

Women's Professional Career and Culture: Software Organizations in India

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Abstract

In this work, we conduct an investigation on perspectives and existing barriers for women trying to pursue a career in the Indian software industry. The study is focused on three dimensions: organizational policies and practices, workplace environment, and social-familial factors. Another goal is to compare the perception of male and female software professionals concerning the impact of these dimensions on the careers of female software professionals. The study reveals that formally organizations provide gender-neutral policies, and currently the emphasis needs to be placed on their implementation. It has been observed that, on the whole, there is a favorable work environment and unbiased attitude toward female software employees. At the same time, we conclude that, despite significant progress, hurdles - mainly coming from the society and family traditions—still exist restraining flourishing careers of women in the software sector.

Keywords

gender issues, challenges, organizational policies, workplace environment, social environment

Introduction

The problem of gender inequality—including the rights for voting and education—has been discussed during the entire history of civilization. Quite recently—on the historical scale—the outstanding mathematician Sofya Kovalevskaya (1850–1891) was rejected by European universities despite remarkable scientific achievements only because gender discrimination banned university education and employment for women (Spicci, 2002). Eventually, she became the first female professor in Europe and a symbol of women's struggle for their rights. Nowadays, those restrictions look as an anachronism, the modern society removed legal discrimination on gender factor. Does it mean that unequal opportunities for both genders are in the past? We investigate this question by looking at today's scenario in the IT sector in India. Traditionally, there has been a shortfall of women in the technology field, which was primarily a male domain. However, during the last decades, women have been constantly closing this gap by acquiring higher education and waiving the orthodox taboos. The IT sector offers white-collar jobs requiring knowledge-centric skills and providing comparatively high salary, international mobility, and a flexible and physically less taxing work in a comfortable office environment (Kumar, 2001; Shanker, 2008; Upadhyaya, 2006). The jobs at computers can be termed suitable for women and possessing IT skills does not appear as odd.

The number of women employed in the Indian IT industry has increased rapidly over the past 10 years (Raghuram et al., 2017), and currently nearly 30% of employees are women (Raghuram et al., 2017; Srinivasan et al., 2013). Women's participation in the IT workforce is one of the highest among non-agricultural sectors in the country (Raghuram et al., 2017). This achievement is somewhat overshadowed by the fact that women working in the IT companies are mostly at the initial career levels (Raghuram et al., 2017; Shyamsunder, 2014; Srinivasan et al., 2013), while their representation drops significantly as they move up the corporate ladder and very few actually make it to the board rooms. The higher the level, the lower the participation of female employees (Shyamsunder, 2014). This possibly indicates that the gender policies in organizations may not be decided by a gender-wise balanced group at apex level. Also, there is a noticeable shift from hard core programming jobs to less programming skill-related ones, like testing, documentation or customer

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support for a lesser pay. Probably, this occurs due to inability to upskill oneself, along with playing the major care-giver role in the family. The nature of the software services industry in India poses some unique challenges for professionals in general and women professionals in particular (Valk & Srinivasan, 2011). This is because software industry has a unique global delivery model with long working hours (Scholarios & Marks, 2004), conference calls outside the conventional working hours or fast-tracking a software project in shifts (Teagarden et al., 2008), rapid technology changes that make skills quickly obsolete requiring software professionals to frequently re-skill by putting extra training and educational hours (Armstrong et al., 2007). Due to this highly demanding scenario at work, they feel compelled to update their knowledge and skills in their spare time, sometimes even sacrificing holidays (Wang et al., 2008).

As Indian women experience a serious bias at the workplace, 55% of them—more than in developing countries such as Brazil, China, and the UAE (Hewlett & Rashid, 2010)—contemplate quitting. IT companies in India face a significant problem of retention following maternity leave, whereas part-time work or career breaks also affect women's careers (Raghuram et al., 2017). Unpredictable working hours and workloads make it difficult for women to balance work and home duties in conventional Indian family setup. "In comparison to occupation roles the salience of women's commitment to family roles—so often emphasized in the Indian culture as being central to their very being—remains undiminished" (Bhatnagar & Rajadhyaksha, 2001). Married Indian women endure more cultural pressure to quit their careers than women in other major emerging markets (Hewlett & Rashid, 2010).

Toward attaining work-family balance and retaining women software professional in workplace, the following factors are crucial:

- Organizational support via development and strengthening of laws and policies conducive for working women (Surie, 2016);
- Workplace support from supervisors and co-workers (Voydanoff, 2002);
- Social support by family, extended family, and friends (Marcinkus et al., 2007).

Therefore, it is important that all of the above dimensions should be examined as potential barriers for Indian women to successfully pursue a career in the software industry. To the best of our knowledge, there are no recent studies that explore all three dimensions simultaneously to identify possible hurdles that Indian female software professionals encounter in their careers in the present context. In 2011, Valk and Srinivasan conducted an exploratory qualitative study of 13 women IT professionals in the software sector in Bangalore, India. They explored the role of organizational policies, practices and social support in achieving work

family balance of female IT professionals from only female participants from one city. In distinction, the present study investigates the challenges experienced by female software professionals with respect to the three dimensions defined above and includes views of both male and female participants from different locations presenting as such wider scope of opinions. We believe that there have been a lot of transformations in the last 9 years with respect to organizational policies, workplace and social environment, and this article attempts to reflect recent developments.

This paper is organized as follows: Section 2 reports the related work in this area. Section 3 presents the methodology whereas Section 4 provides data analysis and results of this study. The next section illustrates the discussion and suggests issues for further research in this area and finally, Section 6 provides conclusions.

Related Work

India outperforms many progressive countries in terms of gender equality related to enrollment in computer science study programs (Thakkar et al., 2018). Thakkar et al. (2018) found the reason behind this trend is socio-cultural pressures, which encourage, even coerce, women into entry-level programs in computing due to the lucrative and stable prospects of the IT sector. Often, parents expect IT sector to open better financial and marital prospects. The Indian information technology (IT) industry is a significant source of high quality and well-paid employment for the educated youth of India (Upadhyaya, 2007). Moreover, IT-related jobs are also considered "safe" for women because they are white-collar jobs in which employees interact with an exclusive, educated stratum of society (Thakkar et al., 2018).

India women also represent a greater share of CS employment than in the overall labor force with 30% of IT employees being women compared to 25% overall (Thakkar et al., 2018). IT professional women, in their navigations between work and personal life yield a more cosmopolitan sense of family than is usually found in the Indian middle class, but one that is distinct from the supposed "Western" model (Upadhyaya, 2012). IT woman offers a compelling cultural icon not only for the IT industry but also for India as a whole, projecting a forward-looking, technologically savvy feminine persona that still remains "authentically" Indian (Radhakrishnan, 2017).

Barriers Due to Organizational Policies

Although participation of women starts unusually high but then experiences a dramatic drop: from 45% among undergraduates, to 30% in the IT workforce, to around 10% of CS researchers, and less than 1% of C-level executives in the IT sector (Thakkar et al., 2018). One way a person can be facilitated in the work domain is by support in the workplace via an organizational approach involving the implementation of family friendly policies (Ezra & Deckman, 1996).

Organizational and supervisor understanding of family duties are also positively related to satisfaction with the balance between work and family life (Ezra & Deckman, 1996). Despite the existence of work-family women-friendly policies in Indian software development organizations, some of the women employees are skeptical about the keenness and willingness of organizations to incorporate these policies and programs (Valk & Srinivasan, 2011). A better organization setup is required and responsible policymakers need to invest in developing and strengthening laws and policies to support working women (Surie, 2016).

Ballakrishnen et al. (2019) found that women facing structural constraints, such as unequally distributed household responsibilities and gender-biased organizational policies, adopt a low-risk strategy of conflict avoidance called intentional invisibility—remaining behind the scenes in attempts to avoid backlash and maintain a professional status quo. While intentional invisibility allows women to successfully navigate gender unequal professional and personal landscapes, it could simultaneously present an additional challenge to career advancement (Ballakrishnen et al., 2019). Another study among female software engineers in Indian IT sector found that gender-based stereotypes, discrimination, the gendered division of labor inside the family, and self-silencing inside organization are found to be functioning as inhibitors of women's growth in career (Maji & Dixit, 2020). There are challenges related with regulations on working hours and parental leave, arranging and managing maternity cover, career stagnation at entry and middle IT career levels (Raghuram et al., 2017). Further, workplace re-entry and re-integration policies in the Indian IT sector are reported to be weak after maternity leave and many women experience being assigned less challenging and less fulfilling tasks after the break (Thakkar et al., 2018).

Challenges Due to Lack of Workplace Support and Inherent Biases

When it comes to working in teams, gender diverse teams have been shown to be more productive than less gender-diverse ones (Vasilescu et al., 2015). Employers are looking for personnel that can contribute to the organization not only with the use of technical skills but can also express their expertise with the use of positive emotional intelligence and communication effectiveness (Hendon et al., 2017). Women have been reported to show the socio-emotional behavior in an organizational structure (Croson & Gneezy, 2009) and discourage conflict (Rogelberg & Rumery, 1996), increasing team efficiency (Rogelberg & Rumery, 1996), and mediating organizational quality (Araújo-Pinzón et al., 2017). The presence of women leads to an effective composition of teams and generally reduces the amount of community smells such as Radio Silence effect (Catolino et al., 2019). Thakkar et al. (2018) conducted interviews with Indian women in all stages of the IT sector and one of the surprising findings of their

interviews was how few participants mentioned any concerns about their ability to do technical work either in an absolute sense or relative to men. Everyday biases could also be significantly reduced by regularly sensitizing employees about their unconscious biases, especially those resulting out of ignorance and blind adherence to social norms (Manjoo, 2014). However, studies have reported challenges such as implicit male gender bias toward women (Dias Canedo et al., 2019), managing workloads and indifference of other team members during pregnancy and child care (Raghuram et al., 2017). There exists an internal division of labor where women are provided with less critical and complex projects and more trust lies on the male professionals and even in the same team, the type of tasks allotted to women differ qualitatively from the tasks assigned to male employees (Maji & Dixit, 2020).

Constraints Due to Cultural and Social Factors

In a transitioning society like India, where the traditional roles of women as homemakers and caretakers are deeply entrenched, the work family balance becomes a challenge for women and their employers (Smetana et al., 2018; Valk & Srinivasan, 2011). A large number of women who are entering the workforce in the Indian IT industry are first-generation women professionals (Valk & Srinivasan, 2011) and as such, they have very little support or understanding from their families (Meena, 2015). Women are always expected to take care of household chores, even if they share bread earning responsibilities (Smetana et al., 2018). By reconciling the family with professional striving, women are able to assert “appropriate difference”—to lay claim to the global while remaining “Indian” (Upadhyaya, 2012). However, a drastic shift accompanies marriage and childcare expectations, with careers brought to a halt for many Indian women (Thakkar et al., 2018). In the end women are expected to “prioritize the family”—work must not be allowed to interfere with the performance of expected gender roles (Radhakrishnan, 2017). Another study shows that in Indian patriarchal society, the onus of domestic labor falls unequally on women compared to most other countries and childcare is considered a gendered job (Thakkar et al., 2018). Indian women spend 298 minutes daily on domestic chores while men spend 19 minutes (Thakkar et al., 2018). Many employed mothers perform the vast bulk of uncompensated childcare and housework while their job advancement is put on hold (Bollen et al., 2014).

Tension between personal aspirations and societal expectations creates a dilemma among women professionals with respect to their careers and it becomes more prominent with changes in parental status (Srinivasan et al., 2013). Indian women endure more cultural pressure to drop out of their careers after marriage or having children compared to women in other major emerging markets (Hewlett & Rashid, 2010). This shows that women require social acceptance in order to continue working successfully. Numerous studies

have demonstrated that personal social support is positively associated with the work-family balance and of particular importance is support from the husband (Valk & Srinivasan, 2011) whereas lack of family support can lead to stress and loss of self-confidence (Smetana et al., 2018).

Travel after marriage and motherhood was reported to be challenging, as women were viewed negatively for prioritizing career rather than their domestic duties (Thakkar et al., 2018). There are also challenges regarding society, culture and family norms when combining work with family commitments and childcaring responsibility (Raghuram et al., 2017). Lack of career progression or career interruption due to marriage and motherhood negatively impacts women's career in terms of their know-why (self-belief and identity), know-how (skills and knowledge) and know-who (networks of relationships and contacts) (Srinivasan et al., 2013).

Physical safety is also noted as a deep concern for women in India, particularly for their parents, who fear compromised safety at workplace, as an ever-present possibility (Thakkar et al., 2018). Due to security issues, working long hours or night shifts places severe restraints on women's ability to access their workplace compared to their male counterparts (Thakkar et al., 2018).

Research Methodology

The study is conducted based on the data obtained from an anonymous questionnaire distributed via the internet among employees of IT companies in India. In its opening part some general information about the participants is acquired, such as gender, experience of work in their companies, their level in the organization (from entry to senior/director), marital status and, additionally, some descriptive information about the organization: its size (small, medium, large), representation of the female staff (in percent), the sector (private, government or public sector undertaking—PSU for short). The main part of the questionnaire comprises survey questions related to the three RQs stated below and capturing additional insights from participants.

This study aims to explore the research questions according to the crucial factors indicated in the Introduction. Notice that, in each discussed issue, not only do we analyze the answers of the participants, but also compare the views of male and female respondents to reveal in which items there is an agreement between the opinions of the two genders and in which there is a significant difference. Specifically, we have:

RQ1. Have IT companies in India adopted gender-sensitive policies?

RQ2. Do you think that the adopted gender-related policies provide true-to-fact gender equality at your workplace?

RQ3. What is the impact of society, culture, and family norms and traditions on the female career opportunities in the software industry?

For each RQ, we prepared relevant survey questions (SQs) providing information on various aspects of the current situation. These are Likert-scale questions, where the answers allow 5 options: “strongly agree,” “agree,” “neutral,” “disagree,” “strongly disagree.” In addition, one open-ended question in each group has been formulated providing the respondents with an option to give more detailed views on the subject and/or propose their own suggestions aiming to improve the situation.

The responses then have undergone statistical analysis, with a two-fold aim:

1. to describe the perception of the respondents in the three aforementioned directions of this research and
2. to establish whether there is a significant difference between the views of male and female participants on the discussed problems.

The main statistical methods used here include the descriptive statistics, interval estimation and hypothesis testing. For each question, the preliminary investigation of the distribution of responses has been done to reveal underlying tendencies and select appropriate methods of statistical inference. To be more specific, we present a general outcome (e.g., whether a given view is widespread in the IT community or whether the views of male and female employees agree on a given issue) and establish numerical boundaries for the obtained percentages to validate the point strictly. Also, we apply hypotheses testing to compare the attitudes of male and female respondents. Meaning thereby, all qualitative findings have been confirmed by quantitative results.

On the whole, the responses to the questionnaire have been obtained from 28 male and 25 female participants. In the paper, confidence intervals are constructed with 95% level of confidence, and the tests are conducted using the level of significance $\alpha = .05$. The formulations of hypotheses for each question are adjusted so that to assure the validity of the method (see, e.g., Neter et al., 1993). For the sake of visual clarification, graphical representation of data is used to illustrate the outcomes.

Data Analysis and Results

The information concerning RQ1 has been structured as follows:

- A. Description of the current situation pertinent to gender-related organizational policies;
- B. Perception of the current implementation of the policies by male and female employees;
- C. Suggestions for the changes to make gender-related policies/regulations in their organizations more inclusive for women.

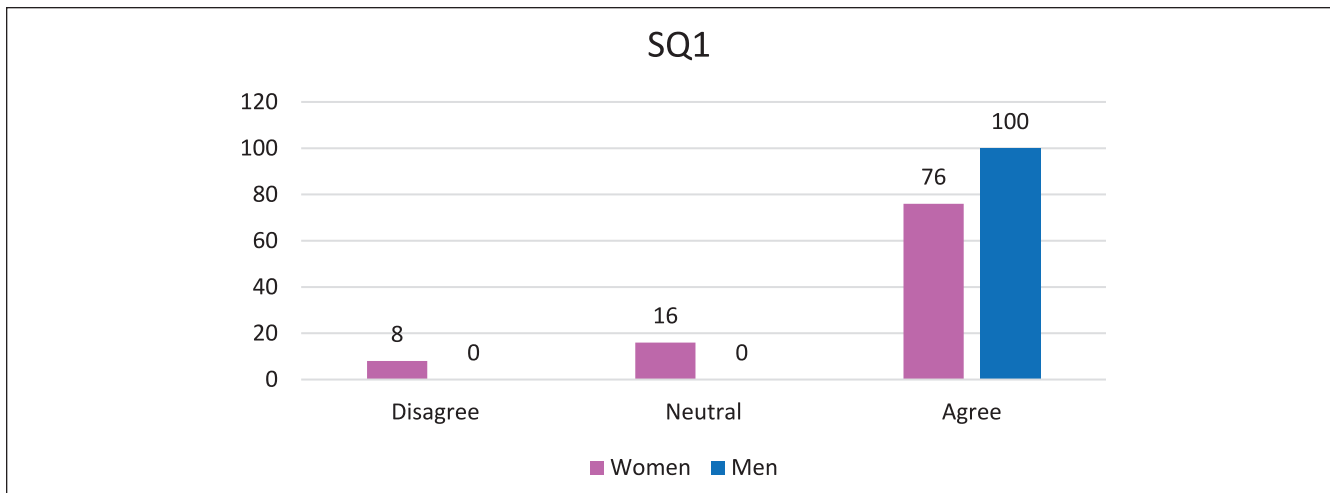


Figure 1. The distribution of responses to SQ1.

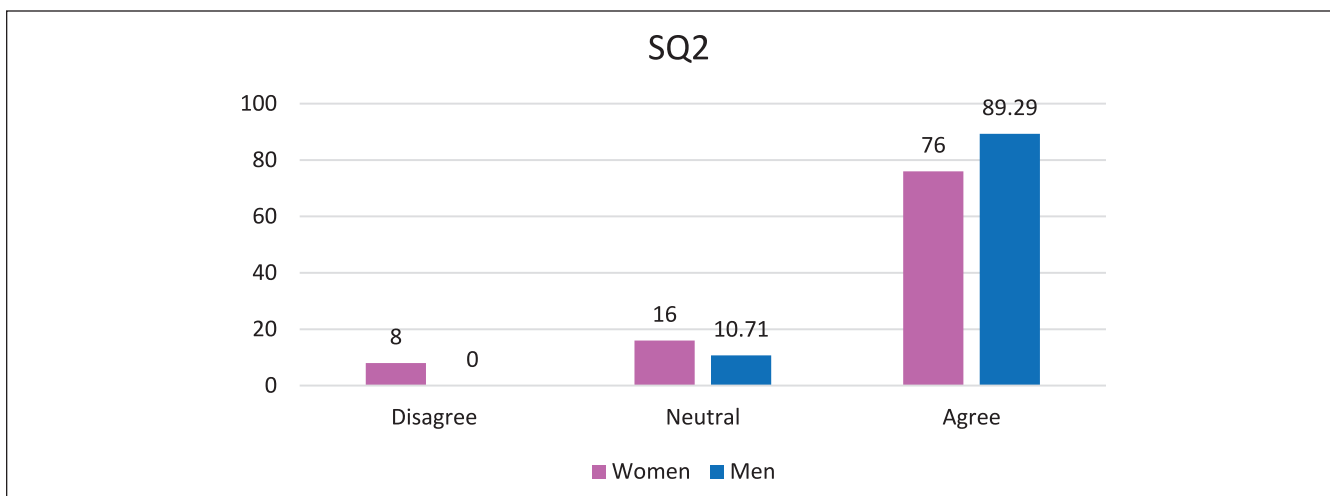


Figure 2. The distribution of responses to SQ2.

With respect to item A, the following information has been captured:

SQ1—Does your organization have a policy that announces equal payment and promotion perspectives for women?

SQ2—Does your organization assert equal opportunities to women for mid-career skill/knowledge upgradation courses?

SQ1. It should be pointed out that the previous knowledge suggested that, as a rule, the answers were going to be positive, and the suggestion has been confirmed by the outcome of the survey question.

In fact, the affirmative responses dominate in the feedback to this question, as demonstrated by Figure 1. All of the male participants replied with “agree” or “strongly agree,” and,

what is more, 64.3% of them are “strongly agree.” Although this does not imply that the population of male employees is unanimous on this issue, a one-sided confidence interval for the percentage gives the lower bound for this percentage as 89.9%, which is a vast majority. The sample percentage of the affirmative answers for females is 76%, which allows to use Z-distribution in order to find a 95% confidence interval (necessary condition: $np \geq 5$ and $n(1-p) \geq 5$) and, as a result, we obtain: $74.6% < p < 77.4%$, which confirms that, in general, female as well as male employees agree that their organizations have policies assuring equal payment and career opportunities for both genders.

As for SQ2, Figure 2 shows that the distribution of answers concerning equal opportunities of professional upgrade/growth for both genders follow the same pattern as described previously in SQ1. Again, the majority of men—53.4%—provided the “strongly agree” answer, while no

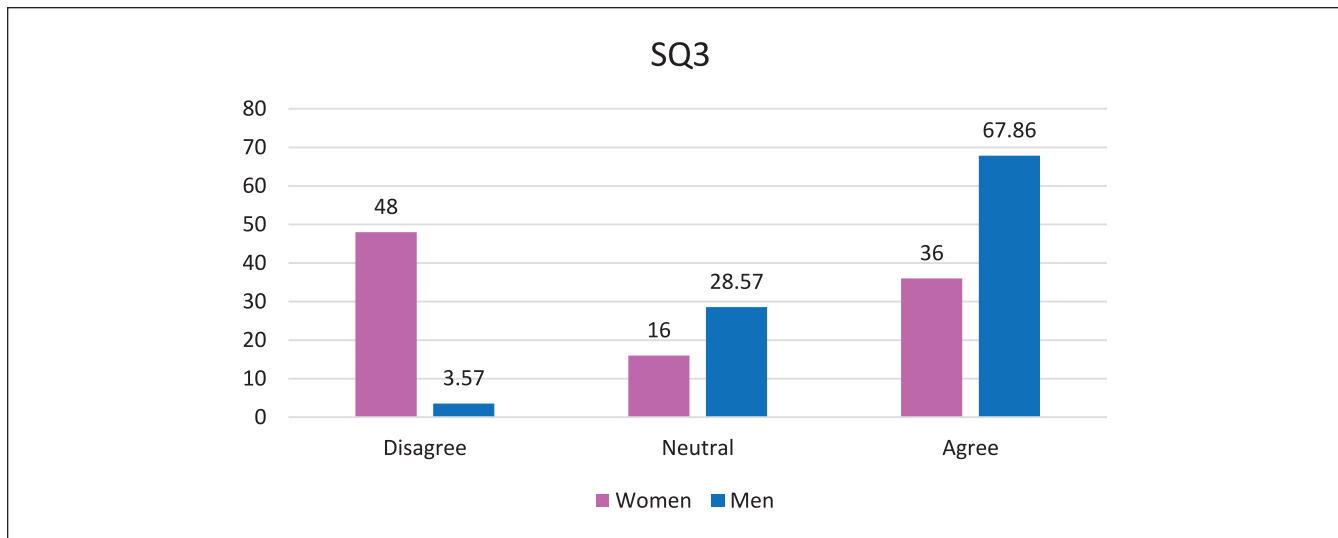


Figure 3. The distribution of responses to SQ3.

“disagree” answers occurred. The unanimity was broken only by “neutral” responses. For the females, the situation is slightly different as 2 “disagree” answers are given, which, however, is not changing the general approval. Totally, 83% of all respondents agree that the organizations provide both genders similar chances to attain mid-career professional up-gradation courses. Consequently, we may conclude that, overall, organizations provide equal opportunities to women for mid-career skill/knowledge up-gradation courses.

Although the available adoption of gender-sensitive policies cannot be underestimated, the reality may not be an exact reflection of the formally declared principles. For this reason, to complete the answer to RQ1, we asked the opinion of the respondents on the situation, that is, how the embodiment of the adopted gender-related policies has been going. To be more specific, we used the following survey questions:

SQ3. Do you feel women availing the provisions for paid leave for maternity/child-care come without any repercussions on their career?

SQ4. Do you think that your organization’s policies are favorable to recruit women after mid-career breaks owing to family requirements?

SQ5. Do you agree that the chances of employability of a married woman is lower than a married man?

Although the responses of participants of both genders confirm the existence of gender-neutral policies in their organizations, the answers to SQ3 and the successive questions reveal that, while ostensible equality occurs in the regulations, there is still a discrepancy between the policies and their implementations. Furthermore, the views of male and female respondents do not agree on this issue as can be observed in Figure 3.

For example, the sample proportion of the male respondents who answer this question affirmatively is $\bar{p}=0.685$ and the rigorous test on the population proportion p of males who share this view is stated as: $H_0: p=50%$ against the alternative $H_1: p > 50%$, yields the observed value of the test statistic $z_{obs}=2.2002$ with the P -value $P=.0228 < .05$. Meanwhile, the sample data with the sample percentage of $p=40%$ does not admit such an interpretation for females. In addition, while a single “disagree” response for males can be regarded as an outlier, the number of “disagree + strongly disagree” responses for females gives the test result of 50% as the population percentage for females. This disaccord shows that practical applications of the existing regulations do not meet the expectations of the female employees.

The same phenomenon—in not so sharp form—can be observed when looking at answers to SQ4: mostly, the male employees agree with the statement, implying the population proportion higher than 50%, while for females this is not the case—only 44% of women in this sample agree. Possibly, this may be explained by the fact that men do not suffer from unfavorable attitudes directly and for them the formal policy principles appear to be a solution to the problem.

SQ5. The view about the existing discrepancy between rules and their execution is further confirmed by the responses to this question. The distribution of the responses to both genders is rather similar and the formal testing gives a lower estimate for people who think that married women have lower chances to be employed are about 35%.

To complete the picture, we asked the participants the next open-ended question: “What changes do you want in your organization policy to make it more inclusive for women?” Notice that 53.5% of men decline a necessity for any change, while only 36% of women share this opinion. Some answers are placed in the “Discussion” section.

Table 1. Summary of Responses to SQ7.

	SA	A	Else
Male	5	11	12
Female	8	10	7

In essence, RQ2 is focused on the respondents' opinions rather than documented and declared statements regarding the workplace environment in terms of equal responsibilities, remuneration, and work conditions for both genders. To answer this question, we formulated several SQs, which can broadly be categorized as follows:

- A. Opinions of the respondents on the contribution of female employees in IT companies;
- B. Opinions of the respondents concerning evaluation of female employees by the companies;
- C. If a respondent agrees that there is a disparity between genders at team level, what individuals (both male and female team members) can do to abolish or at least reduce the impact of this disparity?

In the framework of issue A, we asked the following survey questions:

SQ6. Do you think women employees possess problem-solving capabilities at par with their male colleagues?

SQ7. Do women employees are entrusted with less challenging tasks in the team?

SQ8. Do you feel that as a team member, a woman leading the team creates more harmony, more understanding regarding challenges?

Concerning issue B, we stated the next questions:

SQ9. Do you think that female employees are perceived as equally competent as their male colleagues regarding software tools and technologies?

SQ10. Do you think that women and their input are valued as much as their male counterparts in the team?

The responses to SQ6 reveal that a majority (57.1% of men and 72% of women) gave an affirmative answer. Meanwhile, just 10.7% of men and 12% of women disagree and none of the respondents gave "strongly disagree" answer. The fact that the idea is equally supported by both genders is confirmed by the χ^2 -test. The contingency table test based on Table 1 yields $\chi^2_{obs} = 1.892$, whence the P -value is $.38 > .05$. The result shows persuasively that there is no significant difference between genders in the attitudes toward the capabilities of the female employees.

To proceed, it was asked in SQ7 whether the respondents think that women employees are entrusted with less challenging tasks. The responses show that this view is not widespread

among each gender. while both distributions of responses are symmetric about "neutral" with the distinction that for men certain opinions dominate (10-7-11), whereas for women the modal reply is «neutral»: (8-10-7). Hence, there is no commonly accepted trend on this issue, the software community is divided almost equally into the groups of those who agree/disagree, while substantial part remains "neutral."

Further, in SQ8, we explored whether the idea that "as a team member, a woman leading the team creates more harmony, more understanding regarding challenges" is shared by the respondents. We observe that there is unusually high (about 40% for both genders) percentage of «neutral» responses. Meanwhile, the situation with positive and negative answers among those possessing a definite opinion is contrasting: 62.5% positive versus 38.5% negative for men against 93.3% versus 6.7% for women.

The following SQs related to class of problems B supplement the previous ones by investigating the same situation from a different angle. To elaborate more, these SQs investigate whether the software developers' community acknowledges female employees being equally capable and contributive.

The responses to SQ9 by males reveal 92.6% of affirmative answers, among which 28.6% responded "strongly agree" simultaneously demonstrating the absence of "disagree" answers. If we conduct a test for the population percentage of male employees who agree with this statement (based on the binomial distribution as the condition for the limit theorems are not satisfy), we obtain the P -value $P = .2479 < .05$ in the right-tailed test of the form: $H_0: p \leq 79\%$ against the alternative $H_1: p > 79\%$ with the critical region [25, 28]. This gives a rather high estimate for p . Clearly, the estimate for women cannot be that high with the sample percentage of 76%, that is women appear to be more skeptical in this respect.

We have also probed whether women and their input are valued as much as their male counterparts in the team. The clear majority in both genders—specifically, 85.7% of males and 72% of females—answered this question in the affirmative. Moreover, the responses are distributed according to similar patterns: both are strongly right skewed, showing that on the qualitative level both genders have similar views concerning the appreciation of employee's contributions regardless of gender. Conducting the χ^2 -test as in RQ1, we obtain $\chi^2_{obs} = 1.5182$ with P -value .468, which implies that not only at the qualitative, but also the quantitative level, the views of the representatives of different genders do not have significant disparity.

We implored respondent's views regarding "what one can do to abolish or reduce the impact of this disparity if they agree that there is a disparity between genders at team level." It occurs that 53.5% men and 44% women do not notice any disparity.

In distinction from the previous ones, RQ3 uncovers the situation from an entirely different perspective since it is focused on the interrelation between "internal" and "external"

factors, namely, the agreement between the regulations and demands within the workplace versus the traditions and norms in the families, that is, outside the workplace. To answer this RQ, we gathered information using survey questions related to the following issues:

- A. The views of the respondents about the most common challenges, namely, long working hours and necessity to travel at odd time create more serious hurdles for women compared to men considering the structure of the Indian family setup and the safety problems in the modern Indian society;
- B. The opinions of the respondents reflecting whether women have lower chances than men in pursuing skill enhancement courses, traveling to participate in professional meetings, and getting family support to attend informal network gatherings;
- C. Suggestions of the ways to reduce imbalance between male and female roles due to society, culture, and family norms, if you agree that such an imbalance exists.

With regard to issue A, we asked the respondents following survey questions, which are focused on the problems occurring in the social environment:

SQ11. Do you think long working hours are more challenging for women compared to men considering her role in the Indian family setup?

SQ12. Do you think that travel at odd hours is more challenging for women compared to men considering safety issues in our society?

When it comes to issue B, the focus switches to problems at home and, as such, cannot be resolved by administrative measures, like police control, etc. The following SQs were put forth here.

SQ13. Do you feel that women are limited by their family obligations in pursuing any mid-career skill enhancement courses?

SQ14. Do you feel that women mostly forgo important traveling due to family obligations?

SQ15. Do you think that women get opportunities and support from their families to attend informal networking gatherings outside work as much as their male colleagues?

In answering SQ11, 100% of female and 85.7% of male respondents confirmed that long working hours are a greater problem for women employees. Despite the fact that the sample size ($n=25$) of female employees is relatively small and we cannot claim 100% result for the population of the females, testing $H_0:p \leq 82.3\%$ versus $H_1:p > 82.3\%$ with the rejection region $\{24, 25\}$, the P -value $P=.0489 < .05$ allows to estimate the population percentage as more than 82.3%,

which shows that this concern must be considered as severe. In the same way, the hypotheses testing using the level of significance $\alpha = .05$ and rejection region $\{23, 24, 25\}$ demonstrates that the population proportion for the male employees can be estimated as at least 66.1% ($P = .0494$).

We observed that, when replying to SQ12, all female participants agree that traveling at odd hours is more threatening for women's safety, and, as before, we may claim at the level of significance 0.05 that the population percentage of female employees sharing this view is more than 82.3%. For the male employees the sample percentage is 89.29%, leading with the rejection region $[24, 26]$ to the conclusion that the population percentage is more than 70.2% ($P = .049$).

Now comes item B which is probably strongly tied to the customs and traditions in India. First (SQ13), it was inquired whether women are limited by their family obligations to pursue any mid-career skill enhancement courses. Here, the tendency observed for item A remains unchanged, with slightly stronger "disagreement" from the males. However, the distribution of the responses allows to apply Z -test to confirm that at the level of significance .05, the hypothesis that the population proportions for male and female employees, who agree that the family obligations may be in the way of pursuing mid-career training courses for women are equal. Indeed, performing the test $H_0:p_1 = p_2$ against the alternative $H_1:p_1 \neq p_2$, we obtain the observed value of the test statistic $z_{\text{obs}} = .7947$ yielding the P -value $P=0.424$, whence the null hypothesis cannot be rejected. Therefore, we may estimate the common population proportion as $\bar{p}=62.26\%$ and a 95% confidence interval (49.21%, 75.31%).

SQ14. The answers to this question are very close to those of the previous one. The test on the equality of the population proportions reveals the observed value $z_{\text{obs}} = 1.2458$ with the P -value $P = .21$, which confirms at 0.05 level of significance that percentages are equal. A point estimate $\bar{p}=67.9\%$ leads to a 95% confidence interval (53.4%, 80.5%).

SQ15. To elaborate more, it was asked if women get opportunities and support from their families to attend informal networking gatherings outside work as much as their male colleagues. In distinction, the responses of males and females to this question have unlike patterns. First, it has to be observed that the most common answer for females is "neutral," namely 44%. At the same time, for males the most common answer is "agree" (46.4%). On the whole, 57.1% of males are convinced of equal family support to both men and women, versus 40% of females who share this opinion. The more uniform distribution of the responses compared to the previous question can also be noticed, making the qualitative picture smoother.

Lastly, responses to open-ended question C show that there is a clear consensus among respondents that the situation needs further improvement, and many provided valuable suggestions, which are cited in the next section.

Discussion

Organizational Policies Related to Gender Issues

Based on the results, we may state that both male and female participants in majority agree that organizations' policies declare equal opportunities for the two genders and their organizations have well-laid rules and unbiased policies for both genders. Organizations provide males and females equivalent chances to attain mid-career professional up-gradation courses. On the other hand, while ostensible equality occurs in the regulations, there is still discrepancy between the rules and their implementations. This is in line with results of Valk and Srinivasan (2011), who reported that some of the women were skeptical about organizational policies and programs. They stated that there is a superficial attitude toward women-friendly policies in India, just to show that the company facilitates women's needs (Valk & Srinivasan, 2011). The number of women at the helm in Indian IT companies is miniscule. An analysis indicates that over 51% of entry level recruits are women; over 25% of women are in managerial positions but less than 1% are in the top level/C-Suite (Raghuram et al., 2017), therefore we cannot conclude that the sector is gender impartial. If women are not to be trusted with top posts or decision-making roles, it shows they are not truly empowered, and instead, it is more of a lip service rather than providing equal opportunity to women.

Little less than half of females disagree that women get no repercussions on their careers after taking paid maternity/child-care leaves and less than half of the women, in contrast to majority of men, claim that organizations' policies are favorable to recruit women after mid-career breaks. These numbers convince that the equal opportunities stated by the regulations are not always realized. Companies find it challenging to re-engage women upon their return to work after maternity leave and there is a significant perception among HR managers that women returning from maternity leave might not be able to balance work and caring responsibilities (Raghuram et al., 2017). Workplace re-entry and re-integration policies are reported to be weak after the maternity leave and women experience being assigned less challenging and fulfilling tasks to women after the break (Thakkar et al., 2018). Companies need to train supervisors in supporting pregnant women employees so that they feel empowered to retain them (Raghuram et al., 2017).

Regarding the change they would like in their organizational policies, majority of men decline a necessity for any change, while only little more than one-third of women share this idea. Among the others, there were assertions, which, in our opinion, reflect common perception on the situations. They are presented as following:

"The management should be more focused on giving leadership trainings/activities to their women employees."

"Policies are there, but lack of implementation. . ."

Gender Equality at Workplace

This section presents respondents' opinions regarding the workplace environment in terms of equal responsibilities, remuneration, and work conditions for both genders.

A majority of both men and women agreed that women employees possess problem-solving capabilities at par with their male colleagues. This assertion is strengthened by the outcomes of subsequent questions when the absolute majority confirm that not only do women have equal competence in software development, but also they are perceived as such. Further, both genders have similar views concerning the appreciation of employee's contributions regardless of gender. That is, from the organization's side, any beneficial contribution is adopted irrespective of the fact whom it is coming from. Although in a previous study conducted in an Indian setting, female participants mentioned no concerns about their ability to do technical work either in an absolute sense or relative to men (Thakkar et al., 2018), another global study reported an implicit gender bias from the part of men, toward women in software development projects (Dias Canedo et al., 2019). The present study confirms that Indian women software professionals consider themselves as equally competent as their male counterparts. What is more, contrary to the global study, their male colleagues also view them as such. This is a significant point because an unbiased work environment is a necessary condition for increasing women representation in the software development industry. The tendency is clear: the idea of equal capabilities of both genders to address the upcoming problems is commonly accepted in the Indian software developer's community. The Indian society has evolved from conservative to open-minded as far as raising a girl child is concerned. As girls are exposed to the outside world, they gain self-confidence that makes their grooming no way inferior to that of a boy. This results in their becoming as good troubleshooters as their male counterparts in a team.

The view that women employees are entrusted with less challenging tasks is not widespread among each gender and there is no commonly accepted trend on this issue. This can be explained by the fact that the software industry includes various areas: coding, testing, marketing, etc. and whenever women are involved in all of them, no clear distinction exists in male and female assignments for challenging jobs.

As for the belief that women team leaders create more harmony and understanding regarding challenges, it is more popular among women in comparison to men respondents. It is observed that around forty percent of men and women have no opinion. When asked what individuals can do to abolish or reduce the impact of the disparity if they agree that there is a disparity between genders at team level, majority of men and less than half of women do not notice any disparity. Out of the received suggestions, the ones that stood out are stated below:

“Female team members should come forward and opt for more challenging tasks. Be ready to contribute proactively without being asked.”

“Same role and challenge should be entrusted without any gender consideration.”

Gender Issues Due to Society, Culture and Family Norms

These questions are focused on the interrelation between the workplace demands for the women employees and the family reaction.

All female respondents and an overwhelming majority of males agree that the orthodox family traditions still make long working hours a taboo for women. The same is true for the commuting at odd hours, which in India is considered to be not safe. The conservative society together with lack of secure surrounding for women make late working hours an unfavorable choice (Thakkar et al., 2018). Nearly 70% of the women reported high care responsibilities (Srinivasan et al., 2013) as an impediment factor. In India's patriarchal society, the responsibility of domestic chores falls unequally on women and childcare is still considered a gendered job (Thakkar et al., 2018). Even though Indian middle class becomes more global and more dependent on female earnings, the women, even if they are married, still tend to solely be responsible for the “second shift”—all the household duties involving child or elder care, cooking and so on (Srinivasan et al., 2013).

The tendency remains unchanged, with slightly stronger “disagreement” from the males for subsequent questions. Majority feel that women are limited by their family obligations in pursuing any mid-career skill enhancement courses and women mostly forgo important traveling due to family obligations. Marital and familial responsibilities interfere with career progress (Thakkar et al., 2018). About 73% of women experience family and societal disapproval for traveling alone for work (Srinivasan et al., 2013). The guilt of neglecting family drives talented women to take sabbaticals or even abandon flourishing careers. In distinction, the responses of males and females regarding women getting opportunities and support from their families to attend informal networking gatherings outside work as much as their male colleagues are not conclusive.

It is important to have role models and success stories that can be followed to identify how women overcame these hurdles. One of the women on the board of an IT firm states that it was an extremely fulfilling experience to overcome the challenge and create the right “work life” balance as it is truly meant to be. She states her winning formula (Balakrishnan, 2018):

- Have a clear winning attitude and believing that this was addressable with little to no compromise. This

made me more solution-oriented rather than defensive or apologetic.

- As I became more objective and clear in my articulation, it became easier for my spouse and family to sign in and co-own the solution.
- I adjusted my timeline and working styles to mold into the game plan. I started planning and anticipating things better so I was “at hand” when required by my India-based team.

According to the present study, for the majority of women their own efforts require substantial backing both from family and society. There is a clear consensus among respondents that there is an imbalance between male and female roles due to society, culture or family norms and the situation needs further improvement. They provided many valuable suggestions aiming to reduce imbalance between male and female roles in Indian families and society.

“Mindset needs to be changed at social level. In a family, working person (man or woman) must be treated in same manner.”

“We can't make a change in one day, but I strongly feel while bringing up a child, boy and girl should be treated equally which is not the case in our society. The kitchen work is supposed to be responsibility of woman and financial decisions are taken by man this is case in our society. This should be changed.”

Conclusion and Future Work

The issue of gender inequality has been debated for long and as we indicated, most of the Indian organizations formally have put up a gender-neutral face, supplying uniform growth opportunities for all, adding the facilities like work from home (WFH), maternity leave, flexible hours to give a hint of women-centric attitude. However, the implementation of these policies is not ascertained by organizations as most female respondents still desire flexible working hours or WFH to attain a better work-home balance. This is of great significance especially for metro cities, where most of the software industries are placed: the WFH undoubtedly will save plenty of time on commuting, which can be dedicated to work/home.

Concerning the work environment in India, women are treated as equally competent and their inputs are considered as valuable as their male counterparts'. There exists equal scope for women to lead a team/project and to participate in mentoring and networking opportunities to progress in their career. We may, therefore, conclude that things are definitely looking up at workplaces. The transition is positive for women software engineers and this fact is also acknowledged by most of the respondents. However, the participants also indicated that, at this stage, individuals' attitude requires further transformation toward female team members:

“Assessment of any task should be done irrespective of contributors’ gender. Assignment should be given based on capability, intelligence, hard-work and commitment of an individual not on his/her gender.”

“Additionally, a safe team environment, where all employees can speak up, be heard, and feel welcome, needs to be cultivated.”

A deeper analysis suggests that although formal hurdles concerning employment have been removed, the stereotypes on the role of women still latently exist. For example, odd working hours still remain a taboo. At the society level, a lot needs to be done to ensure that all women can venture out safely. Indian women, especially married ones with children, continue to be the focal point of their families. Their struggle for a balance between work and home is real and eternal.

The barriers which women face come mainly from society and their own family traditions. This is the area where most of the reforms are expected. The refinements should become a part of children’s upbringing and should be inculcated right from childhood so that they grow up believing that other gender is equal and respect other’s qualities. The recommendations expressed by the participants are as follows:

“Owning more responsibilities by the male partner. Sensitizing the kids right from childhood about respecting the females and that both are equal. So, a balanced parenting plays a very critical role which doesn’t discriminate between a boy and a girl. This also must be emphasized and reinforced through education.”

“Sharing household responsibility between husband and wife, backup support in terms of childcare centers, after school centers, support systems for elderly, to move away from the rigid role-responsibility assigned culturally.”

This research shows that to increase women participation in the Indian software industry, organizations must be more focused and sincere on the implementation of their gender policies. On a team level, both genders should try to work in sync, complementing each other’s efforts. However, the most crucial changes are needed regarding the role of women in the society and the family. Various aspects where the initiatives can include women security, childcare services, gender equality, creating awareness among people, educating and spreading awareness to break away from orthodox mindset which confines women to only childcare and household duties.

The factual data gathered with the help of the questionnaire is abundant and could not be analyzed exhaustively within the limits of a single article. Inevitably, some aspects may have remained behind the curtain. For example, a regression analysis investigating possible correlations between factors such as, say, employee’s age, years of experience, level of achievement on one hand and his/her perception of the

current situation in terms of existing gender policy is yet to be examined. Also, one has to bear in mind that the situation concerning women’s involvement in the software domain in India is evolving rapidly and, as such, the results of this study cannot be viewed as timeproof.

Since the situation is continually changing and evolving, the derived conclusions are by no means irrevocable. As with most survey research, reliance on self-reporting may limit the validity of the findings. The present study can be extended with a larger sample in order to validate the results further. There is a necessity to identify existing and upcoming challenges women software professionals are facing in different sectors of employment, namely, Government, Private and Public sector. More detailed investigation of situation should be an area of future research which includes other demographic factors such as socio-economic and educational background as well as job type. Since India is a big country with diverse population, exploring different regions may bring out new insights in this area.

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Ethics Considerations

This research is based on non-identifiable and non-health-related data. Written informed consent was obtained from the participants of this study. Participants were informed in advance; about the aims of the project, their role in it, planned use of the data, and their right to withdraw.

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