

PAPER

Variability in the Persistence of Women in Computing

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ABSTRACT

This study examines the variability of women's persistence in various information technology (IT) roles among sample respondents while presenting how organizational policies can complement Sustainable Development Goal (SDG) number 5—gender equality. The study gathers a range of experiences and challenges through semi-structured interviews with 13 women in technology. The thematic analysis was carried out in iterative stages using the Saturate application for collaborative data coding. The results show that persistence is facilitated by the following elements: existence needs, which are met by a competitive salary and strong family ties; relationship needs, which are met by a favorable organizational climate, social relations at work, recognition of the quality of one's own work, and gender equality; and growth needs, which are met by development and stimulation. Effective pedagogy plays a key role in encouraging women's interest and skills in computing, starting early with mentoring and incorporating gender-sensitive teaching practices. The long-term involvement of women in the IT industry can be supported by comprehensive organizational strategies and educational reforms, which also emphasize the need for constant improvements to remove barriers.

KEYWORDS

Alderfer's existence, relation, growth (ERG) theory, job satisfaction, women in computing, women retention in computing

1 INTRODUCTION

The persistence of women in computing is not universal, and gender inequality has long been an issue in the computing profession, where the number of women relative to men remains low despite efforts to promote more inclusive practices. It would be beneficial to examine related findings and the source of these disparities in further research and to evaluate appropriate intervention programs [1] to retain women in computing.

While women make up a substantial majority of the workforce in health-related professions, their representation is significantly lower in other job categories, notably the physical sciences, computing, and engineering [2]. Holgado (2018) also highlights the importance of including a gender perspective in educational programs [3]

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to tackle the gender gap in higher education. Papadakis (2018) highlights how some Greek computer science textbooks reinforce traditional gender roles, portraying men as tech-savvy and women as less competent [4]. Similarly, Papadakis, Tousia, and Polychronaki's (2018) study at the University of Crete reveals how these biases contribute to the underrepresentation of women in computing, as well as its impact on their participation and career expectations [5]. Tackling these hidden agendas is essential to promoting gender equality in science, technology, engineering, and mathematics (STEM) education and professions. Existing research provides a range of explanations as to why women are underrepresented in computing. Women have generally faced unwelcoming environments in computing spaces, from school to industry [6] [7]. Peers, mentors, and teachers challenged girls and women in these male-dominated spaces to justify their skills [8]. Some research argues that women and their specific pre-career behavioral characteristics are exclusively or equally responsible for the low numbers of women in the field [9] [10]. These behaviors, along with the perpetuation of stereotypical beliefs about ability and belonging in computing, still exist today [11].

Although specific strategies have been developed to improve the representation of girls and women in computing [12] [13], it is not clear that these approaches can be trusted and scaled up in any given field. It is essential to examine both the characteristics likely to exclude women and those likely to include them [14]. This article therefore investigates differences in women's retention in information technology (IT), using Alderfer's ERG (existence, relation, growth) model as a theoretical lens to assess the situation within a locality, specifically Iligan City, which has not been extensively studied in this context, and its implications for the male-dominated sector. This study makes a significant contribution to the literature as it applies Alderfer's ERG model, which links human needs to retention factors in a certain geographical location, and provides a holistic view of the problems they face. The objectives align with the companies' goal of increasing the proportion of women in Iligan's industry, which has not been achieved, and the presence of their gender and development office, which is also insufficient to meet the demands of their workers in the workplace [15].

The research questions this study seeks to answer are: (a) What are the key factors influencing the persistence of women in computing in Iligan City, and how do they compare to broader trends in gender representation in male-dominated industries? (b) How do these factors influence the retention of women in computing professions in Iligan city according to Alderfer's ERG model?

The remainder of this paper is organized as follows: Section 2 describes related work on the theme investigated in this document. The methodological aspects are detailed in Section 3. Section 4 explains the main results obtained. These are discussed in Section 5.

2 RELATED WORK

2.1 Unique challenges and benefits of small towns for women in computing

Small cities present unique challenges and advantages for women in computing. The downside, however, is that generally, women working in smaller cities have smaller professional networks [16] that can make it harder to link up with co-workers and mentors for their career development [17]. The labor market in such areas is generally less developed and offers fewer possibilities to get

employed and advance, eventually limiting career advancements. Furthermore, due to the restrictive access to resources and next-level training programs, women are not able to follow industry trends nor be more competitive [18], [19]. For the same reason, it can also be harder to juggle work with family life in small cities, which have fewer childcare and other care services, and these are more expensive to use.

However, small towns also offer advantages. They tend to be close-knit communities, which can be associated with strong social support networks for a flexible workplace. The lower cost of living in these towns can lead to greater financial independence and a better quality of life for women working in IT [20], [21]. Small towns continue to have a reputation for being quieter and slower-paced, with significantly shorter commutes, leaving more time for women to balance work and private life. Employers in smaller towns may be more sensitive to their employees' needs, offering personalized support and flexible working hours to help balance work and life.

Organizations can pursue a number of strategies to retain women in computing roles in small cities. Flexible work arrangements make it possible for employees to fit their professional lives around personal responsibilities, while online training and professional development programs help ensure that people never stop developing their skills. Organizational mentorship programs can help women establish a professional network and receive career guidance [22]. A supportive and inclusive workplace culture will increase job satisfaction and retention, thereby make it more likely to achieve gender equality and include strategies to address biases [23]. In this way, by promoting better community involvement—through volunteer opportunities and local tech meetups—people understand more about the benefits of the place and thus feel more involved in the region.

2.2 Women in computing in the Philippines

The status of women in computing in the Philippines reflects the broader socio-cultural landscape of the country, which has established an extensive institutional framework to promote gender equality. The Philippines has ratified key international agreements focused on women's rights, such as the convention on the elimination of all forms of discrimination against women. The Philippine constitution affirms women's equality with men, and the government has enacted policies such as the Magna carta of women, which requires the state to uphold and protect women's human rights [24] [25]. Despite these measures to foster gender equality, the technology and computing fields globally, including in the Philippines, present a mixed picture. Gender disparities persist, and women remain underrepresented in certain computing domains. The Philippine institute for development studies in 2022 cited those women who are engaged in digital jobs receive 18.4% less salary than men [26]. Traditionally, areas such as artificial intelligence, cybersecurity, and software development have been characterized by a notable underrepresentation of women. While women constitute a substantial majority of the workforce in health-related professions, their representation is noticeably lower in other job clusters, including the physical sciences, computing, and engineering [2]. Unrecognized causes of division may exist, as seen by the inconsistent gender gaps in STEM areas, where women are overrepresented in science but underrepresented in technology and engineering [27]. 'Despite the increase in the number of women engaged in the S&T (science and technology) industries in the past 25 years, it is also observed that

the percentage gap between female and male S&T professionals did not diminish but rather increased,' the Philippine Business Coalition for Women Empowerment (PBCWE) said. Even with the significant advancements made in the past few years toward gender equality, women's economic empowerment continues to lag [25]. For example, the percentage of female bachelor's degrees in computer science dropped from 28% in 2000 to 18% in 2015 [28]. This trend could be similar in the Philippines, whose education and professional sectors are influenced by global patterns. One of the primary challenges in understanding the gender gap in computing in the Philippines specifically is the lack of gender-disaggregated data. Without solid data, it is challenging to accurately pinpoint the status of women in computing or develop targeted interventions to address the gender gap [29]. However, the Philippines' high ranking in education on the World Economic Forum index, influenced by its gender equality policies, suggests potential for women's participation in computing and technology [30]. Globally, women are 1.6 times more likely to report a lack of skills as a barrier to using the internet, and technological advancements risk exacerbating inequalities between those with and without digital skills [31]. Thus, while the Philippines' framework for gender equality is notable, ongoing efforts are necessary to ensure that women have the same opportunities as men to develop digital skills and participate fully in the field of computing.

Several groups, both governmental and non-governmental, are striving to reduce the gender gap in computer education and jobs. Despite these positive developments, challenges such as gender stereotypes, societal expectations, and workplace biases continue to hinder the full participation of women in computing in the Philippines. This is evidenced by transformative laws such as republic act (RA) No. 9262 [32], the Anti-violence against women and their children (VAWC) Act of 2004, and RA No. 9710, the Magna Carta for Women of 2009 [33]. These legislative milestones have contributed to the Philippines ranking 19th among 146 countries in terms of gender parity, according to the global gender gap index 2022 [34].

Governments and state actors have a critical role to play in enabling the development of digital skills more broadly and supporting people, especially those who are left behind. This includes scaling up programs and capacity development initiatives tailored to the needs of women and, if feasible, collecting more detailed data to guide these strategies [31]. While there is great support for gender equality in the institutions of the Philippines, significant long-term efforts are needed to transform this support into significant wins for women in the computing domain.

2.3 Alderfer's ERG Theory

American psychologist Clayton P. Alderfer established the ERG theory in 1969 as a revision of Maslow's hierarchy of requirements. Alderfer's ERG theory reduces the complexities of human wants to three basic categories: existence (E), relatedness (R), and growth (G) [35]. This approach simplifies understanding of human motivation by categorizing demands into three major areas.

On the other hand, Maslow's hierarchy of needs is represented in the form of a bottom-up pyramid, indicating that lower-level needs must be satisfied before higher-level needs can be addressed. These needs are physiological (food, clothing), security (employment), love and belonging (friendship), self-esteem, and self-actualization [35], as shown in Figure 1. At the base of the pyramid are physiological needs, i.e., an individual's basic needs, such as food and clothing.

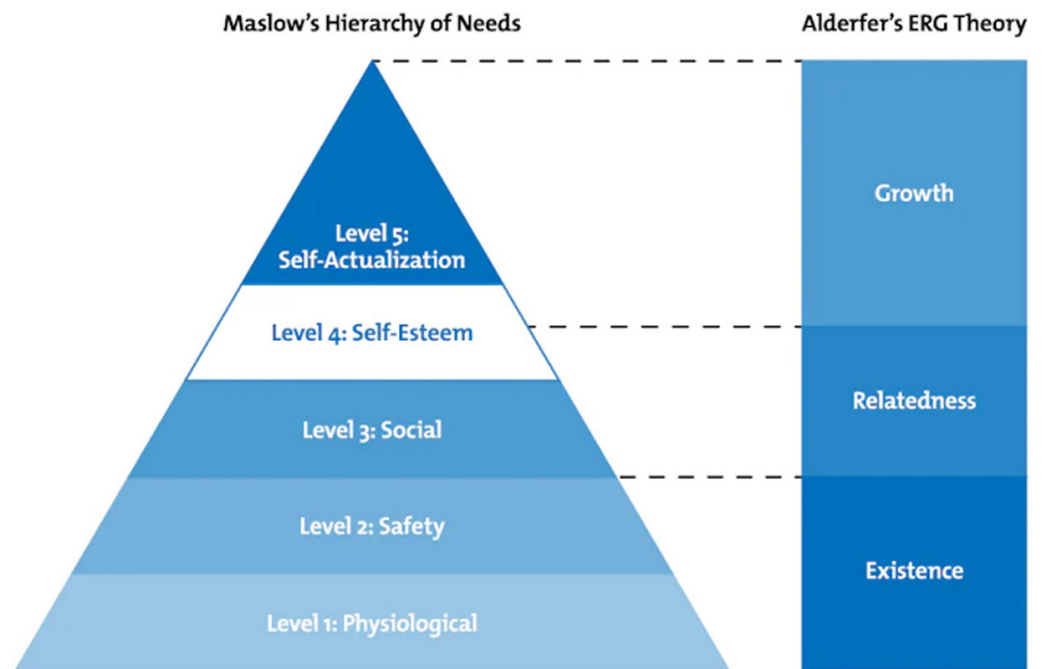


Fig. 1. Maslow's hierarchy of needs and Alderfer's ERG theory from: the mind tools content team (Accessed 2024, June 10)

Represented as a pyramid, Maslow's hierarchy of needs is evaluated from the bottom up, emphasizing that lower-level needs must be fulfilled before addressing those higher up. These needs include physiological (food and clothing), safety (job security), love and belonging (friendship), esteem, and self-actualization [35] as presented in Figure 1. At the base of the pyramid are physiological needs, such as food and clothing, forming the fundamental requirements for an individual's well-being. The next level is stability and security that may lead to job security. Then the next tier is the need for love and a sense of belonging linked to social relationships and friendships that affect an individual's emotional health. Moving up, the hierarchy covers ego needs, which relate to the desire to be well thought of, praised and to have high self-esteem. And at the very top is self-actualization, the desire to be the best that one can be.

The physiological needs are referred to as existence needs (employment, property and health) in Alderfer's ERG theory. Similarly, Alderfer's relates to the 2nd tier of Maslow's needs and emphasizes the significance of relationships with others. Both ideas emphasize the basic human need for social contact to promote well-being. Moving forward, people desire recognition and esteem from others, which is the third element in Alderfer's ERG model. This requires developing confidence, self-worth, and a desire for personal improvement. At this stage, people attempt to attain their maximum potential and become their best selves. This is in sync with Maslow's idea of self-esteem and self-actualization, in which people recognize their strengths and seek self-fulfillment. However, the theory as opposed to Maslow's Hierarchy of Needs implies that individuals may derive motivation across different levels at the same time rather than following a pattern of progression from one level to the next. It suggests the shifting character of human wants, considering that their importance differs across individuals and changes with the situation. For instance, someone will value personal development over social ties. Furthermore, the theory features "frustration-regression" components, which indicate that if

higher-level wants are unsatisfied, people may relapse to chase lower-level desires out of frustration.

3 METHODOLOGY

The study conducted a semi-structured interview with employed women living in the region of Lanao del Norte and in computing-related jobs in Iligan City. Research indicates that the industries in Iligan City and Lanao del Norte have organizational culture policies that specifically mention women's empowerment and/or gender equality in accordance with Sustainable Development Goal (SDG) #5, which is gender equality [15]. There were two different approaches used: an online interview via zoom or google Meet to accommodate their preference for a remote interviewee, and a planned face-to-face interview. The methodology for this study employs simple random sampling to select female participants from the population of women engaged in the computing field. To facilitate this, women from various sectors within the computing industry will serve as a sampling frame. This approach guarantees that the sample is representative of the broader population of women in computing and helps to mitigate selection bias, enhancing the validity and reliability of the study's findings [36] [37]. An hour or two was usually allotted for each interview. All of the interviews were then recorded and transcribed by the researchers for later analysis.

Thematic analysis was conducted in multiple iterative phases. At first, researchers immersed themselves in the transcripts and notes to understand the data collected. Codes were then developed to determine similar characteristics or patterns that seemed important for the objective of the study. This organizing process grouped these codes into potential themes that reflected perspectives, thoughts, or experiences across the dataset. The process of comparing and contrasting codes and themes was used to elaborate on the issues, and subsequently, researchers checked interpretations iteratively to strengthen the accuracy and depth of the study.

Proponents made use of the saturate app to encode responses between researchers. This web tool is a collaborative platform for qualitative analysis that helps teams code field notes and other free-form data. To assist in the coding validation, the author and participants were given access. In addition, members were given rights to check the results to allow respondents to review and approve the findings to validate the reliability and relevance of the study from their standpoint. The researchers also performed peer debriefing to engage with peers or co-researchers to review and critique findings. The process itself delivered feedback improving the quality and reliability of the analysis. Another file was updated with the themes and codes used at the time as well.

4 RESULTS AND DISCUSSION

A total of thirteen interviews centered on women working in the computing industry were conducted. Specifically, these participants are from a variety of computing roles, including web and software developers, database administrators, system analysts, quality assurance specialists, virtual assistants, network administrators, and graphic artists. Six to eight interviews are sufficient for a homogeneous sample, acknowledging sample heterogeneity and research objectives. 12 to 20 interviews are needed to achieve maximum variation [38], as cited in [39]. Lastly, based

on the work of [40], a qualitative researcher suggests that 6–12 interviews for qualitative research are sufficient for one project.

5 MAIN RESULTS

The variety of roles that these women have played in Iligan city illustrates the complex contributions that women have made to the computing industry in the city, as shown in Figure 2. The prevalence of roles in software development and web development indicates the existence of women in this field, showcasing their ability and interest in coding and programming tasks. Furthermore, the existence of positions in quality assurance, database administration, virtual support, and graphic design shows how many more chances exist for women in the computing industry outside of typical coding occupations.

Further, upon analysis of the data gathered, some of the facilitators that are found to have significant impact on the retentions of these women in Iligan city are salary, family proximity, positive workplace, culture and perks, social working environment, job recognition, opportunities for growth and challenging jobs, and gender balance environment.

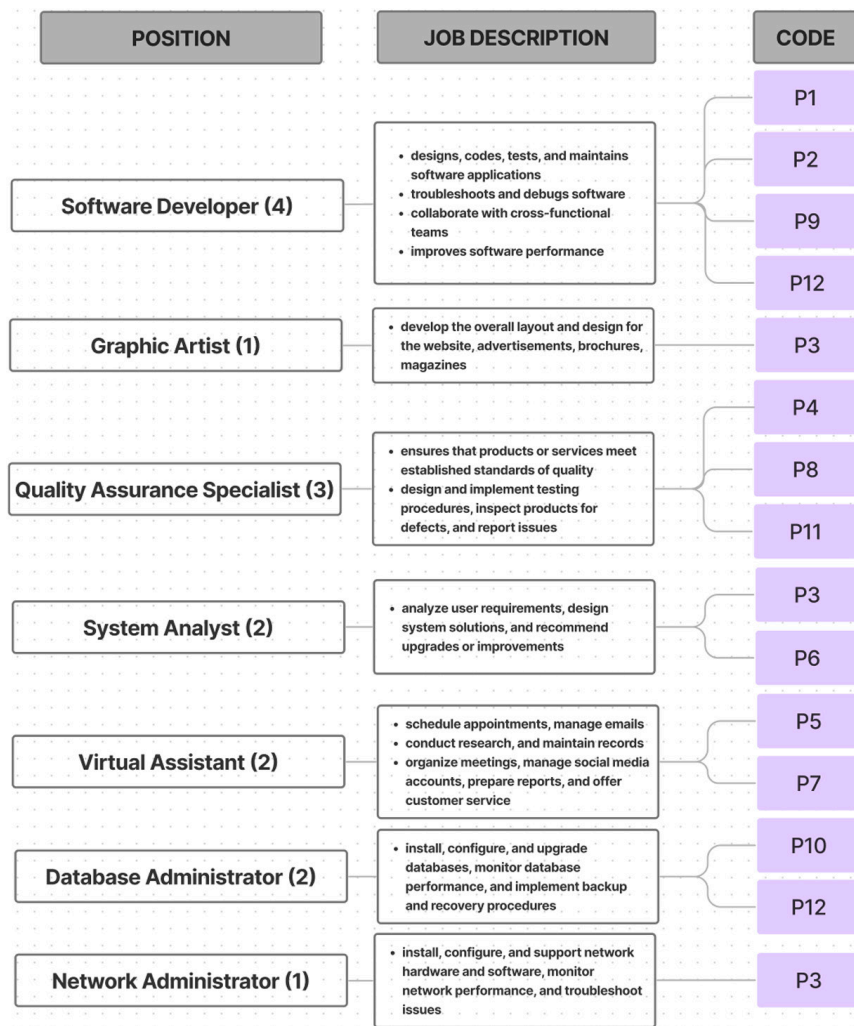


Fig. 2. Summary of the respondents' role in the company

5.1 Salary

The study illustrates the interdependence between job satisfaction, salary, and cost of living, a particularly complex issue in urban areas [41]. Their salaries were the main motivating factor for eight participants to work in their jobs, and they were enjoying it because of other incentives offered with it. But while all of these women recognized that they might be able to earn more money in a bigger city, they also saw the benefits of staying, specifically its relatively lower cost of living when compared to big cities.

“Ok ra man ang sweldo nga ilang gi offer sa ako. Ang akong kitaon sa dagkung syudad murag daku pero grabe man sad ug expense.” If translated, *“The salary they offered me is okay. What I could earn in a big city seems substantial, but the expenses are also significantly higher.”* (P6)

“The Salary is enough for my needs so I decided to stay.” (P8)

P5 also mentioned that her earnings are sufficient to cover her monthly expenses, and the significance of compensation varies depending on each employee’s individual desires and needs.

5.2 Family Proximity

Results also provide insight into the significant impact of family proximity on women’s decision to stay in local propensities [42]. Seven of the respondents have reported that the presence of family members living in or in neighboring municipalities is one of the reasons for retaining the job.

P2 mentioned that she was too reluctant to leave her father alone, establishing an emotional attachment and sense of responsibility that kept him from leaving. Similarly, P3, a single mom, prioritizes her relationship with her child and dismisses the idea of moving away. It just would have meant more to her to be available for the child’s needs than the potential of having more benefits from relocating for work. P9 highlighted further on the emotional comfort and refuge provided by family. Family members near the workplace offer security and a sense of belonging. Being away from her family would disrupt her emotional stability, making it difficult for her to consider working anywhere else.

“Knowing my family are accessible in times of need offers me sense of safety and peace of mind and somehow significantly impact my job and overall well-being.” (P10)

5.3 Positive workplace culture and perks

Moreover, the chance of progression or perhaps role switching available from an employer through on-the-job training to permanent positions leads a great deal of women to feel confident in the job. P2, P1, and P13 stress the impact of these initiatives on their retention in the company.

“Our company is supportive with one another. We excel in our job through collaboration and help from one another.” (P2)

P6 emphasizes that strategic management approaches should be more supportive, such as exercise breaks during working hours.

5.4 Social working environment

P12 and P6 value each and every friend they have within the workplace.

“I would have quit if it weren’t for my co-workers who constantly encourage me when faced with deadlines and crucial assignments.” (P12)

Similarly, P6 views a healthy sense of competition among coworkers, which only serves to enhance the daily routine’s motivation. Furthermore, these women’s connection to their jobs is impacted by their interactions with their managers.

“My supervisor has been really considerate to us. He constantly asks about our professional work and check whether we are doing fine.” (P8)

She feels even more secure and fulfilled in her work because she can easily contact her supervisor with any questions or concerns about her job. They are able to trust their supervisor more as a result, and they have a good working connection that makes her feel appreciated and understood.

5.5 Job recognition

Seven women described how positive feedback on their performance has helped to make them feel good about themselves and work-related satisfaction, a reason for staying with the company. Both P6 and P9 elaborated on it, saying that they like the way their boss always recognizes their work. P13 added that the incentives that come along with her supervisor’s recognition help her feel better about herself.

“My supervisor is great because he constantly remembers to give me praise and always provides an incentive when I do well at work.” (P13)

P1 and P7, respectively, narrated how they respected when they know their work was noted and conformed. They see it as more than just a reward for the morale; they feel that by providing them with recognition, it validates their abilities and what they contribute as part of the success of the organization. Their appreciation for their employer not only increases their job satisfaction but also strengthens their commitment to the business.

5.6 Opportunities for growth and challenging jobs

“My work challenges me to gain new skills and develop professionally, in addition to letting me use what I learned in college.” (P10)

P10 stated that her present employment requires her to learn new things and build on the knowledge she gained from her undergraduate degree.

“I’m always on new high-level projects, so I never get bored.” (P4)

Her job satisfaction is enhanced by her drive for intellectual curiosity at work and her participation in challenging activities that prevent her from feeling ordinary. It demonstrates that hard work will keep an employee engaged and put in the extra effort for his/her job. P11 similarly reported that internal competition is the best motivator in her high-functioning team, which implies a solid challenge for self-improvement both personally and professionally.

5.7 Gender balance environment

When asked whether there is a culture of gender bias in the workplace, 100% of respondents answered that they have not experienced any. This unanimous response makes it very evident that the organization is totally committed to advancing gender equality.

6 DISCUSSION

6.1 Factors influencing the persistence of women in computing in Iligan city

One of the key findings of the study is that these participants were said to be overall content with the income/salary they currently had; this existing salary held an essential reason for career satisfaction. This means that perhaps money is a defining criterion when it comes to how much appreciation one has for the work. Research consistently shows that wages significantly impact job satisfaction, but other factors such as career development, rewards, and job stability also play a role [43] [44]. For women, the cost of living relative to earnings and perceived value in total remuneration are particularly influential in job retention decisions [44]. That being said, it is worth noting that they were only satisfied when their salaries not only matched but also on how their income aligned with the cost of living in that region. For others, living in a city with a lower cost of living made adequate pay more sufficient, allowing them to live comfortably. This feeling of economic security, combined with the perks of living in the city, acted as an extremely effective counterpoint to finding a higher-paid job elsewhere. Job satisfaction is positively impacted by compensation as well as training and development, with the former also having an effect on employee retention [45], especially in the field of computing [46]. The researchers derive, from this, that while wages clearly have a considerable impact on people's job satisfaction (i.e., it is not just the money), the cost of living relative to earnings and perceived value in terms of total remuneration also influence women's decisions about job retention early after hire. These findings have effects for employers and policymakers alike. The absolute level of salaries is an important concern—and so are those same salaries compared with the cost of living in the areas where employees live. Competitive compensation packages can help to improve employee satisfaction and retention [47] [48] [49], so long as they are available in the context of local economic conditions. Further, urban-specific affordable housing and other basic services should be acknowledged as key enabling factors for the sustenance of a standard of living in cities so that employees are not strained to seek out better-wage jobs.

Moreover, results also emphasize the complexity of job satisfaction and retention, identifying just how much family considerations matter, especially among

women at work. This highlights how family ties and support systems have at least some effects on the types of work choices women make. For many women, proximity to family is an important consideration for why they choose to stay in or leave their job—even more important than monetary and emotional factors. Akyol (2024) further demonstrated that grandmothers' proximity can impact women's labor force participation, with the presence of non-resident family members increasing the likelihood of staying in rural regions (Ferguson, 2023) [50] [51]. Employers and policymakers must acknowledge these specific needs for an inclusive working environment. Women are typically socialized to take on more responsibilities, particularly caregiving roles in the family [52]. They consider being close to their family not as some kind of convenience but an integral element in balancing the work-life balance. Public and private employers must realize that a woman often considers her family as she advances in a profession and reinstate policies to assist women who wish to balance career advancement with family responsibility [53] [54]. With family-friendly policies, such as parental leave and childcare support, women may balance work with family obligations [55]. Retention incentives so that women want to stay where they are, such as relocation assistance for family members or programs, can lead to more female workers remaining on the job and higher job satisfaction.

In addition, the significant influence on the company's establishment of a supportive work environment and all-encompassing benefits are also some of the top reasons behind retaining female employees. These arrangements present an opportunity of comfort and ease, which can greatly contribute to these women not quitting their jobs. Employee retention is highly impacted by a positive work environment, which is defined by elements such as trust, physical comfort, and social interaction [56] [57]. Some of which are fixtures such as couches and lounges that add to a relaxed environment for work/health.

Frequent recognition and reward are also needed to keep morale high, and allowing room for development ensures that there is always something to learn and attain in terms of a career path [58] [59] [60]. This consistent recognition is not only a way of validating the work they are doing; it also serves to push them to continue working at their standard level. Linking praise to material rewards shows that the company values its workers and shows that it cares about each and every one of them, which fosters a culture of excellence and loyalty.

Flexible working hours and working from home are a reflection of promoting work-life balance to employees, thus allowing them to effectively juggle their personal and professional lives. Comprehensive health and wellness programs and competitive financial benefits help keep employees healthy and financially fit so their career can grow in a positive direction. Improved workplace facilities, social events, and flexible working environments add to the motivating workplace. Together, these components aid in employee retention, greater job satisfaction levels, and workplace efficiencies.

Further, women are found to be more likely to stay at work because of their ties with superiors and coworkers than for any other reason. This emphasizes the beneficial effects of mentors and supervisors who are supportive on the career progression of women, with a role also played by gender congruence in supervisory dyads [61] [62]. They can function effectively in a less demanding work environment because they have positive coworkers by their side. Organizational engagement and a positive supervisor-subordinate relationship are important indicators of employee retention [63]. However, some level factors that likely create such

relationships—organizational structure and practices [64] and supportive HR practices [65] in this context, are also essential to determining the experiences of women at work. In the end, all praises and recognitions from one's supervisors help create a positive professional atmosphere that motivates its workers to perform exceptionally in order to remain committed [66] [67].

Employee retention and contentment in a company are also directly correlated with growth opportunities. Vianen (2019) [68] and Tareq (2020) both emphasize the role of challenging tasks and an innovative work environment in promoting job satisfaction. Through these types of opportunities, employees can learn new skills and progress in their careers while feeling appreciated by the company. This can be accomplished by providing additional training needs, mentorship possibilities, promotional chances, and the opportunity to tackle fresh and different projects. It is crucial for workers to continue their professional development in order to prevent monotony. Workers will remain with your organization as long as they are able to see themselves in the future and are encouraged and supported. On the other hand, a difficult job can be very inspiring for most employees, especially those who are working in areas such as computing where the requirements of work always necessitate challenges of solving problems and innovation.

Continuous learning, healthy competition, and interesting projects make computing a challenging profession—one that inspires individuals to elevate, upskill, and outperform relentlessly.

Lastly, most of the replies centered on the organization's dedication to guaranteeing that employees may operate in a setting where a person's gender has no influence on their professional experience or prospects for growth. Numerous advantages flow from this commitment to gender balance, which support the creation and attractiveness of an inclusive workplace where all workers, regardless of gender, feel appreciated for who they are.

The encouraging comments provided by these women speak highly of the organization's gender equality-promoting policies and procedures. In addition to upholding moral principles, the company increases worker satisfaction and productivity by eliminating any perception of gender bias. The "glass ceiling" and preference differences may account for women's higher job satisfaction than men's, despite the possibility of lower working conditions [69].

6.2 Facilitators and Alderfer's ERG theory

The survey data were analyzed in parallel with Alderfer's ERG theory, as shown in Figure 3. It illustrates how various variables influence women's job retention in small towns such as Iligan city.

Competitive pay and fostering deeper family ties are major strategies used to cater to existence needs [70] [71], crucial when these women are navigating the complexities of both personal and professional life. These needs, which include salary, benefits, and communication, are crucial for sustaining motivation and performance in adult learners and employees. The competitive financial incentives guarantee that women can support their families and themselves, allowing for flexibility in time management and convenience in meeting the requirements of children and jobs. Economic security is provided by competitive financial advantages, and women find jobs near their families preferable because they provide emotional stability and convenience.

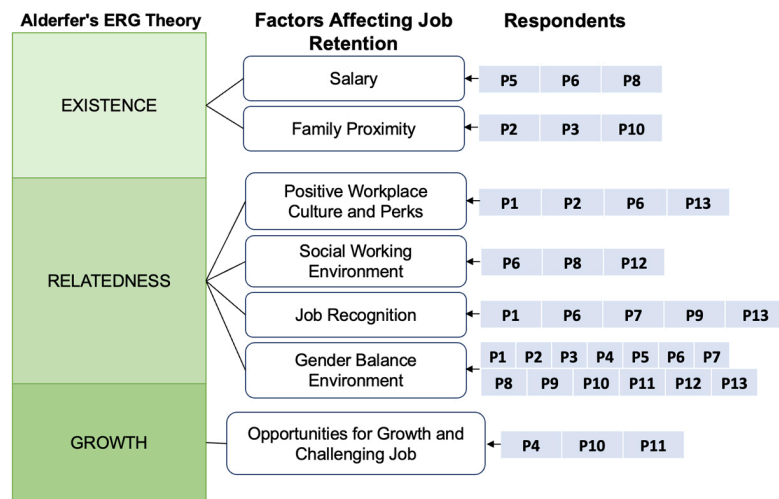


Fig. 3. Alderfer's ERG theory and the factors affecting women's job retention in computing

Rewards from working and an ideal setting support relatedness need [72]. The role of rewards in supporting relatedness need, a key component of Alderfer's ERG Theory, is further emphasized by the mediating role of need satisfaction in the relationship between total rewards and retention [73]. Women feel that extra affection helps them integrate into the company even more and appreciate being recognized and rewarded for their hard work. According to Taamneh et al. (2018) [74], compensating employees is the largest investment and the biggest differentiator for achieving a sustained competitive advantage [75]. For this reason, rewarding people extends beyond giving them a salary in order to boost output and accomplish company goals. One approach that emphasizes the value of employee preferences in luring, inspiring, and keeping essential personnel is the total rewards preference model [76]. Many studies conducted over the course of the last 20 to 25 years have suggested that one of the most important factors in obtaining increased retention is total rewards, which are the sum of all financial and non-financial benefits [77]. The importance of these positive interactions between supervisors and peers was emphasized by the female participants. For instance, P12 and P6 highlighted the importance of friendships at work for support and satisfaction at work. Additionally, these infrequent job appreciations, as P6, P9, P15, P7, and P13, help people form social bonds and develop a sense of self-worth.

Opportunities for growth and challenging jobs are essential for satisfying growth needs [78]. Women, such as P10 and P4, for example, enjoy self-improvement and seek to take on some new tasks. In order to minimize turnover, organizations and LGU's must take advantage of these chances for professional growth and make sure that women remain engaged and satisfied. Nembhard (2012) [79] examines the impact of challenging work environments on productivity and satisfaction, emphasizing the importance of promoting and supporting empowered work cultures. Nonetheless, the consistent response may additionally emphasize the culture they have established to assist women in the workplace.

This comprehensive strategy guarantees a work atmosphere that is encouraging, stimulating, and rewarding, which can help keep women in their positions.

The sample size of the study focusing on Iligan city is limited and therefore may not generalize to the larger population of computing women. Relevant drivers of women's persistence in computing are likely to vary across small cities in ways that a single study cannot capture. Moreover, many studies do not have longitudinal

data so that one cannot see how persistence changes over time for women and thus how workplace policies and personal circumstances change. Further, a void in the industry-specific struggles can limit the nuances concerning a wide array of struggles that women may face within different sectors of the tech industry. Focusing implementation of these recommendations and recognizing limitations may best facilitate the retention and success of women in computing, particularly in small city environments.

7 CONCLUSIONS

The persistence of women in computing is a complex issue that can be effectively understood through the framework of Alderfer's ERG theory, which can be divided into three main categories—existence, relationship and growth. Finding the specific requirements of a given job is essential to designing a role that enables women to reach their maximum potential and have a long-term career in the technology industry [80]. The guarantee of a competitive wage and the implementation of family-friendly policies satisfy living needs, which encompass basic material and physiological needs. It is essential to offer remuneration comparable to that in other regions, particularly in small towns where employment opportunities are scarce and the cost of living can vary considerably, in order to reduce financial stress. In small towns such as Iligan, proximity to family is usually another important factor. With flexible working hours and the possibility of working remotely, women are better equipped to manage their personal and professional obligations, which increases job satisfaction and reduces the risk of work-family conflict.

In small towns, meeting relationship and growth needs beyond basic existence needs is also essential to keeping women in IT professions [81]. Fostering a work environment where employees enjoy working with each other and where there are strong relationships between peers and superiors can build a supportive and resilient culture that inspires loyalty within the workforce [82]. Growth is linked to opportunities for personal development and self-actualization, which are met by providing continuous learning opportunities and challenging projects to enable women to develop and hone their skills. Spencer (2021) [83] and Bustamante (2022) [84] both emphasize the need for interventions that foster a sense of belonging and professional identity for women in computing, with Spencer focusing on intersectional capital and Bustamante on motivations and professional roles. This entails making a concerted effort to eliminate prejudice and provide equitable possibilities for advancement. To ensure that no advantage or barrier prevents any woman from advancing, it is imperative that proactive measures be taken to ensure that women do not encounter persistent challenges in their career objectives [85]. These initiatives may involve mentorship programs, grants, and outreach attempts that motivate young women to consider studies and employment in computer science and related sectors. Breaking down these challenges will need ongoing efforts from schools, industry leaders, and governments to promote a more favorable and welcoming marketplace for women pursuing computer jobs. Furthermore, creating a culture of equality and inclusiveness inside technology organizations is critical for maintaining and developing women in the sector. By addressing these demands collectively, technology companies in small cities can enhance their capacity to keep women in computing and promote a more inventive, diverse, and equitable tech sector.

These insights could have implications for policymakers to introduce family-friendly policies, competitive pay parity, and work hours that align with the

schedules of women in smaller cities such as Iligan. These can also enable tech companies to create a more inclusive work environment, contributing significantly toward increased job satisfaction levels as well as retention through mentorship programs, continuous learning opportunities, and efforts against workplace biases. Additionally, education institutions can capitalize on the result to develop programs encouraging young women to pursue computing careers. The study intends to benefit the wider community in small cities through fostering innovation, diversity, and equity within their local tech sector.

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