Why Do Women Professionals Leave the IT Field? Ten Insights and Recommendations From the World IT Project

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***Abstract*—*This article presents 10 insights explicating the reasons why women information technology (IT) professionals leave the IT field. This study analyzes the data obtained from 10 386 IT employees in 37 countries, collected during the World IT Project, the largest academic IT study ever conducted. The findings indicate that at the highest risk of permanently leaving the IT profession are women who 1) are employed part-time, have less education, and, as a result, work in supporting and liaison roles rather than in traditional core (i.e., men-dominated) IT positions; 2) are between 21 and 29 years old; 3) belong to an organization in a non-IT industry that has not reached a high level of organizational IT maturity and employs fewer than 200 people; and 4) exhibit high uncertainty avoidance and low individualism. Women occupying middle- and senior-level managerial positions are also more likely to leave IT than their nonmanagerial counterparts. The insights reveal an archetype of a woman IT employee who is at the highest risk of permanently leaving the IT profession and lead to practical recommendations for IT managers and policymakers.*

Key words: Gender, IT profession, retention, turnaway, women.

Women in the IT Profession

The underrepresentation of women has been an Achilles' heel of the information technology (IT) profession and an ongoing concern for managers, educators, and policymakers, with implications at the individual, organizational, and national levels [1], [2]. Various initiatives to inspire and attract women to the computing field—including women's outreach programs, computer camps, programming clubs, special interest groups, conferences, celebration events, and government support [3], [4], [5], [6], [7]—have produced a slight increase in the number of women IT graduates [8], but the overall participation of women in the IT profession remains persistently low. One of the reasons for this disparity is the high turnaway (i.e., permanently leaving the IT field) among women: within five years of entering the IT profession, 45% of women leave the computing domain, compared to only 17% of men [9]. The consequences of the high turnaway rate may be devastating for individuals, organizations, and society. Women who have spent time and money acquiring professional IT skills see their career aspirations crushed. Their families lose income associated with the generally higher paying IT jobs. Organizations continue to experience a shortage of IT talent despite the availability of a necessary skill set in the general population, and this situation has only worsened following the COVID-19-triggered

Great Resignation and Quiet Quitting trends [10], [11]. A large portion of industry-specific knowledge is never passed on to the next generation of IT workers. The resources of educational institutions are wasted when half of the women IT graduates eventually depart from the chosen domain.

To understand women's underrepresentation in the IT sector, many studies have explored gender stereotypes and the differences between the genders [12], but most of these attempts fail to produce actionable, practical recommendations. Instead, rather than comparing women to men, exploring the differences among women professionals themselves represents a more fruitful avenue [13], [14]. Consistent with this line of research, in the World IT Project, we explored a number of issues that women IT professionals face and analyzed them in the turnaway context.

The World IT Project

The World IT Project is the largest academic IT study ever conducted [15]. A core team of five scholars from the USA, Canada, India, and Türkiye, supported by the efforts of more than 80 country investigators, obtained data from 10 386 IT employees in 37 countries. These countries represent all major world regions and differ in their economic development, IT maturity stages, political systems, religions, cultures, etc. Country investigators were recruited based on their ability to collect the required sample and their knowledge of their home country's specifics. The same survey instrument containing 160 items was administered to 10–15 employees from up to 25 organizations of all sizes across different industries. When necessary, the instrument was translated into the country's local language, back-translated into English, and refined to ensure accuracy. The inclusion criteria consisted of being a full-time IT employee and at least 18 years old. No exclusion criteria based on IT employees' personal characteristics, seniority levels, job roles, etc., were applied in order to collect a representative sample. Country investigators used various methods to approach prospective respondents, including personal contacts, industry associations, former graduates, industry databases, etc. The study was not funded, although some country investigators secured local funding independently. Most countries relied on a web-based survey, and a few used a combination of online and offline questionnaires. For most countries in the sample, a minimum of 300 valid responses were collected. For more details about the World IT Project, refer to Palvia et al. [16] and the project's website.[1]

To ensure data reliability and validity, six types of tests were successfully conducted on the entire dataset: 1) data cleansing, including the removal of inaccurate, incomplete, invalid, and straight-lined answers; 2) assessment of common method bias using Harman's [17] single factor test; 3) evaluation of construct reliability and validity [18]; 4) confirmatory factor analysis and model fit estimation; 5) measurement invariance testing; and 6) endogeneity testing. With respect to this article, data were analyzed using standard statistical procedures appropriate for each type of analysis, including *t*-tests, analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), and correlations.

Underrepresentation of Women in IT

Similar to the previous surveys of the IT workforce [19], in the World IT Project, we found that only 27% of employees in our sample were women. Women also have less IT work experience than men: 40% of women work in IT for less than four years, compared to 25% of men, and only 9% remain in IT jobs for at least 20 years, versus 15% of men. The women IT workforce is generally much younger than that of men: 41% of women are between 21 and 29 years old compared to only 29% of men in the same age category. On average, women IT employees have more education than men: 81.6% of women hold a bachelor's or master's degree, versus 75.3% of men. Women are also 50% more likely to occupy part-time IT positions than men. These findings are interesting and confirm our expectations about the women workforce in IT. Therefore, we conducted a deeper analysis to explore the differences among women IT workers specifically and discovered 10 notable insights about their turnaway intentions, which led to practical recommendations.

Insights and Recommendations

Insight #1—The gender imbalance that exists within the IT job roles facilitates women's exodus from the IT profession: Men-dominated IT job roles include traditional core IT positions such as programming, system administration, maintenance, management, and strategy. By contrast, the largest proportion of women work in supporting and liaison roles, such as testing, operations, financial systems, analysis and design, database administration, email/messaging systems, and user relations. Women's turnaway depends on the type of IT job role: those who occupy traditional core (i.e., men-dominated) IT positions exhibit lower turnaway than those in supporting and liaison roles.[2]

Recommendation #1: To reduce gender imbalance within the IT

[1] https://aserenko.com/witp/

[2] All comparisons in this article are significant at $p<0.05$ or less.

industry, organizations should hire and promote women into traditional core IT positions rather than limiting them to supporting and liaison roles. They should also introduce on-the-job training initiatives, certifications, and skill-building workshops to transition women from supporting and liaison tasks into traditional core IT roles.

Insight #2—Younger women IT workers are more likely to leave IT: It seems reasonable to assume that as people age, they become less likely to abandon their current profession. Women between 21 and 29 years of age report the highest turnaway intention, but as they age from 30 to 49 years old, their turnaway intention declines.

Recommendation #2: Organizations should prioritize retaining young women hires, who typically hold their first or second IT job. To achieve this, they should introduce onboarding, career development, mentorship, and peer networking programs. IT managers should also assign young women hires to challenging, high-impact projects to help them feel engaged with their jobs.

Insight #3—Women with less education tend to work in support IT roles and are more likely to leave the IT profession: Women who have a high school diploma (or less) or an associate degree tend to occupy support IT positions (help desk, training, and application support) and show higher turnaway intention than those with a bachelor's or a master's degree who work in traditional core IT roles, including programming, management, and strategy.

Recommendation #3: Organizations should support women's education by subsidizing their part-time post-secondary degrees, offering education subsidies and scholarships, and launching specialized certifications in core IT areas and subsequently promote women into traditional IT roles.

Insight #4—Women in managerial roles are more likely to leave IT: In total, 46% of women IT employees perform various managerial duties, but they exhibit higher turnaway intention compared to their nonmanagement counterparts. Notably, turnaway intention is higher among those employed in middle- and senior-level IT positions than in lower management ones. It is possible that the stress and pressure associated with higher level managerial jobs lead some women to reconsider the direction of their professional careers.

Recommendation #4: To support middle- and senior-level women IT managers, organizations should offer stress management and wellbeing programs, work-life balance initiatives, and flexible schedules as well as encourage shared leadership and delegation to distribute tasks more evenly within management teams.

Insight #5—Being laid off from an IT job does not impact women's turnaway intention: In total, 10% of women reported that they have ever been laid off from an IT position. Surprisingly, this does not influence their subsequent turnaway intention. This finding shows that women are highly resilient and that their turnaway decisions are shaped by factors unrelated to a single layoff episode.

Recommendation #5: Organizations should emphasize and foster resilience within their women IT workforce and help women feel more secure and confident in their IT roles.

Insight #6—The size of the organization matters: Women who work for organizations employing fewer than 200 people exhibit higher turnaway intention than those employed in larger organizations. It is possible that larger employers offer more stability and opportunities for career growth, which influence women's decisions to stay in IT.

Recommendation #6: Smaller organizations should foster a sense of stability within their women IT workforce and make sure that women have vast opportunities for career growth.

Insight #7—Being employed in an organization operating in the IT industry is beneficial for professional retention: In total, 25% of women IT employees work in an organization that is part of the IT industry, whereas others are occupied in other industries, including financial (12%), government (9%), education (8.5%), manufacturing (7%), retail (6%), etc. Women employed in the IT industry exhibit lower turnaway intention than their colleagues in other sectors of the economy.

Recommendation #7: Organizations operating outside the IT industry should prioritize the retention of their women IT workforce and proactively develop various retention policies. Most importantly, they should align the IT roles, career perspectives, workloads, and professional benefits for women IT workers with those provided by IT industry employers.

Insight #8—Higher organizational IT maturity reduces turnaway intention: There is a negative correlation ($\rho = -0.1$) between the level of organizational IT maturity (i.e., the degree to which an organization has established effective collaboration between non-IT and IT managers to optimize the utilization of available IT resources [20]) and turnaway intention. It appears that organizations with a higher level of IT maturity foster greater professional loyalty among their women IT employees.

Recommendation #8: Organizations should focus on increasing IT maturity by promoting knowledge exchange and communication between non-IT and IT managers. This approach may not only improve business-IT alignment but also help

women IT managers foster a sense of professional accomplishment and increase their retention within IT.

Insight #9—Part-time positions are associated with higher turnaway: Although only 8.6% of women work part-time, they are more likely to leave IT than those who are employed full-time.

Recommendation #9: Organizations should be proactive in transitioning qualified women professionals from part-time to full-time career tracks to improve their retention in IT.

Insight #10— Masculinity is not a barrier to women's IT careers; uncertainty avoidance hinders IT career retention, while individualism supports it: We found no evidence to support the commonly held belief that masculine culture drives women out of IT. Among Hofstede's [21] five espoused cultural dimensions [22]—power distance (the relationship between people in power and their subordinates), individualism (focusing on one's personal goals), masculinity (preference for achievement and rewards), uncertainty avoidance (intolerance of ambiguity), and long-term orientation (the connection of the past with the present and the future)—turnaway intention is positively correlated with uncertainty avoidance ($r = 0.54$) and negatively with individualism ($r = -0.50$). IT tasks are inherently challenging, unpredictable, and ambiguous. They require workers to accept a sense of constant uncertainty and change. It appears that women who cannot tolerate ambiguity are more likely to depart from their IT careers. By contrast, a tendency to focus on one's individual needs keeps women in the IT workforce.

Recommendation #10: Among their women IT workforce, organizations should instill a sense of comfort and confidence in staying in the IT profession. For this, they need to reduce uncertainty by clarifying future career pathways, promotion requirements, and performance expectations; providing job stability and long-term contracts; offering routine feedback and support; and initiating training on coping with ambiguity and change. They should also encourage individualism by emphasizing women's individual achievements and personal responsibility.

Table 1 summarizes the insights and recommendations presented above.

Final Thoughts

Women constitute a highly skilled, yet, unfortunately, underrepresented part of the IT workforce: as this study shows, their overall level of education exceeds that of men. However, they exhibit a higher turnaway rate than men, which further diminishes the limited supply of human capital in the IT sector. This study does not imply that organizations should hire and retain women over men solely because they are women. Instead, it suggests that by understanding the reasons why women IT workers leave the IT profession, IT managers and policymakers will be able to make more informed decisions when developing policies to retain women and strengthen their IT workforce. In this regard, the insights above reveal an archetype of a woman IT employee who is at the highest risk of permanently leaving the IT profession: she is employed part-time; has less education and, as a result, works in supporting and liaison roles rather than in traditional core (i.e., men-dominated) IT positions; is between 21 and 29 years old; belongs to an organization in a non-IT industry that has not reached a high level of organizational IT maturity and employs fewer than 200 people; and

Table 1. Summary of Insights and Recommendations.

#	Women's IT Turnaway Factors	Managerial Recommendations
1	The gender imbalance existing within the IT job roles.	Promote women to traditional core IT positions rather than supporting and liaison roles.
2	Young age.	Focus on retaining young women hires who generally hold their first or second IT job.
3	Lower level of education.	Support women's part-time education through scholarships, subsidies, and certifications.
4	Middle- and senior-level managerial IT positions.	Offer stress management programs, work-life balance initiatives, and flexible schedules as well as encourage shared leadership.
5	Factors unrelated to a single lay-off episode.	Emphasize the notion of resilience, job security, and confidence.
6	Small organizational size up to 200 employees.	Smaller organizations should foster a sense of stability within their women IT workforce.
7	Working in a non-IT industry.	Organizations operating outside the IT industry should pay close attention to the retention of their women IT workforce.
8	Lower level of organizational IT maturity.	Promote knowledge exchange and communication between non-IT and IT managers and improve business-IT alignment.
9	Part-time IT positions.	Proactively move qualified women IT professionals from part-time to full-time career tracks.
10	Uncertainty avoidance.	Instill women's sense of comfort and confidence in staying in the IT profession.

exhibits high uncertainty avoidance and low individualism. Women occupying middle- and senior-level managerial positions are also more likely to leave IT.

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REFERENCES

[1] S. K. White, "Women in tech statistics: The hard truths of an uphill battle," CIO, 2024. [Online]. Available: https://www.cio.com/article/201905/women-in-tech-statistics-the-hard-truths-of-an-uphill-battle.html
[2] J. C. Williams, "Hacking tech's diversity problem," *Harvard Bus. Rev.*, vol. 92, no. 10, pp. 94–100, 2014.
[3] M. Y. Vardi, "What can be done about gender diversity in computing? A lot!," *Commun. Assoc. Comput. Machinery*, vol. 58, no. 10, p. 5, 2015.
[4] P. Fatourou, Y. Papageorgiou, and V. Petousi, "Women are needed in STEM: European policies and incentives," *Commun. Assoc. Comput. Machinery*, vol. 62, no. 4, pp. 52–57, 2019.
[5] U. S. Congress, "S. 4028 - Women and Underrepresented Minorities in STEM Booster Act of 2024," 118th Congress, 2024. [Online]. Available: https://www.congress.gov/bill/118th-congress/senate-bill/4028
[6] J. L. Tims, "Achieving gender equity: ACM-W can't do it alone," *Commun. Assoc. Comput. Machinery*, vol. 61, no. 2, p. 5, 2018.
[7] C. Alvarado and E. Judson, "Using targeted conferences to recruit women into computer science," *Commun. Assoc. Comput. Machinery*, vol. 57, no. 3, pp. 70–77, 2014.
[8] S. Zweben and B. Bizot, "2019 Taulbee survey: Total undergrad CS enrollment rises again, but with fewer new majors; doctoral degree production recovers from last year's dip," *Comput. Res. News: Publication Comput. Res. Assoc.*, vol. 32, no. 5, pp. 1–63, 2020.
[9] V. Barr, "Gender diversity in computing: Are we making any progress?," *Commun. Assoc. Comput. Machinery*, vol. 60, no. 4, p. 5, 2017.
[10] A. Serenko, "The human capital management perspective on quiet quitting: Recommendations for employees, managers, and national policymakers," *J. Knowl. Manage.*, vol. 28, no. 1, pp. 27–43, 2024.
[11] A. Serenko, "The great resignation: The great knowledge exodus or the onset of the great knowledge revolution?," *J. Knowl. Manage.*, vol. 27, no. 4, pp. 1042–1055, 2023.
[12] V. K. Singh, M. Chayko, R. Inamdar, and D. Floegel, "Female librarians and male computer programmers? Gender bias in occupational images on digital media platforms," *J. Assoc. Inf. Sci. Technol.*, vol. 71, no. 11, pp. 1281–1294, 2020.
[13] J. L. Quesenberry and E. M. Trauth, "The (dis)placement of women in the IT workforce: An investigation of individual career values and organisational interventions," *Inf. Syst. J.*, vol. 22, no. 6, pp. 457–473, 2012.
[14] E. M. Trauth, J. L. Quesenberry, and H. Huang, "Retaining women in the U.S. IT workforce: Theorizing the influence of organizational factors," *Eur. J. Inf. Syst.*, vol. 18, no. 5, pp. 476–497, 2009.
[15] P. Palvia et al., "The World IT project: History, trials, tribulations, lessons, and recommendations," *Commun. Assoc. Inf. Syst.*, vol. 41, no. 18, pp. 389–413, 2017.
[16] P. Palvia, J. Ghosh, T. Jacks, A. Serenko, and A. H. Turan, Eds. *The World IT Project: Global Issues in Information Technology*. Singapore: World Sci., 2020.
[17] H. H. Harman, *Modern Factor Analysis*, 2 ed. Chicago, IL, USA: Univ. Chicago Press, 1967.
[18] J. C. Nunnally and I. H. Bernstein, *Psychometric Theory*, 3 ed. New York, NY, USA: McGraw-Hill, 1994.

[19] WomenTech, "Women in Tech Network. Women in tech stats 2024: Uncovering trends and unseen data by WomenTech Network," 2024. [Online]. Available: https://www.womentech.net/en-ca/women-in-tech-stats
[20] A. Ragowsky, P. S. Licker, and D. Gefen, "Organizational IT maturity (OITM): A measure of organizational readiness and effectiveness to obtain value from its information technology," *Inf. Syst. Manage.*, vol. 29, no. 2, pp. 148–160, 2012.
[21] G. H. Hofstede, *Culture's Consequences: International Differences in Work-Related Values*. Newbury Park, CA, USA: Sage, 1980.
[22] M. Srite and E. Karahanna, "The role of espoused national cultural values in technology acceptance," *MIS Quart.*, vol. 30, no. 3, pp. 679–704, 2006.

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