

Exploring Gender Perspectives on Parenthood Experiences among Fathers and Mothers in the ICT Field

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Abstract. *Context:* Previous research has explored the beneficial effects of gender diversity within Information and Communication Technology (ICT) teams. Nonetheless, it's widely acknowledged that women encounter numerous obstacles in sustaining their careers, particularly after becoming mothers, in contrast to fathers. **Goal:** This paper investigates the perceptions of practitioners mothers and fathers in the ICT field regarding the challenges they encounter in the job market concerning parenthood, with a particular emphasis on gender perspectives. **Method:** We have conducted a survey with fathers and mothers working in the ICT field to ascertain their perceptions of parenting challenges. **Results:** Our findings indicate that male practitioners find the organizational culture inclusive towards employees who are parents, while most women don't feel the same way. Mothers have shown to feel insecure about the impact that maternity leave can have on their careers and reported receiving fewer job opportunities because they have children, while most fathers do not share these concerns. Furthermore, the majority of ICT practitioners who are parents said their coworkers are supportive regarding their parental responsibilities. **Conclusions:** The analysis highlights common challenges faced by parents in the ICT industry, such as balancing work and family responsibilities, workplace discrimination against women, and an organizational culture that lacks support for parents. Nevertheless, there is a growing acknowledgment of the necessity for inclusive policies and mutual support to tackle these challenges.

1. Introduction

The experience of motherhood and fatherhood marks a transformative period in people's lives, but it can significantly impact their professional and academic trajectories, especially for mothers [Santos and Cordeiro 2021]. Throughout history, tasks related to parenthood and household chores have been predominantly assigned to women, imposing on them the responsibility for home care, while men dedicated themselves to external work. These stereotypes restrict opportunities for both genders, contributing to the perpetuation of gender inequality in the professional environment and presenting various challenges for women who are mothers [Rocha et al. 2023].

Stereotypes and prejudices still persist today when we observe the issue of parenthood in the workplace, as it affects men and women differently [Rocha et al. 2023],[Canedo et al. 2023]. A breakdown by IBGE in 2021 shows that only 54.6% of the women with young children are employed, while the percentage of employed men with young children is 89.2% [IBGE 2021]. Parenthood in the Information and Communication Technology (ICT) market faces significant challenges due to the demanding

nature of the industry, with long working hours and tight deadlines. The lack of parental leave policies and support, such as corporate childcare, makes it difficult to balance career and family life. These obstacles not only affect the well-being of professionals, especially mothers, but can also harm diversity and inclusion in the sector, discouraging valuable talented professionals from staying or joining the industry [Rocha et al. 2023], [González et al. 2016]. In this study, we conducted research to investigate the difficulties and challenges that professionals who are parents face in their daily lives, especially in the field of ICT. To identify the perception of parenthood, a survey was carried out to investigate the unique challenges that each parental group faces in their careers in the ICT field, aiming to better understand the specific needs and concerns of these professionals.

2. Related Work

Canedo et al. [Canedo et al. 2022] investigated how ICT practitioners perceive and are affected by various factors while working from home (WFH), with a focus on gender differences. It delved into organizational changes, challenges, well-being, productivity, and the impact of the pandemic on WFH. The results indicated that ICT practitioners generally felt more productive during the pandemic, with a notable observation that most leaders in this field are men. Furthermore, the study highlighted a significant gender discrepancy in the division of household chores and childcare responsibilities. 42% of women reported that managing household tasks and attending to childcare duties could impact their ability to work remotely.

[Rocha et al. 2023] conducted a study with 141 mothers from different countries investigating the difficulties faced by mothers in software development teams around the world. The results revealed that these women face sociocultural challenges, including issues of work-life balance, inappropriate jokes, and harassment. The prejudices they suffer make them insecure about their work. Additionally, they often lack a support network during and after maternity leave, resulting in a feeling of overload. [Loch et al. 2021],[Bezerra et al. 2023], [dos Santos and Marczak 2023] demonstrated that despite the challenges faced by women engineering students, they tend to complete their undergraduate studies, proportionally, in greater numbers and in less time than men, even in the most technological courses where they are a minority. [Loch et al. 2021] highlighted that the lack of encouragement in STEM fields is perpetuated by family, school, society, and university, leading women to believe they do not have aptitudes for technical careers. The accounts of the interviewed researchers/lecturers showed that regarding the balance between academic career, family, and children, there is a decrease in dedication concerning scientific production and participation in conferences. Additionally, inequality in the division of household tasks was reported, which overburdens women, leaving them with less time to dedicate to their careers.

[Santos and Cordeiro 2021] addressed the challenges faced by students who are mothers during their teacher education in higher education. The authors explored factors that may interfere with the retention of these students in their courses, including issues related to motherhood, such as balancing family and academic responsibilities, lack of adequate institutional support, and the influence of these factors on successful course completion. The authors emphasized the importance of inclusive policies and practices to promote the retention and academic success of mother students, recognizing the specific challenges they face when pursuing teacher education. [Master et al. 2016] addressed the

impact of gender stereotypes on girls, especially in the context of Computer Science. The study suggests that these stereotypes can undermine girls' interest in the field and affect their sense of belonging. The authors explore how cultural perceptions and stereotypes can influence girls' attitudes and self-efficacy regarding computing, contributing to the underrepresentation of women in this field. The authors also highlighted the importance of educational approaches that combat gender stereotypes to promote more equitable participation of women in Computer Science. [González et al. 2016] reiterated previous findings on the challenges faced by women in male-dominated environments, particularly in the ICT sector. The interviewed women highlighted time demand as the main obstacle, showing a willingness to accept lower salaries in exchange for reduced working hours. The long working hours environment is perceived as more stressful for women, affecting the balance between personal and professional life, with evidence of women's double burden. The ICT sector offers opportunities for qualified women, although challenges of gender discrimination persist. Measures such as mentoring programs and diversity policies are suggested to attract and retain diverse talents, but their effectiveness depends on profound cultural changes within companies.

3. Methodology

A survey was conducted to explore professionals' perceptions regarding parenthood in the ICT job market. The survey targeted ICT professionals who have children. It was made available online and promoted across various platforms. The survey was divided into two categories: questions related to the participant's profile and questions regarding the perception of parenthood in the ICT job market. For the questions in this second category, 14 questions were formulated using the Likert Scale [South et al. 2022] and 2 open-ended questions. Table 1 presents these 16 questions. The responses were analyzed both qualitatively and quantitatively. Graphs were used for quantitative analysis. For qualitative analysis, representative excerpts from the responses were selected to ensure a more accurate analysis. Additionally, two initial questions were defined to filter participants according to our target audience. The first one confirmed whether the participants had children, and the second one inquired about their experience in the ICT job market. Therefore, only those who met these two requirements could proceed with the survey. The data that support the findings of this study are openly available in Zenodo here.

ID	Question
P01	Describe the main challenges you face or have faced as a student in the academic environment due to being a parent.
P02	The organizational culture in my company is inclusive regarding employees who are parents.
P03	The parental leave policies in my company are adequate to meet the needs of employees who are parents.
P04	My company offers flexible work options that make it easier to balance my parenting and professional responsibilities.
P05	My company provides adequate support for employees who are parents, such as additional benefits or childcare services.
P06	I feel supported by my coworkers regarding my parental responsibilities.
P07	I believe that attitudes towards parenthood in the TIC job market are evolving positively.
P08	I feel safe to communicate absences/delays due to parental responsibilities.
P09	I was afraid that my career could be affected when taking maternity/paternity leave.
P10	I feel like I receive fewer opportunities for professional growth for being a parent.
P11	In the workplace, I have heard malicious comments/jokes involving my parenthood.
P12	I believe I received different treatment at work after becoming a parent.
P13	I believe that my parental responsibilities limit my ability to accept job opportunities.
P14	At my job, there is a perceived pressure to always be available, which can be challenging as a parent in the IT field.
P15	My team's perceptions and treatment towards male fathers and female mothers vary depending on their gender.
P16	Describe the main challenges you face or have faced in your job as a father or mother.

Table 1. Survey Questions

4. Results

In total, there were 61 responses to the survey. However, only 43 participants met the prerequisites of having children and having some experience in the ICT labor market. Thus, only these 43 responses were considered in the data analysis. There were 24 responses from women, representing 55.8% of the total, and the remaining 19 responses were from men. Respondents were from 11 Brazilian states, covering all regions of the country. The majority of respondents were from São Paulo and the Federal District, which together represented 62.8% of the participants.

Mothers and fathers of various ages participated in the research. The majority were between 31 and 40 years old, representing 53.5% of the total, 23.3% were between 41 and 50 years old, and 20.9% were between 21 and 30 years old. Only 2.3% claimed to be over 50 years old, and there were no respondents under 21 years old. Regarding the participants' education level, it is notable that the majority have completed higher education (55.8%), while 20.9% are currently enrolled at this level. 14% have completed a Master's degree, and 4.7% are Master's students. Additionally, 2.3% have completed a Ph.D., and another 2.3% have completed high school. Those who stated they are currently enrolled in any level of education were invited to answer the open-ended question P01 in Table 1. The analysis of this question is conducted in Section 4.2. Regarding family relationships among respondents, the vast majority (88.4%) reported being married, in a long-term relationship, or in a common-law marriage, all living with their partners. The rest were single or divorced and not living with a partner. Only 2 participants stated they do not live with their children. A notable minority (2.3%) have four children, with a slightly larger portion (4.7%) having three children. However, a significant group (39.5%) have two children, while the largest segment consists of those with only one child, representing 53.5% of the total.

The survey collected data on the age of the participants' youngest child, showing a diverse range. Notably, 14% have children under one year old, and 27.9% have children aged 1 to 3, indicating a significant portion with very young children. Additionally, 20.9% have children aged 4 to 6, while 11.6% have children aged 7 to 9, and another 11.6% have children aged 10 to 12. A smaller proportion, 9.3%, have children aged 13 to 15, and 4.7% have children over 15. Seeking to understand the work reality of these parents, we collected information about their current work model. 41.9% of respondents work remotely, indicating a growing trend towards remote work adoption. On the other hand, 27.9% continue to work in person, and 20.9% adopt a hybrid work model, combining in-person and remote periods. This finding corroborates the findings of [Canedo et al. 2022], where many professionals, after the Covid-19 period, remain with remote or hybrid work. Finally, 9.3% of the participants are currently unemployed.

4.1. Perception of Parenthood in the ICT Job Market

In Likert Scale questions, participants rated their agreement level from 1 to 5, with 1 being "Strongly Disagree," 2 "Disagree," 3 "Neither Agree nor Disagree," 4 "Agree," and 5 "Strongly Agree." Analysis was gender-specific, comparing percentages for each gender group. For instance, 100% of mothers' responses comprised the 24 responses from women, while fathers' responses represented the 19 responses from men. Question P02 in Table 1 focuses on professionals' perception regarding their company's organizational

culture concerning the inclusion of employees who are parents. As can be seen in Figure 1 and 2, there is a clear disparity in perception between fathers and mothers. While 52.5% of men strongly agree that their company’s culture is inclusive for employees with children, only 20.8% of women share this opinion. This gap may reflect the workplace inequalities faced by mothers, challenges often not encountered by fathers. Rocha et al. [Rocha et al. 2023] also identified that mothers working in the Software Engineering field operate in organizations with a low representation of women in their teams.

One way to analyze a company’s organizational culture is by observing the benefits offered to employees [Giffords 2009]. Figure 1 and 2 analyzes professionals’ perception of the organizational support provided to parents, such as additional benefits and childcare services (P05). In this regard, the majority of men, 52.6%, report a positive experience, while 37.5% of women share this perception. In a study conducted by Trinkenreich et al. [Trinkenreich et al. 2022], most women stated that in order to have a friendly organizational environment, companies should provide childcare facilities so they can leave their children during work. To grasp the interpersonal dynamics within

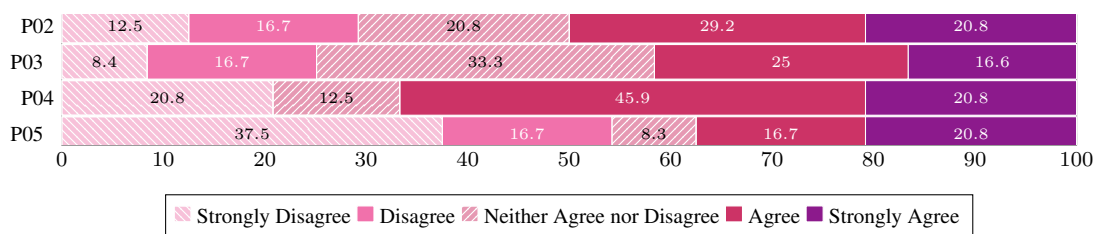


Figure 1. Questions P02 to P05 answered by mothers

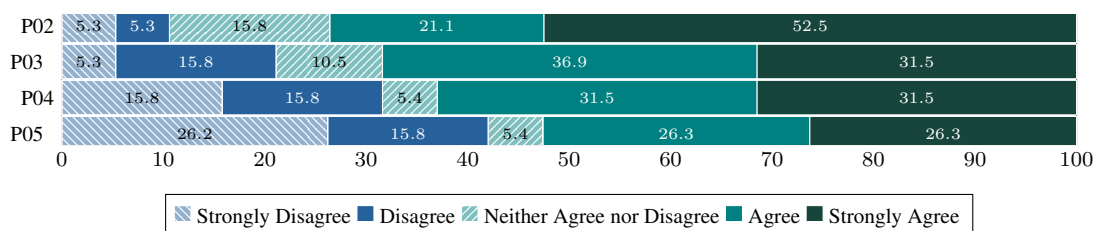


Figure 2. Questions P02 to P05 answered by fathers

the workplace concerning parental responsibilities, we analyzed the responses from questions P06 and P11 in Table 1. The first question delves into colleagues’ supportiveness regarding these duties. Figure 3 and 4 illustrates the findings, indicating that most parents feel supported by their coworkers. P11 investigated the occurrence of unpleasant comments or jokes related to parenthood in the workplace. While the majority don’t encounter such challenges, 20.9% of mothers have faced inconvenient comments from colleagues about motherhood, with 15.8% of fathers experiencing similar difficulties, as shown in Figure 5 and 6. These incidents can not only affect employees’ emotional well-being but also reflect issues related to organizational culture and mutual respect among colleagues. This finding corroborates various studies on women’s perceptions of their team members [Trinkenreich et al. 2022], [do Outão et al. 2023], [Canedo et al. 2023], [Canedo et al. 2021], [Sarmiento et al. 2022].

Although the data suggest a positive experience for professionals with children in these two questions, mothers' experience is still more negative than fathers', as illustrated in both graphs. For example, 25.1% of mothers partially or completely disagree with the statement about feeling supported by their colleagues, in contrast to 10.6% of fathers who share this opinion (Figure 3 and 4). The same occurs in Figure 5 and 6, where mothers still have a worse experience than fathers, despite the overall scenario being optimistic. Rocha et al. [Rocha et al. 2023] also identified that mothers in the Software Engineering field hear hurtful comments from their colleagues. It's impossible to discuss parenthood in the ICT workplace without investigating issues related to parental leave. Questions P03 and P09 from Table 1 explore this issue. Figures 1, 2, 3 and 4 present the findings of our research. The participating fathers tend to have a more positive perspective on how well the parental leave policies in their companies meet the needs of employees with children compared to mothers (Figure 1 and 2). However, the most notable disparity arises in the perception of career insecurity when taking parental leave. While 83.2% of mothers partially or fully agree with the statement "I was afraid that my career could be affected when taking maternity/paternity leave," the majority of fathers have the opposite perspective, with 57.9% partially or fully disagreeing with this statement (Figure 3 and 4). Rocha et al. [Rocha et al. 2023] identified that many mothers changed jobs after parental leave, either because they were fired or needed to find another job with better conditions and parental support policies.

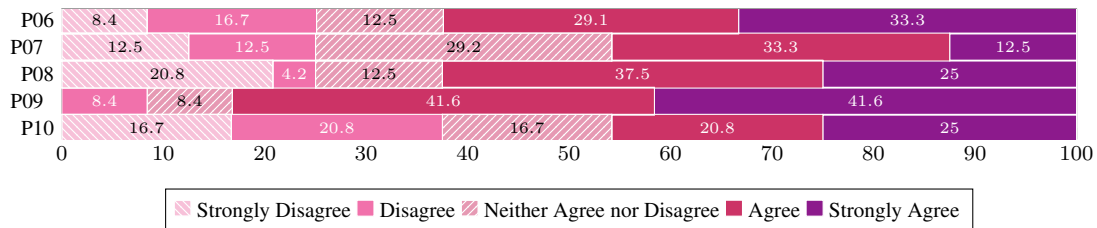


Figure 3. Questions P06 to P10 answered by mothers

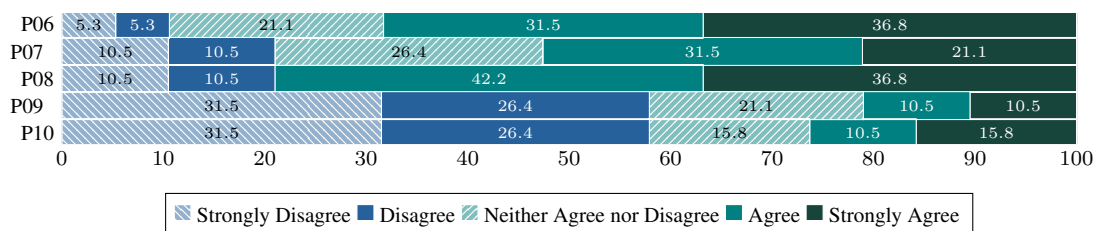


Figure 4. Questions P06 to P10 answered by fathers

There still persists a significant disparity in the perception of professional opportunities when becoming a parent. While 45.8% of mothers report receiving fewer opportunities for career growth due to their parenthood, the majority of fathers (57.9%) disagree with this statement Figure 3 and 4 (P10). Moreover, it's noteworthy how women feel more constrained to accept job opportunities due to motherhood compared to men, as can be observed in Figure 5 and 6 (P13). Regarding the treatment received in the workplace after having children, the majority of male participants did not perceive any difference. However, mothers' perception on this matter was more evenly divided, as shown in Figure 5 and 6 (P12). As for the perception of differences in treatment between mothers

and fathers based on gender, a considerable portion of fathers (36.8%) partially disagreed that there is any difference. Mothers also have mixed opinions on this issue, although a slightly higher proportion partially disagrees with this statement, as shown in Figure 5 and 6 (P15).

The flexibility that remote work can provide can be very valuable for IT professionals, and at the same time, it can be a challenge for parents who need to balance work routines with children at home. Figure 1 and 2 (P04) shows that the vast majority of respondents feel that their company offers flexible work options that facilitate this balance. 78.6% of professionals who share this opinion work remotely or in a hybrid manner. Despite this, a significant portion reports feeling pressure to always be available, as seen in Figure 5 and 6 (P14), with a similar distribution of opinions among genders. Parenthood often requires professionals to be absent from their work, and communicating these absences can be challenging. Faced with this need, the majority of survey participants report feeling secure in communicating absences or delays due to parental responsibilities, reflecting a positive perspective regarding the organizational culture of IT companies in this aspect. However, a significant portion of 23% still expresses a lack of security in this regard as show in Figure 3 and 4 (P08). This scenario suggests the persistence of obstacles for parents facing difficulties in balancing their professional and family obligations.

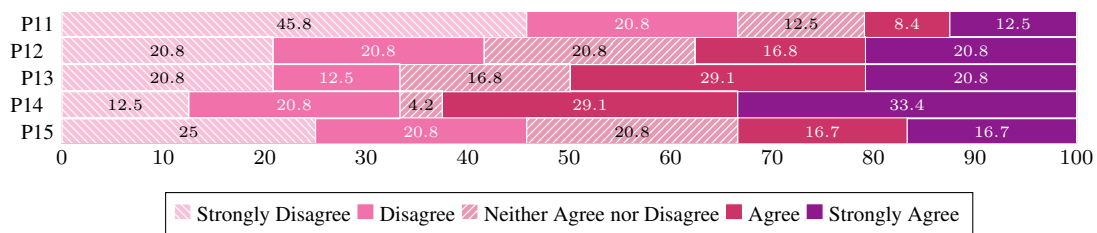


Figure 5. Questions P11 to P15 answered by mothers

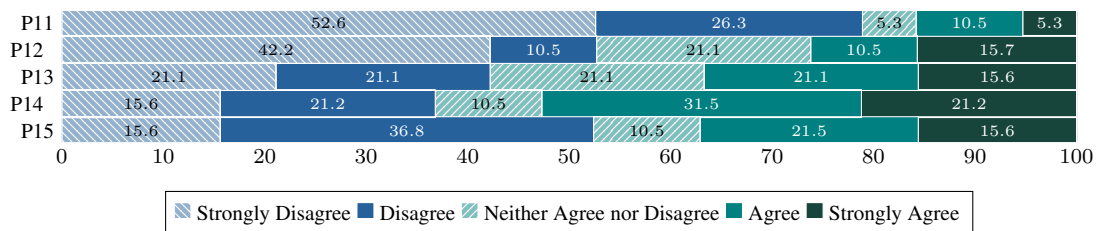


Figure 6. Questions P11 to P15 answered by fathers

Despite the challenges faced, Figure 3 and 4 (P07) highlights an optimistic outlook among professionals regarding the shift in the workplace attitudes towards parenthood. It is worth noting that, comparatively, fathers present a slightly more negative perspective than mothers.

4.2. Challenges in the Academic Environment

The first open-ended question of the survey investigates the challenges linked to parenthood while pursuing academic studies. Out of the 43 eligible survey participants, 9 responded to this inquiry, comprising 5 men and 4 women. The male respondents cited various challenges, such as struggling to be present at home, lacking energy for studies,

balancing family and academic/professional obligations, limited quality time with children, difficulty finding adequate support, absence of paternity leave, and lack of childcare assistance. Women, on the other hand, shared that the challenges they faced during their academic journey included balancing their schedule to take their children to school, resulting in delays in classes; rushed lunches while reading articles and correcting homework; finding a balance between studies and quality time with their children; and psychological strain in managing academic, domestic, and professional demands along with childcare. The remote work format facilitated this balance, but, on the other hand, blurred the boundaries between these two worlds. Although some mothers never felt discrimination in college for being pregnant, others reported a lack of empathy from colleagues who did not share the same demands.

Both groups face obstacles related to managing time between family responsibilities and academic commitments. However, there are differences in the specific experiences faced by each gender. While men highlight challenges such as the lack of paid paternity leave and the absence of childcare assistance, women report additional difficulties, such as balancing the routine of taking children to school, arriving late for classes, and performing academic activities while attending to household and family needs. Additionally, women face the psychological challenge of managing professional and domestic demands without the support of colleagues. In summary, while men and women share many common challenges in balancing parenthood and academic studies, the specific experiences of each group reflect the complexities of gender social expectations and family responsibilities.

4.3. Challenges in the Job Market

In the second open-ended question, both fathers and mothers described the greatest challenges they encountered in the job market. Twenty-two participants answered this question, with 12 being women and 10 men. The main issues highlighted by women were: 1. Being frowned upon for missing work to care for sick children; 2. Getting fired after returning from maternity leave; 3. Uncomfortable questions during job interviews; 4. Fewer job offers after maternity leave; 5. Lack of adequate support in the workplace; 6. Inappropriate comments about their personal life, revealing a disparity in treatment compared to male colleagues; 7. Juggling remote work with household chores; and 8. Pressure to maintain constant productivity.

P6 said: “(...) In my previous job, my boss constantly asked me who I left my children with during work; they didn’t offer daycare assistance or any other similar support. Even though I isolated myself at home and avoided noise, I didn’t talk about my children at work, but I always heard a joke related to them. There were male colleagues who had 4 children and no one made any mean jokes, but because I had 2 children, I always heard jokes about my motherhood. (...)”

However, some mothers reported that they currently work in more supportive organizations that understand their reality, and despite discrimination, for some mothers, the field of ICT is more welcoming than others due to the possibility of remote work. Although remote work has facilitated the juggling between these roles, it has also created an additional challenge of finding a suitable balance between the two responsibilities. Other women reported that having a partner present in their children’s daily lives

helps alleviate some of their concerns. This finding was also identified by Rocha et al. [Rocha et al. 2023].

P37 said: “Today, I don’t face any challenges in my workplace. I work for a company that understands parental responsibilities, offers differentiated benefits for me and my children, and doesn’t punish me when I need to be absent to deal with family matters. (...)”

Among men, the main difficulties include the pressure to be present in childcare, even when they feel tired or when they receive a “day off” to take care of sick children, as well as the need to prioritize family over work during their remote working hours. Thus, family demands often become men’s primary concern. Some fathers face direct discrimination, such as being fired upon revealing their fatherhood, while others deal with more subtle obstacles, such as the expectation to be available all the time and the financial difficulty of covering childcare costs. Despite these challenges, many report receiving significant support from colleagues and the organization they work for to deal with parental demands, which demonstrates a gradual change in organizational culture towards active fatherhood. However, there are still obstacles to overcome, such as the difficulty of balancing studies with childcare and the lack of flexibility in changing areas within the ICT sector, especially considering family responsibilities.

When analyzing the reports of men and women working in the ICT market and facing challenges related to parenthood, it is possible to identify both similarities and significant differences in their experiences. Both groups face obstacles such as the need to balance work demands with family responsibilities, including childcare and active involvement in their children’s school life. However, women report additional challenges, such as direct discrimination in the workplace, receiving fewer job offers after maternity leave, and inappropriate comments during job interviews. Additionally, issues like lack of adequate support, such as childcare assistance, and pressure to maintain productivity even in situations of family overload are particularly highlighted in female reports. On the other hand, men face difficulties related to the expectation of being available all the time, discrimination regarding active fatherhood, and financial struggles to cover their children’s school/childcare costs. Although both groups receive significant support from colleagues and the organization to deal with parental demands, there are still obstacles to overcome, such as a lack of flexibility to change fields within the ICT sector and pressure to maintain high professional performance amidst family responsibilities. These analyses highlight the importance of inclusive policies and practices that recognize and address the specific needs of fathers and mothers in the workplace, promoting a healthy balance between work and personal life for all ICT professionals.

5. Threats to Validity

This study, like any research, has threats to its validity and limitations, which will be addressed in this section. According to Kasunic [Kasunic 2005], when discussing the validity of a study, there are three important types: construct validity, internal validity, and external validity. **Construct validity** concerns the accuracy and representativeness of the measures used in the study. The survey used in this research was developed by two Computer Science students based on a form from the work of Soares et al. [Rocha et al. 2023]. To avoid any bias, the survey questions were validated by an experienced professor in

conducting qualitative research, and after validation, the form was distributed to collect responses. On the other hand, **external validity** refers to the generalization of the study's results beyond the specific sample and conditions in which the study was conducted. Although we obtained responses from over 10 Brazilian states, more than 60% of the responses are from São Paulo and the Federal District, which may compromise the generalization of the results. Finally, **internal validity** refers to the confidence in the causal relationship between the study's variables. As mentioned earlier, the responses were concentrated in two Brazilian states, thus the identified problems cannot be generalized to all states or worldwide.

6. Conclusion

The data analysis reveals a complex intersection between parenthood and the workplace in the ICT field, reflecting both common challenges and significant differences between men and women. Both groups face the difficult task of balancing professional demands with family responsibilities; however, women often deal with additional obstacles, such as direct discrimination in the workplace, lack of adequate support, and potential career impacts of maternity leave. Meanwhile, men face pressures related to the expectation of always being available and difficulties in covering family expenses. However, it is important to highlight that despite the reports of participants in the research who responded to the open-ended questions, many ICT professionals receive some type of support from their colleagues and the organizations they work for to address the challenges of parenthood. This gradual change in organizational culture demonstrates a growing awareness of the importance of inclusive policies that recognize and address the specific needs of fathers and mothers in the workplace. It is crucial to recognize that the research presented in this study has significant implications for the development of interventions and policies aimed at promoting gender equity and equal opportunities in the workplace. Investing in training programs that raise awareness among managers and colleagues about the challenges faced by fathers and mothers can contribute to a more inclusive and supportive work culture. Similarly, policies that offer benefits, respected maternity leaves, flexibility in working hours, and childcare assistance can help alleviate the burden on ICT professionals who are parents.

As future work, it's important to continue the research to gain a deeper understanding of the experiences of ICT professionals regarding parenthood. This may include investigations into the effectiveness of parental leave policies, the implementation of additional benefits for fathers and mothers, and the development of strategies to promote a more inclusive and supportive work environment for parenthood. Additionally, exploring how technology can be used to facilitate the balance between work and family life, as well as investigating the impact of remote work on family dynamics, are promising areas for future research. These efforts are essential for creating more equitable and supportive work environments for all ICT professionals, regardless of their parental status.

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