

# Job and Career Satisfaction of Software Engineers

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## Abstract

The purpose of this study is to evaluate how several factors including gender, years coding, education level, compensation, hours worked, work setting, and confidence level in manager affect job and career satisfaction for software engineers. The data was analyzed from a 2019 done by Stack Overflow, an online community for developers to learn, share programming knowledge. Surveys from over 65,000 software engineers were analyzed. Based on the survey results, women have the highest job satisfaction. The younger a person coding the higher the job satisfaction. Women and men have equally high job satisfaction. Respondents who identified as other gender are significantly less satisfied than men or women. Education level does not significantly influence career or job satisfaction. Job satisfaction is influenced by the confidence level an employee has in their manager. Although those employees that had no managers scored high in job satisfaction, those who were very confident in their manager scored a higher level of job satisfaction.

**Keywords:** job satisfaction, software engineers, information technology, gender

## 1. INTRODUCTION

Organizational behaviorists and organizational psychologists have long studied the subject of employees' job satisfaction. The literature includes several facets of what variables make up job satisfaction. According to Lumley, Coetzee,

Tladinyane & Ferreira (2011), job satisfaction can be defined as "an individual's total feeling about their job and the attitudes they have towards various aspects or facets of their job, as well as an attitude and perception that could consequently influence the degree of fit between the individual and the organization" (pg. 101).

Employee satisfaction is “determined by subjective perceptions related to the treatment received by the organization, for instance, policies of rewards, hiring and firing policies, performance and retribution.” (Crespi-Vallbona & Mascarilla-Miro, 2018, pg. 36). Sempene, Rieger & Roodt (2002), assert that job satisfaction is made up of many variables such as “structure, size, pay, working conditions and leadership”, all representatives of organizational climate (pg. 23). Some of these variables may also include the “importance of job position, teamwork atmosphere, leadership, recognition and compensation, physical labor conditions and personal labor conditions as key aspects of employees’ well-being.” (Crespi-Vallbona & Mascarilla-Miro, pg. 37). In a study done by LeRouge, Wiley, & Maertz (2013), the authors included job security, the work itself, one’s supervisor, compensation, work/life balance, and advancement/opportunities as important facets of job satisfaction.

Lumley, et. al (2011) used Spector’s (1994) Job Satisfaction Survey to analyze nine facets of job satisfaction (Table 1).

Facet	Description
Pay	Satisfaction with pay and pay raises
Promotion	Satisfaction with promotion opportunities
Supervision	Satisfaction with person’s immediate supervision
Fringe benefits	Satisfaction with monetary and non-monetary fringe benefits
Contingent rewards	Satisfaction with appreciation, recognition and rewards for good work
Operating procedures	Satisfaction with operating policies and procedures
Co-workers	Satisfaction with co-workers
Nature of work	Satisfaction with type of work done
Communication	Satisfaction with communication within the organisation

Table 1: Nine Facets—Spector’s Job Satisfaction Survey (1994)

Much of the literature has focused on the satisfaction of Information Technology (IT) professionals, with little emphasis on the software engineer, specifically. This study analyzes the career and job satisfaction of software engineers, with specific attention to gender, age, education, experience, leadership and compensation.

## 2. LITERATURE REVIEW

### Education Level

Numerous researchers have examined the effect of education level on job satisfaction (González, Sánchez & López-Guzmán, 2016; Ross & Reskin, 1992; Yeo, Sasaki, Serenko, Sato & Yu, 2018). Ross and Reskin (1992) surveyed 557 Illinois workers and found that well-educated respondents were more likely to work in an area that provides more control, but the total effect of

education on job satisfaction was nil. Yeo, et al (2018) examined job satisfaction among IT workers in Taiwan, Japan and China. They also determined that the level of education had no effect on job satisfaction (Yeo, et al, 2018). Similarly, Gonzalez et al (2016), looked at the hospitality industry and found that education level does not influence job satisfaction.

Opposingly, Pew Research Center (2016) found that there was a difference in job satisfaction based upon education level. They found that highly educated workers among the most satisfied with their jobs.

### Gender

Does the job satisfaction of men and women who work in technology differ? In a study on gender inequality and job satisfaction of working professionals in 32 European countries, including IT and non-IT workers, Perugini & Vladislavjevic (2019), found that despite being paid less than men and facing worse working conditions, lower promotion opportunities and workplace discrimination, women typically report higher levels of job satisfaction.

Ghazzawi (2010) surveyed 132 IT professionals, 99 men and 33 women in various Southern California organizations using the Minnesota Satisfaction Questionnaire (MSQ) which is made up of a 5-point Likert scale, to ascertain general job satisfaction. The study examined the effects of gender on job satisfaction and concluded that gender does not play a role in job satisfaction among IT professionals in the United States.

The author also found that, regardless of gender, major sources of job satisfaction of IT professionals were, 1) the ability to keep busy all the time (male 82% vs. female 85%); 2) the ability to do things that don't go against one's conscience (male 80% vs. female 94%); 3) the steady employment (male 78% vs. female 85%); 4) the chance to work independently (male 76% vs. female 85%); co-worker's comradery (76% male vs. 82% female); 5) the chance to try one's own methods of doing the job (72% male vs. 88% female) (pg. 24).

Major sources of job dissatisfaction experienced by both male and female IT professionals were, “1) the chances for advancement (male 35% vs. female 48%); 2) the way company policies are put in to practice (male 36% female 45%); 3) pay and the amount of work (male 46% vs. female 55%) and 5) the chance to delegate to people (male 49% female 55%)” (Ghazzawi, 2010). Although these factors are their lowest job

satisfaction, "28% of male and 27% of female respondents indicated that they were not satisfied regarding their chances for advancement on the job." (pg. 24)

Sharma (2017) studied 220 IT professionals across three IT companies in India. The findings revealed that, "organizational cultural values such as fairness, growth opportunities and reputation of organization have a positive effect on the job satisfaction, whereas organizational traits like aggressiveness have a negative influence on job satisfaction." (pg. 35) Both men and women felt organizational fairness to be an equally important and equally strong foundation to their job satisfaction. Female IT professionals found that attention to details is a factor, influencing job satisfaction of female employees more than their male equivalents.

Naidoo (2018) surveyed 158 South African IT professionals to ascertain their pay level and its relationship to job satisfaction. The findings of the study revealed that, "irrespective of gender or ethnicity, IT employees in South Africa who are generally less satisfied with the salary they are receiving, have a low degree of commitment to their organizations, and are only moderately satisfied with their jobs." (pg. 17)

Priya & Mahadevan (2013) conducted a study with 151 female information technology (IT) and 70 information technology enabled services (ITES) employees from India. The respondents were between the ages of 23 to 45 years, with an average age of 34 years. They found no significant difference in job satisfaction among junior, middle and senior levels of women executives in the sector.

### 3. METHODOLOGY

Data from a survey hosted by Stack Overflow, an online developer's community, was used for this research. The use of Stack Overflow is well established as a source for peer-reviewed journals including Barua, Thomas, and Hassan (2014), Asaduzzaman, Mashiyat, Roy, and Schneider (2013), and Treude and Robillard (2016). The Stack Overflow dataset consisted of dozens of demographic, descriptive, and opinion questions about the state of programming today. Over 90,000 responses were gathered from code developers from all over the world (Appendix 1). The data was filtered to respondents who indicated they were software developers by profession. This resulted in a dataset of over 65,000 responses. The results of this study reflect an analysis of a subset of these questions that

may be relevant to software engineers' job and career satisfaction. Two questions were used as measures of satisfaction.

- (1) How satisfied are you with your current job? (If you work multiple jobs, answer for the one you spend the most hours on.)
- (2) Overall, how satisfied are you with your career thus far?

The responses were on a 5-point Likert scale from very dissatisfied to very satisfied. These two variables were used as dependent variables. The independent variables tested were those that may influence job and career satisfaction. They included gender, age, year started coding, years coding, education level, total compensation level, hours worked, work setting, confidence level in manager.

## 4. RESULTS

### Gender and Age

The average age of respondents was 31 and predominantly male. The distribution of the respondents' ages and job satisfaction is shown in Figure 1. A regression analysis was performed on age and job satisfaction. It was found that age is not a significant variable for career satisfaction but was significant for job satisfaction at  $p < .02$ . In other words, younger individuals have higher current job satisfaction, but older individuals are just as satisfied with their careers as younger individuals. These findings may be the result of other variables such as years coding which we explore later.

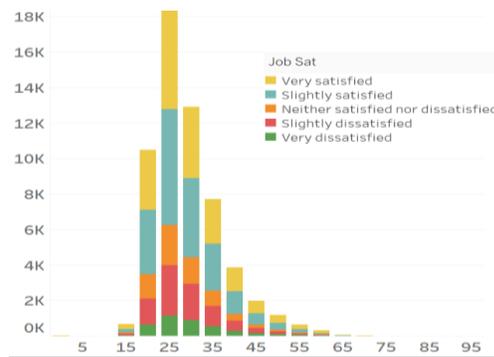


Figure 1. Age and Job Satisfaction

The distribution of gender with average age and years coding are given in Table 2. It was found that women have the highest average level of job satisfaction, approaching only slightly satisfied (4 on a scale of 1 to 5). Next satisfied are men followed by other. All are significantly different at  $p < .01$  (Table 3)

Gender	Count	Avg Age	Avg Years Coding	Avg Age Started Coding
Male	56,959	31	13	15
Female	4,208	30	10	17
Other	2567	30	12	14

Table 2. Gender with Average Age, Years Coding, and Avg Age Started Coding

	N	Average Job Satisfaction
Male	56,959	3.69
Female	4,208	3.78
Other	2,567	3.60
<b>Overall</b>	<b>63,734</b>	<b>3.69</b>

Table 3. Job Satisfaction by Gender

With just career satisfaction as the dependent variable the results were somewhat different. Women and men had equally higher career satisfaction but only approaching 4.0 slightly satisfied (Table 4). An ANOVA showed a significant difference by gender but a post hoc analysis showed no significant difference between males and females. It is interesting that career satisfaction is higher than job satisfaction and that the difference between males and females no longer exists when career satisfaction rather than job satisfaction is examined. Other genders are significantly less satisfied in their career than males or females at  $p < .01$ .

	N	Average Career Satisfaction
Male	58,145	3.96
Female	4,333	3.99
Other	2,806	3.78
<b>Overall</b>	<b>65,284</b>	<b>3.95</b>

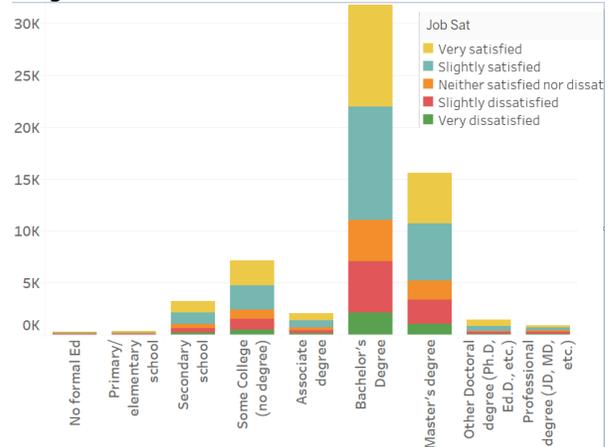
Table 4. Career Satisfaction by Gender

These findings of job and career satisfaction by females either equaling or exceeding males is an important finding. The scarcity of female computing majors in universities today does not map to this positive job and career satisfaction by females.

### Education Level

Most of the respondents had bachelor's degrees. The education level along with job satisfaction is shown in Figure 2.

Figure 2. Education Level and Job Satisfaction



Education level does not significantly affect job satisfaction, which has a non-significant  $p$  value of .214. These results further support the finding of other researchers (González, Sánchez & López-Guzmán, 2016; Ross & Reskin, 1992; Yeo, Sasaki, Serenko, Sato & Yu, 2018). However, education level is an influencing variable for career satisfaction. For software developers the greater the education level the lower the career satisfaction. (Table 5). These results suggest that career expectations are not being met for college graduates but that they are satisfied in their current jobs.

Educational Level	Avg. Job Sat	Avg. Career Sat
No formal Ed.	3.43	3.60
Primary School	3.62	3.75
Secondary School	3.77	4.00
Some College	3.72	3.98
Assoc. Degree	3.73	4.02
Bachelor's Degree	3.67	3.97
Master's Degree	3.70	3.92
Other Doctoral (PhD, Ed.,D)	3.93	4.08
Professional Degree (JD, MD)	3.42	3.70
	<b>3.69</b>	<b>3.95</b>

Table 5. Educational Level with Job and Career Satisfaction

### Experience Coding

Two relevant variables in the survey were, the age that the respondent first started coding and the total number of years that the respondent had been coding. In other words, the data indicated how old the respondents were when they started programming and how many years they have

been practicing. The number of years coding and the age that an individual starts coding influences job satisfaction. The earlier age an individual starts coding and the longer respondents had coded lead to higher levels of job satisfaction and career satisfaction (Tables 6 and 7). Both factors were statistically significant with a  $p < .01$ . The impact of both of these variables on career and job satisfaction were very similar as both had nearly identical standardized coefficients.

<b>Age Started Coding</b>	<b>Job Satisfaction</b>	<b>Career Satisfaction</b>
<b>0 - 5</b>	3.57	3.8
<b>6 - 10</b>	3.78	4.04
<b>11 - 15</b>	3.74	4.00
<b>16 - 20</b>	3.62	3.89
<b>21 - 25</b>	3.58	3.91
<b>26 - 30</b>	3.77	4.08
<b>31 - 35</b>	3.84	4.06
<b>36 - 40</b>	3.85	4.05
<b>41 - 45</b>	3.43	4.52
<b>46 - 50</b>	3.5	3.54
<b>+50</b>	4	3

Table 6. Age start Coding with Job and Career Satisfaction

<b>Years Coding</b>	<b>Job Satisfaction</b>	<b>Career Satisfaction</b>
<b>0 - 5</b>	3.68	3.67
<b>6 - 10</b>	3.66	3.66
<b>11 - 15</b>	3.67	3.67
<b>16 - 20</b>	3.70	3.70
<b>21 - 25</b>	3.73	3.73
<b>26 - 30</b>	3.75	3.75
<b>31 - 35</b>	3.78	3.78
<b>36 - 40</b>	3.80	3.80
<b>41 - 45</b>	3.88	3.87
<b>46 - 50</b>	4.05	4.05
<b>+50</b>	4.22	4.22

Table 7. Years Coding with Job and Career Satisfaction

These findings suggest that perhaps the earlier we expose children or young adults to programming, the more satisfied they may be with their computing job and career. Also, there is not a fatigue factor in programming. This is an extremely important finding. That is, the more you code, the more you like your job and career. Coders seem not to "burn out" as perhaps many in other careers do.

Regression output shown in table 6 and 7 confirms these speculations. The younger one started to write code (lower age), the higher the job satisfaction. The more years coding, the higher job satisfaction. Both are significant at  $p < .01$ .

**Confidence Level in Manager**

Job satisfaction is influenced by confidence level in one's manager, as shown in table 8. The higher the confidence level in a manager, the higher the job satisfaction. However, job satisfaction for those having no manager is high as well. Only Very confident in manager is higher than No manager. All are significantly different from one another at  $p < .05$ .

	<b>N</b>	<b>Average</b>
<b>No Response</b>	10060	3.77
<b>No manager</b>	1623	3.82
<b>Not at all confident</b>	8196	2.74
<b>Somewhat confident</b>	22274	3.57
<b>Very confident</b>	21699	4.13
<b>Total</b>	<b>63852</b>	<b>3.69</b>

Table 8. Confidence Level of Manager with Job Satisfaction

**Compensation**

Compensation and the number of hours per week worked are factors for a job and career selection. This study looked at Converted Compensation (to USD) and number of hours worked per week to determine if either of these variables significantly impacted job or career satisfaction. As shown in tables 9 and 10 for both job and career satisfaction, compensation does make a significant positive difference but the number of hours worked per week is not significant. Compensation is significant at  $p < .01$ .

	<b>Unstandard. Coeff</b>	<b>Std. Coeff</b>	<b>Sig.</b>
<b>(Constant)</b>	3.673		.000
<b>Conv. Comp</b>	1.970E-7	.045	.000
<b>Weekly Hrs</b>	.000	.003	.462

Table 9. Weekly Hours Worked and Compensation on Job Satisfaction

	Unstandard. Coeff	Std. Coeff	Sig.
(Constant)	3.673		.000
Conv. Comp	2.563E-7	.063	.000
Weekly Hrs	.000	.005	.291

Table 10. Weekly Hours Worked and Compensation on Career Satisfaction

**Country**

The final variable examined was country of residence to see if there was an international difference in job or career satisfaction. Table 11 through 14 show career and job satisfaction by the top 10 Countries and Bottom 10 with over 100 respondents.

For the most part Western countries show high career and job satisfaction than eastern or Communist nations. For example, Kowal & Roztock (2015) conducted a study of 391 IT professionals working in various companies in Poland. They found that many Polish IT professionals “feel that their compensation level and promotion opportunities are inadequate for the competency they possess.” They concluded that this might be explained by “the existing compensation structures in many Polish companies.” (pg. 1008)

Perugini & Vladislavljevic (2019) found in a study of job satisfaction over 32 European countries that women in Europe “have on average higher levels of job satisfaction than men.” (p. 138) However, employment in “typically male occupations also decreases female job satisfaction...”. (p. 139)

Further research would be needed to determine if this is due to general work conditions in the countries or the nature of the software work performed within these countries.

Country	N	Mean
Norway	419	4.23
United States	16,028	4.22
Estonia	154	4.19
Canada	2481	4.13
Sweden	959	4.12
Lithuania	183	4.11
Netherlands	1,356	4.09
Finland	413	4.08
United Kingdom	4,432	4.07
New Zealand	391	4.06

Table 11. Career Satisfaction by Country Top 10 with over 100 respondents

Country	N	Mean
Japan	308	3.60
Nepal	143	3.59
Turkey	654	3.57
Malaysia	194	3.56
Italy	1086	3.55
Iran	558	3.53
Indonesia	305	3.44
Viet Nam	137	3.39
Taiwan	126	3.32
China	437	3.17

Table 12. Career Satisfaction by Country with over 100 respondents Career Satisfaction Bottom 10

Country	N	Mean
Norway	417	4.07
Estonia	153	3.94
Sweden	944	3.93
Finland	401	3.92
Netherlands	1337	3.91
USA	15,679	3.90
Canada	2,427	3.89
Denmark	440	3.85
Australia	1,402	3.82
Slovakia	165	3.79

Table 13. Job Satisfaction by Country Top 10 with over 100 respondents

Country	Count	Mean
Mexico	474	3.39
Indonesia	300	3.39
Malaysia	191	3.37
Bangladesh	374	3.34
Viet Nam	131	3.31
Turkey	635	3.29
Iran	534	3.27
Nepal	135	3.23
Taiwan	120	3.16
China	411	2.99

Table 14. Job Satisfaction by Country Bottom 10 with over 100 respondents

## 5. CONCLUSIONS

Scholars have been studying job satisfaction for a long time, as far back as 1935 when Robert Hoppock published his seminal book, *Job Satisfaction*. Over time, scholars have studied a wide variety of variables that constitute employee satisfaction.

This study examined job and career satisfaction of software engineers using a Stack Overflow dataset of over 65,000 respondents from around the world on the state of programming careers today. Job satisfaction variables that were analyzed included; education level, gender, age, number of years of experience, confidence in one's manager, compensation and country of origin.

We found that job and career satisfaction by females either equaled or exceeded males' satisfaction. The authors noted that career satisfaction is higher than job satisfaction and that the difference between males and females no longer exists when career satisfaction rather than job satisfaction is examined. These conclusions are supported by Ghazzawi (2010), Sharma (2017) and Naidoo (2018). Perugini & Vladislavljevic (2019), found that despite being paid less than men and facing worse working conditions, lower promotion opportunities and workplace discrimination, women typically report higher levels of job satisfaction.

The data indicated that software engineers are the most satisfied with their jobs early in their career and at a younger age, with the highest satisfaction between the ages of 25-30 years. Satisfaction begins to drop off at age 30 and continues through to retirement or age 65. But career satisfaction is not influenced by age. A possible explanation is that older individuals have had a long successful career but at an advance age may be less satisfied in their jobs because of advances by younger individuals and/or resistance to changes in programming languages and practices. This apparent dichotomy deserves further exploration, since the number of years coding positively influences job and career satisfaction.

Our analysis determined that education level does not significantly affect job satisfaction. These results further support the findings of other researchers (González, Sánchez & López-Guzmán, 2016; Ross & Reskin, 1992; Yeo, Sasaki, Serenko, Sato & Yu, 2018). However, education level is an influencing variable for career satisfaction. For software developers the

greater the education level the lower the career satisfaction. These results suggest that while career expectations are likely not being met for college graduates, they are satisfied in their current jobs.

This study also found that the earlier an individual started to write code, coupled with length of time (experience) one had coding, the higher levels of job satisfaction and career satisfaction one had. These findings suggest that perhaps the earlier we expose children or young adults to programming, the more likely they will be satisfied with their computing job and career. We also found that the frequency with which an individual wrote code, the more they enjoyed their job and career.

Job satisfaction is influenced by confidence level in one's manager. Lumley, et al (2011) assert that "employee satisfaction increases when the immediate supervisor is understanding, friendly, offers praise for good performance, listens to employees' opinions and shows personal interest in them." (p. 103) Our results found that the higher the confidence level in a manager, the higher the job satisfaction. Interestingly, we also found that job satisfaction for those having no manager at all is also high.

Our analysis concluded that compensation does make a significant positive difference in employee satisfaction but the number of hours worked per week is not significant. According to Kowal & Roztocki (2015), "many IT professionals feel that their compensation level and promotion opportunities are inadequate for the competency they possess." (pg. 1008) Naidoo (2018) found that "IT employees in South Africa who are generally less satisfied with the salary they are receiving" are only moderately satisfied with their jobs (p. 17). Lumley, et al (2011) concluded that "managers need to review existing pay practices so as to offer fair pay..." (p. 115)

We concluded that, in general, Western countries show high career and job satisfaction as compared to Eastern or Communist nations. Kowal & Roztocki (2015) found that many Polish IT professionals "feel that their compensation level and promotion opportunities are inadequate for the competency they possess." (pg. 1008) Perugini & Vladislavljevic (2019) found that women in Europe "have on average higher levels of job satisfaction than men." (p. 138) However, employment in "typically male occupations also decreases female job satisfaction..." (p. 139) Further research would be needed to determine what variables are causing the disparity between

the countries who have a high level of satisfaction among their software engineers and those who have a low level of satisfaction.

## 9. REFERENCES

- Asaduzzaman, M., Mashiyat, A. S., Roy, C. K., & Schneider, K. A. (2013, May). Answering questions about unanswered questions of stack overflow. In 2013 10th Working Conference on Mining Software Repositories (MSR) (pp. 97-100).
- Barua, A., Thomas, S. W., & Hassan, A. E. (2014). What are developers talking about? an analysis of topics and trends in stack overflow. *Empirical Software Engineering*, 19(3), 619-654.
- Crespi-Vallbona, M., & Mascarilla-Miro, O. (2018, 2nd Quarter). Job Satisfaction: The Case of Information Technology (IT) Professionals in Spain. *Universia Business Review*(58), 36-51. doi:10.3232/UBR.2018.V15.N2.02
- Ghazzawi, I. (2010). Gender Role in Job Satisfaction: The Case of the U.S. Information Technology Professionals. *Journal of Organizational Culture*, 14(2), 1-34.
- González, F., Sánchez, S., & López-Guzmán, T., (2016). The Effect of Educational Level on Job Satisfaction and Organizational Commitment: A Case Study in Hospitality, *International Journal of Hospitality & Tourism Administration*, 17:3, 243-259.
- Hoppock, R. (1935). *Job Satisfaction*. Oxford, England: Harper.
- LeRouge, C. M., Wiley, J. W., & Maertz, J. C. (2013). A Comparison of Job Satisfaction between IT and Non-IT Women Incumbents in Clerical, Professional, and Managerial Positions. *The DATA BASE for Advances in Information Systems*, 44(2), 39-54.
- Priya, S., & Mahadevan, U. (2013, December). Women Executives in IT/ITES Sectors: Job Satisfaction and Quality of Work Life. *Rajagiri Journal of Social Development*, 5(2), 105-114. *Systems*, 44(2), 39-54.
- Kowal, J., & Roztock, N. (2015). Job Satisfaction of IT Professionals in Poland: Does Business Competence Matter? *Journal of Business Economics and Management*, 16(5), 995-1012.
- Lumley, E., Coetzee, M., Tladinyane, R., & Ferreira, N. (2011). Exploring the job satisfaction and organizational commitment of employees in the information technology environment. *Southern African Business Review*, 15(1).
- Naidoo, R. (2018, January). Turnover intentions among South African IT Professionals: Gender, Ethnicity and the Influence of Pay Satisfaction. *The African Journal of Information Systems*, 10(1), 1-20.
- Perugini, C., & Vladisavljevic, M. (2019). Gender inequality and the gender-job satisfaction paradox in Europe. *Labour Economics*, 60, 129-147.
- Pew Research Center (2016). Social & Demographic Trends, the state of American Jobs – How Americans view their jobs. Retrieved from <https://www.pewsocialtrends.org/2016/10/06/3-how-americans-view-their-jobs/>
- Ross, C. & Reskin, B. (1992). Education, Control at work and job Satisfaction, *Social Science Research*. 21(2) 134-148.
- Sempene, M., Rieger, H., & Roodt, G. (2002). Job Satisfaction in Relation to Organisational Culture. *SA Journal of Industrial Psychology*, 28(2), 23-30.
- Sharma, P. (2017). Organizational culture as a predictor of job satisfaction: the role of age and gender. *Management*(22), 35-48.
- Treude, C., & Robillard, M. P. (2016, May). Augmenting api documentation with insights from stack overflow. In 2016 IEEE/ACM 38th International Conference on Software Engineering (ICSE) (pp. 392-403).
- Yeo, B., Palvia, P., Sasaki, H., Serenko, A., Sato, O., & Yu, J. (2018) Exploring Job Satisfaction of IT Workers in Taiwan, Japan, and China: The Role of Employee Demographics, Job Demographics, and Uncertainty Avoidance, *Twenty-fourth Americas Conference on Information Systems*, New Orleans, 2018

