1'500 EUR that corresponds to the closest rounded number to the officially given salary level for programming specialist (Algas.lv, n.d.).

In order to group respondents by age, six age groups were introduced. Five of these are three-year groups and one of them is 30+. Although Central Statistical Bureau of Latvia (2016) suggests having five-year groups, we are using three-year groups. For overall population, five year groups are precise enough, yet students who are more homogenous in their age need more precise grouping, otherwise, most of the students would fall into the same age group (20-24). So, the age groups given in the survey were 16-19, 20-21, 22-24, 25-27, 28-30, 30+.

3.7 Survey Participants

The students whose perceptions were studied were from the University of Latvia (Latvijas Universitāte), Riga Technical University (Rīgas Tehniskā Universitāte), the Latvia University of Agriculture (Latvijas Lauksaimnicības Universitāte), Alberta College (Alberta Koledža), the University of Economics and Culture (Ekonomikas un Kultūras augstskola), Ventspils University College (Ventspils Augstskola), the Rezekne Higher Education Institution (Rēzeknes Tehnoloģiju akadēmija), the University of Daugavpils (Daugavpils Universitāte), Transport and Telecommunication Institute (Transporta un Sakaru institūts), and Vidzeme University of Applied Sciences (Vidzemes Augstskola). Such a great number of universities allowed us to acquire opinion from various regions of Latvia and levels of prestige.

Culture and attitude towards the survey might be different from university to university that might influence who chooses to participate in the survey. For example, it is found that people coming from different backgrounds judge the same items differently, especially educated people. At the same time, people who are educated in different locations might make a completely different type of decisions (Henrich, Heine, & Norenzayan, 2010). At the same time, when sample characteristics are close to the population characteristics, the surveyed people who choose to answer and who do not, do not affect variables examined (Holbrook, Krosnick, & Pfent, 2007, as cited in Moss-Racusin et al., 2012).

The survey was forwarded to students by the representatives of the universities via email or posted on the institutions' studyportals, thus all of the students were surveyed via the

Internet. The survey was opened to all students simultaneously and was available in Latvian. Reminders about the survey were shared by the universities' student unions or by representatives of IT programmes to make sure that the number of responses is as high as possible. Also, students were offered to participate in a lottery to get a reward (tickets to the cinema) for completing the survey.

3.8 Sample size

To determine sample size, most researchers choose confidence level of 90 or 95 percent. This shows how certain we can be that if the survey would be repeated, the results obtained will be plus or minus 10 or 5 percent of what would be achieved if the whole population was interviewed (Hague et al., 2016). Using 90 percent confidence interval we obtain that our sample size must be at least 200 respondents, taking into consideration the total number of IT students who are studying in the given universities is little below 3'000 (the number of students was acquired from the managers of the educational programs or representatives of the universities).

3.9 Data Analysis

The participants were asked to value a candidate's *Competence, Likeability, Hireability* using a Likert scale, and suggest adequate *Salary*. For all variables, except *Salary*, the responses were first averaged to create a single value for each, higher numbers indicate greater perceived *Competence*, *Likeability*, or *Hireability*. Then the variables were used for further analysis. For the purpose of analysis, we used natural logarithm of *Salary* that is named *lnSalary* in this section and later analysed as *Salary.* Natural logarithm was used to obtain a percent differences in *Salary* rather than absolute values to gain more intuitive results. Also, after performing skewness test we can reject the hypothesis that *Salary* is normally distributed, thus usage of logarithm is suggested.

First, an ordinary least squares (OLS) regression was used for each dependent variable. Consider the following regressions for Model 1:

$$Competence_i = \beta_0 + \beta_1 * CVname_i + \beta_2 * Gender_i + \varepsilon_i \quad (1.1)$$

$$Hireability_i = \beta_0 + \beta_1 * CVname_i + \beta_2 * Gender_i + \varepsilon_i \quad (1.2)$$

$$Hireability_i = \beta_0 + \beta_1 * CVname_i + \beta_2 * Gender_i + \varepsilon_i \quad (1.3)$$

$$lnSalary_i = \beta_0 + \beta_1 * CVname_i + \beta_2 * Gender_i + \varepsilon_i \quad (1.4)$$

where:

- *CVname* is the name indicated on the materials (CV, extract from motivation letter) received by the respondent.
- *Gender* is the gender of the respondent answering the survey questions.
- ε_i is the error term.

Further on, regression for *Competence* will be shown as an example, as the right handside for the rest of the terms (*Hireability, Likeability, lnSalary*) is the same.

To provide more insight into the results additional terms were added. Consider Model 2:

$$Competence_i = \beta_0 + \beta_1 * CVname_i + \beta_2 * Gender_i + \beta_3 * Age2224_i + \beta_4 * Age2599_i + \varepsilon_i \quad (2)$$

where:

- *Age2224* represents the age group 22-24 year-olds.
- *Age2599* represents respondents older than 25 years.

The age group 16-21 years old (*Age1621*) was not included in the model to avoid dummy variable trap.

As mentioned before, to group respondents by age, six age groups were introduced at first. Five were three year groups and one of them was 30+. However, for some groups, such as 16-18 year olds, the number of responses was low, thus, they were regrouped to create three age groups with similar size.

Further on, we added location of the education institution or of the main campus of it as an additional explanatory variable to Model 1. Consider the following Model 3:

$$Competence_i = \beta_0 + \beta_1 * CVname_i + \beta_2 * Gender_i + \beta_3 * Riga_i + \varepsilon_i \quad (3)$$

where:

- *Riga* is a dummy variable that equals 1 if the respective respondent's education institution is located in Riga, and 0 otherwise.

The variable *Riga* is added to see if there are any significant differences between opinion in and outside the capital of Latvia. It is relevant due to a wage gap between Riga and other locations in Latvia (Pelane, 2017), thus, the variable *lnSalary* could be valued differently. Also, as previously mentioned, people educated in different locations can make their choices in various ways (Henrich, Heine, & Norenzayan, 2010).

Next, all previously described variables were added to the regression. Consider the following Model 4:

$$Competence_i = \beta_0 + \beta_1 * CVname_i + \beta_2 * Gender_i + \beta_3 * Riga + \beta_4 * Aage2224 + \beta_5 * Age2599 + \varepsilon_i \quad (4)$$

The models described above assume that the effect of the independent variable on the dependent variable is always the same and the average effect is shown. However, it is unclear what creates this "average", and, thus, the model might not give any useful insights (Brambor, Clark, & Golder, 2006). To gain more detailed results, an interaction term is added to the regression. An interaction term measures the difference between two groups of variables that are not additive and influence the dependent variable simultaneously (Brambor, Clark, & Golder, 2006). By adding the term, a particular condition is set, and the results might differ from the ones obtained by Models 1-4, for example, *lnSalary* might change when valued by a particular gender and *CVname.*

Once interaction terms are added to the model, the coefficients and the significance of the independent variables may change (Brambor, Clark, & Golder, 2006). It is not a sign of multicollinearity, but might be due to a low number of observations (Brambor, Clark, & Golder, 2006). However, if the interaction terms are excluded, it can lead to heteroscedasticity or omitted variable bias (Williams, 2015).

Usually, all of the variables that create the interaction are included in the model also independently (Brambor, Clark, & Golder, 2006). As a result, Model 5 was obtained:

$$Competence_i = \beta_0 + \beta_1 * CVname_i + \beta_2 * Gender_i + \beta_3(CVname_i \times Gender_i) + \varepsilon_i \quad (5)$$

Results of the models studied are summarized in Appendix D.

4. Analysis and discussion

Further, the description of the data gathered is presented. Next, the obtained results are analysed and discussed. This section ends with the potential limitations and biases in the experiment as well as suggestions for recruitment and education activities, taking into consideration the obtained results.

4.1 Description of Data

When the questionnaire was improved taking into account the feedback from the pre-test, it was sent out to the representatives of 10 Latvian higher education institutions that offer IT related courses. The representatives forwarded the questionnaire to the students via email or posted it on the institutions' news platforms. The survey was sent out on January 16th, 2018, however, from the responses recorded it is possible to conclude that the representatives forwarded the information to students only in the following days or week. The survey was closed on March 8th, 2018.

During the timeframe, we received valid responses from 10 Latvian higher education institutions. Only the responses where all of the necessary information was provided were used for further analysis. The data obtained is summarized in Table 1**.**

In total, 438 students started the survey, however, only 229 of answers were fully completed and valid for further analysis. The response rate for the survey was 8%, which is lower than in other studies that used similar methodology, such as Moss-Racusin et al. (2012), and Steinpreis et al. (1999). The lower response rate can be explained by students perceiving the messages with the survey as spam or not having an applicable incentive to answer to the survey questions. The highest response rate was obtained from the University of Economics and Culture (29%), followed by Rezekne Higher Education Institution (23%).

Most of the respondents (72%) were male and 83% of all the respondents represented the age group 19-24 years old. These demographic characteristics correspond to the underlying population of interest as male students represent 82% of Latvian IT students, and 19-24 is the largest age group enrolled in Latvian higher education institutions.

All of the 229 valid respondents received the same materials, and were randomly assigned a male or a female candidate to evaluate, thus, the applicant's name was the only variable that differed between participants. Altogether, there were 110 respondents who evaluated a female's CV, and 119 respondents who assessed a male's CV.

Name of institution	*Responses recorded*	*% of students that responded*	*Female answers*
Alberta College	16	7%	0%
Latvia University of Agriculture	28	12%	39%
Rezekne Higher Education Institution	45	23%	20%
Riga Technical University	18	2%	22%
Transport and Telecommunication Institute	5	5%	20%
University of Daugavpils	26	15%	19%
University of Economics and Culture	11	29%	18%
University of Latvia	69	8%	33%
Ventspils University College	7	4%	43%
Vidzeme University of Applied Sciences	4	8%	25%
Total	229		

Table 1*: Summary of the survey responses. Altogether 229 responses were recorded from 10 higher education institutions, response rate from each of the universities as well as percentage of female respondents is presented. The data was obtained by the authors.*

4.2 Results and Analysis

4.2.1 Competence

Variable *Competence* was found to be significant at 95% level of confidence in Model 2 (C_Model2) (Appendix D.4). If the male persona's CV was evaluated, the perceived competence level given by the Latvian IT students was by 0.23 units higher than for the female's CV, everything else held constant. No other models showed significant differences in how the variable was perceived.

4.2.2 Likeability

There were found no significant differences in how Latvian IT students evaluated the perceived *Likeability* of the CVs (Appendix D.5).

4.2.3 Hireability

Model 1 (H_Model1), Model 2 (H_Model2), and Model 4 (H_Model4) showed that if a male persona's CV was evaluated, the perceived *Hireability* was 0.27 units higher than for a female's CV at a 95% level of confidence, everything else held constant (Appendix D.6).

Model 3 (H_Model3) showed no statistically significant difference in how *Hireability* was evaluated.

4.2.4 Salary

Model 1 (S_Model1), showed that if a male's CV was evaluated, starting *Salary* was by 10% higher than a female's, at a 95% level of confidence, everything else held constant (Appendix D). Model 2 (S_Model2) and Model 4 (S_Model4) showed that if a male's CV was evaluated, starting *Salary* was by 10% higher than a female's, at a 95% level of confidence, everything else held constant (Appendix D). Model 3 (S_Model3) showed that if a male's CV was evaluated, starting *Salary* was by 9% higher than a female's, at a 90% level of confidence, everything else held constant (Appendix D). To add, in Model 2, students who are older than 25, gave by 18% higher starting salary than all of the respondents, at a 99% level of confidence, everything else held constant. Model 3 showed that those who study in a university that is in Riga or has the main campus in Riga, give 10% higher starting salary than those who are not, at a 95% level of confidence, everything else held constant. Additionally, Model 4 showed that students who are older than 25 gave by 17% higher starting salary than those who are not, at a 99% level of confidence, everything else held constant. Also, Model 4 showed that students of universities that are located in Riga or have the main campus there, evaluated that starting salary by 8% higher than those who are not, at a 95% level of confidence, everything else held constant (Appendix D.7).

Model 5 (S_Model5) showed that if the male CV was evaluated by a male respondent, it received by 3.6% higher salary evaluation than the female's CV evaluated by a woman, everything else held constant (Appendix D).

Model 4 had the highest goodness of fit of a model (R^2) for all of the variables. The lowest goodness of fit for Salary and Hireability were in Model 1, but for Competence and Likeability - Model 5 (Appendix D).

4.3 Discussion

In this section we compare the obtained results with previous findings, as well as show opinions collected from students and HR specialists that we do not aim to generalize, rather treat as possible explanations that need to be verified.

4.3.1 Competence

In four out of five models, there was found no difference in how the students perceived the applicant's *Competence.* Spelke (2005) states that men and women have the same abilities in mathematics, thus, the students might have observed that their course mates perform equally well, hence no difference in *Competence* (Ādams Muzikants, personal communication, March 18, 2018). Also, students interviewed did not mention that their female course mates seem to be less competent or able to perform tasks related to their studies (Ādams Muzikants, personal communication, March 18, 2018; Jūlija Treščenko, personal communication, March 20, 2018).

At the same time, Model 2 shows that the female persona also might be evaluated as less competent due to significance of the dependent variable in Model 2. "Riga Tech Girls" representative together with a student interviewed state that this might be so as when male and female industry specialists are compared, women tend to be perceived more "junior" (Alise Semjonova, personal communication, March 19, 2018; Jūlija Treščenko, personal communication, March 20, 2018). "Junior level" was meant that the perceived level of abilities, knowledge, and skills for a particular position, in other words, someone who has started working in a position later most of the time is perceived as more "junior" than others working for a longer time.

4.3.2 Likeability

Both the male and female applicant were perceived as equally likeable. It is possible that the short motivation letter did not provide enough information to evaluate *Likeability*. Several respondents in the comment section of the survey stated that an interview is necessary to fully evaluate the persona. Also, recruiter Jūlija Grigorjeva (personal communication, February 12, 2018) and HR specialist Liene Sproģe (personal communication, March 20, 2018) states that "chemistry" between the applicant and the team leader play a critical role. Recruiter Jūlija Grigorjeva (personal communication, February 12, 2018) believes that not the gender, but the unique personality traits determine *Likeability* of a person and there are no pronounced differences between male and female applicants.

Interestingly, Symons and Ibarra (2014) observed the difference between male and female applicant *Likeability* when surveying students. However, Symons and Ibarra (2014) used a senior position persona and job description. It is possible that the result for *Likeability*

would change if the experiment of this thesis would be organized for a senior not a junior level position.

4.3.3 Hireability

Models 1, 2, and 4 show that the male persona was evaluated as more hireable (Appendix D). This shows the same results of what Deloitte (2016) has observed in the IT industry. Our results might show the opposite (as some of the models still showed insignificance of the dependent variable) of SIF finding that men and women always have the same opportunities in the labour market (Neatkarīgā Rīta Avīze, 2016).

Students Treščenko and Muzikants (personal communication, March 20, 2018; personal communication, March 18, 2018) admit that the industry is perceived as more for men, thus, women instantly could be evaluated as less hireable. "Riga Tech Girls" founder Semjonova (personal communication, March 19, 2018) explains the problem with lack of women role models for the industry that would encourage more and more women to develop their careers in the IT industry and thus make the field more "applicable" for them. Also, Semjonova (personal communication, March 19, 2018) mentions that women might be evaluated as less hireable due to a possible maternity leave in the future.

Interestingly, HR specialist Sproģe (personal communication, March 20, 2018) mentions that women tend to work at one company for a longer time period than men as they seek for security, and they are more reliable. Thus, she admits that the results are surprising for her as she would expect to see the opposite.

Models 3 and 5 still show no difference in the perceived *Hireability* (Appendix D). Recruiter Grigorjeva (personal communication, February 12, 2018) explained that *Hireability* might not differ between male and female applicants as the chosen position attracts both genders. From her own experience, the IT industry has some positions that attract one of the genders more than the other, thus, in an experiment with a different position the results could be different.

4.3.4 Salary

We find a difference in the logarithm of *Salary* level proposed by the respondents for the male and female persona (Appendix D). This result comes as no surprise for "Riga Tech Girls" representative Semjonova (personal communication, March 19, 2018). She explains that as women tend to be more shy and ask for a promotion or additional benefits rarely.

Similarly, the former HR officer at Netflix, McCord (2017), reminds to regularly evaluate if both genders receive the same wage level as this, for her experience, is the most common reason for biased salary system. Also, recruiter Grigorjeva (personal communication, February 12, 2018) states that the difference might be influenced by the culture in the job market in Latvia that perceive men differently than women when it comes to wages. Interestingly, SIF found that more than half of Latvians believe that wage for the same job is the same for both genders (Neatkarīgā Rīta Avīze, 2016), which is the opposite of what we have observed. This finding is important as SIF has found that differences in how both genders are treated mainly comes from the differences in salary level (Dienas Bizness, 2014). As Latvians are one of the least likely, compared to other Europeans, to say that gender equality is a fundamental right (European Commission Directorate-General for Justice and Consumers, 2015), the Latvian IT students might be focused on the idea that gender equality is not a fundamental right and, thus, show this view also when evaluating one of the CVs.

Recruiter Jūlija Grigorjeva (personal communication, February 12, 2018) and HR specialist Liene Sproģe (personal communication, March 20, 2018) were the only interviewees who admitted that the salary difference is an unexpected result.

4.3.5 Differences in evaluator opinion

Model 5 was used to test if the gender of a respondent affects the perception of the applicant, respectively if male respondents' valuation will differ from female respondents'. In a similar experiment Moss-Racusin et al., (2012) concluded that both, female and male, evaluators were equally likely to show bias against the female applicant. The model shows that male respondents suggest higher *Salary* for the male applicants than women for the female applicant. This can be explained by women believing they have higher competition (Latvijas Organizāciju psihologu biedrība, 2006) and, thus, are willing to give other female applicants less.

There was no significant difference between how both gender respondents valued *Competency, Hireability, and Likeability* of the applicant. The finding is similar to Moss-Racusin et al. (2012) that stated that both genders evaluated CVs in the same way, and the results suggest that also all Latvian IT students seem to show the same opinion for both, male and female, applicants.

4.4 Biases and limitation

4.4.1 Biases and limitations while preparing for the experiment

While preparing for the experiment and conducting interviews, there might be an *experimenter or interviewer bias*. It means that the questions might be formed in a way that reflects our opinion. As the information given in semi-structured interviews affects both the experiment and the results, we used prepared questions. Such preparation decreases experimenter bias (Gravetter & Forzano, 2018). Also, we avoided mentioning interest in gender discrimination while doing the interviews, rather showed a general interest in the IT job market in Latvia.

Our created description of the survey might increase sample bias. This might come from the fact that we mentioned only the overarching topic of the survey - IT job market. Thus, those who are more interested in the field, such as those who are working, might be more likely to answer the survey questions (Gravetter & Forzano, 2018). However, this should not decrease the validity of the results, but rather show the opinion of the those involved in the job market, thus might be even more reliable.

4.4.2 Biases and limitations during the experiment

As the IT students are learning to program and use computers, having the survey Online does not increase sample bias, however, there are other limitations and biases. As the respondents received the survey Online, there might be *self-selection bias*, meaning that some students were more likely to respond than others. This is a common limitation for Online surveys (Wright, 2005). After the survey was distributed, a reminder about the survey was sent out to students, encouraging those who chose not to answer in the first round, to do so in the second one.

Another sample bias can occur if *a respondent chooses to answer the questionnaire multiple times*. Such bias is especially common for surveys that provide monetary rewards to respondents (Gravetter & Forzano, 2018). We offered the respondents to respond to the questionnaire and maybe get a reward (a ticket to the cinema). As we do not see other reasons that might increase the desire to answer more than once, this bias might be little or non-existing. Also, we used a software that allows to see the respondent's IP address and answering time that might signal for potential biases, however, we did not recognize any.

Culture in the surveyed universities is different, *some might see such a survey as a spam, while others as a great activity related to their field of studies*, this might be another sample bias. Thus, we aimed to survey as broad range of universities as possible to cover both types of cultures in the sample. As the survey was held in Latvia, the results might be different if students who do not speak Latvian would be able to answer. As the universities in the sample teach in Latvian, this should not create too large deviations from the results obtained. Also, the thesis focuses on Latvian students, not exchange students who might be studying in English or any other language.

Those who answered the survey might create *social desirability bias* as the topic of the research covers ethical questions. To decrease the bias, we did not mention the variables studied (*Likeability, Hireability, Competence,* and *Salary*). Most importantly, we stated only the overarching topic to the respondents, never mentioning particular interest in gender discrimination. Another way to decrease social desirability bias is by asking question indirectly (Fisher, 1993). Taking into consideration the finding, we used the questions that ask for the information as indirectly as possible, and also mixed the questions so that the ones that cover the same variable are not right next to each other.

After answering the survey, *students might be sharing their view or experience with other peers*. This could create a bias as the students could also share with information about the gender of the persona in the CV, thus, understanding the concept of the survey that contains 2 different CVs to evaluate. Such communication might increase biases if heard by students who are about to respond the survey.

4.4.3 Limitation for generalizations

Studying university students *restricts us to generalize the results* as they might be more homogenous than the overall society (Gravetter & Forzano, 2018). However, we do not aim to generalize the results, thus, the limitation should be considered only if one wants to generalize the findings of this thesis.

4.5 Suggestion for recruiters and IT industry representatives

We would like to make several suggestions on how to decrease possible biases in recruiting and participation in the IT industry due to different perceptions of gender by the Latvian IT students. These suggestions are raised taking into consideration our findings.

First, the recruitment process in the first stage could be based on tests before an employer sees information from the CV, with only successful candidates invited to face-to-face or telephone interviews. In this way, the candidates have a chance to prove themselves worthy before the perception of them change their opportunities. Similar approach was mentioned by Sproģe (personal communication, March 20, 2018).

Next, we would suggest considering using more programs or approaches that allow to see applicants' CVs without their names and hints about the gender, allowing both genders to be evaluated based on their skills and experience. Such approach was also discussed by O'Connor (2016) and the Economist (2015), and even suggested by Cohn (2016).

Later, a fixed base salary could be introduced for each position. Promotions might be partly based on tests and pre-set key performance indicators, similar approach is used by Liene Sproģe (personal communication, March 20, 2018).

Other suggestions focus on education that is critical in the IT industry. We would suggest introducing IT related classes as early as possible in schools to allow both genders to try it and decide if they are interested in the field. This idea is already in the implementation process in Latvian educational system (Skola2030, n.d.). These changes in the education system would allow young Latvians to make the decision of further studies in the field based on their opinion, not the society's perception of it. Previously the United Kingdom and Italy have managed to implement similar ealy age mandatory IT classes (Wojcicki, 2017). Also, a similar idea was mentioned by Semjonova (personal communication, March 19, 2018).

Lastly, Jūlija Treščenko (personal communication, March 20, 2018) and Ādams Muzikants (personal communication, March 18, 2018) mention that the topic of gender roles in the IT sector is not widely discussed amongst students, thus, raising awareness of the topic during the studies might help to popularise the above-mentioned activities.

5. Conclusions

Perception of equally skilled and experienced male and female applicant by the Latvian IT students was examined. We aimed to answer the following research question:

*-How does Latvian IT students' perception (*Competence, Likeability, Hireability*, and* Salary*) differ between a male and a female applicant with the same qualification and experience?*

In order to find the answer to the research question, we surveyed 229 IT students from 10 universities in Latvia. Some students were randomly assigned a male persona to evaluate for the position, but others - a female persona. During the laboratory experiment, we studied four variables of perceived *Likeability, Hireability, Competence*, and the starting *Salary*. To answer our research question, we found that starting *Salary*, and for some models perceived *Competence* and perceived *Hireability* were evaluated to be significantly lower for the female persona, but *Likeability* did not differ in any models for different gender applicants.

Lastly, we suggest further examination of the possible changes in the perception and also the development of an action plan for tackling the issue of unequal perception of genders in the IT industry in Latvia taking into consideration our findings. The findings are important for recruiters to consider the possible biases that might affect the Latvian IT industry and take steps against such situation. Also, these findings could be valuable for those who are developing a new educational system in Latvia (Skola2030) to see how during school years Latvian's perception of IT industry being suitable for both genders could be improved.

For further research we would suggest developing a comparison of perception of genders in the IT industry in other countries, as well as an examination of the steps they have taken in order to equalize the perceptions.

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7. Appendices

Appendix A. Questionnaire of the Key Dependent Variables

Variable	*Question in Latvian*	*Answers in Latvian*
Competency	Cik lielā mērā kandidātes prasmes un pieredze atbilst minētajai darba pozīcijai?	Pilnībā neatbilst, ideāli atbilst
Hireability	Cik liela ir iespēja, ka Jūs ieteiktu kandidāti dotajai darba pozīcijai?	Noteikti neieteiktu, noteikti ieteiktu
Competency	Kā Jūs novērtētu kandidātes kompetenci? Kompetence - izpratne un zināšanas par doto jomu.	Ļoti zema, ļoti augsta
Hireability	Ja Jums būtu jāizlemj pamatojoties uz doto informāciju, vai pieņemtu kandidāti dotajai darba pozīcijai?	Noteikti nepieņemtu, noteikti pieņemtu
Likeability	Ņemot vērā doto informāciju, cik patīkama Jums šķiet šīs kandidātes personība?	Ļoti nepatīkama, ļoti patīkama
Likeability	Ņemot vērā doto informāciju, vai Jums būtu interese labāk iepazīt šo personu un iekļaut viņu savā paziņu lokā?	Noteikti neinteresētu, noteikti interesētu
Likeability	Ņemot vērā doto informāciju, vai uzskatāt, ka kandidāte veiksmīgi iejustos jaunajā darba vietā, ja tiktu pieņemta?	Noteikti neiejustos, noteikti iejustos
Likeability	Vai Jūs būtu gatavs strādāt vienā komandā ar šo kandidāti? (Šo jautājumu izvērtēt no persnīgā viedokļa)	Noteikti nē, noteikti jā
Competency	Cik, Jūsuprāt, kvalificēta ir šī kandidāte (atbilstoši dotajai darba pozīcijai)? Kvalifikācija - oficiāls novērtējums, ko iegūst, kad persona ir pierādījusi noteiktas zināšanas atbilstoši mācību standartiem.	Pārāk nekvalificēta, pārāk kvalificēta
Salary	Ja Jūs varētu noteikt šīs kandidātes sākuma mēneša neto algu (“alga uz rokas”), cik eiro tā būtu?	No 360 līdz 1500
Hireability	Kāda, Jūsuprāt, ir iespēja, ka kompānija AAA pieņēma šo kandidāti dotajai darba pozīcijai?	Noteikti netika pieņemta, noteikti tika pieņemta
	Ja Jums par savām atbildēm ir kādi papildus komentāri, lūdzu tos ierakstiet šeit:	
	Kāds ir Jūsu dzimums?	sieviete / vīrietis
	Cik Jums ir gadu?	16-18 / 19-21 / 22-24 / 25-27 / 28-30 / 30+
	Vai esat bakalaura vai maģistra programmas students?	bakalaura / maģistra / cita
	Kurā augstskolā Jūs pašlaik studējat?	
	Kuru studiju programmu Jūs apgūstat pašlaik?	

Table 2.A. *Survey questions in Latvian for a female persona. Questions were asked in the listed sequence. Questions 1-11 are adjusted from Moss-Racusin et al. (2012) regarding one of the key dependent variables:*

Hireability, Likeability, Competence*, or* Salary. *Participants were required to answer questions 1-11 using a 7-point Likert Scale (Question 10 had infinite number of points). Gender was changed in the Latvian version for a male persona given in the CV. Questions 13 - 17 were used to check that the students are from the IT field and to obtain the necessary data for further analysis.*

Variable	*Question in English*	*Answers in English*
Competency	Do the skills and experience of the applicant matched the position given?	Do not match at all, perfect match
Hireability	How likely would you be to suggest the person for the position?	Definitely would not suggest, definitely would suggest
Competency	Did the applicant strike you as competent? Competency - understanding and wisdom about a particular topic.	Really incompetent, really competent
Hireability	How likely would you be to hire the applicant for the position if given such an opportunity?	Definitely would not hire, definitely would hire
Likeability	Taking into consideration the given information, how much do you like the applicant's personality?	Really unpleasant, really pleasant
Likeability	Would you characterize the applicant as someone you want to get to know better and add to your network of acquaintances?	Definitely not, definitely yes
Likeability	Taking into consideration the given information, do you believe that the applicant would fit in easily in the new workplace?	Definitely would not fit in, definitely would fit in
Likeability	Would you be ready to work in a team with the applicant?	Definitely no, definitely yes
Competency	How qualified do you think the applicant is for the given position? Qualification - official grading given to a person when he or she has proven his or her knowledge according to particular standards.	Too unqualified, too qualified
Salary	If you had to choose one of the following starting salaries for the applicant, what would it be?	EUR 360, EUR 1500
Hireability	How likely do you think it is that the applicant was actually hired by AAA for the job she applied for?	Noteikti netika pieņemta, Definitely was not hired, definitely was hired
	If you have any comments about your answers, please write them here:	
	What is your gender?	male / memale
	How old are you?	16-18 / 19-21 / 22-24 / 25-27 / 28-30 / 30+
	Are you a bachelor or master level student?	bachelor / master / other
	Which university are you attending right now?	
	Which study programme are you taking?	

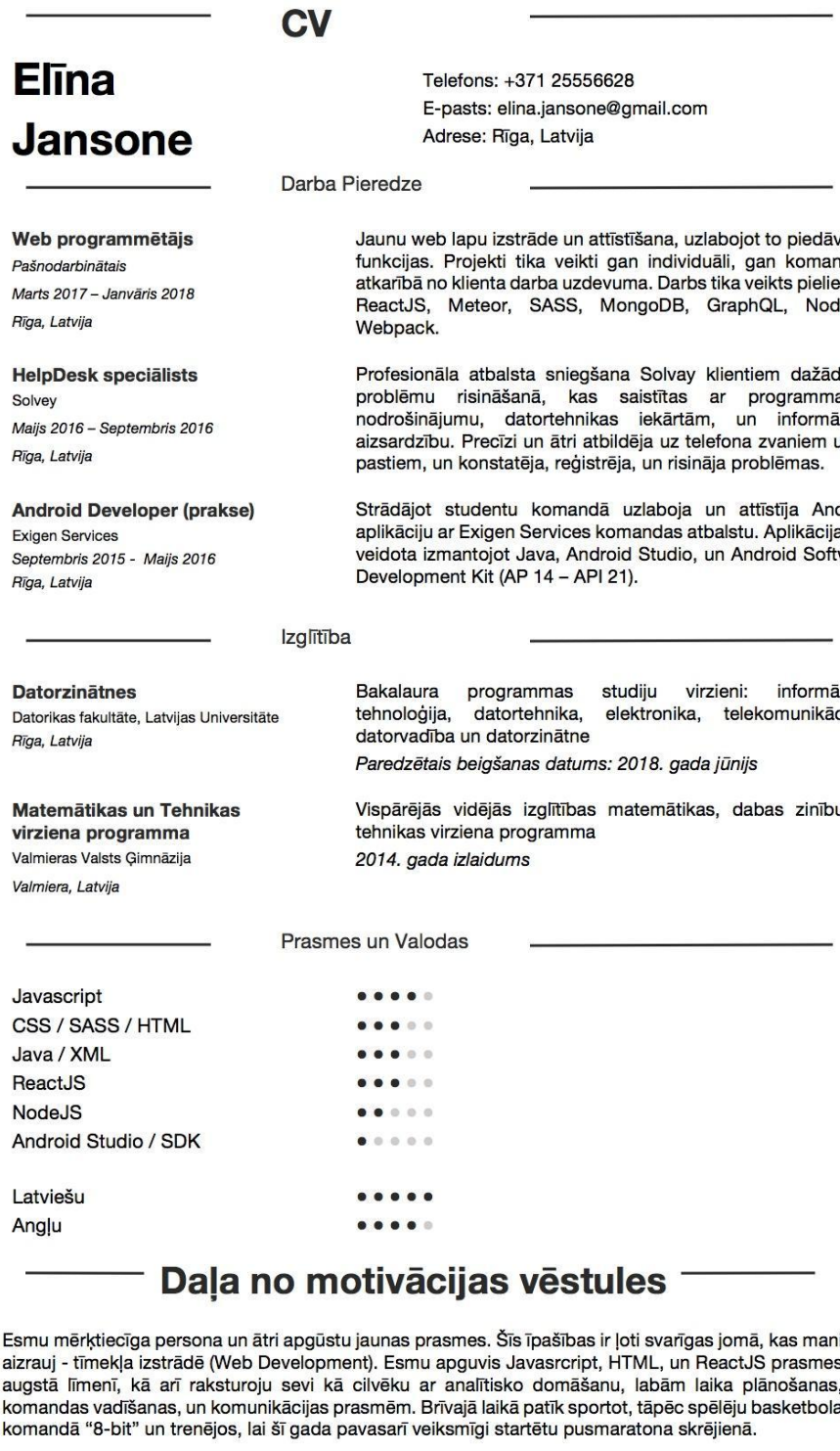
Table 2.B. *Survey questions in English. Questions were asked in the listed sequence. Questions are adjusted from Moss-Racusin et al. (2012) regarding one of the key dependent variables:* Hireability, Likeability, Competence*, or* Salary. *Participants were required to answer questions 1-11 using a 7-point Likert Scale (Question 10 had infinite number of points). Additional questions were used to check that the students are from the IT field and to obtain the necessary data for further analysis.*

Appendix B. Interviewee List for the First and the Second Round of Interviews

Activity	*Name, surname, date of interview*	*Occupation*
Development of CV and job position description	Liene Bērziņa, January 8, 2018	3rd year student at the Latvian University of Agriculture
	Elisa Drelinga, January 8, 2018	3rd year student at the Latvian University of Agriculture
	Austris Cīrulnieks, January 11, 2018	4th year student at the University of Latvia, a team leader and a developer at company kurp.es
Discussion of results	Zanda Torganova, January 12, 2018	Recruiter at IT company TestDevLab
	Jūlija Grigorjeva, February 12, 2018	Recruiter in X Infotech
	Viola Pušņakova, February 9, 2018	Recruiter at MS-IDI
	Liene Sproģe, March 20, 2018	Human Resources and Administration Manager at LineData
	Alise Semjonova, March 19, 2018	Co-founder of Infogram, CEO of Riga Tech Girls
	Ādams Muzikants, March 18, 2018	4th year student at LU, application developer at Accenture Latvia
	Jūlija Treščenko, March 20, 2018	4th year student at LU, developer at UpMatched

Table 3. *List of Participants of semi-structured interviews. Three of the interviewees assisted in the development of CV, motivation letter and job description. Seven interviewees participated in a discussion of results. The date of the interview, name, surname and occupation of each participant is presented.*

Appendix C. Additional Materials - CV, Motivation Letter, and Job Description



CV

Elīna Jansone

Telefons: +371 25556628
E-pasts: elina.jansone@gmail.com
Adrese: Rīga, Latvija

Darba Pieredze

Web programmētājs
Pašnodarbinātais
Marts 2017 – Janvāris 2018
Rīga, Latvija

Jaunu web lapu izstrāde un attīstīšana, uzlabojot to piedāvātās funkcijas. Projekti tika veikti gan individuāli, gan komandās, atkarībā no klienta darba uzdevuma. Darbs tika veikts pielietojot ReactJS, Meteor, SASS, MongoDB, GraphQL, NodeJS, Webpack.

HelpDesk speciālists
Solvey
Maijs 2016 – Septembris 2016
Rīga, Latvija

Profesionāla atbalsta sniegšana Solvay klientiem dažādu IT problēmu risināšanā, kas saistītas ar programmatūru nodrošinājumu, datortehnikas iekārtām, un informācijas aizsardzību. Precīzi un ātri atbildēja uz telefona zvaniem un e-pastiem, un konstatēja, reģistrēja, un risināja problēmas.

Android Developer (prakse)
Exigen Services
Septembris 2015 - Maijs 2016
Rīga, Latvija

Strādājot studentu komandā uzlaboja un attīstīja Android aplikāciju ar Exigen Services komandas atbalstu. Aplikācija tika veidota izmantojot Java, Android Studio, un Android Software Development Kit (AP 14 – API 21).

Izglītība

Datorzinātnes
Datorikas fakultāte, Latvijas Universitāte
Rīga, Latvija

Bakalaura programmas studiju virzieni: informācijas tehnoloģija, datortehnika, elektronika, telekomunikācijas, datorvadība un datorzinātne
Paredzētais beigšanas datums: 2018. gada jūnijs

Matemātikas un Tehnikas virziena programma
Valmieras Valsts Ģimnāzija
Valmiera, Latvija

Vispārējās vidējās izglītības matemātikas, dabas zinību un tehnikas virziena programma
2014. gada izlaidums

Prasmes un Valodas

Javascript ●●●●○
CSS / SASS / HTML ●●●○○
Java / XML ●●●○○
ReactJS ●●●○○
NodeJS ●●○○○
Android Studio / SDK ●○○○○

Latviešu ●●●●●
Angļu ●●●●○

Daļa no motivācijas vēstules

Esmu mērķtiecīga persona un ātri apgūstu jaunas prasmes. Šīs īpašības ir ļoti svarīgas jomā, kas mani aizrauj - tīmekļa izstrādē (Web Development). Esmu apguvis Javasrcript, HTML, un ReactJS prasmes augstā līmenī, kā arī raksturoju sevi kā cilvēku ar analītisko domāšanu, labām laika plānošanas, komandas vadīšanas, un komunikācijas prasmēm. Brīvajā laikā patīk sportot, tāpēc spēlēju basketbola komandā "8-bit" un trenējos, lai šī gada pavasarī veiksmīgi startētu pusmaratona skrējienā.

Material C.1. *CV and extract from motivational letter in Latvian. Each respondent received these materials with a male or female name, and were asked to evaluate the persone based on survey provided in Appendix A. These materials developed by the authors together with Elise Drelinga, Liene Bērziņa, and Austris Cīrulnieks.*

Darba sludinājums

Pozīcija: Jaunākais (junior) Web Developer.

AAA ir strauji augoša IT kompānija, kas saviem klientiem piedāvā augstākās kvalitātes servisu. Šī ir unikāla iespēja kļūt par daļu no komandas, un darboties kopā ar augsta līmeņa profesionāļiem, kuri snieguši pakalpojumus pasaulē vadošajām kompānijām, piemēram, Skype un Microsoft. AAA piedāvā iespēju gūt starptautisku pieredzi, izaugsmes iespējas un apmācības, mūsdienīgu darba vidi, un draudzīgu un atsaucīgu kolektīvu.

Darba pienākumi:

-Strādāt ar React.js kodu bāzēm web lapu attīstībai
-Optimizēt vietnes dažādām ierīcēm un pārlūkprogrammām

Prasības:

-Vēlama pieredze darbā ar React.js
-JavaScript un NodeJS prasmes
-Izpratne par "Server Side development tools", "transpilers", kā arī "preprocessors", piemēram, Babel, Webpack, SASS, LESS
-Ļoti laba izpratne par React.js un tā pamatlikumiem
-Pieredze izmantot tādas React.js darbplūsmas kā Flux vai Redux
-Prasmes HTML un CSS izmantošanā
-Izpratne par "Search Engine Optimization"
-Iepriekšēja pieredze programmatūras izveidē vai līdzīgā uzdevumā

Material C.2. *Description of the job position. Each respondent received this material and were asked to evaluate the given person for this particular job position based on survey provided in Appendix A. Materials developed by the authors together with Elise Drelinga, Liene Bērziņa, and Austris Cīrulnieks.*

Appendix D. Results from regression analysis

Variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
CVname	0.224	0.227*	0.221	0.224	0.147
Gender	0.165	0.168	0.170	0.172	0.106
Age2224		0.0425		0.0429	
Age2529		0.224		0.212	
Riga			0.0935	0.0759	
CVname×Gender					0.108
Const.	4.612***	4.556***	4.561***	4.517***	4.655***
R^2	0.0225	0.0307	0.0254	0.0326	0.0233

Table D.4 *Results for Competence. The table contains the coefficients for variable* Competence*, obtained by regressing the 5 models described in Results and Analysis section. Results presented show the coefficient of each variable regressed. Interaction term coefficients are shown in a case when both dummy variables are 1 i.e. CVname belongs to a male persona and Gender of respondent is male. *** shows the significance at 0.1%, ** at 1%, and * at 5% level.*

Variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
CVname	-0.0379	-0.0371	-0.0341	-0.0327	-0.0962
Gender	0.202	0.167	0.159	0.161	0.121
Age2224		-0.00740		-0.00814	
Age2529		0.0527		0.0717	
Riga			-0.110	-0.117	
CVname×Gender					0.0816
Const.	4.964***	4.957***	5.024***	5.017***	4.997***
R^2	0.00518	0.00555	0.00771	0.00837	0.00547

Table D.5 *Results for Likeability. The table contains the coefficients for variable* Likeability*, obtained by regressing the 5 models described in Results and Analysis section. Results presented show the coefficient of each variable regressed. Interaction term coefficients are shown in a case when both dummy variables are 1 i.e. CVname belongs to a male persona and Gender of respondent is male. *** shows the significance at 0.1%, ** at 1%, and * at 5% level.*

Variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
CVname	0.269*	0.272*	0.264	0.267*	0.392
Gender	0.253	0.258	0.261	0.265	0.346
Age2224		-0.0473		-0.0464	
Age2529		0.126		0.105	
Riga			0.143	0.132	
CVname×Gender					-0.171
Const.	4.632***	4.623***	4.554***	4.555***	4.563***
R^2	0.0283	0.0316	0.0332	0.0356	0.0297

Table D.6 *Results for Hireability. The table contains the coefficients for variable* Hireability*, obtained by regressing the 5 models described in Results and Analysis section. Results presented show the coefficient of each variable regressed. Interaction term coefficients are shown in a case when both dummy variables are 1 i.e. CVname belongs to a male persona and Gender of respondent is male. *** shows the significance at 0.1%, ** at 1%, and * at 5% level.*

Variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
CVname	0.0955*	0.0982*	0.0920*	0.0951*	0.245**
Gender	0.0369	0.0417	0.0424	0.0460	0.151*
Age2224		-0.0119		-0.0114	
Age2529		0.184**		0.170**	
Riga			0.0998*	0.0837*	
CVname×Gender					-0.209*
Const.	6.555***	6.524***	6.501***	6.481***	6.471***
R^2	0.0245	0.0735	0.0490	0.0905	0.0465

Table D.7 *Results for Salary. The table contains the coefficients for variable* Salary*, obtained by regressing the 5 models described in Results and Analysis section. Results presented show the coefficient of each variable regressed. Interaction term coefficients are shown in a case when both dummy variables are 1 i.e. CVname belongs to a male persona and Gender of respondent is male. *** shows the significance at 0.1%, ** at 1%, and * at 5% level.*