Feminization of the Information Technology Sector in Armenia: reasons and perspectives

Report

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Contents

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Abstract: This report reviews key gender issues and gender-inclusive opportunities presented in the Armenian IT arena. Even though the IT sector in Armenia is highly developed there is a lack of information about gender and IT. Existing data about gender distribution and division of labor are fragmented and scattered. This research fills the gap providing information on the transformation of the IT sector in Armenia into a more gender-inclusive environment supporting more women to be enrolled. The feminization of the IT sector in Armenia is a positive and transformative trend driven by various factors, including increasing workforce demand, supportive educational opportunities, agile management methodology, flexible work environment and gender-inclusive corporate culture. This shift from a traditionally male-dominated industry is influenced by various factors and holds promising prospects for both women entering the field and the industry.

Acronyms

AI - Artificial Intelligence

EI - Expert Interview

GAC - Gender Awareness Checklist

HR - Human Resources

ICT - Information and Communication Technologies

IT - Information Technologies

R&D - Research and Development

SSOS -Semi-structured Online Survey

STEM - Science, Technology, Engineering and Mathematics

Executive summary

This study comprehensively examines the gender landscape within Armenia's Information Technology (IT)[1] sector, spotlighting both positive shifts and areas requiring improvement. Despite the sector's high development, there exists a dearth of consolidated data on gender dynamics, hindering a clear understanding of gender distribution and labor division within the field.

This research aims to shed light on the potential of Armenia's burgeoning IT sector as a catalyst for advancing gender equality in predominantly male-dominated society. The feminization of IT, marked by increased female participation is notably influenced by factors such as workforce demand, gender neutral enrollment, supportive educational initiatives, mentorship programs, flexible work setting, agile management practices and gender-inclusive corporate cultures.

Despite positive trends, notable disparities persist: men often hold leadership positions, while women are prevalent in administrative and support roles within universities and organizations.

Motivation among students favoring IT over other STEM fields is driven by the abundance of labor market opportunities, diverse project scopes, flexible working conditions and agile management mode, career advancement and development chances, and substantially higher salaries. However, concerns arise regarding the quality of professionals entering the industry, as some lack foundational academic backgrounds, impacting their developmental prospects within companies.

A positive trend observed is the growing collaboration between universities and the IT industry, fostering a conducive environment for mutual growth. Nonetheless, reports of violence against female specialists within the IT sector highlight a significant area necessitating urgent attention. Instances of unwanted sexual comments, physical harassment, and sexual advances were reported, often resulting in self-resolution due to concerns about career implications, trust in the reporting process, or fear of retribution.

In conclusion, while Armenia's IT sector showcases promising gender-inclusive strides and collaborations, tackling gender-based social obstacles and fostering a more supportive, equitable environment remain imperative. Enhancing academic foundations, ensuring fair reporting mechanisms, and cultivating gender-inclusive workplace cultures will further empower female participation and foster a truly inclusive IT landscape in Armenia.

[1] In this research the terms IT and information and communication technologies (ICT) are not distinguished. They are considered the same.

Introduction

In the global landscape women are far less likely than men specialized in the fields related to Science, Technology, Engineering and Mathematics (STEM)[2,3,4]. Despite their foundational contributions to the tech industry, women have encountered persistent barriers throughout their careers in the IT sphere and other STEM domains[5,6]. The enduring gender-based division of labor has perpetuated the categorization of professions as either feminized or masculinized[7], further entrenching horizontal and vertical gender segregation in the labor market[8].

This disparity manifests across multifaceted dimensions, including disparities in employment opportunities, limited access to leadership roles[9], wage discrepancies[10], and the prevailing workplace perceptions[11]. Specifically, within the tech industry, women notably face stark underrepresentation in both leadership positions and technical roles[12,13].

However, an intriguing departure from these norms emerges in Armenia, where the information technology sector exhibits a notable trend toward feminization, positioning the country at the forefront of this transformative shift[14].

Problem Statement

Globally, there persists a significant gender disparity in specialization within STEM fields, with women remarkably underrepresented.

The prevailing gender distribution matrix perpetuates a systemic imbalance, positioning women as an oppressed employee group, characterized by limited vertical advancement opportunities and inequitable salaries compared to men's dominant position, resulting in higher salaries[15].

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[2] Global Gender Gap Report 2023, World Economic Forum, June 2023

[3] Global STEM Workforce https://swe.org/research/2023/global-stem-workforce/

[4] Girls' and women's education in science, technology, engineering and mathematics (STEM), UNESCO Report 2023

[5] Global Gender Gap Report 2022, World Economic Forum, July 2022

[6] Bridging The Digital Gender Divide, OECD 2018

[7] Bridging The Digital Gender Divide, OECD 2018

[8] Gender equality and women's and girls' autonomy in the digital era, UN ECLAC 2023

[9] Global Gender Gap Report 2023, World Economic Forum, June 2023

[10] World Employment and Social Outlook: Trends, International Labour Organization 2021

[11] A QUANTUM LEAP FOR GENDER EQUALITY: For a Better Future of Work For All, International Labour Organization 2019

[12] Richilene Vaz Cidrea D., Weidmanb L., "The Challenges of Integrating Women in Leadership Positions in the Technology Industry", International Journal of Innovation, Creativity and Change. www.ijicc.net Volume 15, Issue 4, 2021

[13] 2020 Women in US Technology Leadership Report, Silicon Valley Bank

[14] According to the survey conducted by the Enterprise Incubator Foundation, 62% of technical positions in the ICT sector were occupied by men and 38% by women (Enterprise Incubator Foundation. *Armenia ICT Sector: State of the Industry Report.* Yerevan, 2018). Updated statistics show it has lessened to 37% (Armstat: Employment 2021).

[15] Understanding the gender pay gap, International Labour Organization, Women in Business and Management 2019

Specifically, within the tech industry, women remain conspicuously underrepresented in both leadership positions and technical roles[16].

In contrast to the general trend, Armenia presents a unique deviation from this norm, displaying a remarkable trend toward feminization within the information technology sector. A 2018 survey of the 750 information and communication technology companies operating in Armenia found that 62% of technical specialists in those companies were men and 38% were women[17]. Recent research highlights a noteworthy statistic striking 70% of IT students at American University of Armenia are females[18]. However, this data necessitates further examination through comprehensive research encompassing higher education institutions offering IT specializations, engagement with IT organizations, and consultation with experts possessing pertinent knowledge in this domain. Such an extensive study aims to elucidate the current landscape of the IT sector in Armenia, delving into understanding causes and potential trajectories propelling its pronounced feminization.

Research design and methodology

The research design is tailored to comprehensively explore the extent and nature of women's engagement within the IT sector, employing a feminist methodology to underscore and capture the nuanced experiences of women in this rapidly evolving workspace[19].

The primary objective of this research is to delve into the developmental trajectories and gender-related challenges encountered by women in the field. The specific research objectives outlined are as follows:

- Understanding the extent of participation of female students in IT education, encompassing both formal (universities) and non-formal education;
- Assessing organizational commitment and initiatives aimed at fostering gender equality;
- Evaluating the practical approaches employed by organizations;
- Recognizing the interplay between structural frameworks and individual experiences;
- Understanding the dynamics of power within Armenian IT organizations and highlighting the adverse consequences of such differentiation;
- Exploring the awareness levels regarding instances of sexism and discerning the understanding of the harm caused by oppressive behavior among women in the workplace.

In general, this research aims to explore the developmental paths and gender-specific obstacles faced by women in the field (workplaces and educational institutions).

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[16] Richilene Vaz Cidrea D., Weidmanb L., "The Challenges of Integrating Women in Leadership Positions in the Technology Industry", International Journal of Innovation, Creativity and Change. www.ijicc.net Volume 15, Issue 4, 2021

[17] Armenia ICT Sector: State of the Industry Report, Enterprise Incubator Foundation, Yerevan, 2018

[18] Baghdasaryan V., Barseghyan G., Gender wage gap and female labor supply in Armenia, Winter Workshop in Economic Theory and Policy, Armenian Economic Association, 2018

[19] Brisola Sh., Seigard D., Sengupta S., Feminist Evaluation and Research: Theory and Practice, the Guilford Press, New York, London 2014

The research methodology entails a multifaceted approach, integrating the following elements:

- ➢ Secondary analysis of existing data pertinent to the field;
- ➢ Expert interviews and group discussions with key stakeholders;
- ➢ Gender Awareness Checklist (GAC) were completed online by the key stakeholders;
- ➢ Semi-structured Online Survey (SSOS) with women working as IT specialists and students enrolled in IT programs;
- ➢ In-depth interview was implemented to share the success story in the IT industry.

Sampling for this research involved **expert interviews (EI**) engaging 12 experts, encompassing key informants in the IT domain and professors affiliated with prominent universities renowned for their IT departments. Key informants had more than five years' expertise in the field. Additionally, two **discussion groups** were convened with HR management at PicsArt, an Armenian Unicorn[20] IT company, and another with a combined management and human resources (HR) group at Synopsys Armenia, an international company with a branch in Armenia.

Apart from the EI, a **semi-structured online survey (SSOS)** was distributed among 104 women in the IT field, including both IT professionals and students pursuing IT programs. Among these respondents, 76 were employed across more than 60 different IT companies, and 21 identified themselves as students attending 11 different universities (10 local and 1 international). A crucial requirement for survey participation among workers was being employed in the role of a software developer at any IT company. This criterion was designed to specifically focus on technical staff and eliminate the involvement of other roles such as administration, HR, or any non-technical personnel within the IT sector.

Since the female founders of the IT companies are not many, for the **in-depth interview** only 1 representative was selected, whose initiative got the most recognition worldwide and has the most social impact.

Expert interviews conducted were instrumental in providing an in-depth exploration of the primary research focus. Designed as exploratory research, these interviews engaged individuals acknowledged for their involvement, expertise, and decision-making influence within the IT field. In tandem with expert interviews, online **checklists (Gender Awareness Checklist (GAC))**

[20] A unicorn is a private startup company that has crossed the $1 billion valuation mark, within its first 10 years. The term was first used this way in 2013 by American angel investor Aileen Lee, founder of Cowboy Ventures. Unable to come up with another word to describe how rare a $1 billion startup is, she called them unicorns to drive home the point. The world has been using her term for the past nine years, during which their number has increased to more than 800.

measuring gender awareness were disseminated among previously interviewed experts, yielding comprehensive feedback. The insights gleaned from these interviews and checklists shed light on gender dynamics and division of labor within IT organizations, particularly regarding the feminization of the IT sector in Armenia.

Qualitative data obtained from semi-structured questions of the online survey was meticulously analyzed using NVivo qualitative data analysis software, allowing for a thorough examination and interpretation of the gathered insights. The quantitative portion of the data was analyzed via excel corresponding tables consistent tool.

Semi-structured online survey (SSOS) was conducted with 104 respondents comprising women in IT roles or studying in IT programs. It included open-ended questions, so that both quantitative and qualitative information could be gathered. This comprehensive approach aimed to provide a nuanced understanding of women's experience within the Armenian IT sector, shedding light on pertinent gender-related issues and dynamics in various institutions acting in IT.

An in-depth interview was implemented to delve into and share the success story in the IT industry with one of the female IT entrepreneurs. This method allowed for a comprehensive exploration of her experiences and achievements within the field.

The research was conducted from 2021 to 2023, with the most recent data updates available as of December 2023.

Historical Excurse and Current Situation

Armenia's technology sector has evolved through two pivotal developmental stages: the era under Soviet governance and the post-Soviet era of independent Armenia. In the initial phase, Armenia emerged as a prominent hub for Research and Development (R&D) and manufacturing in computer science and electronics. The seeds of this potential were sown in the 1950s with the establishment of significant R&D centers and semiconductor manufacturing plants. These establishments, operating under the Soviet Government, were principally dedicated to industrial and defense applications on a medium to large scale. Notably, many of these organizations accommodated in-house software development departments, focusing on automatic accounting and various organizational functions. Armenia has emerged as a leading force in the realm of information technology, distinguishing itself among neighboring Commonwealth of Independent States and Middle Eastern countries.

The IT industry in Armenia has appeared as one of the rapidly expanding sectors in the nation, consistently achieving an annual growth rate of over 20%[21,22]. Moreover, Armenia is swiftly becoming home to IT Unicorns[23] – enterprises valued at over $1 billion – and is anticipated to host 10 such unicorns by 2027[24].

Transitioning into the subsequent stage, the tech sector in Armenia pivoted towards outsourcing and offshore software development. This period witnessed a remarkable realization of the IT industry's potential by an increased cohort of investors, policymakers, and professionals. Armenia garnered attention as a favored destination for numerous multinational companies seeking to outsource R&D, operational functions, and software development[25]. Recognizing its significance, the Armenian Government actively declared support for the IT sector, marking it as a central priority within its economic development policies[26].
According to the statistics of the Ministry of High-Tech Industry of the Republic of Armenia, in 2020, IT sector was the fastest growing sector in Armenia: around 21% growth in industry was recorded and 3400 new specialists with IT specialization entered the labor market[27]. From automation in manufacturing to data-driven decision-making in business, the influence of ICT is evident in optimizing operations and driving productivity. It is expected that approximately 20000

[21] Information and Telecommunication Technology, Armenia - Country Commercial Guide, Official Website of the International Trade Administration 29.11.2023 https://www.trade.gov/country-commercial-guides/armenia-information-and-telecommunication-technology
[22] Armenia ICT Sector: State of the Industry Report, Enterprise Incubator Foundation, Yerevan, 2018
[23] Tumanyan V., *Role of Unicorn Startups in Developing the Country's Startup Ecosystem*, Education, Innovation, Knowledge, 2021.6
[24] Hassassian A., FemInno shines spotlight on women in tech in Armenia, CIVILNET 21 Jul, 2023 20:15
[25] Armenia ICT Sector: State of the Industry Report, Enterprise Incubator Foundation, Yerevan, 2018
[26] Armenia IT industry overview, PwC, October 2021
[27] High-tech minister presents list of most demanded professions in Armenia, ARMENPRESS, 13:10, 15 March 2021

specialists in the sector will be demanded in the coming five years. Engineering is the most demanded job of the IT sector in Armenia. The statistics are based on the information provided by nearly 150 employers in the IT sector[28].

The advancement of the IT field hinges on the active participation of corresponding educational institutions dedicated to its development. Without the support and involvement of such institutions, the realization of progress in this area would be unattainable.

The preeminent institutions for technical specializations in the field of ICT are the State Engineering University of Armenia and Yerevan State University. Additionally, several other institutions contribute to ICT education, including the American University of Armenia, the Armenian-Russian (Slavonic) University, the National University of Architecture and Construction of Armenia, and the French Higher Institute of Engineering in Armenia.
These educational establishments play a crucial role in nurturing the knowledge, skills, and expertise necessary for the sustained growth and evolution of the field. Nevertheless, universities alone cannot furnish students with adequate experience to secure positions in the industry. In response to this challenge, numerous companies actively participate in arranging specialized training courses, and internship programs for students. Hence, IT progress in Armenia is also a logical outcome of a significant shift in the dynamic between educational institutions and the IT industry. The previous lack of dialogue has transformed into a knit interchange between both parties, paving the way for mutual collaboration. This caused the launch of several IT educational centers, with a specific focus on enhancing professional skills. Among them are the most well-known ones: Microsoft Innovation Center Armenia, Armenian-Indian Center for Excellence in ICT, Innovative Solutions and Technologies Center in Armenia (ISTC), Armenian National Engineering Laboratories (ANEL), Gyumri and Vanadzor Technology Centers, Synopsys Inc. Educational Centers and Initiatives, Armenian Code Academy and others.

Aligned with formal educational institutions, centers offering non-formal education formats also have got a distinctive impact on students.

TUMO LABS - a cost-free hub for applied science and engineering serves as one of those examples bridging between higher education and industry. The program, tailored for TUMO Labs, is open to individuals aged 18 and above. The educational curriculum at TUMO Labs encompasses a combination of methods, which allows students to gain theoretical knowledge and hands-on skills in technology, applied science, and engineering[29].

In addition to numerous education institutions for adults, there are also centers offering educational opportunities to young enthusiasts in the field of IT.

[28] Source: https://edu.hti.am/
[29] Source: https://tumolabs.am/

ARMATH LABS - Being established in 2011, the Armath Engineering Laboratories started global dissemination of the Armenian model of technology education. Through interactive after-school classes young people aged 10-18 have the opportunity to conceptualize, build, test, and enhance their own creations within a secure and enjoyable environment, fostering new friendships and even sparking startup initiatives.
As of 2023, 641 engineering laboratories were operational in all Armenian regions, Georgia, Kuwait, France, USA, Bangladesh, and India. Approximately 17200 students benefit from free engineering education[30].

COAF SMART Center - integrates innovation with education for children and youth aged 6-18. This distinctive non-formal education hub guides students living in the regions of Armenia through a transformative 2-3 year-long experience focused on SMART Citizenship and STEM education. The inclusive curriculum caters to varied learning and developmental requirements, guaranteeing that individuals from diverse backgrounds derive value from transformative programs[31].

Investment Potential in Armenia's IT Sector

1. *Sustainable Growth and Contributions* - Armenia's IT industry has demonstrated consistent and robust expansion, boasting an annual rate of approximately 20%[32,33].
2. *Technology Hubs* - The nation has strategically established multiple technology hubs and innovation centers, fostering an environment conducive to technological innovation and serving as a domicile for notable IT companies[34].
3. *Highly Skilled Workforce* - Armenia boasts a proficient pool of extensively trained IT professionals. Renowned universities in the country offer top-tier technical education programs, ensuring a steady supply of skilled talent[35].
4. *Thriving Startups and Innovation* - A thriving ecosystem for startups has flourished in Armenia, witnessing a surge in tech startups and entrepreneurial initiatives, showcasing a culture of innovation and ingenuity[36].

[30] Source: https://armath.am/en/about
[31] Source: https://www.coaf.org/#
[32] Hassassian A., FemInno shines spotlight on women in tech in Armenia, CIVILNET 21 Jul, 2023 20:15
[33] High-tech minister presents list of most demanded professions in Armenia, ARMENPRESS, 13:10, 15 March 2021
[34] In 2020, Forbes referred to Armenia as the world's next tech hub! https://armenia.travel/about-armenia/tech-innovations/
[35] Avetisyan A., IT education centers in Armenia: Starting IT career in Armenia, July 26, 2022 https://intech.am/it-education-in-armenia/
[36] Successful Startups from Armenia to Watch for in 2023 and Beyond: Driving Innovation and Redefining the Future Together, 10 Aug 2023 https://volo.global/blog/news/successful-startups-from-armenia

5. *Governmental Backing* - The Armenian Government has demonstrated proactive measures in bolstering the growth and sustenance of the IT industry, exhibiting a supportive stance towards fostering technological advancements[37,38].
6. *International Acclaim and Expertise* - Armenian IT entities and professionals have garnered commendable international recognition for their exceptional expertise and pioneering solutions. Their contributions have been acknowledged globally, further solidifying Armenia's reputation as a hub for technological proficiency and inventive solutions within the global market[39,40].

Investing in Armenia's IT sector presents an opportunity to tap into a burgeoning industry backed by a skilled workforce, conducive environment, and government support, thereby offering promising prospects for substantial returns and long-term growth[41].

Despite this entire supporting environment for Armenian IT industry, global and regional factors have yet huge influence on that sphere:

- The impact of the COVID-19 pandemic on the IT sector has been noteworthy globally, including in Armenia. The pandemic brought about significant changes, challenges, and opportunities for the IT industry. Led by COVID-19 related challenges, the crisis sparkled **innovation in the IT sector**. The pandemic accelerated the need for **digital transformation** across various sectors. Despite disruptions, the IT industry demonstrated complete resilience by quickly adjusting to the new normal. With lockdowns and social distancing measures, the IT sector rapidly transferred to **remote work** setups. Basically, the IT industry stood out as exceptional, being the only one that experienced minimal damage from the COVID-19 pandemic. Moreover, it has even gained advantages as a significant portion of the working procedures shifted to the digital domain using ample of tools offered by the IT industry.
- The war escalated during 2020-2023[42,43,44,45] significantly affected Armenia's workforce, potentially drawing many individuals, particularly those impacted by the conflict, into the

[37] Women in Tech, IT is Armenia https://itis.am/womenintech/eng
[38] High-tech minister presents list of most demanded professions in Armenia, ARMENPRESS, 13:10, 15 March 2021
[39] Armenia IT industry overview, PwC, October 2021
[40] Setrakian L., In Armenia's biotech boom, remarkable women are leading the way, 05-30-2022
[41] Armenia IT industry overview, PwC, October 2021
[42] Armenia-Azerbaijan conflict: Azerbaijan president vows to fight on https://www.bbc.com/news/world-europe-54356334
[43] Azerbaijan resumes attacks on Armenia, as Russian military alliance announces fact-finding mission, 14 Sep, 2022 https://www.civilnet.am/en/news/674553/azerbaijan-resumes-attacks-on-armenia-as-russian-military-alliance-announces-fact-finding-mission/
[44] From blockade to war: The ethnic cleansing of the Armenians of Nagorno-Karabakh, December 12, 2023
[45] Lemkin Institute Statement on Self-Determination of Armenians in Artsakh (South Caucasus). There is no "Peace" or "Prosperity" through Genocide, Released 24 November 2022

IT sector[46]. The war clearly showed the development of IT in Armenia is overestimated – there were no technologies and Armenia lost. Whatever technology is created in Armenia is later **outsourced** and is not used in the country. And it is not about the mental capital, there are plenty of talented and decent IT professionals. It is just about the resources of the country to become a customer, be able to make an order and use the created software. Hence, the war highlighted gaps in the country's IT ecosystem, emphasizing the need for significant **structural changes**, a responsibility that extends beyond just universities to government initiatives. However, benefits anticipated for the State not only by paid taxes, which are standard practices in the IT sector, but also by the new level of collaboration of certain IT organizations for more meaningful and valuable input to the State beyond financial transactions.

The war significantly impacted **productivity** as people struggled to concentrate for over a month. However, a noteworthy response emerged, with individuals going to the front, prompting a collective determination to maintain work standards. Those staying in the workplace took on additional responsibilities in the absence of team members, who went to the border to defend the country. That reflects a **shared commitment** among employees to contribute financially and invest as a way of support in the broader protection effort.

The uncertainties created by external factors such as the COVID-19 pandemic and the war prompted a general trend of considering opportunities to work abroad, potentially involving remote work and relocation. This trend points to instances where employees have expressed plans to relocate, indicating a response to the challenges posed by these external events.

[46] "University-Private Sector Cooperation for Training Specialists" project, Ministry of High-Tech Industry of the Republic of Armenia https://hightech.gov.am/en/cragrer/cragrer/masnagetneri-patrastman-bowh-masnavor-hatvac-hamagorcakcutyun-cragir

Causes for Feminization of the IT Sphere in Armenia

In spite of the significant impact wielded by global and regional factors on this sector the extensive supporting factors are in place for the Armenian IT industry to be broadly developed. This speedy advancement in Armenian ICT profoundly influences various societal dimensions reshaping existing values, especially among newer generations[47]. As technology continues to advance at an accelerated pace, it acts as a catalyst for transformation across various social constructs, fostering innovation and altering the way people perceive and engage with their life and find solutions to their issues.

The IT industry in Armenia has the potential to help individuals overcome unfavorable labor conditions[48] despite their gender. This is not the only reason for the rising rate of female IT specialists in Armenia. As reported by different studies, approximately 37% of individuals currently employed in Armenia's technology sector are women, a notable figure when compared to the global average of 20%[49,50].

Relying on the results of this research, the influencing factors on the growing representation of women in the Armenian IT sphere can be outlined as follows:

- **Supportive educational opportunities**
- **Increasing workforce demand**
- **Flexible work environment**
- **Agile management methodology**
- **Gender-inclusive corporate culture**

Supportive educational opportunities

Essential Preconditions and Learning Opportunities in the IT Industry

With the advent of more supportive educational opportunities and a notable reduction of stereotype pressure on female students to study STEM, an increasing number of women are now opting for careers in IT. The expanding landscape of inclusive educational programs is empowering women to explore and excel in IT fields, breaking down traditional barriers that may have hindered their participation in the past.

Noticeably, opportunities for learning are deemed equitable for all aspiring individuals, irrespective of gender. *"There is no difference and discrimination in terms of professional development and education prospects, all is accessible for both women and men" (EI).* Access to

[47] NATIONAL REPORT ON CAREER GUIDANCE ARMENIA 2021 https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/genericdocument/wcms_835225.pdf

[48] The Impact of the Coronavirus Pandemic on the Labor Market in Armenia

[49] Melkumyan R., Women in Tech: Not Enough, Not Yet, EVN MAGAZINE Jul 11, 2022

[50] High-tech minister presents list of most demanded professions in Armenia, ARMENPRESS, 13:10, 15 March 2021

formal and non-formal educational avenues is considered open to anyone interested in entering the IT field. The sentiment shared by many expert interviewees emphasizes the impartiality in educational opportunities: *"All doors are open, regardless of whether one pursues education through universities, private training, or self-education" (EI).*

Interestingly, universities are perceived to lag behind in providing practical knowledge compared to specialized training centers. These centers, tailored to the needs of the industry, impart more practical and relevant skills. Collaborations between IT companies and these training centers prove pivotal, often becoming the gateway for individuals to secure employment. Graduates from prestigious university programs might still seek internships or training from these centers to align their skills with industry needs, demonstrating the industry's investment in shaping competent IT professionals.

However, there is a pertinent concern highlighted by university representatives regarding the haste in entering the job market. The absence of a solid foundation in fundamental subjects like mathematics adversely affects individuals' performance in the industry. While prominent companies prefer candidates from IT-related faculties, there is a substantial number that overlooks this criterion. Individuals completing short-term IT courses might secure initial positions but often encounter developmental challenges due to the absence of a comprehensive academic background.

The flexibility of both online and offline modes, coupled with the relatively short duration of these training opportunities[51], enhances their applicability and attractiveness, particularly for women. This adaptability allows women to integrate learning into their schedules, accommodating various demands of home chores and childcare. Additionally, the condensed timeframe may be particularly advantageous for those managing multiple responsibilities, providing a more feasible option for skill development without significant time commitments. As a result, these training programs become a more accessible and enticing avenue for women seeking to enhance their knowledge and skills in IT domains.

[51] Training programs in IT specializations typically span 2 to 6 months, with the duration varying based on the specific field and/or chosen programming languages.

Chart 1.1.

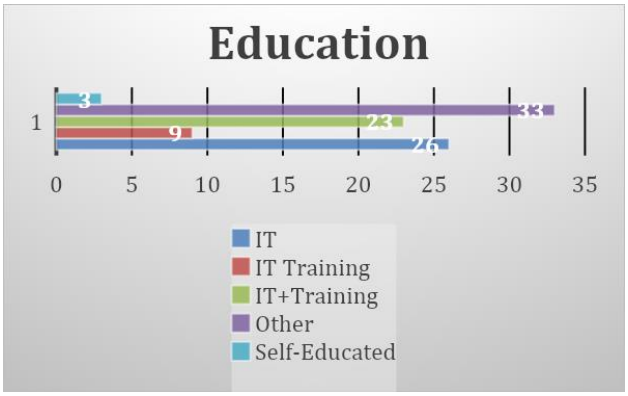
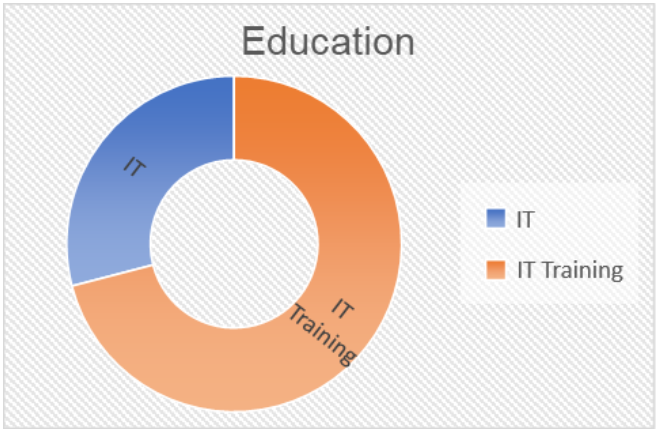


Chart 1.1 reflects the educational backgrounds of participants in the semi-structured online survey (SSOS). 3 respondents indicated that they engaged in self-education to specialize in IT. 23 participants mentioned had been pursuing IT training concurrently with their formal IT studies at universities. 33 individuals had an academic background in other disciplines and sought IT training to acquire a new specialization, facilitating a shift in their career direction towards the IT field. Out of the respondents, 9 underwent IT training, while only 26 were content solely with academic courses in IT.

Chart 1.2.



This study also depicts the general trend of educational preferences. *Chart 1.2* illustrates that IT training played a more significant role in supporting women to become specialists compared to academic courses (SSOS). This observation strongly aligns with the insights shared by numerous key informants within the IT industry (EI). Regardless of whether they are in a formal or non-formal format, all educational options offer the opportunity to enter the labor market and achieve self-realization. This is particularly crucial given the gender disparities present in the Armenian labor market[52,53,54]. Another important factor is their welcoming environment and inclusive atmosphere or at least neutral setting in those educational institutions, which promote participation of women in traditionally male-dominated fields of study. *"If a person wants to enter this field, all doors are open. Even if the university doesn't let them*[55]*, they can take private training. If that doesn't work*

[52] Women's labor force participation is lower than that of men, with just over half (51.4%) of women of working age participating in the labor force, compared with 70.6% of men. Source: *Armenia: Country Gender Assessment*, Asian Development Bank, Manila, 2019

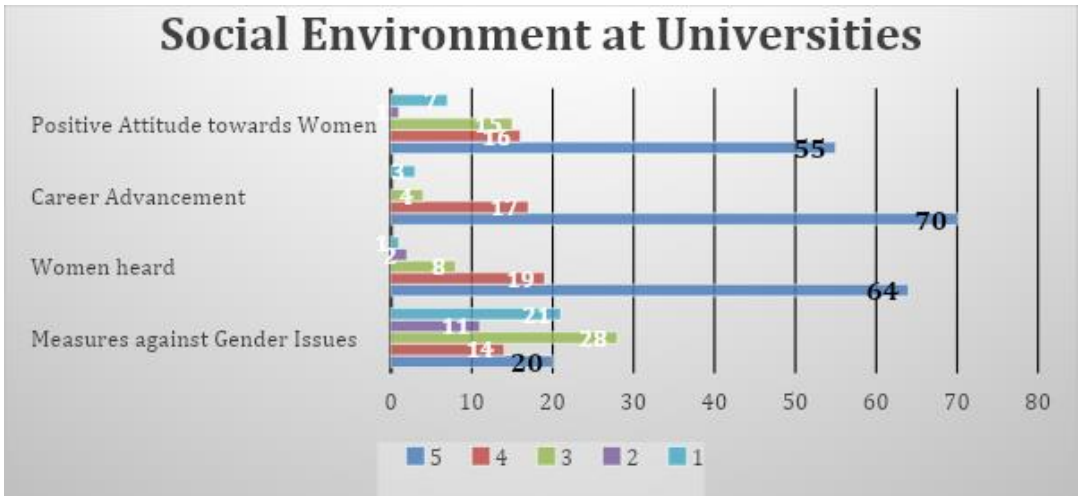
[53] The unequal distribution of labor based on gender in society, coupled with the predominant responsibility of women in performing the majority of unpaid care work (3 times more than men), has been recognized as a fundamental factor contributing to women's limited economic activity in Armenia.

[54] In addition, there is also a gender pay gap practiced in Armenia. Source: United Nations Entity for Gender Equality and the Empowerment of Women and Statistical Committee of the Republic of Armenia, *Analysis of the gender pay gap and gender inequality in the labor market in Armenia*, UN Women, Yerevan, 2020

[55] The requirements to enter any university in Armenia are the official tests and exams taken and as a result got sufficient marks.

out, they can do self-education, completely accessible to do all that... I wouldn't differentiate between women and men, girls and boys in this matter, how to enter this field - through the same path, through the same door" (EI).

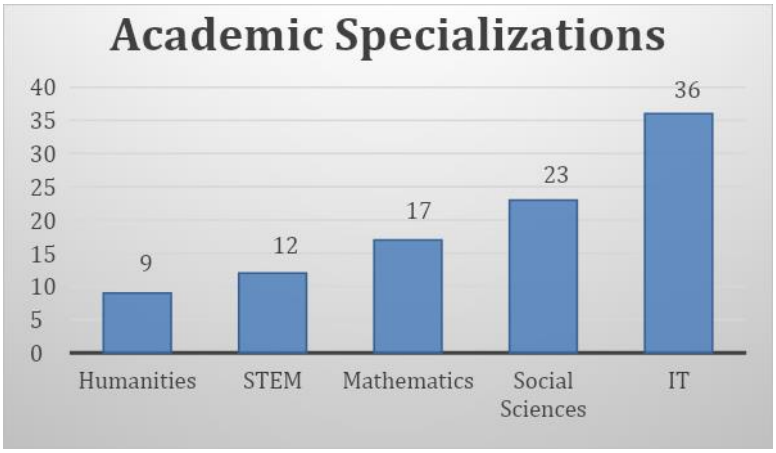
Chart 2.



In *Chart 2* is shown 55 (52,9%) respondents of the SSOS absolutely agreed there was a positive attitude towards women in their faculties. According to 70 (67,3%) participants in their faculties, women and men had equal opportunities for career advancement. 64 (61,5%) women thought in their faculties, women were always heard when they shared their opinions and views. Only 20 (19,2%) absolutely agreed that the universities had developed certain measures for neutralizing and solving gender issues in their programs.

Worth mentioning that not all the respondents had a STEM background. Over 30% of them were representatives of other disciplines. Therefore, the information provided above does not exclusively reflect the atmosphere of STEM faculties alone.

Chart 3.



In *Chart 3* the academic specializations of the respondents are mentioned. The least number of respondents were from Humanities with 9 (8.6%) of answers. The STEM professions were just a bit higher than Humanities (12 or 11%). The count for Mathematics was made separately from STEM because among the other STEM academic disciplines math is the closest and most needed for IT. Thus, 17 (16%) of respondents

had a math background. Surprisingly, women from Social Science disciplines were the second highest among the online survey participants (23 or 22%). 36 (34,4%) of respondents preferred to become IT specialists, since the beginning they had a clear picture of their profession. The rest of 8 (7,6%) did not give any answer to this question. Important to note that the primary requirement for participating in the SSOS was that all working respondents had to be actively involved in software development processes. This criterion aimed to specifically target technical staff and exclude the participation of other roles like administration, HR, or any non-technical personnel working in IT.

As educational institutions actively promote gender inclusivity in STEM disciplines *or at least do not make hindrances* (EI), a cultural shift is underway. This change is fostering an environment where young women feel encouraged and empowered to pursue IT careers, aligning with the global trend of recognizing the importance of diverse perspectives in technology-driven fields. This shift signifies not only a change in individual career choices but also a broader societal transformation.

Evolution of Female Representation in IT Studies: Past Trends and Current Landscape

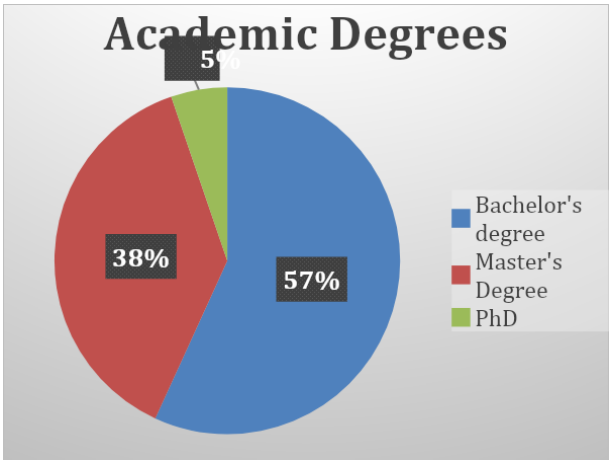
In the past, the IT domain was predominantly characterized by a male-dominated student body. However, recent years have witnessed a discernible evolution in this pattern, with an increasing proportion of female students choosing to pursue education and careers in IT. *"Even in specialized programs like the Robotics master's program, where historically there were no female students, the current enrollment includes 30% marking an unprecedented shift" (EI).* This transformation is indicative of the breaking down of traditional gender stereotypes and barriers that may have once deterred women from entering this field.

"Previously, the representation of female students in IT was relatively lower. The percentage of female students in IT programs usually hovered around 10%-15%, maximum 20% reflecting a smaller portion of the overall student body. However, the current landscape portrays a significant change, with an obvious increase in the presence of female students within IT disciplines. Presently, the statistics indicate a rise, with approximately 40% of students in IT programs being female" (EI). In the American University of Armenia, it even reached to 70%[56]. However, the rationale behind this data provides an explanation for introducing the requirement of proven English language proficiency for entering the American University of Armenia - a skill that is not typically anticipated from male students since *"they are more in STEM rather than in humanities" (EI).*

[56] Baghdasaryan V., Barseghyan G., Gender wage gap and female labor supply in Armenia, Winter Workshop in Economic Theory and Policy, Armenian Economic Association, 2018

The decline in the number of male students is occasionally linked to mandatory military service[57]. Observations note a perception that girls' diligence yields success while boys might display lower motivation, partly influenced by the impending mandatory military service obligation. Consequently, there is a trend where more females tend to enroll, especially in master's courses, as male students are required to fulfill military service obligations. Meanwhile, in the context of the Ph.D. program in IT, out of 6 applicants, only 1 is a female candidate (EI).

Chart 4.



As per the SSOS results, participants were either employed or engaged in studies at the time of the research. A majority of respondents, 78, reported having already graduated, while 5 indicated that they were not currently studying at a university. The distribution of educational qualifications showed that 57% held bachelor's degrees, 38% held master's degrees, and a minority of 5% possessed Ph.D.s (*Chart 4)*. Notably, among those with Ph.D.s, one was in Social Science, and the remainder were evenly distributed between STEM and IT[58] fields.

These figures prove the hustle of the specialists once becoming employed rarely look back for the continuation of the formal education. This can be explained with enticement by the prospect of earning income. Besides, pursuing a Ph.D. becomes more challenging for women, as men often opt for it as a means to avoid mandatory military service.

A further modification in educational environments was associated with experiences of studying abroad in international academic settings. Previously, obtaining international education abroad was predominantly pursued by male Armenian students. However, the paradigm has evolved, with an increasing number of female students opting for overseas studies. This shift signifies a departure from prior constraints, such as parental approval concerns and the dissipation of security apprehensions and gender differentiation between sons and daughters.

In essence, the confluence of supportive educational initiatives and the removal of constraints for female students is not only expanding career options but also laying the foundation for a more inclusive and dynamic IT sector. This positive trend bodes well for the continued growth and

[57] Armenia has compulsory 2-year military service for youth from the age of 18 to 27, with reserves up to the age of 35. It is the obligation of every male citizen to serve in the military in one form or another, utilizing talents or developing them for the benefit of the country. In case they study at state universities, the service can be postponed until they graduate.

[58] IT was separately counted to emphasize the intention of the selection of IT specialization.

innovation within the industry, driven by the diverse talents and perspectives of both men and women.

Gender Dynamics in Academic Settings: Insights from Interviews

Despite the significant changes in the proportion of women in different aspects of STEM education, an uneven gender distribution persists in academic positions among university staff.

- The faculty composition predominantly features male programming professors, with minimal female representation, and almost quarter female presence in the math department compared with male.
- In terms of administrative positions, men hold most of the leadership positions in departments and the dean roles, while women primarily occupy deputy and supportive organizational roles.

The outcomes gleaned from interviews conducted with key informants from universities and educational centers revealed several noteworthy insights:

Gender Dynamics: The prevailing sentiment among the informants suggested a shifting landscape in gender representation within educational institutions. There appears to be a gradual increase in female enrollment and participation in traditionally male-dominated fields, including STEM disciplines.

Equal Access to Education: Informants highlighted efforts aimed at ensuring equitable access to education across genders. Programs and initiatives promoting gender-inclusive education have been implemented, striving to eliminate disparities in educational opportunities.

Emergence of Female Role Models: Female faculty members and leaders within educational institutions are increasingly viewed as influential role models, inspiring and guiding female students to pursue and excel in diverse academic domains, including technology-related fields.

Addressing Gender Disparities: Efforts to address gender disparities encompass a multifaceted approach, integrating policies, mentorship programs, and awareness campaigns within the academic environment. These endeavors aim to foster an inclusive and supportive ecosystem for female students and educators.

In summary, despite the low representation of women in STEM faculties of the Armenian universities, especially in high positions, noticeable transformation in the proportion of female students in IT is obvious. This highlights a positive shift towards inclusivity, breaking down gender barriers and creating a more diverse and dynamic educational landscape that aligns with the evolving needs of the industry.

Generally, the decrease in restrictions reflects a commitment to equality and diversity, acknowledging the inherent potential within the female workforce. By dismantling barriers that may have previously limited opportunities, there is a growing recognition of the valuable contributions that women can make in shaping the future of the IT industry.

Increasing workforce demand

Relevance over Credentials: Professional Competence as the Decisive Factor in IT Employment

The scarcity of adept personnel poses a significant challenge for IT industry employers presently. That shortage of available talent in the market often leads more employers to prioritize capabilities over academic qualifications in the IT sector. Proficiency in executing job responsibilities takes precedence over possessing a specific academic background or a higher education diploma in an IT-related field. Consequently, professional development and educational opportunities remain equally accessible to both genders, fostering an environment free of discrimination or bias.

Within this context, female IT specialists are viewed on equal footing with their male counterparts. *"We operate without gender-based distinctions; competence is the sole benchmark for any role. Our organization rigorously upholds this principle, fostering an environment devoid of gender-related biases within our teams" (EI).*

The workforce demand is so high that a notable portion of third-grade students, over 70%, already engage in work opportunities. Lecturers strive to encourage students to maintain their focus on studies, with some students even receiving scholarships and invitations to participate in research programs within university laboratories (EI).

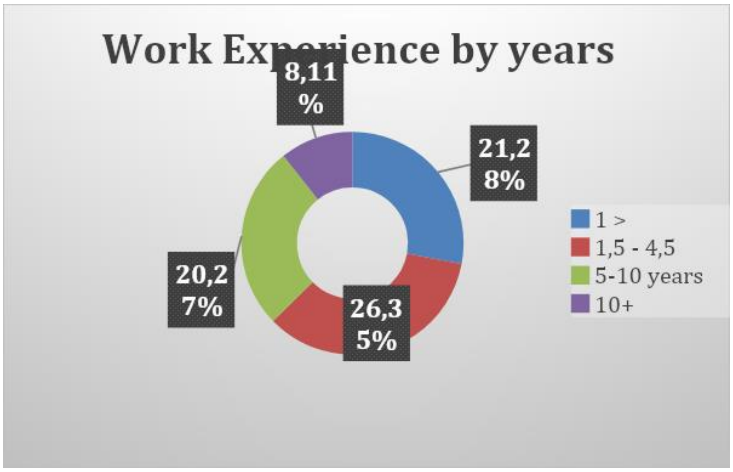
The IT employers use various strategies to entice professionals to join their companies, offering different benefit packages such as health insurances, sport club memberships, vacation in overseas resorts and more. Moreover, the dynamic work pace and prospects for both personal and professional growth including studying opportunities abroad[59], serve as additional incentives for individuals opting for a career as an IT specialist. All those flattering conditions increase interest in the IT industry.

The enhanced need for proficient and trustworthy personnel explains the remarkable transformation of demographic composition of people entering the IT industry. This shift reflects a departure from previous trends, indicating a changing landscape and a more inclusive environment within tech production. In fact, the representation of women in the IT sector has undergone a notable shift in recent years, marked by a considerable increase in numbers.

[59] Many of the personnel of especially international IT companies get the opportunity to travel and attend various qualification improvement sessions, workshops, and other means of professional development in different branches of the same company.

Comparatively, five years ago, the presence of women in this domain has approximately doubled (EI). This growth is evident in the current proportion, where females now account for around 40%[60], up from a meager 20% previously. The average age within the industry has also notably decreased to around 25 years, indicating a younger workforce, with some professionals even as young as 20-22 years old (EI).

Chart 5.



Out of the 104 participants in the SSOS, 76 provided affirmative responses regarding their employment status, while the remaining 29 indicated that they were unemployed during the response period (SSOS). In fact, among the 29 individuals, 21 specified that they were students enrolled in various local and international universities.

The subsequent chart (*Chart 5*) details the work experience of the respondents. A significant portion of them had accumulated 1.5 to 4.5 years of experience in the IT field (26 individuals). Interns and those with less than 1 year of experience were nearly equal in number to those with 5 to 10 years of experience (21/20). Only eight participants reported having more than 10 years of experience in IT. This data suggests that the number of women IT specialists has increased by approximately **2.5 to 3 times** over the past decade.

The enrolment of a skillful and dedicated workforce, combined with investments in training and resources for preparation of new personnel, enhances the chances of having a loyal and committed staff. Such staff becomes a valuable asset in achieving long-term organizational goals. Employees who feel a sense of loyalty are more likely to stay with the company, reducing turnover costs and fostering a stable and experienced workforce. Moreover, a committed staff tends to be more productive, innovative, and collaborative, contributing positively to the organization's culture and overall success.

According to many experts, devotion and trustworthiness emerge as significant attributes valued in female workers. Employers note a perceived higher level of commitment and loyalty among female employees, observing that they tend to exhibit greater allegiance to their roles compared to their male counterparts. These characteristics further contribute to the preference for female IT specialists in certain workplaces (EI).

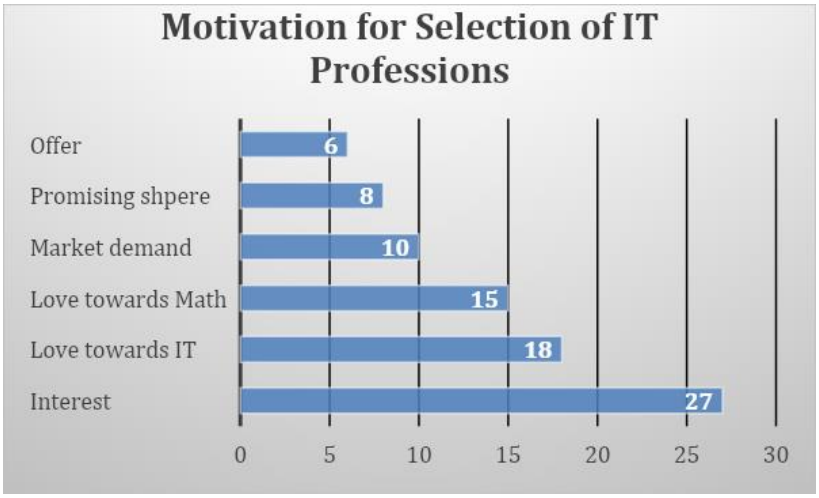
[60] Armenia IT industry overview, PwC, October 2021

Flexible work environment

The primary motivation behind students favoring IT over other STEM disciplines often revolves around the extensive array of opportunities presented by the labor market. The swift entry into employment, coupled with the diverse spectrum of IT projects available, makes it an attractive field. Virtually all contemporary projects involve an IT component, thereby expanding the industry's scope across various interests. Furthermore, the significantly higher remuneration in IT compared to other STEM fields and additional incentives mentioned above act as a weighty motivator for many.

However, the appeal of the IT sector for women extends beyond its attractive financial rewards, encompassing a work environment that is both accommodating and adaptable. Basically, the remuneration is not usually the first thing motivating female employees in Armenia for work[61]. Even having higher achievements in education, they are not used to translate the intellectual capital into the economic one[62]. Here again gender restrictions and stereotypes still work.

Chart 6.



According to 27 of SSOS respondents, their primary motivation for choosing IT was their genuine interest in the field, followed by a passion for IT (18) and mathematics (15) (*Chart 6*). Subsequently, 10 respondents believed there was a high market demand for IT

[61] Research conducted by the World Bank, (World Bank, *Republic of Armenia Leveling the STEM Playing Field for Women: Differences in Opportunity and Outcomes in Fields of Study and the Labor Market,* Washington, DC, 2017) revealed that women tend to choose careers that correspond with their gender role allowing them to carry out domestic work. The research presented the characteristics of the "ideal job for a woman" based on the answers of the female respondents. It turned out that women prefer jobs which:

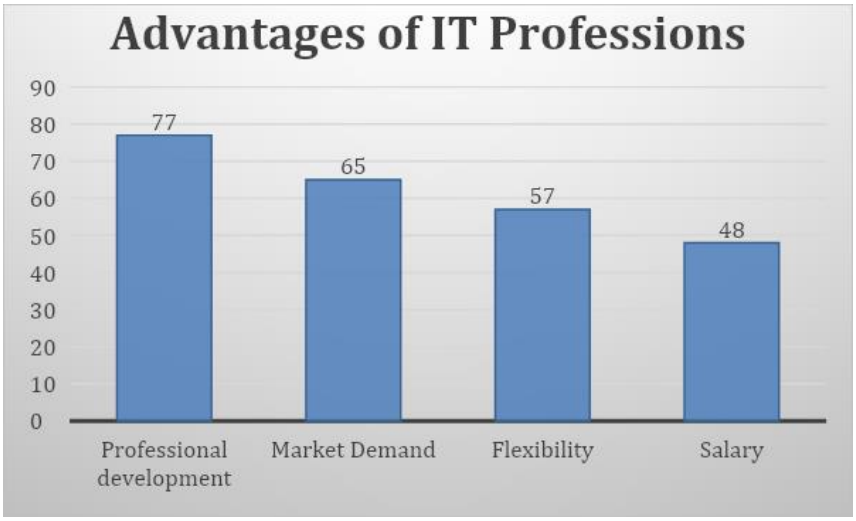
- do not require long working hours or frequent business trips which can result in long absence from home, family, children, and husband;
- have a female-dominated environment, in order not to provoke husbands' jealousy and family conflicts;
- have lower salary in order not to provoke competition with the husband, who is supposed to be the breadwinner of the family.

[62] Women are more likely than men to obtain university degrees in Armenia. In 2019, women received 72% of master's degrees compared to 28% received by men, which is more than twice as many. However, women's high level of educational attainment has not yielded corresponding gains in the labor market. Source: *Country gender profile Armenia*, EU4Gender Equality: Reform Help Desk, European Union, NIRAS, August 2021
Source: USAID/*Armenia Gender Analysis Report*, Banyan Global, Washington, August 2019

professions, while 8 perceived the IT industry as promising, and 6 received offers to enter the field.

The presence of a flexible work environment within the IT industry serves as a compelling factor that attracts women to pursue careers in this field. The compliance of various work arrangements creates an environment where women feel comfortable to balance their personal and professional lives effectively. This flexibility not only enhances job satisfaction but also contributes to a more inclusive and diverse workforce in the IT sector, fostering an atmosphere that values individual needs and promotes equal opportunities for all.

Chart 7.



The dynamic nature of the technological landscape necessitates a commitment to staying abreast of the latest advancements. Women in IT express a keen interest in organizations that actively foster an environment conducive to ongoing learning and professional development. Following the SSOS responses, 77 of them find advantageous professional development coupled with cognitive development opportunities, creativity, discovery, innovation, and a genuine interest and passion for creating new technology (*Chart 7*). This aligns with the industry's rapid evolution, where the acquisition of new skills is not just a one-time endeavor but a continuous process. The emphasis on ongoing skill development emerges in the package of crucial factors attracting women to the IT domain. The digital era demands a diverse set of skills, and women are more likely to be engaged in IT roles when they perceive a commitment from employers to help them cultivate and enhance their skill sets. Organizations that invest in training programs, mentorship initiatives, and skill-building workshops create an environment that encourages women to thrive and contribute meaningfully to the IT sector.

The next favorable factor influencing the choice of an IT profession is market demand. This aligns with the relevance of the profession, its novelty, and the prospects for career advancement. 65 SSOS participants believe that the demand in the industry will alleviate challenges in securing suitable employment and facilitate self-realization in the labor market. This suggests that perceiving the field's demand contributes to a more optimistic outlook on career opportunities and professional fulfillment.

For 48 respondents, the prospect of a relatively high salary within the IT industry stands out as a key factor that adds to the appeal of pursuing a career in this field. This underscores the significance of competitive remuneration in attracting individuals to the IT profession, emphasizing its role as a motivating factor for those considering entry into the industry. The recognition of a robust salary as an attractive aspect suggests its influential impact on women weighing their career choices. This observation also contributes to challenging a gender-related stereotype, as it implies a shift where women, traditionally seen as caregivers, are actively pursuing roles as breadwinners. The desire for financial independence and control over economic aspects of their lives is evident, reflecting a changing dynamic and breaking down traditional gender roles within the workforce. This attitudinal shift showcases the evolving perspectives and aspirations of women in the IT sector.

Offering flexible schedules, remote work options, and a dedication to creating a positive workspace with supportive management and healthy teams, the industry attracts female individuals towards specializing in IT. A total of 57 participants highlighted the flexibility of the work environment as a noteworthy advantage. This underscores the importance of an equal and egalitarian atmosphere and a comfortable work setting that allows for adaptability, potentially accommodating varied schedules and fostering an environment conducive to a balance between professional and personal life. The emphasis on flexibility suggests that this aspect contributes positively to the appeal of pursuing a career in the IT field.

Chances of continual learning opportunities, ongoing skill development, and overall flexible work arrangements as the main factors inclining women to be engaged in IT were also emphasized by the key informants. The ability to balance professional responsibilities with personal commitments is a key consideration for women in the workforce (EI). IT companies that prioritize flexible work schedules, remote work options, and family-friendly policies are more likely to foster an inclusive environment, ultimately promoting gender diversity in the industry. According to SSOS respondents, the highest agreement was about caregiving responsibilities, with 65 respondents acknowledging supervisor support for these duties (*Chart 8*). Hence, the provision of flexible work arrangements emerges as one of the pivotal factors in attracting and retaining women to IT roles.

Agile management methodology

Agile management methodology in IT represents a dynamic and iterative approach to project management and software development that prioritizes flexibility, collaboration, and responsiveness to change. Originating from the Agile Manifesto[63], this methodology values individuals and interactions, working solutions, and customer collaboration over rigid processes and comprehensive documentation. The key principles of Agile include embracing change,

[63] Manifesto for Agile Software Development https://agilemanifesto.org/

delivering working solutions frequently, and fostering collaboration between cross-functional teams. While working closely with stakeholders, those teams frequently reassess priorities to ensure that the end product aligns with the client's needs. This emphasis on individuals and interactions underlines the importance of open communication, sharing ideas, and work collaboration among team members. It helps to build a cohesive team that can quickly respond to challenges and changes in project requirements. Additionally, a proclivity toward teamwork and adeptness in integrating into a team are highly regarded.

Agile management requirements place a premium on communication skills, purposefulness and a growth-oriented mindset. Embracing a willingness to experiment, learn from mistakes, and consistently adapt to new approaches is vital. Given the rapid evolution of technologies, stagnation leads to obsolescence. Those willing to explore and innovate tend to thrive. This mindset, regardless of gender, is often cited as a key attribute for success by most key informants (EI).

Agile leadership is about creating high-proficient teams out of separate individuals. It requires constant development, communication, bottom-up approach, farsightedness, flexibility, adaptation, accountability. It adopted 3 principles: created environment for excellence, decentralized decision-making, supported growth of people[64].

Considering the information mentioned above, it can be claimed that in the realm of IT, the role of a software developer is not the exclusive path. This underscores the egalitarian nature prevalent in the industry, where each individual's role holds significance and is duly appreciated within the team structure. This can be explained with non-vertical subordination but rather with an equal relationship where every specialist is valued and is considered an important chain of the work procedure. In such an organizational framework, there is a departure from traditional top-down structures, and a more collaborative and inclusive approach is embraced. Within this context, the emphasis is on fostering a sense of equality and mutual respect among specialists. Each team member is valued not based on a hierarchical position but for their unique contributions and expertise. This approach tends to promote a more engaged and empowered workforce, as individuals feel acknowledged for their skills and are motivated to actively involve themselves in daily discussions and exchange knowledge.

Hence, the departure from a vertical chain of command to a more horizontal and collaborative structure often results in enhanced creativity, innovation, and a sense of ownership among specialists. It fosters an environment where individuals are motivated to contribute their best, knowing that their input is valued and plays a crucial role in the overall success of the work procedure. This approach not only promotes a more inclusive and collaborative environment but also has the potential to elevate the overall efficiency and effectiveness of the work measures.

[64] Source: https://www.ckju.net/en/dossier/agile-all-principles-agility-agile-leadership-and-how-be-agile-leader

Gender-inclusive corporate culture

Qualities Attributed to Women in IT

The IT domain encompasses numerous specializations, and in several of them, women often exhibit substantial prowess, particularly in functions emphasizing timely delivery and reception. Most of the key informants claim it is far easier with female workers because they always accomplish the tasks in a decided deadline. *"I've never seen a female worker who would avoid or postpone the task" (EI).* Some interviewees explain it with the fact that for female specialists, it is a matter of proving that they are definitely not inferior in IT.

Roles entailing direct client interaction, effective communication, understanding client needs, and ensuring robust client relationships often see a higher representation of female employees. *"Girls find it effortless to communicate and handle organizational tasks with various teams, whether familiar or unfamiliar. In the IT sector, particularly, girls communicate openly and calmly, effectively driving progress. If they were boys, progress wouldn't be as swift, as boys, especially in Armenia, tend to be a bit challenging and make things more complicated." (EI).*

Experts highlighted a distinct pattern: women specialists predominantly occupy communication, product owner, quality assurance, project manager, designer roles, as well as HR and admin roles. Some believe that women excel in these areas, fostering smoother operations (EI), while men tend to specialize in software developing positions. *The IT field has many other specializations, in which women are often far ahead of men (EI).*

Many key informants underscored that success in the IT realm transcends merely creating quality products; it necessitates being first, which inherently demands speed. This pursuit of primacy requires traits like flexibility, quick orientation, and adept problem-solving capabilities to swiftly navigate challenges. Beyond technical expertise, several prerequisites stand out as vital in this industry: unwavering motivation, diligent work ethic, dedication, and a genuine passion for the work - an attribute often associated with women. *"I honestly think that our technical women are quite strong" (EI).*

Experts lauded the work ethics of women specialists, citing traits such as responsibility, accuracy, problem-solving capabilities, discipline, and adaptability as invaluable contributions to organizational success. Soft skills, deemed notably common among women, emerge as a pivotal component alongside professional knowledge.

Additionally, a quality highly esteemed in female employees is their resolute determination. Despite facing challenges such as spending significant time commuting daily, some choose to work remotely. However, many of them actively opt to immerse themselves in the corporate environment, expressing a desire to be an integral part of the organizational culture. This

dedication is particularly evident in specialists who originate from regions in Armenia grappling with various challenges, highlighting their exceptional resolve and purposefulness (EI).

Women in IT roles bring invaluable perspectives and skills to the field. Their presence enhances diversity, fostering a collaborative and innovative environment. Their attention to detail, problem-solving abilities, and communication skills contribute essentially to the industry's success (EI).

Empowering Diversity: Women's Impact in the IT Roles

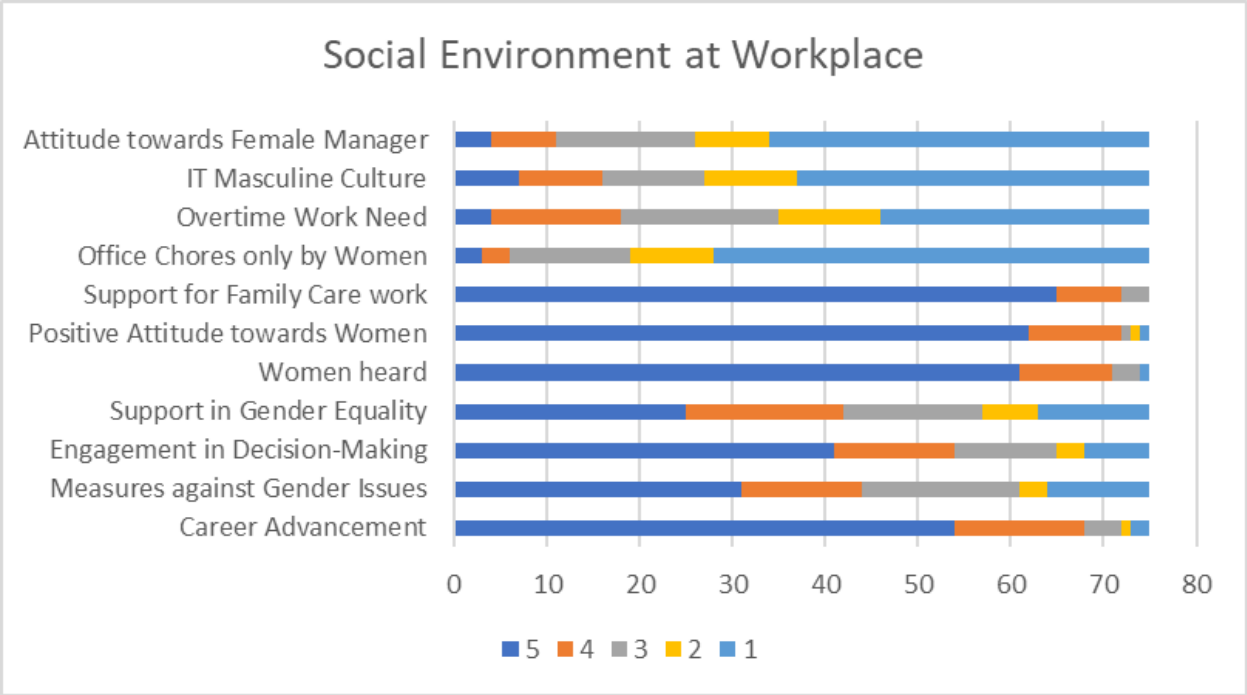
According to experts involved in this research, female participation in software creation processes varies between 25% to 48%, with a growing trend of female engagement in international organizations (EI). Due to the inclusive practice and mentorship programs of those organizations, active fostering for women's career advancement is visible (EI) (See in sub-chapter: **Gender Equality Initiatives in Armenia's IT Sector**).

Relying on the insights from key informant interviews (EI), it becomes evident that women's influence in IT roles is substantial and empowering. Embracing diversity, particularly the inclusion of women in IT positions, offers numerous advantages and positive outcomes:

1. **Diverse Perspectives and Innovation.** Women in IT introduce varied perspectives, experiences, and problem-solving approaches, fostering a more innovative and creative work environment. This diversity of thought often leads to the development of more comprehensive and effective solutions.
2. **Enhanced Team Dynamics.** Including women in IT teams encourages collaboration, improves team dynamics, and stimulates a more inclusive workplace culture. This diversity of voices can lead to better decision-making and problem-solving.
3. **Closing the Skills Gap.** Empowering women in IT helps bridging the gender gap in technology-related fields, contributing to a more balanced and diverse workforce. Encouraging women to pursue careers in IT can address skill shortages and increase the overall talent pool in the industry.
4. **Role Models and Mentorship.** The existence of women in IT serves as role models and mentors for aspiring new professionals, especially young women. Their presence and success in the industry inspire and encourage others to pursue similar career paths, thus fostering a cycle of mentorship and support.
5. **Economic Empowerment.** Increasing women's participation in IT roles not only benefits the industry but also contributes to economic empowerment on a broader scale. It opens up opportunities for financial independence, career advancement, leadership roles and access to resources, creating a more inclusive economy.

To assess gender sensitivity, diversity, inclusivity and overall workplace climate in the IT industry, several scaled questions were included in the SSOS (*Chart 8*) with responses ranging from "absolutely agree" (5) to "absolutely disagree (1)."

Chart 8.



Graph 8 illustrates the outcomes: 41 respondents disagreed that some men find it challenging to work under a female superior, with only 4 considering it highly relevant. Additionally, 38 strongly disagreed that certain IT jobs are more suitable for men, while 7 held the opposite view. Regarding overtime work, 4 women absolutely agreed and 14 agreed that they regularly face the need for overtime, contrasting with 47 who strongly disagreed. The highest consensus was related to caregiving responsibilities, with 65 respondents stating their supervisors are responsive in situations involving caregiving (doctor's appointments, parent-teacher meetings, caring for a sick child or parent, etc.). Around 62 and 61 female IT specialists felt there is a positive attitude towards women in their offices and absolutely agreed that women are heard when expressing their opinions, respectively. The fewest respondents (25) agreed that their managers actively support gender equality initiatives in their teams, while 31 strongly agreed that their offices have developed tools to address gender issues in projects. A majority (54) believed that women and men have equal promotion opportunities, with only 2 strongly disagreeing. It's noteworthy that 82 respondents did not participate in any training covering gender topics, while 22 had undergone such training.

In summary, the results of the SSOS indicate a generally positive perception among female IT specialists regarding workplace dynamics. The majority of respondents expressed satisfaction with the inclusivity of their work environments, debunking stereotypes related to gender roles within

the IT sector. While there are areas, such as managerial support for gender equality and participation in gender-related training, where improvements can be made, the overall trend highlights progress towards fostering a more equitable and supportive atmosphere for women in the IT industry. A similar picture was given also by the GAC respondents. The findings emphasize the importance of continued efforts to address gender-related issues and promote a workplace culture that values diversity and equality.

Is there a positive discrimination favoring women in Armenian IT?

The Transformative Influence of Female IT Specialists on Workplace Cultural Dynamics

It appears that many Armenian IT employers favor female workers for several reasons that extend beyond technical skills. One significant factor is the **transformative impact** a female presence has on the **workplace atmosphere**. Employers note that when a woman joins the team, she often introduces a shift in the working climate. Her presence tends to mitigate complaints and diffuse the potentially aggressive communication style prevalent in male-dominated settings[65], thereby fostering a **more balanced corporate culture**. This difference in communication styles is perceived as beneficial, leading to positive changes in how people interact and collaborate. *"When there is a girl, she restrains male colleagues with her role, and we have not yet crossed the line to communicate with the girl in the same way as in the environment of boys. It's good that the difference still exists, and it changes the whole atmosphere, it changes the ways of people's communication, and it also brings positive change in work" (EI).*

Moreover, male interviewees also highlight the **nurturing aspect** that female workers bring to the office. This nurturing quality encompasses feminine interactions, promoting creativity, unity, and **cultivating a caring environment**. Such attributes contribute to fostering positive team dynamics and enhancing the overall corporate culture. Consequently, some employers practice a form of positive discrimination, favoring female IT specialists based on these gender-associated stereotypes.

Another quality attributed to women is their **loyalty** which is highly appreciated by the many employers and highlighted by many experts during this research. In the context of the workplace, women's loyalty is seen as a valuable asset that contributes to a stable and committed workforce, fostering positive relationships between employees and employers. The acknowledgment of this

[65] In this statement, it brought up the cultural aspect of communication in Armenia, highlighting that men might use curse words and vulgar language when interacting within a male community. However, they refrain from employing the same language when in the presence of female individuals.

quality not only underscores its significance but also sheds light on the broader recognition of the unique attributes that women bring to the professional sphere.

Worth to add employers' attitude to keep the female workers unlike many other countries, where there is insufficient rate of **retention** of female IT specialists[66]. Encountering a supportive work environment in the IT sector, fostering their professional growth and long-term engagement within the industry, women become more efficient, innovative, and committed.

Some interviewees perceive a distinction between female and male IT professionals. It is notable that many of them express this in favor of female specialists in development roles, while a few vaguely assert the opposite based on their own personal experiences. However, it's essential to highlight that these views do not diminish the contributions of female workers in other positions within the field. *"In the IT field, one does not have to necessarily be a software developer. This is something that highlights the horizontal relationship in the IT industry. Everyone has their importance and is valued accordingly in the team. The IT field has many other specializations, in which women are often far ahead of men. The function of delivering and receiving on time, which I still think women do a lot better than men, actually" (EI).*

In essence, acknowledging and empowering the impact of women in IT roles is pivotal for fostering a more inclusive, innovative, and balanced industry that can better meet the demands and challenges of a rapidly evolving technological landscape.

Evolving Perspectives: Gender Neutrality in the Perception of IT Specialists

As per insights shared by key informants, attitudes toward female IT specialists showcase notable diversity. Despite the existing positive attitude towards women in IT mentioned above, however, a majority concurs that distinctions between female and male IT employees are negligible. They affirm the presence of equally exceptional female and male developers, perceiving no substantive disparity between them. Within their respective organizations, the consensus aligns with the belief that gender holds no bearing on one's capacity as a specialist: "*equality reigns supreme" (EI)*.

Relying on information provided by experts, a significant number of organizations demonstrate a commitment to merit-based selection, devoid of gender bias. *"The paramount consideration for us is the proficiency of a specialist in their field. Gender is immaterial; our organizational ethos revolves around this principle" (EI).* This shift highlights a positive trend towards greater gender diversity within the field, signifying an encouraging progression towards a more balanced

[66] According to various researches more than 56% of female IT specialists are likely to quit in the USA It industry. Source: Annabi H., Lebovitz S., *Improving the retention of women in the IT workforce. An investigation of gender diversity interventions in the USA*, 2018
Source: Women in Technology by Numbers, https://www.spencerstuart.com/-/media/images/inline-images/womenintech-062116-graphic-large.jpg

representation of both genders in the IT industry. *"In the contemporary landscape of recruitment, the primary criterion for most employers revolves around professionalism and the ability to deliver high-quality work. The emphasis lies on an individual's expertise, diligence, and the outcomes they produce rather than their gender" (EI).*

Moreover, a prevalent sentiment suggests that gender discrimination is an antiquated issue steadily waning in significance. Voices within this group articulate an idea that as the world progresses, moments of gender inequality are gradually fading into obsolescence: "*The evolving world landscape is leaving behind instances of gender inequality" (EI).*

The statements shared by experts highlight several key points:

- ✓ ***Equality in Skills and Abilities***: Many employers acknowledge that both male and female IT professionals possess equal skills and capabilities. This recognition helps debunk stereotypes and underscores the importance of judging individuals based on their abilities rather than gender.
- ✓ ***Changing Perceptions****:* Some individuals believe that the issue of gender discrimination is gradually diminishing as the world progresses. This optimism suggests a positive trend toward inclusivity and equality in the IT industry.
- ✓ ***Merit-Based Hiring***: Employers prioritize professionalism, knowledge, and work quality above gender when hiring. This attitude reflects a commitment to fostering a fair and unbiased work environment.
- ✓ ***Diversity and Inclusion****:* The emphasis on a gender-neutral work environment and the absence of gender divisions within teams indicate a commitment to diversity and inclusion. This approach is essential for creating a welcoming and supportive workplace culture for all employees.

Despite the merit-based approach, departmental disparities persist. They are notable especially within software creation teams where men predominantly prevail. Some attribute this to perceived preferences in learning tendencies, suggesting that female representatives might lean towards non-technical subjects or face social expectations nudging them away from software development roles. There the distinctions exist between **front-end** and **back-end** roles[67], with back-end roles perceived as more challenging[68] and often associated with a higher male representation. An observation regarding coding preferences, with men favoring back-end coding and women exhibiting proficiency in front-end development is often associated with the perceived intricacies inherent in back-end development. They are commonly deemed more demanding and

[67] Front-end developers employ programming languages to animate the client side of a website. This process demands technical, creative, and communication skills. On the other hand, back-end developers utilize server-side programming languages to guarantee the proper functioning of websites. Front-end results are immediately visible, more tangible, and in the case of back-end, the results are not immediately perceivable.

[68] Simmons L., Front-End vs. Back-End: What's the Difference?, Updated November 9, 2023

consequently attract fewer women (EI). Notably, sometimes there exists a perceived hierarchy, attributing a greater level of difficulty and expertise to back-end coding. But the perceived hierarchy arises more from the historical context rather than from an absolute difference in difficulty or expertise[69]. Agile management can be considered one of the means this hierarchical disparity is eliminated. Besides, it is essential to mention that both back-end and front-end development demand unique skill sets and expertise. Also, contemporary observations indicate a noteworthy shift, showcasing a trend nearing parity between men and women in both front-end and back-end roles (EI). This evolving landscape suggests a gradual evolution toward a more balanced gender distribution across various facets of software development within the IT industry.

Concerning discrimination in the IT sector, some experts articulate that it can be experienced by both female and male IT specialists especially during the enrollment. This discrimination may stem from societal expectations tied to gender-specific responsibilities in Armenia, such as the potential military draft for men and maternity leave for women[70]. *"Discrimination can affect both genders in hiring decisions—men might face rejection due to impending military service, while women might encounter bias because of potential maternity leave. Flexibility in the IT sector allows for adaptability in short-term projects despite these concerns"* (EI).

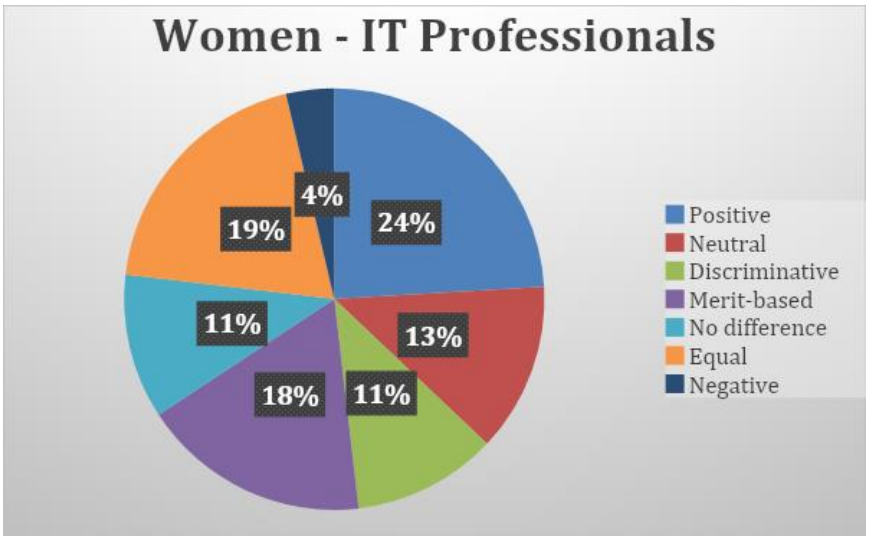
To explore the meaning of ***"Female IT Specialist"***, an open question was offered to the SSOS respondents (*Chart 9*). 24% of the responses expressed a positive attitude towards female specialists. They specifically highlighted qualities such as purposefulness, continuous learning and development, possessing advanced skills, and delivering optimal performance. Nothing should hinder women from excelling in any field, as they bring responsibility, contribution to faster IT development, strength, and the ability to teach and support teams. Women in the IT field are seen as purposeful, dedicated, and responsible professionals who contribute positively to their teams. Equality was the subsequent theme, constituting 20% of the responses, closely followed by the prevalent merit-based approach in the IT sector, accounting for 18% of the answers. Responses pertaining to equality and merit-based principles emphasized the significantly low level of discrimination in IT, highlighting the importance of equal rights and opportunities for both men and women. The absence of gender-related issues was underscored, expressing the belief that success as a specialist in the field is contingent on individual capabilities rather than gender. Participants noted the absence of gender-related problems in their experiences, portraying the IT sector as a model characterized by a focus on individual rights and the absence of discriminatory treatment, serving as a positive example for other institutions, particularly those in Armenia.

[69] Historically, back-end development was considered more complex due to its involvement with databases, servers, and business logic. Front-end, on the other hand, dealt primarily with user interface design and interactions. This led to a perception that back-end work required deeper technical knowledge. Front-end coding, on the other hand, focuses on the user interface (UI) and user experience.

[70] Though the legislation ensures 100% remuneration of the salary during the 140 days of maternity leave, the lack of paid paternity leave still fosters the unequal share of childcare responsibilities on a legislative level and slows down women's return to the labor market. Source: Labour Code of the Republic of Armenia

Neutral responses, constituting 13% of the feedback, considered hardworking and responsible individuals, irrespective of age and gender, as capable of achieving significant success.

Chart 9.



While the majority of respondents did not report instances of discrimination, accounting for 11% of answers, it is crucial to acknowledge the experiences of those who did. Becoming a female IT specialist requires persistence, involving twice extensive study, continuous self-verification, and the navigation of societal expectations. This experience demands round-the-clock work while managing other responsibilities. Adapting to societal expectations and disproving stereotypes are emphasized, with assertiveness required to counter opposing opinions. Despite relatively less attention to gender in the field, the need to continually prove skills and abilities, overcome stereotypes, and face competition from male counterparts is acknowledged. The journey involves tackling biases, complex perceptions, and the constant effort to be recognized and appreciated.

Another 11% of respondents believed that gender plays no significant role in the IT field, where discrimination is perceived as absent, and being a woman or a man makes no difference. The focus is on individual skills and expertise, as everyone in the IT sector is considered a specialist, rendering gender irrelevant. 4% of respondents highlighted the negative aspects of being a female IT specialist, noting challenges such as managing a demanding work schedule, balancing professional and personal life, and coping with competition, skepticism, and potential biases from male colleagues. Married women with children may encounter difficulties due to time constraints, and the need to stay updated with industry developments and overcome career breaks, particularly during maternity leaves, is also emphasized.

Generally, the IT field offers ample opportunities for both genders to thrive, emphasizing a culture of continuous development and equal access to resources for skill enhancement. This inclusive approach not only promotes diversity within the industry but also encourages a collaborative and dynamic environment where both men and women can contribute their unique talents and perspectives.

Women in IT Leadership

Leadership style assumes significance; it is not about mere management but effective leadership, especially critical in the IT domain. Combining strong leadership with exceptional professional knowledge lays the groundwork for substantial personal and professional growth. Importantly, these qualities are seen as attainable by both men and women within the industry.
The senior positions in the IT sector still see a lower representation of female specialists in the Armenian IT industry. However, there is a burgeoning pool of talented young women in junior roles aspiring to ascend to senior positions in near future. Several international IT companies have embraced gender-sensitive approaches, promoting female leadership through structured development programs and inclusive strategies. These companies emphasize diversity and inclusion, implementing strict inclusion strategies and regular training sessions to combat harassment and promote a diversity culture in the work environment (See in sub-chapter: **Gender Equality Initiatives in Armenia's IT Sector**). This is also reflected in the GAC answers: Representatives from international IT companies observed a rise in the presence of women in senior management roles over the past few years. However, this trend was not mentioned being noticed in local companies, particularly those with smaller staff.

Gender Dynamics in the IT Sphere: Challenges and Transformations

The prevailing sentiment among key informants and female representatives within the IT sector, involved as interviewees in this research, reinforces the existence of perceived gender-based oppression. Their shared experiences and observations underscore the persistence of **nuanced inequalities** within the industry. The IT working culture, according to them, is tailored to suit male needs and pacing, potentially creating challenges for female professionals. Here are their observations:

Work-Life Balance Challenges: Project deadlines often demand late work hours, which could conflict with family responsibilities, especially for female workers. Traditional expectations of women managing household chores[71] and societal expectations of conservative families regarding female presence at home after the business time over further compound this challenge. According to SSOS responses, 17% mentioned the need for overtime work, meanwhile 44,8% disagreed with that idea. These findings underscore the complex interplay between professional demands and traditional gender expectations placed on female professionals, who often face challenging decisions in balancing work and family life.

[71] Employment does not free up women from unpaid household responsibilities; however, these responsibilities limit their opportunity for paid labor.

Maternity Leave vs. Career Growth: Female employees, particularly newly married ones, may encounter verbal agreements to delay maternity leave. It usually goes with an offer of promising career trajectories, potentially influencing their career progression. The need to reimburse resources invested in female newcomers' professional development often affects those women's decision of having a baby. Ultimately, the choice to take maternity leave may impede their professional advancement compared to men, because women are perceived as the primary caregivers. This dynamic explains the variations in the duration of maternity leave among female IT specialists. *"The attraction of a career advancement explains why many women have started to shorten their maternity leave duration from 36 months to 4-6 months and begin working far sooner than before" (EI).*

Knowledge Sharing and Communities: Women in IT may encounter difficulties in finding similar communities for knowledge sharing and professional interaction. *"I haven't had such software developer girlfriends, tech lead girls, with whom I could discuss my experience, or my knowledge, or if I had tried something and came to say... let's discuss it, and that's the main obstacle" (EI).* Unlike their male counterparts who can form networks during informal activities, the lack of such communities among female IT specialists poses a challenge for skill enhancement and professional development. "*The men go together to smoke*[72]*, drink, talk, even in the parking lot they can communicate about their work, but for female workers it is harder to find such communities for knowledge sharing, talking about things among themselves, agreeing, testing and coming back to talk again. Such female communities among IT specialists simply do not exist yet".*

Stereotypes and Organizational Bias: Outdated management models tend to perpetuate stereotypes that hinder the acknowledgment and acceptance of the capabilities of female IT specialists. In contrast, contemporary IT companies are actively embracing diversity and providing equal opportunities, contributing to the gradual reduction of these barriers. This shift towards more inclusive practices is fostering an environment where the skills and contributions of female professionals in the IT field can be better recognized and appreciated. Overall, being dominant in terms of profitability, the corporate culture of the IT sphere starts to spread its ideology and approaches to other industries and companies, necessitating them to review their values and approaches and make corresponding changes.

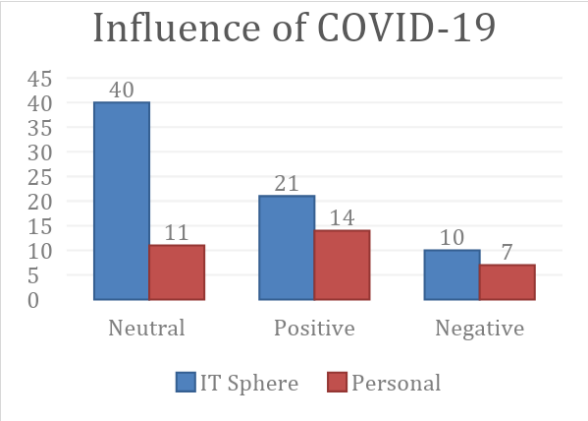
Regarding the socio-economic impact assessment of the COVID-19 outbreak in Armenian communities, it is notable that the pandemic affected both women and men in various ways. In many cases, the pandemic exacerbated existing gender disparities, affecting employment, caregiving responsibilities, access to education, and mental health differently for women and men[73]. The IT sector's response to these challenges has highlighted its role not only in addressing

[72] There are far more smokers among men than women in Armenia. At least in the public places more men smoke than women.

[73] Socio-Economic Impact Assessment of the Covid-19 Outbreak in Armenian Communities, UNDP 2020

immediate needs during a crisis but also in shaping resilient, adaptable, and innovative solutions that were able to positively impact communities and economies, both during and after the pandemic. During the onset of the COVID-19 pandemic, the IT industry showcased a higher level of preparedness compared to other sectors. However, for female employees, transitioning to **remote work** intensified responsibilities, as they were required to manage both **work and childcare simultaneously**. *"They are expected to do working assignments in addition to accomplishing childcare and house chores and all those simultaneous responsibilities can exhaust women" (EI).*

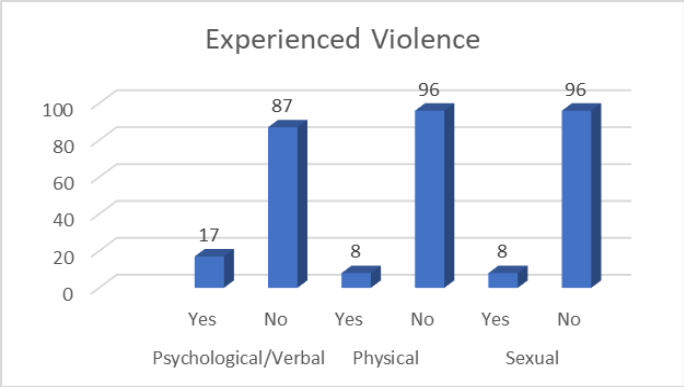
Chart 10.



Meanwhile, remote work provided the flexibility for women to adapt their working hours according to their schedules and responsibilities. Based on the information collected from the SSOS (*Chart 10*), the pandemic had a neutral effect on the IT sector, with 40 individuals perceiving no significant influence, while 21 viewed it positively, and 10 observed a negative impact. Regarding personal development, 14 respondents believed COVID-19 had a positive effect supporting them for having more discretionary time for self-development or family time. Meanwhile, 11 considered it neutral, and only 7 deemed it negative due to the challenges of combining childcare with work.

Addressing Challenges: Violence and Harassment among Female IT Specialists

Chart 11.



The insights from the survey data regarding experiences of violence among female IT specialists are quite concerning. Out of 104 respondents:

- 17 reported experiencing, witnessing, or hearing unwanted sexual comments, advances, inappropriate compliments, jokes, or looks in their university or workplace.
- 8 mentioned experiencing or witnessing physical harassment or assault, including invasion of personal space, unwanted touching, or other forms of physical violence.

- Similarly, 8 respondents reported incidents of sexual harassment or being aware of such incidents in their university or workplace[74].

Notably, the majority of these women handled these situations independently by confronting the individuals responsible. Some refrained from reporting due to concerns about fairness, confidentiality, or potential repercussions on their career. Only one respondent reported a complaint, which was resolved satisfactorily.

Important to highlight that the key informants noted their organizations actively reinforce gender sensitive behavior and implement procedures to prevent and address instances of sexual harassment. This statement received significant agreement among the respondents of GAC.

These findings reveal a need for stronger measures to address and prevent instances of violence and harassment within the IT industry. Implementing comprehensive and proactive measures is imperative within the IT industry. Such measures should include creating a safe reporting environment, ensuring confidentiality, offering support services, and implementing educational programs to raise awareness about the consequences of such behaviors. Additionally, fostering a culture of respect and inclusivity through organizational policies and leadership commitment is crucial in cultivating a workplace free from violence and harassment.

Despite these challenges, there's a noticeable shift in the industry. The increased presence of female students in IT programs has altered the ecosystem, fostering confidence and a sense of community among women. This change in perspective and growing female representation signifies a shift towards a more balanced gender ratio in various IT departments. A conducive ecosystem that fosters self-expression and self-development has proven to be non-restrictive for women in the IT industry. This environment not only benefits companies by promoting diverse perspectives but also serves as a platform for women's personal growth and self-realization.

Gender Equality Initiatives of Armenian IT industry

Synopsys, an international organization, places significant emphasis on gender equality within its operations. Recent research conducted by the company indicates a positive trend, with 30% of leadership positions being held by women, showcasing a consistent inclination toward increased female representation in leadership roles.

[74] The data was gathered prior to the revision of the Labour Code of the Republic of Armenia, which was enacted on May 3, 2023. It explicitly prohibits workplace violence or sexual harassment (article 3.3). Despite the incorporation of these provisions into the Labour Code, no subsequent modifications were made in the Criminal or Administrative offenses legislation to establish specific penalties for workplace violence or sexual harassment. Nevertheless, the Criminal Code includes other offenses under which the relevant acts might be categorized, such as Psychological Intervention (art. 194) or Physical Intervention (art. 195).

The involvement of women stands as a strategic focus area within Synopsys' HR initiatives. Recognizing the benefits of a balanced gender presence, the organization acknowledges its positive impact on work environments and overall outcomes. Diverse perspectives fostered by gender-balanced teams contribute to enhanced discussions and varied viewpoints, enriching the decision-making process. The commitment to equality extends to their recruitment practices, where job interviews involve both female and male employees. This deliberate approach ensures a diversity of opinions during the candidate selection process, promoting a more balanced and inclusive hiring environment.

Furthermore, specialized programs are implemented to encourage women's participation in engineering programs, aiming to address gender imbalances in technical fields. Notably, in the Armenian office of Synopsys, a leading software company specializing in chip and semiconductor creation, 33% of engineers are women. This contrasts sharply with their Silicon Valley office, where the representation of women engineers is less than 15%.[75]

The **"Girls Go Engineering"** program, active for three years now, targets female students in their 3rd year or higher, enrolled in IT, computer science, computer engineering, or telecommunications disciplines. This initiative hosts a competition, inviting high-performing female students to participate, with a focus on granting scholarships of up to $1,500 for tuition fees. The primary objective of this program is twofold: to provide financial support for female students and to empower their entry into the IT sector. A key strategic approach involves deliberate outreach across diverse regions in Armenia to ensure a broad and inclusive representation of applicants. This approach aims to maximize the geographic coverage and reach of the program, ensuring accessibility and opportunity for aspiring female candidates from various parts of the country.

The **"Women in Leadership"** program is an annual initiative designed to cultivate and enhance the leadership potential of 20-25 women within the organization. This program serves as a platform for these participants to serve as exemplars and mentors for other women in the IT domain, fostering the establishment of peer groups for mutual support and growth. A pivotal aspect of this program involves a mentorship component, facilitating connections and guidance from established women leaders across Synopsys worldwide. Additionally, female employees are actively encouraged and supported to engage in international conferences, workshops, and events. Their participation serves not only as a means for professional development, staying abreast of IT trends, and networking but also positions them as esteemed guest speakers, elevating the visibility and recognition of female IT specialists.

The program places significant emphasis on nurturing leadership qualities, focusing on aspects such as self-confidence, problem-solving, networking, and professional branding. It also underscores the importance of leading and supporting others on a similar path. The curriculum

[75] Women in Tech, IT is Armenia https://itis.am/womenintech/eng

encompasses a spectrum of soft skills and avenues for self-development. Worth to mention, while participation in the program is highly beneficial, it does not mandate a subsequent transition to management positions for all its attendees.

Within other organizations, independent experts have revealed instances of gender pay gaps and an uneven distribution of responsibilities. This has prompted recommendations for changes in the positions and roles of female employees within these entities. The findings suggested a need for a more equitable approach to both compensation and professional responsibilities to ensure fair treatment and opportunities for female employees, which were realized following the suggestions. Eventually those women had a position advancement including all the consecutive privileges.

Significantly, it's noteworthy that local IT companies are dedicated to adopting the same consistent approach towards inclusivity and diversity. They actively implement strategies aimed at fostering an inclusive working culture, with the objective of making their companies more appealing to highly qualified professionals. By prioritizing inclusivity, these companies strive to create an environment that both attracts and retains talented individuals, contributing to a diverse and innovative workforce. This commitment not only enhances the company's reputation but also aligns with the growing emphasis on diversity and inclusion in the broader professional landscape.

Perspectives Unveiled: Summarizing Insights

Shifting Gender Dynamics in the IT Sector: Trends and Transformations

The gender landscape within the IT sector has undergone notable transformations in recent years. A significant surge in the number of women pursuing careers in IT is evident. Compared to half a decade ago, the female representation in this field has multiplied. The demographics within the IT workforce have also experienced a shift towards a younger age profile. Interviews suggest that five years ago, men outnumbered women significantly, with female representation scarcely reaching 20%, and the average age hovering around 30 for both genders. According to key informants, presently, the gender distribution stands at approximately 40% female to 60% male, with the average age plummeting to 25 or even lower, in the range of 20-22 (EI).

Some key informants offered an explanation for this gender disparity, which revolves around demographic trends, indicating a historical shortage of girls due to sex-selective practices, particularly prevalent in Armenia until recent times[76,77]. This demographic trend, affecting the ratio

[76] PREVALENCE OF AND REASONS FOR SEX-SELECTIVE ABORTIONS IN ARMENIA, UNDP 2012
[77] Shahnazaryan G., Hovhannisyan S., THE SYSTEMIC AND CULTURAL CAUSES OF SEX-SELECTIVE ABORTIONS IN ARMENIA, Yerevan 2017

of men to women in the IT sector especially for certain age range[78], is anticipated to persist. Several interviewees foresee a future gender proportion in IT will remain relatively consistent at 40% female to 60% male, emphasizing a continuing younger influx of talent, with individuals entering the field at ages 17-18 (EI).

Curiously, male key informants expressed the opinion that the proportion of female IT specialists will not increase beyond the current 40% female to 60% male ratio. In contrast, female informants expressed strong confidence that the number of women in the field will surpass men in the near future. A potential rationale for this phenomenon could be that men fear losing control over resources within the industry and, on a subconscious level, may resist the idea of women outnumbering them in that sphere and sharing power.

It's noteworthy to acknowledge that female key informants previously highlighted encountering notable **skepticism** and **occasional mistrust** directed towards female IT specialists. However, there has been a discernible decrease in such attitudes over time. A shift in perceptions has occurred, emphasizing the realization that expertise and proficiency are not contingent on gender. Interestingly, that disbelief appears to have been predominantly experienced by female informants occupying software developer positions. In contrast, those engaged in HR or other fields within IT did not report similar doubts regarding their skills and professionalism.

There is a palpable shift in women's perceptions of their **potential for growth** in the IT field. They increasingly recognize their capacity to achieve at the same level as their male counterparts, with many choosing to overlook gender as a limiting factor in their career pursuits. Forecasts by interviewees suggest a trajectory toward diminished gender inequality in the industry within the next five years, supported by observable shifts in student demographics, reflecting a more balanced gender participation in educational settings, both organically and through deliberate interventions (EI).

Influential Factors Shaping the IT Landscape: Insights from Expert Interviews and Gender Awareness Checklist

This compilation of interview excerpts sheds light on various factors influencing IT specialists and students. The discussions touch upon gender dynamics, skill prerequisites, company preferences, the impact of war, and the evolving nature of the IT sector, both in response to global events like COVID-19 and the shifting borders of the labor market. The survey also explores the role of universities and the assessment of Armenia's IT development in the wake of recent challenges.

[78] After the Policies and Principles on Discrimination Against Women and Sex-Selective Abortion Bans were released, the demographic balance has begun to normalize. Prior to these policies, there was a consistent bias favoring boys, resulting in a sex ratio of 120 boys per 100 girls in the 2000s. Worth mentioning that generation has already reached the age of adulthood and acquires any form of employment.

Gender Dynamics in Professional IT Growth: Men often find it more manageable to navigate professional demands, allowing for extended work hours or late stays, a practice less viable or preferred among women. This presents an imbalance as men do not perceive this commitment as an obstacle to their career growth.

Essential Skills and Qualities in IT Professions: A solid foundation in fundamental mathematics and proficiency in key programming languages like C, C++, Java are prerequisites. Personal attributes such as diligence, accountability, adaptability, and collaborative abilities further define a successful IT professional.

Gender Bias in Company Preferences: IT firms lean towards hiring men, assuming they will not take extended leave post-marriage or have difficulties during business trips. However, determined female students exhibit exceptional drive, focusing on their careers with unwavering purpose, although societal expectations may divert them towards family after reaching a certain income threshold.

Impact of Recent Events on IT Landscape: The war significantly affected Armenia's workforce, potentially drawing many individuals, particularly those impacted by the conflict, into the IT sector[79]. The war highlighted gaps in the country's IT ecosystem, emphasizing the need for significant structural changes, a responsibility that extends beyond just universities to government initiatives.

Evolving Labor Market Dynamics: The advent of COVID-19 reshaped labor market borders, enabling global talent acquisition for Armenian startups and providing opportunities for Armenian professionals to work abroad. Hybrid learning models facilitated lectures by international experts, expanding universities' access to global talent.

IT Development Challenges: Armenia's IT sector faces challenges where local innovations are often outsourced and underutilized within the country. The issue isn't a lack of skilled professionals but a shortfall in resources and a conducive environment to implement and utilize locally created software.

These findings underscore systemic gender biases, skill prerequisites, and broader socio-economic factors impacting Armenia's IT sector, highlighting areas for structural improvement and global integration.

Currently, women are increasingly recognizing their potential for growth and realizing that they can achieve the same as their male counterparts. There is a growing trend of disregarding gender as a factor affecting career opportunities. According to the majority of interviewees, the prevailing forecast is that gender inequality will diminish within the next five years, especially evident among students. The intentional effort to bridge the gender gap is evident, with a shift observed in the gender balance. *"If before in summer schools there were 10 boys and 1 girl, now the picture is completely different, they are almost equal. And this tendency goes not just naturally but also intentionally" (EI).*

[79] High-tech minister presents list of most demanded professions in Armenia, ARMENPRESS, 13:10, 15 March 2021

Trailblazing Insights: Mariam Torosyan on Innovating Safe YOU application. A Confluence of Social Activism and IT

Exclusive Interview with Mariam Torosyan:
Founder of Safe YOU, the All-in-One Platform
Intersection of Social Activism and IT

Armenia holds the top position worldwide in the "Technology and Innovation for Gender Equality" action coalition as part of the UN-led Generation Equality Forum.

In various parts of Armenia, young women are increasingly overcoming obstacles in the field of technology. Mariam Torosyan, hailing from Yerevan, is a social entrepreneur who serves as the founder and CEO of the Impact Innovation Institute. In 2020, she introduced Safe YOU, a comprehensive platform crafted to safeguard women from domestic violence and link them with a community that provides support to fellow survivors[80].

Supported by UNFPA, the platform increases awareness of women by disseminating insights from a network of professionals and offering corresponding services. Additionally, the application enables users to send a cost-free emergency message, sharing their location with three close family members or friends, local police, and other service providers.

In her role as a social entrepreneur, Ms. Torosyan recognized the significance of connecting with fellow innovators and activists, as well as engaging with governments and NGOs to enhance digital platforms for women and girls. Safe YOU presently boasts a user base exceeding 20,000. As its influence expands, the platform plays a pivotal role in empowering more women through technology, aligning with the UN Sustainable Development Goal of Gender Equality[81]. Presently, the app operates in three countries - Armenia, Georgia, and Northern Iraq (Kurdistan) - with plans for expansion into Romania, Slovakia, Kazakhstan, Uzbekistan, and two additional countries in Africa. Ultimately, the primary driver for app development is the user, as constant engagement and openness to feedback are essential to enhance accessibility and user-friendliness, an ongoing process with no definitive endpoint.

In June 2021, Safe YOU app received acknowledgment as a Digital Public Good, in accordance with the guidelines outlined in the United Nations Secretary-General's 2020 Roadmap for Digital Cooperation.

70% of the Safe YOU app team are women and 30% are men. The last are responsible for the core work for the software tasks. Unlike many other IT initiatives and organizations all the management members are female.

[80] "We are empowered by technology", UNDP 2021
[81] Petrosyan A., Ulikhanyan Zh., UNO Yerevan and UNICEF Armenia. Editorial support and adaptation for the UNSDG site by the UN Development Coordination Office

Civic tech, despite its significance in addressing social issues, faces vulnerability and is prone to failure, being the least financed sector in the tech industry with limited knowledge in technology creation. It emphasizes the need for faster progress in developing tech solutions to advance women's protection, addressing gender issues, inequality and their logical consequences in public health, and economic impacts on societies.

Safe YOU initiative team is currently doing a separate project with the police and digitalizing their inner system which will be connected to the Safe YOU application. This means they go through institutional integration and development, and this is also a clear sign that the app is so important for the police that they want to scale up their inner system for easier adjustment to the new technologies.

The Safe YOU app goes beyond aiding women in reaching out to trusted contacts and the police during threats of violence; it also facilitates evidence collection through voice recording features for future investigations. Additionally, the app aims to prevent violence by employing AI to identify patterns, predict future incidents, assess risks, and propose preventive measures and policies to both governments and civil society for activism and advocacy. It highlights the significance of AI in understanding the mathematical aspects of violence for improved predictability and prevention.

The success stories are multiple: we have a case when a woman was locked in an unknown place, but because of the location function she pressed the button and her geolocation was detected, and we could find and save her with the help of the rescue crew.

Conclusion:

Shifting Dynamics in Armenia's IT Sector and Gender Perspectives

This comprehensive study sheds light on the multifaceted landscape of gender dynamics within Armenia’s information technology sector, encompassing various challenges and promising facets influencing women's participation and experiences in this domain.

The IT sector in Armenia has undergone considerable expansion and progress in the last decades. Armenia has become a sought-after destination for technology companies and startups, owing to its advantageous business conditions, proficient workforce, and supportive government programs.

The advancement of Armenia's IT sector can be traced back to historical factors such as the lingering influence of Soviet-era inclinations toward mathematics and STEM fields. Additionally, the legacy of a robust engineering education system, coupled with a relative underdevelopment in other sectors, has steered individuals toward discovering their potential in the realm of IT. The allure of the IT industry lies not only in its lucrative financial and other incentives but also in the conducive and adaptive work environment it fosters. With flexible working hours, remote capabilities, and a commitment to cultivating a positive workspace, the sector beckons individuals toward IT specialization.

The demographic landscape of representation within IT studies has seen noticeable shifts. Presently, statistics indicate approximately 40% presence of female specialists among IT students. Several factors contribute to this shift. Initiatives aimed at promoting STEM education among girls, as well as efforts to debunk stereotypes surrounding gender and technology, have played a pivotal role. Educational institutions and industry stakeholders have recognized the importance of fostering diversity in IT, leading to targeted programs and outreach activities designed to attract and retain female talent in the field.

Opportunities for learning in the IT field are perceived as equal for individuals of all genders, with a consensus among experts that discrimination is absent in terms of professional development and education prospects. Notably, specialized training centers are recognized for providing more practical and industry-relevant skills compared to universities, leading to collaborations between IT companies and these centers. However, concerns are raised about the haste in entering the job market, emphasizing the importance of a solid foundation in fundamental subjects for sustained success in the industry.

The study’s quantitative analysis reveals educational backgrounds, career trajectories, and workplace perceptions among female IT professionals. It highlights a positive attitude in universities toward gender equality, albeit with room for improvement in institutional measures addressing gender issues. Meanwhile, the professional prerequisites for success in IT, including mathematical proficiency and programming languages, remain paramount.

The industry's disposition toward hiring is not biased against women; instead, it often (30%) aligns with individual preferences leaning towards social science disciplines rather than STEM.

The flexibility of both online and offline modes, combined with the relatively short duration of these training opportunities, makes them more applicable and appealing, especially for women. This adaptability enables women to integrate learning into their schedules, addressing various demands of home chores and childcare, making these training programs a more accessible and enticing option for women looking to enhance their knowledge and skills in IT domains.

Despite the limited presence of women in leadership positions within STEM faculties in Armenian universities, there is a discernible change in the ratio of female students pursuing IT education. This signifies a positive move toward inclusivity, breaking gender barriers and fostering a more diverse and dynamic educational environment aligned with the evolving requirements of the industry. Overall, the reduction of constraints reflects a dedication to equality and diversity, recognizing the inherent potential within the female workforce. By dismantling previous barriers that restricted opportunities, there is an increasing acknowledgment of the valuable contributions women can offer in shaping the future of the IT industry.

The evolving landscape of female participation in the IT industry signifies a positive shift toward gender balance within the industry. While men's representation continues to dominate, recent years have witnessed a rise in the presence and recognition of female professionals, indicating a changing narrative and a more inclusive future for the IT sector. This transformation not only benefits individual female specialists but also enhances the competitiveness and adaptability of the IT industry on a global scale.

Employers in the IT sector often prioritize skill sets over diplomas, offering opportunities based on competence. Encouraging perseverance and purposefulness, both genders contribute to software creation.

Presently, more girls and women are gravitating towards IT, infiltrating domains previously unexplored, such as robotics. The primary drivers of career growth in IT, however, are personal

traits such as loyalty, diligence, determination, open-mindedness, and continuous self-improvement as well as competences considered in the package of soft skills[82].

Despite the perception of equal opportunities for career advancement, a subtle advantage for men was highlighted due to informal agreements that newly married women are often subjected to regarding employment tenure, which are not applicable to men. A verbal agreement is reached to delay maternity leave, as the company fears capacity losses if a newly hired individual, who has undergone preparatory training, takes maternity leave within the first six months of enrollment.

The study underscores the impact of societal factors, including the military draft for men and family responsibilities for women, shaping career trajectories within the IT industry. It also highlights the aftermath of the recent war, indicating the potential influx of novices into the IT sector.

A positive shift in attitudes towards female IT specialists, coupled with equality and meritocracy in the workplace is noticeable. Gender does not play a role in evaluating professionals. Expertise and work quality as the primary criteria for enrollment reflect a progressive mindset.

The importance of continual learning opportunities, ongoing skill development, and flexible work arrangements as critical factors influencing women's active engagement in the IT sector is evident. Organizations that recognize and prioritize these elements are better positioned to not only attract but also retain talented women in the ever-evolving landscape of information technology. The IT industry offers women a sense of freedom and fewer restrictions in working conditions, particularly in the digital domain, making it an appealing career choice.

The flexibility, well-paid opportunities, and the possibility of working from home provide women with the means for easier self-realization, overcoming traditional barriers, including geographical constraints, and challenging stereotypes related to education in STEM fields.

In the realm of IT, where distinctions between men and women specialists may exist, it is noteworthy that the industry maintains a commitment to equity and an egalitarian approach. This is not characterized by a vertical hierarchy of subordination but, instead, by an ethos of equality where each specialist is recognized and valued as an indispensable link in the work process. This egalitarian perspective is pivotal in ensuring that talent is recognized and nurtured based on merit, skill, and expertise rather than gender.

Moving away from a hierarchical structure to a flatter, collaborative model often leads to increased creativity, innovation, and a greater sense of ownership among team members, creating an environment where individuals are motivated to contribute their best, recognizing the value of their

[82] NATIONAL REPORT ON CAREER GUIDANCE ARMENIA 2021
https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/genericdocument/wcms_835225.pdf

input in the overall success of the work process, ultimately fostering inclusivity and collaboration while potentially boosting overall efficiency and effectiveness. Agile management is a methodology supporting its realization in the IT industry.

The recognition of teamwork as a crucial part of the soft creation procedure reinforces a sense of inclusivity and mutual respect. By cultivating a culture that prizes diversity and acknowledges the significance of every team member, the IT industry not only promotes acceptance and unity but also harnesses the collective strengths of a diverse workforce. This commitment to equity is essential for sustaining dynamic and innovative working teams which draw on the rich array of talents contributed by individuals, regardless of gender.

The representation of women and men is undergoing a natural change because of the increasingly progressive hiring policies and practices implemented by the IT companies in recent years. This diversity underscores the breadth of roles within the IT industry and the varied strengths that female individuals bring to these roles.

While the number of women in the IT industry has grown, their distribution across departments differs. Software creation teams predominantly comprise men, whereas women hold slightly fewer leading positions. Nevertheless, there is a near balance in front-end and back-end roles among genders. Moreover, women excel in roles like Project Managers, Product Owners, Quality Assurance specialists, Designers, as well as Network and Administrative roles, while they are comparatively fewer in software development teams. However, the current trend shows an increase of female representation in software creation professions as well.

Women in IT express a strong interest in organizations that prioritize ongoing learning and professional development, emphasizing the importance of skill enhancement in the dynamic technological landscape. Market demand for IT professionals is also identified as a key factor influencing career choices. Especially young women believe that industry demand improves employment prospects and self-realization. Additionally, the perspective of a relatively high salary in the IT sector is a significant motivator, challenging gender-related stereotypes and reflecting evolving aspirations of women in the industry. The flexibility of the work environment is also highlighted as a crucial advantage, emphasizing the importance of an inclusive and adaptable workspace.

An observed gender disparity in the field has been attributed, in part, to demographic imbalances stemming from past societal factors, notably from statistical disparities between male and female populations due to historical practices like sex-selective abortions. The demographic trends, reflected in the ratio of 40% female and 60% male representatives in the IT field, are anticipated to persist. Forecasts indicate a continuation of the current proportions, potentially skewing even younger, with an influx of 17-18-year-olds entering the industry.

The realm of technical professions historically favored men, but the landscape is changing, witnessing a surge in women choosing IT. Women's preferences lean towards administrative roles, reflecting a focus on family over career advancement. Despite the trends promoting equality, childcare responsibilities often pose a hindrance to career progression, predominantly affecting women due to societal norms and the bias towards women taking parental leave.

Gender disparities within the IT field are apparent, reflecting societal norms and perceptions. Men often face fewer obstacles and societal expectations compared to women, enabling them to navigate professional life more flexibly, including working late hours without concern about family obligations. Moreover, stereotypes persist regarding women's aptitude for technical subjects and their career aspirations, which impact their choices within the IT domain.

The study underscores the impact of societal factors, including the military draft for men and family responsibilities for women, shaping career trajectories within the IT industry. It also highlights the aftermath of the recent war, indicating the potential influx of professionals into the IT sector.

The COVID-19 pandemic reshaped the IT labor market, opening avenues for remote collaborations and global talent acquisition. The hybrid mode of work, while expanding opportunities to cross-border talent acquisition, also accentuates the need for recalibration in skill assessment and training to maintain quality standards.

The display between the development of IT solutions within Armenia and their implementation domestically emerges as a crucial concern. Despite an abundance of skilled professionals, the country's utilization of these resources remains limited, often resorting to outsourcing rather than leveraging local talent.

Female professionals within the IT sector, highlight the persistence of gender-based challenges. These challenges include difficulties in maintaining work-life balance due to demanding project deadlines conflicting with family responsibilities, verbal agreements to delay maternity leave impacting career trajectories, a lack of communities for knowledge sharing among female IT specialists, and stereotypes perpetuated by outdated management models.

However, the most concerning revelation pertains to the prevalence of gender-based violence and harassment within the IT industry. Instances of unwanted comments, physical harassment, and sexual advances mention a hostile environment for some female IT specialists, leading to underreporting due to fears of career repercussions or lack of faith in the reporting process.

While strides have been made in promoting gender equality and opportunities within Armenia's IT sector, persistent biases, societal norms, and workplace challenges sometimes still hinder women's full participation and success. Addressing these challenges necessitates systemic changes, including fostering diversity promoting and inclusive workplace culture, unbiased recruitment practices, and robust mechanisms for reporting and mitigating gender-based issues.

Though the number of female IT professionals has increased, their presence in more senior positions remains comparatively low. Though, a significant cohort of talented young women in junior positions aspires to ascend the career ladder rapidly. International IT firms, often championing a gender-sensitive approach, actively promote female leadership. Some have implemented specific action plans to foster leadership qualities among female employees, aligning with broader initiatives aimed at promoting diversity and inclusion. Female leaders will persist in overcoming obstacles and shattering glass ceilings in the foreseeable future.

Overall, the research revealed, there is a growing realization among women in the IT sector that gender need not impede career aspirations. Many are increasingly focused on their professional growth, spurred by recognition of their capabilities and potential. Forecasts among industry insiders suggest a promising trajectory toward gender parity, currently evident among students where an equitable representation of males and females is being observed in educational settings and intentional efforts are being made to sustain and accelerate this trend.

Recognizing and empowering the influence of women in IT roles is crucial for cultivating a more inclusive, innovative, and balanced industry. This approach is essential to effectively address the demands and challenges posed by the swiftly evolving technological landscape. By ensuring the active participation and empowerment of women in the IT sector, organizations can harness diverse perspectives and skills, ultimately driving greater success and resilience in the face of technological advancements.

The shift towards more inclusive practices in contemporary IT companies is noted as a positive development, contributing to the recognition and acceptance of female IT professionals' capabilities. The influence of major corporations entering Armenia is reshaping norms, advocating against discrimination and harassment, fostering inclusive cultures. In essence, the IT industry's corporate culture, dominant in profitability, propagates its ethos and practices to other sectors, promising a ripple effect of progressive ideologies.

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Annex 1

List of Expert Organizations

Name	Sex	Position
1. Adobe	Male	Team Lead
2. AOD Systems	Male	Chief Officer
3. ASD Systems	Female	Team Lead
4. Brainbees Solutions	Male	CEO
5. CodeInno	Male	CEO
6. Digitain	Male	Team Lead
7. Picsart	Female team	
8. Soft Construct	Female	Head HR
9. Synergy	Female	Team Lead
10. Synopsys	Female team	

List of Educational Institutions:

Name	Sex	Position
Yerevan State University	Female	Lecturer
French University in Armenia	Female	Dean of the IT Faculty
Russian Armenian Slavonic University	Male	Lecturer
Armenian Code Academy Training Center	Male	Trainer