



UMEÅ UNIVERSITY

Skill Dynamics in the Face of Technological Advancements

A Study of Engineering Roles in the Sri Lankan Tech Sector

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Abstract

This thesis investigates how emerging technologies impact the skill requirements for Software Engineers, Quality Assurance Engineers, and Implementation Engineers within the tech industry in Sri Lanka. The study, conducted in a startup tech company, employed thematic analysis on data gathered from ten in-depth interviews encompassing both technical and managerial positions. The findings emphasize the critical importance of continuous professional development for technical employees to maintain relevance and advance in their careers. Key insights include the necessity for tech professionals to stay abreast of rapid technological changes, engage in interdisciplinary learning, and cultivate adaptability to thrive in an evolving landscape. The implications underscore the need for strategic planning and ongoing professional development initiatives in IT Management to address evolving skill demands and ensure organizational competitiveness. The research highlights the dual nature of technological progress, offering both opportunities and challenges, and underscores the importance of proactive skill development and institutional support to navigate the evolving tech landscape effectively.

Keywords: Technical advancements, Skill requirements, Professional development, Technological change, Continuous learning, Career progression

1 Introduction

Based on the integration of advancements in digital domains, recent technological advancements in Technical Employment have brought about a changing atmosphere in industries across the globe. This shift is the era of artificial intelligence, robotics, Internet of Things (IoT), and other digital technologies, and revolutionary regarding the labor market, changing the very nature of jobs, skill requirements of employees, and even the very concept of work (Alsulaimani & Islam, 2022). Because the technological industry adapts and integrates new technologies so rapidly, it appears to be the primary domain of focus when it comes to how these major technical developments affect skilled employment.

Since the advent of the Industrial Revolution, mechanization has replaced many manual laborers in several industries. This period initiated a new era in technological history that eventually developed into the digital age, which began in the mid-20th century and lasted until the early 21st century. As explained by Kurt (2019), the advent of information technology marked the beginning of the network era when the economy was redefined as a network of information and knowledge gained significant attention.

The tech industry is one of the most important sectors in Sri Lanka and the country is growing rapidly in recent technological advancements to become a hot emerging IT industry hub of South Asia (Gunawardana, 2017). The industry's development is associated with global technological trends, hence the surge in the need for software engineers (SE), quality assurance engineers(QE), and implementation engineers(IE). Nevertheless, these professionals are not only merely observers, but they also are active initiators and Developers of the technical innovations which drive the recent technological advancements. In the context of the implementation of multiple technologies into daily functions and product development processes, their roles and responsibilities are changing significantly (Asanka, et al., 2014).

However, SEs who are the backbone of the software that drives the economy must keep up with new programming paradigms, tools, and methodologies. QEs, who were used to testing the quality and performance of the software, are now also involved in testing in high-tech environments and automated solutions that are AI-based or machine learning. Also, IEs need to update their knowledge since they will deploy the integration into the live base. That dilemma was addressed by (Tassey, 2002).

SE, IE and QEs critical parts are emphasized through the participation of those professions in the technologies that define the Recent technological advancements. The adaptation, innovation, and development they exhibit in their roles is crucial to their individual career paths and to the long-term economic and technological development of the country. This master's thesis intends to investigate how these professionals are coping with the threats and opportunities that Recent technological advancements have to offer, unveiling the interplay between technological innovation, skill acquisition, and employment patterns in the tech industry.

The aim of this study is to identify the subtle impact of Recent technological advancements on technical employment in Sri Lanka, focusing on the experiences and opinions of software, quality assurance, and implementation engineers. It aims to inform how these professionals are contributing to and are being impacted by the technological revolution that is shaping the industry. Therefore, the study will help understand the role of technical professions in the promotion to the epochal changes of time, thereby, enriching the comprehensive understanding of the future of work in a global digital economy.

1.2 Background

Recent technological advancements have triggered revolutionary changes on a global scale, impacting working conditions, economies, and societies. It is important to understand how people develop and nurture innovative capacities, the challenges they encounter, and the possibilities for new technical specializations (Petrulia et al., 2016). This modern era is defined by the integration of several technologies, which has profound effects on the labor force, services, and production. Every stage of this technological development has brought about significant changes that have reorganized technical employment duties across industries (Saunders, 2018). Still, there's a chance that the future will somewhat mirror the past. Because of predicted technological advancements, professional and technical occupations will likely increase both absolutely and substantially (Mark, 1987).

In the Sri Lankan context, the tech industry is one of the sectors wherein such global technological trends have been absorbed and utilized to dominate a good part of local and international markets (WBR, 2016). The technology environment of the country is a system of startups, traditional IT firms, and innovation hubs that is a horizontal strategy towards digital technologies and entrepreneurialism. Besides, it is a leading employment and skills and foreign exchange generator for national GDP (WBR, 2016).

Sri Lanka's emphasis on IT and digital services has positioned it as a key player in the world's technology market and has attracted investments and partnerships from all over the globe. It is the actual technical professionals in these roles that are leading this transition in this country. Their work contributes to turning Sri Lanka into one of the global technology suppliers, by means of a program of modern technology creation and implementation (Rassool & Dissanayake, 2019).

Artificial intelligence and the other such technologies are both boon and bane for employment in technical fields. However, these technologies can render traditional roles less relevant and necessitate updates in skills to stay current. While from the point of view

of society this technological evolution can be considered as an opportunity for improving efficiency and as a threat of unemployment and social inequality. From an economic perspective, such shifts might contribute to an economy's strength and ability to compete, but it does strain the workforce which must adapt to changes daily. In isolation, professionals should specialize in a field that requires digital literacy and specialization skills constantly that affect career paths and require life-long learning and adaptability (Alsulaimani & Islam, 2022).

Aim

This research explores the effects of Recent technological advancements on the roles of Software Engineers, Quality Assurance Engineers and Implementation Engineers, skill requirements and employment dynamics of technical professionals in Sri Lanka's tech industry.

1.3 Research Question

What changes in skill demands are observed among engineering professionals due to recent technological advancements in the Sri Lankan Tech industry?

1.4 Contribution

The current study results are expected to make several contributions in various fields. Scholarly, it is a contribution to technology-employment literature by providing clear data and empirical evidence that can be taken as input for further research. Economically the study serves as a repository of the tech companies, especially those in Sri Lanka as it puts forward the evidence-based strategies for managing the workforce transitions in the digital age. Culturally, it enables the policymakers and the educationalists to recognize the job trajectories and to compile related educational programs and policy frameworks to make the workforce agile within the rapidly dynamic technological changes.

2 Related Research

2.1 Introduction

This literature review is intended to investigate the connection between the history of technological progress in the industrial sector and the technological roles in a Sri Lankan tech company. It is dominated by the transformation from mechanical to digital as the primary target is to restructure the economy focusing on knowledge work and its subsequent influence on work skills and the whole working process in Sri Lanka. The review also concentrates on the present implementations of the changes, such as working from home, flexible work structures, and worldwide workforces. Furthermore, it addresses the growth of the roles that have only recently been created due to technological development, namely implementation engineers, data scientists, and cybersecurity experts. This discussion brings to the fore the summary of the main findings and the connectivity of these events to the present technological requirements. This comprehensive approach may serve as a good case in historical and modern theoretical analysis about the Recent technological advancements in Sri Lanka and their contribution to tech employment.

2.2 Changes in Technical Employment Roles and Dynamics

The established exhibits of automation and job loss from manual labor industries to today's knowledge-based tech workplaces tell us that the local economies not only go through global changes but also undergo internal restructuring as low-level jobs are also eliminated in the technical industry. It is mainly due to the progression of industrial development during the Recent technological advancements period and its continuity to the level of the digital age at present (Wilfried, 1989). Hence, this role of technology is to primarily bring about the displacement of the descriptive and mechanical work being replaced by the scientific, cognitive, and collaborative work prevalent in the modern-day economy (George, 2024).

According to Benner, 1999, the industrial production framework was replaced by a knowledge-based economy in nations' labor markets, which clearly demonstrated the benefits of technology and globalization. Involvement in which the human brain has become the operating system in the whole corporate environment and the gradual learning process, and an instrument of constant evolution. An example is the fact that adhering to due process standards takes a business less time when a tech company is at the core of innovation in any given market (Benner, 1999).

During the last few years, the tech industry of Sri Lanka has grown mostly owing to a policy environment established by the government and efforts of universities that mainly focused on Science, Technology, Engineering and Mathematics education. The global scale phenomena are generally reflected in occupational assignments; nevertheless, local educational policies, corporate policies, and economic policies influence the range, with the primary focus remaining on efficacy. The jobs of software engineers and quality assurance engineers have been transformed in Sri Lanka in the same way as the main factors of wider-scale economy and information technology (Aturupane, et al., 2011).

Besides that, the demand for software engineers in Sri Lanka is increasing dramatically as businesses start changing from traditional platforms to digital one hence makes a shift. In Rathnayake's (2016) article, Sri Lankan software engineers cannot afford to think that programming and software development alone is critical anymore to become significant members of their organizations. Instead, they must understand how to translate IT development into business performance measures. This shows that managerial and technical work roles frequently overlap, emphasizing how strategically important it is to have a solid technical foundation.

QA Engineering is a response to the increasing complexity of software development processes nowadays. Today the quality assurance process is more complicated than just looking for bugs. In fact, they include the review of these systems which include security, stability and usability (Autumn & Hurry, 2023). This kind of transformation is proof of the overall transition to a DevOps paradigm, a culture where the line between development, operational, and quality assurance tasks is increasingly blurring, and the single continuous flow of work is escalating (Autumn & Hurry, 2023).

The adoption of the Agile methods has not just led to the transformation of the jobs but also the workflow across the technical positions in the Sri Lankan hi-tech sector (M.M.Safwan, et al., 2013). Agile approaches emphasize a lot of flexibility, teamwork, and customer-driven development. Consequently, engineers are compelled to develop not only technical skills, but also communication, teamwork, and conflict management (Padumadasa & Peiris, 2011). Imparting the breadth effect which in turn enhances the employment rate by virtue of the creation of working environments that emphasize diversity in skill.

Moreover, by way of that, businesses have started to explore the possibilities of integration of AI and Machine Learning systems which is the reason behind the shift of technical job requirements from Sri Lanka (Mozelius, et al., 2011). In the tech industry,

engineers are supposed to be able to work within and understand this complex systems. Furthermore, they should learn continuously, which should be an effort imposed upon professional development experts to learn.

The shifting in technological fields in addition to the fresh dynamics of the technologically oriented Sri Lanka is the reflection of the international push that is based on the legacy of the Recent technological advancements. It implies the skills of a workforce, or soft skills, such as adaptability, life-long learning, and unification of technical capabilities with good business insight will be needed, and they will be coming for a broad and skillful group. (Malik & Wickramasinghe, 2013).

2.3 Technological Advancements

The contribution of technological development to employee participation, especially the one contemporary from the era, must be considered. The emergence of systemic change that resulted in the creation of digital society and labor market and especially the IT sector can shape the perceptual paradigm. At present highly developed software innovations and digital transformation are the significant factors that lead people to the acquisition of new skills, abilities, and labor methods (Ungureanu, 2019).

Nevertheless, in the tech sector, these have been the most principal developments. It is another step in software engineering methodologies which are familiar and applied in the context of rapid and productive development (Ghezzi & Cavallo 2018). Agile in the above discourse by Ghezzi & Cavallo, (2018), agility is one of the innovations. Agile or rapid prototyping is a reaction to traditional waterfall models which had an unacceptably slow pace of technology and market changes. Agile methodologies concentrate on adaptivity and prompt feedback as well as an iterative approach at all high-tech-oriented work (Gochhait, et al., 2022).

Moreover, technological Development focuses on the integration of software development and operations to shorten the development cycle and delivering features, fixes, and updates at the closest link to business needs. This action not only changed the technical skillset and structure of cooperation and organization, but also the organization and cooperation structure of enterprises (Jastroch, et al., 2011).

Additionally, cloud computing has paved the way for three more innovations: scalability, flexibility, and accessibility. Giants like AWS, Azure, and Google being the assets, the democratization of using mighty tools is made possible thus, regardless of company size, one can scale up. They resulted in new roles like cloud engineers and professionals to synchronize and maintain the fog environment (Co & Oh, 2023).

AI and ML are the new horizons in the technology sector, and they are reshaping tech jobs. These technologies are not already helpful in predictive analytics, automation, and both internal and external customer service but also create the need for new skills and problem-solving among the employees in the tech sector. Employees are accustomed to working with AI-driven systems. Being proficient in using these interfaces is the required skill for all people who are applying for jobs at the modern tech workspace (Bulchand-Gidumal, et al., 2023).

Furthermore, mobile and IoT (Internet of Things) technologies amplified the scope of software development in a lot of electronic devices like smartphones, home emergency systems and others. It has become a concern not only for mobile developers and engineers but also for those working in the new areas of IT, such as mobile platforms and IoT (Bhuiyan, et al., 2021).

A consequence of the technological revolution is the redefinition of people functioning, whether they work in the tech sector or not. After transitioning from a traditional industrial setting to an information base underpinning enterprise, a mixture of technical and non-technical roles that require critical thinking, problem-solving, and

continuous learning are in great demand and their numbers are rapidly growing (Gökçearslan, et al., 2019) And, as technology advances and becomes more complex, so will the job nature evolve, leading to a relentless job transformation in the tech industry (Ringberg, et al., 2019).

2.4 Skill Transformation and Evolving Requirements

The presentation of professional skills that range from technical expertise to computer skills perfectly indicates an enormous change in the nature of the job, in a way that it echoes the parallelism of the economy and the knowledge base. For instance, the tech field is the one, in which the trend can be clearly seen in information technology, with all the emerging and innovating technologies that demand Tech industry to work on their skill set to make them more abundant (Green, et al., 2003).

During the past few years, the skill sets and educational requirements of the technology sector in Sri Lanka have gone through a drastic change, as observed by Silva & Amaradasa, (2022), Transformation evaluation shift will be much more sophisticated than just software and system management technical expertise. This reveals that, at this stage, the literacy in technology and cognitive features are unquestionably dependent on each other (Silva & Amaradasa, 2022).

Software engineers are still very important but soft skills have become more important in the last 10 years or so (Ahmed, et al., 2013). Skills like these get more critical when there is a rise in the number of projects involving multiple teams and many disciplines (Keil, et al., 2013). Nowadays, not only individuals with programming skills are being sought, but those who have interpersonal and analysis skills, because it is important to manage teams, understand the needs of users, and know how to work effectively with stakeholders.

Therefore, the other crucial issue is a continuous learning process and an unceasingly alterable adaptation to changes that will come. The rise in competency in learning and adapting to situations has become key requirements of technical skills due to the fast changes brought by technical innovations (Cook, 2019). Lifelong learning is no longer a matter of choice (Cook, 2019). It has been demonstrated by the World Economic Forum's (WEF) report from 2018 that shaping a functioning work world in rapidly developing industries is not possible without a system combining continuous learning and training which are not as static as once was the case (Forum, 2018).

In addition, the development of AI machines and ML in the field could offer employment skills that comprise data literacy and AI ethics among others. The focus on how the integration capability and the transparency of the understanding of the output of an AI employment escalates while not losing sight of the ethical implications is gaining traction (Struensee, 2021).

IT skills needed are no longer only for the narrow and pure technical base talent, but it is also important to be able to think critically and have specific and personal skills. This transformation will lead to new characteristics, like willingness to learn and improve, follow regulations and have good communication skills (Gallagher, et al., 2010).

2.5 Employment Dynamics

The tech sector is experiencing a unique and diverse set of changes as a result of increased technology advancement, globalization changes, and the work culture and employee characteristics (Malaarachchi, et al., 2016). In Sri Lanka the study done on the subject by Malaarachchi, et al., 2016 depicts this in the increase of the number of people working from home and jobs becoming more flexible and working from anywhere in the world.

This signifies a shift towards the responsiveness within the workforce and structure centered around the employee.

Remote Work has sped up because of the development of digital communication technologies which are now more important. These platforms like Zoom, Slack and MS Teams are the major tools to facilitate communication and flaw-free collaboration by those who work remotely (Vartiainen & Vanharanta, 2023). This phenomenon of teleworking is not only about global talent sourcing, but it is also about balancing work and family life situations where both are being valued by employees and in particular in tech where one can be exposed by unforeseen demands at odd hours (Countouris, et al., 2023).

The rising trend of flexible spaces in the technology industry is noteworthy also. The hours of these agreements can be full-time jobs, fixed-term jobs, individual contracts and project-oriented jobs, which provide workers with improved time management and less pressure. This does not only meet the employees' requirements but ensures that companies deploy resources effectively in terms of the projects' ranking and the dynamics of the market (Lehdonvirta, 2018).

Another main problem is the mental health and the work-life balance that employees face in a contemporary workforce. In the era of the digital world, technology companies adapt to the pace of tech-changes and the shifting consumers' demands, but there is a reality that employees and their mental health become more and more important. Observing this trend in tech-related areas with high-stress levels and more complex is very important (Lee & Sirgy, 2019).

Organizations these days continue to develop programs that focus on mental health needs of employees by supplying services like counseling, mental health days off and educating managers on the signs of mental health symptoms and actions of dealing with mental health problems among employees (Alsulaimani & Islam, 2022). Technology companies such as Microsoft and Google are at the forefront in offering mental health resources as part of the employee's benefit packages with the aim of tackling mental health issues at the relevant levels and hence boosting employees' satisfaction and productivity (Wu, et al., 2021).

These initiatives, in a not so roundabout way, not only make employees happy, but also help the company in many ways by using various tactics such as preventing turnover, creating a stable company culture and increasing productivity (Al-suraihi, et al., 2021). Through the mental health initiatives undertaken by tech companies, a lot of issues have been brought to light such as that the well-being of a person at work and the fast-paced innovative environment are not as incompatible as perceived and, as an employer, this becomes the new norm in shaping the work-life dynamics of employees (Al-suraihi, et al., 2021). The statement demonstrates how recent actions of tech companies are shaping the notion of workplaces and mental health. It aims to disprove the belief that a dynamic quick-changing organization cannot have high levels of well-being. These examples demonstrate that it is possible to have a good work-life balance even in fast-paced workplaces. This makes employers realize that it is important to create certain conditions within their businesses that will not only promote the wellbeing of their employees, but also foster the creativity and innovation potential of employees which makes this approach to the management of the work-life relations the new norm.

Transnational movement of the high-tech industry has brought in diversified and inclusive workspaces. The business now is globalized, and the employees are more of a multicultural and diverse composition which requires them to work in diverse environments which are complex. This is especially important in recruitment, assembly of a team, and management process where cultural knowledge and communication skills are given the same importance as other technical abilities (Syed & Tariq, 2017).

Hence, these shifts not only shape but also are shaped by the growing trends in the general society such as collaboration, flexibility, accessibility and interactivity. Yet, tech companies will have to be able to think through these evolving trends since they also probably will be reshaping the presence of workforce among the global technological companies (Kraus, et al., 2021).

2.6 Emerging Job Roles and Pathways

Technological breakthroughs tend to give rise to new job functions in the tech industry and this demonstrates how technology continues to be a major force in business operations. For instance, Waschull and colleagues (2017) offer a case of a new position called implementation engineers some organizations are establishing to help them integrate new technologies into their systems.

Implementation engineers are a critical part in putting the software to use and confirming that it is functioning properly and blending into the pre-existing IT infrastructure, while at the same time adjusting the technology so that it suits the requirements of their organization. Therefore, this role includes both technical skills such as programming and system management, and soft skills like trouble shooting and communication with stakeholders to manage expectations (Owoc, et al., 2021).

Moreover, the growth and development of cloud computing has given birth to cloud engineering and architecture. Mainly, they oversee the creation, running, and management of cloud services platforms and tools. The presence of cloud computing jobs is an outcome of the growing number of firms which consider cloud services as more scalable, responsive, and less expensive than all other computing resources (Yeboah-Boateng, et al., 2014).

To be precise, data science and analytics are now an essential approach to discovering the value of data that modern technologies produce. Data scientists and analysts become strategic players who decode data mysteries and direct decision-making, optimal operations, and customer satisfaction. The significance of these roles has also been increased by the Internet of Things (IoT) and big data technologies which are the growing segments in the business sector (Davenport, 2014).

Another occupation field that has seen an increase in job numbers is cyber security. Digitalization not only enables businesses to run more efficiently but also makes them more vulnerable to cyber-attacks. Cybersecurity specialists are key people implementing companies' data and system security against various threats. Their functions now include cyber security issues, cloud security, data privacy, and regulatory compliance (Saeed, et al., 2023).

Nevertheless, apart from the increasing popularity of mobile devices there have been alternative types of mobile development apps developed. These developers develop their products, especially for those who are still developing as the entire world gets digitized by mobile phones. These mobile developer skills entail programming comprehension and software design along with an understanding of user experience and optimization (Islam & Mazumder, 2010).

The emerging roles underscore a broader trend in the tech industry: together with the increased and higher level of performance of these technologies, some of the technical skills of a higher level are also required. Through these avenues, people are now on the path to these careers, with greater enthusiasm for lifelong learning and professional development and coping with such uncertainties (Souto-Otero, et al., 2023). Colleges, universities, and other companies now prepare specialized programs and certification levels that will help experts get into the high-growth areas jobs (Souto-Otero, et al., 2023).

3 Research Methodology

3.1 Research Strategy

The research strategy of the study was designed based on the interpretivist philosophy and inductive approach, while the main mode of data collection was qualitative interviews. This was a target-based strategy that involved getting information from respondents to collectively characterize the impact of the Industrial Revolution's heritage on modern technical jobs within a Sri Lankan tech company.

The strategy began with a choice of subjects for interviews—these included software engineers, Quality Assurance Engineers, and Implementation Engineers of different levels. This multifaceted community of participants was a great help in creating a rich and complex research base, used to collect conflicting opinions and different ideas, thereby enriching the information with various experiences and views. Pre-determined questionnaires were not used. The interviews were semi-structured, ensuring that the participants could talk about certain aspects while also allowing ample space for further discussion.

Qualitative analysis and data collection techniques were deployed and implemented in the next step of thematic analysis. With software like MAXQDA, the replies were converted into codes, and similar themes emerged in the interviews.

The survey played a critical role in this research study by serving as the primary method for data collection to gain insights into the roles, experiences, and perspectives of potential interviewees within the Sri Lankan tech company. To give a thorough knowledge of the company's policies and processes, a varied set of participants, including software engineers, quality assurance engineers, implementation engineers, and managerial positions was chosen by deliberate sampling based on the survey results. The data from the survey was analyzed using thematic analysis via MAXQDA software. This involved identifying, interpreting, and documenting specific thematic patterns in the data collected from the survey responses. By employing thematic analysis, we were able to extract meaningful insights and patterns from the survey data, which laid the foundation for the subsequent in-depth interview questions and enriched the overall research findings.

Through the use of the qualitative findings, which were the interpretive results of the individuals, both analytical techniques and the individual interpretational results of the project were brought to the fore to show how broader social impacts affect professional virtues. The holistic merging of several data sources and tools was the crucial portion that helped to get to the main research points. This combination provided the researcher with comprehensive knowledge of the long-term effect of technological changes from the industrial past to contemporary technical job patterns.

3.2 Introduction

In determining the research approach and methodology for investigating the impact of recent technological advancements on technical employment within a Sri Lankan tech company, the choices have been guided by the specific purpose and research question at hand. Given the multifaceted nature of the inquiry into the roles of software engineers, quality assurance engineers, and implementation engineers, the study employs a structured interview approach, interpretivism research philosophy, inductive approach, and thematic analysis to understand the complex connections between historical industrial progress and modern technology jobs, providing a comprehensive understanding of these events. Furthermore, the flexibility of a thematic analysis design allows for agile adjustments to capture the dynamic nature of the tech industry, ensuring that the study remains relevant and insightful. Ultimately, this approach is poised to offer

valuable insights into the evolving landscape of technical employment in Sri Lanka's tech sector.

3.3 Research Philosophy – Interpretivism

Interpretivism has been chosen as the guiding philosophy of this research to find out more about the subjective experiences and semantic implications the engineers in the tech-industry gave in connection with the industrial movement. Interpretivists argue while there are universal factors, it is social processes that come into play to produce existence. It is generally expressed through the influence of the reality of the world on the individual truth in the parameters of human and social life. However, it ponders the decomposition of these positions and the socio-cultural conditions altered by the Recent technological advancements.

3.4 Research Method - Qualitative Methodology

The research uses a qualitative approach in which there is a possibility to succeed in getting a very detailed view of how the Recent technological advancements affected the technology in a Sri Lankan Tech company. The methods of Qualitative are represented by a comprehensive analysis of the context and serve better to figure out what role history plays in contemporary workplaces.

The qualitative research utilized in this case is the structured interviews that are mostly used to reveal subjects' perception, attitudes, and feelings in the working environment. Such time provides software engineers in the development, quality assurance, and implementation departments an opportunity to carry out their thoughts freely. This privilege gives them more space to unfold the different colors that affect their functions. The semi-structured interviews then yield the freedom of follow-ups and dealing with crucial moments right there and then, ensuring the interviewees' views are completely understood.

Obviously, these results can be developed, however, at the same time, they have been built and tested within a certain organization and country context rather than in other technology industries or different cultures. This sort of deliberate focus enables the reader to explore the respective associated challenge and role type-specific adjustments relative to technological development, and this results in more refined perceptions, which are very important for some groups of professionals in the firm and the context of operations chosen.

3.5 Company Background

For our study, we selected a fast-growing startup in Sri Lanka known for its strong reputation in swiftly adapting to digital advancements. This company's dynamic environment and innovative approach made it an ideal candidate for our research. After obtaining permission to conduct our thesis with them, we initiated a survey aimed at identifying suitable respondents for our interviews. The survey was designed to gather insights into the roles, experiences, and perspectives of potential interviewees, ensuring a diverse and representative sample. Using purposeful sampling based on the survey results, we selected individuals who could provide the most relevant and insightful information for our research. Our final selection included two software engineers, two quality assurance (QA) Engineers, two implementation engineers, and four individuals in managerial positions. This diverse group provided a comprehensive understanding of the company's strategies and practices from multiple professional angles, enriching the depth and quality of our research findings.

3.6 Data Collection

The interview method of data collection was the main method for this research since it was the fundamental approach to gathering rich, well-experienced insights, which were from the various perspectives of the engineers who contributed to the research. The interview method by far was the most flexible and comprehensive approach that inquired manifold facets to reveal the subjective context as well. Based on the survey results, it formulated the research questions. The survey comprised 31 inputs, which facilitated the creation of interview questions.

The interviews offered the chance to add a personal touch in talking about different aspects of work, workplace context, and technology enhancement, etc., and also expressed respondents actual thoughts and feelings in an actual discussion. By means of this very technique, the researchers could study the responses in detail and ask follow-up questions that made the us able to get at some more subtle details and underlying issues. The engineers could understand, as well, along with how the technological advancements had come out to compare with the current role played by branches and their transactions, tools, and organizational structures.

Moreover, the qualitative design of interviews was in agreement with the context of our study that fell under the interpretive paradigm, which could collect and analyze views of technical stuff. Participants were allowed to share their thoughts and experiences through interviews, and that was why they could deliver the relevance and impact of history in their practiced culture. This was the basic foundation of this work because it enabled the authors to have a better understanding of the impacts of industrialization on technical jobs in Sri Lanka at that time, it gave the power to the writing as it was based on true stories.

3.7 Interview Time and Background Table

Date	Duration	Participant	Designation
2024 April 15	29 min	Respondent 1	Implementation Engineer
2024 April 16	13 min	Respondent 2	Implementation Engineer
2024 April 17	34 min	Respondent 3	Senior Architect [The field of Management]
2024 April 17	16 min	Respondent 4	Associate technical lead. [The field of Software Engineering]
2024 April 22	15 min	Respondent 5	Quality Assurance Engineer
2024 April 30	19 min	Respondent 6	Project Manager
2024 May 01	18 min	Respondent 7	Quality Assurance Engineer
2024 May 09	11 min	Respondent 8	Senior Software Engineer
2024 May 09	20 min	Respondent 9	Project Manager
2024 May 09	42 min	Respondent 10	Project Manager

3.8 Data Analysis Methods – Thematic Analysis via MAXQDA

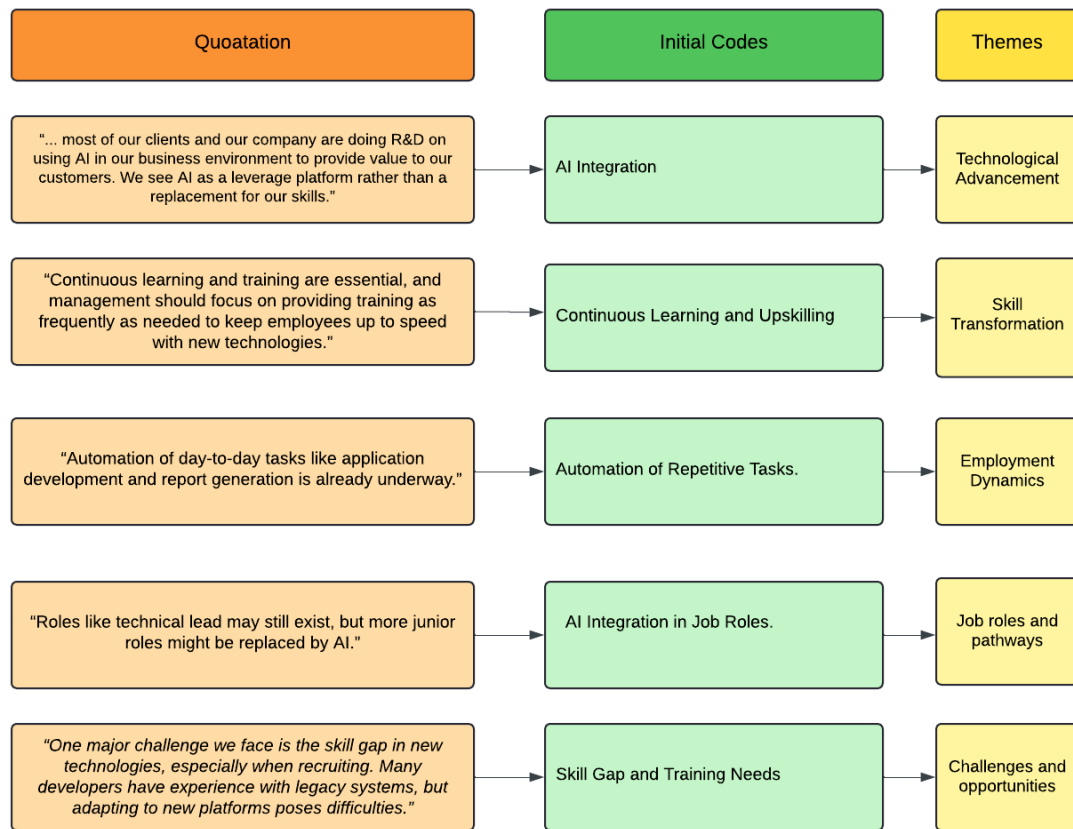
Thematic analysis was the method chosen for the analysis of the qualitative data due to identification, interpretation, and documentation of some specific thematic patterns in the data. It involved a rather complicated process which included the understanding of data parameterization, coding, generating, among other processes and then converting it. For the purpose of analyzing the interview data collected in the course of this work, thematic analysis was used to have a better understanding for the overall outcomes of the given research. Modern technical positions in tech companies in Sri Lanka can be seen as universally relevant.

The MAXQDA software also enhanced the level of credibility and the accuracy of the proceedings. The software together with referring to the transfer of various quantities of text data into related forms assisted people with precise operations of labeling; encoding; classifying; and, surely, controlling the information. Coding was the categorizing of various codes after noting down important/repeated themes within the data and assigning them meaning.

The coding followed by the MAXQDA was then used for the analysis and the presentation for the graphic display for the codes from the addressee lines. Themes in the case referred were the theme organized the meaning or message in the data collected. This one was further validated and refined to make it a more accurate and reliable representation of the observed data. The main positive feature of thematic analysis was that it could be applied using an inductive approach.

In addition, our data analysis process involved a comprehensive approach that delved deeper into the collected data. After coding the data using MAXQDA, we conducted a thorough examination of the emerging themes and patterns to extract meaningful insights. This involved a meticulous review of the coded data to identify connections, discrepancies, and recurring motifs. Furthermore, we engaged in a process of constant comparison, where we compared different data points to uncover relationships and draw out nuanced interpretations. We were able to improve our comprehension of the data and create a compelling story that captured the details of the research findings through this iterative analysis process. Additionally, we employed techniques such as memo writing to document our reflections and insights throughout the analysis, providing a transparent account of our analytical journey and decision-making process. By actively engaging with the data beyond the coding stage, we ensured a robust and thorough analysis that captured the depth and intricacies of the research outcomes.

Figure 1. Coding Tree



3.9 Ethical Consideration

The ethical aspects of this study were also highlighted to protect the dignity, rights, and welfare of all the participants as the prime responsibility, as per the guidelines based on the Swedish Research Council's guidelines for ethical consideration in research (Council, 2024). Before the interviews, informed consent was received, explaining the purpose of the research, procedures, potential risks, and benefits of the study. Data confidentiality was ensured with the implementation of anonymization of participant data and secure storage of all information to maintain privacy. Additionally, the participants were informed about their right to withdraw from the study at any time without any penalty. The application of those ethical principles was validated at every stage of the research process, from data collection to publication, strengthening the researcher's commitment to ethical standards.

4. Results

The influence of recent technological advancements on technical employment was explored through interviews with software engineers, quality assurance engineers, implementation engineers, and managers. The results reveal varied reflections from these professionals, highlighting significant changes in their roles, responsibilities, and job satisfaction. Software engineers emphasized the impact of automation and AI on coding efficiency and problem-solving capabilities. Quality assurance engineers discussed the shift towards continuous integration and automated testing. Implementation engineers

noted improvements in deployment processes due to advanced tools, while managers reflected on the challenges and opportunities brought by these technologies in terms of team dynamics and project management. These insights provide a comprehensive understanding of how technological advancements are reshaping the technical employment landscape.

4.1 Theme 01 – Technological Advancements

4.1.1. AI Integration

Interviews revealed significant insights into AI integration. R1 discussed the emulation, evolution, and incorporation of AI into IT, emphasizing that AI is seen as a tool for expanding business capacities rather than devaluing expertise. Their company and clients are involved in R&D to optimize AI for business strategy and stakeholder utility (Zirar, Ali, and Islam, 2023).

“... most of our clients and our company are doing R&D on using AI in our business environment to provide value to our customers. We see AI as a leverage platform rather than a replacement for our skills.”

R3 highlighted AI's role in ERP systems for generating emails, presenting AI solutions, and analyzing big data to anticipate market behaviors, which helps tailor products and services.

“...We utilize AI-generated emails, AI solutions, and big data analysis for predicting market behaviors. Our cloud-based applications cater to over 500 clients, ensuring reliability and maintenance.”

4.1.2. Automation Tools

Respondents leverage technology solutions to optimize processes and improve productivity. They enhance automation within their processes to achieve better scalability while maintaining agility in constantly changing environments (Filippi, Bannò, and Trento, 2023).

Respondents discussed using automation in application development and report generation, with ongoing tests for chatbot tools to automate support tasks (Josten and Lordan, 2022). R5 shared their use of automation tools like Selenium, Cucumber, JMeter, TestRail, JIRA, and BrowserStack, which decentralize testing facets and are more convenient than manual testing.

“...We use Selenium, Cucumber, JMeter, and other test management tools like TestRail, JIRA, and BrowserStack to automate processes.”

4.1.3. Cloud-Based Solutions

Software Engineers use cloud platforms such as AWS or Azure to ensure elastic organizational infrastructures and services. QA testers work on cloud testing platforms like BrowserStack or Sauce Labs, and use cloud-based test management tools like TestRail or JIRA for tracking test cases. Implementation Engineers deploy cloud infrastructure to handle large data volumes and provide simplified deployment solutions (Avram, 2014).

R8 noted that cloud-based ERP systems, along with DevOps and agile methodologies, have shaped their company's evolution and adaptation.

“...With cloud computing, DevOps, and agile methodologies, implementation engineers now play a more integral role in deploying and maintaining complex systems, requiring diverse skills in cloud technology and infrastructure as code.”

4.1.4. Advanced Testing Frameworks

Advanced frameworks ensure smooth and efficient IT infrastructure deployment. Managers implement and incorporate better test paradigms into product development, ensuring consistent quality assurance (Lechler, 2019).

Only Quality Assurance Engineers had adopted these frameworks. R5 detailed advanced testing tools like Selenium for web applications, Cucumber for behavior-driven development, JMeter for performance testing, and BrowserStack for cross-browser testing on virtual devices. R7 concurred, noting these tools improved their test practices.

4.1.5. Big Data and Predictive Analytics

Software Engineers use big data frameworks like Apache Hadoop or Spark for processing large data amounts, designing systems to identify patterns and enhance functionality (Bagriyanik and Karahoca, 2016). QA Engineers use big data analytics for test data analysis, promoting an analytical approach to ensure comprehensive test coverage. Tools like Splunk or ELK stack are used for logs and performance testing (Ji et al., 2020).

One Respondent highlighted big data and AI solutions in their ERP system for predicting market behaviors and making informed business decisions.

“...We use AI solutions and big data analysis for predicting market behaviors. Our applications are cloud-based, ensuring reliability and easy maintenance.”

4.2 Theme 02 – Skill Transformation

4.2.1. Continuous Learning and Upskilling

Implementation engineers, quality assurance engineers, and software engineers in technical firms emphasize continuous adaptation to technological progress. This involves coordination with other departments and inviting trainers for workshops on AI and cloud computing (Li, 2022). Implementation engineers stress frequent training sessions and use web resources like Udemy and Codecademy for self-learning. QA engineers seek further qualifications, such as ISTQB certification, and take courses related to AI and automation testing. Software engineers invest in up-to-date knowledge through conventions, online classes, and workshops to stay current with new architectural patterns and AI tools. This approach ensures professionals continually update their skills to enhance competency in their industries.

R1 emphasized, “Continuous learning and training are essential, and management should focus on providing training as frequently as needed to keep employees up to speed with new technologies.”

R9 noted, “Our company addresses potential job displacements and upskilling needs by offering comprehensive training programs focused on emerging technologies like machine learning, cloud computing, and cybersecurity.”

4.2.2. Training Programs and Courses

Technological advancements have made training programs crucial for enhancing the skills of implementation engineers, QA engineers, and software engineers to increase performance and efficiency (Anantatmula, 2018). Project managers ensure effective training by working closely with cloud computing firms to train teams on AI, cybersecurity, and data analytics. Implementation engineers attend programs to learn tools like Jenkins and Azure DevOps. QA engineers credit classes like ISTQB and additional education in AI and automation testing for advancing their testing capabilities. Software engineers use platforms like Udemy or attend workshops to learn new architectural patterns and AI applications, keeping teams relevant and promoting innovative thinking.

R3, R6, R9 and R10 facilitate training programs with industry experts and partnerships with cloud computing firms.

“We conduct regular appraisals and provide training sessions and workshops with industry experts to keep employees updated with the latest technologies,” R3 stated.

4.2.3. Use of Online Learning Platforms

R1 and R2 emphasized using online platforms like Udemy and Codecademy for continuous learning.

“Apart from self-learning, we encourage using platforms like Udemy or Codecademy,” said R1.

R4 and R8 stated that they also leverage platforms like Udemy to learn new architectural patterns and frameworks.

“Sometimes I use online platforms like Udemy to learn new architectural patterns or frameworks,” noted R4.

4.2.4. Adaptation to Technological Change

Continuous learning and adaptability are crucial for implementing new technology projects (Trajchevska, 2022). Active learning and role flexibility enable seamless integration of new technologies. Every occupation acknowledges the need to stay compatible with technological advancements, including preparing for AI-enabled alternatives, automation, and cloud operations.

“The company supports employees in adapting to technological shifts by providing technical workshops and encouraging new technology adoption through incentives,” stated R1.

R5 shared, “Integrating automated testing tools like Selenium into our development cycle enabled us to automate regression testing and continuous integration, resulting in faster deployment cycles.”

4.2.5. Emerging Technologies

Respondents (R3, R6, R9, R10) focus on emerging technologies like machine learning, cloud computing, and cybersecurity in their training programs.

“Integrating emerging technologies into products and services increases the demand for specialized skills in AI, cybersecurity, and data science,” R3 highlighted.

Respondents (R4, R8, R7) also express interest in advancing their skills in AI, automation testing, and new technological frameworks.

These observations demonstrate a shared commitment across various technical roles to continuous learning, adapting to technological advancements, and focusing on emerging technologies to enhance professional capabilities and remain competitive in the evolving tech industry.

4.3 Theme 03 – Employment Dynamics

4.3.1. Automation of Repetitive Tasks

Technological advancements in automating tasks significantly enhance efficiency in technical employment by minimizing repetitive jobs. This allows workers to focus on higher-level, more impactful efforts.

R1, R2 and R5 discuss how AI and automation tools handle repetitive tasks, enabling them to concentrate on more complex activities.

“...With AI, we can address repetitive tasks and offload a portion of our manual work.”

“Automation of day-to-day tasks like application development and report generation is already underway.”

“I expect AI to take over routine tasks, allowing me to focus on complex test scenarios.”

4.3.2. Focus on Creative and Critical Tasks

Automation reduces time spent on routine work, enhancing creative and critical thinking skills. Robotic process automation and AI technologies allow professionals to focus on exploratory and higher-level work.

“We encourage leveraging automation for repetitive tasks while emphasizing human intuition, critical thinking, and driving innovation.”- R6

“Automation initiatives, like application development coding and report generation, are in the testing phase, shifting focus to more critical tasks.”- R10

4.3.3. Efficiency in Development and Testing

R3, R9 and R4, R8 note that AI tools like GitHub Copilot and SonarQube improve coding efficiency, streamline development processes, and enhance report generation.

“Automation tools have streamlined development, allowing engineers to focus on creative problem-solving rather than routine tasks.”- R9

“We’ve implemented code-checking tools like SonarQube and AI tools like GitHub Copilot to identify and resolve issues early on.”- R3

4.3.4 Enhanced Data Analysis and Decision-Making

Technical solutions enhance decision-making through improved data analysis. Tools and software like big data analytics platforms and AI efficiently process large data sets, supporting better decisions.

“Automated report generation systems gather and analyze data in a timely manner, freeing up valuable time for analysis and decision-making.”- R8

These observations reflect a shift in employment dynamics where the integration of AI and automation tools transforms job roles, emphasizing efficiency, creativity, and higher-level problem-solving.- R2

4.4 Theme 04 – Job roles and pathways

4.4.1 AI Integration in Job Roles

The integration of AI in jobs involves deploying AI solutions to support workers and organizations in accomplishing various tasks across multiple fields. AI can handle tasks like coding, report generation, and data analysis more efficiently than employees. This shift enhances efficiency and redefines job roles, requiring professionals with skills in AI and data science, thereby changing technical employment dynamics in a specialized and strategic manner.

“...I could see AI taking over the IT industry. So, we would have to adapt. I don't think it would threaten all IT roles, but it would help us do things more proactively and efficiently. All roles would use AI in the future.”- R1

“Roles like technical lead may still exist, but more junior roles might be replaced by AI.”- R4

4.4.2 Continuous Learning and Skill Updates

Continuous learning and skill updating are crucial for every technical specialist due to the dynamic nature of the employment market. Education helps professionals manage complex issues, solve them, and develop creative solutions that align with organizational goals. Self-development also aids in career growth by preparing individuals for changes in skill demand, encouraging them to seek new positions.

- R5: Necessity of updating knowledge every day.

“Technologies are evolving and updating every day. I need to update my knowledge daily, which can be challenging but is necessary.”

4.4.3 Interdisciplinary Collaboration

Interdisciplinary collaboration involves cooperation between colleagues from different fields to handle problems or achieve objectives. This approach fosters creativity, innovation, and improved problem-solving skills by integrating specialized knowledge to offer unified solutions. Multidisciplinary operations are crucial in modern technical settings, where technologies like AI, data science, and cybersecurity require knowledge across various fields.

- R6: Emphasis on interdisciplinary collaborations.

“We anticipate a lot of evolution in technical employment due to technological advancements, with greater emphasis on interdisciplinary collaborations and the integration of emerging technologies into products and services.”

- R9: Greater emphasis on interdisciplinary collaboration and cross-functional teams.

4.4.4 Automation and Workflow Optimization

Automation enhances workflow processes by efficiently gathering, analyzing, and presenting data, aiding in decision-making and increasing productivity.

“Automated systems for report generation can gather, analyze, and present data in an organized and timely manner, aiding in decision-making processes and optimizing workflow.”- R2

“I've implemented natural language processing tools to automate tasks like text summarization and sentiment analysis, streamlining the handling of vast amounts of textual data.”- R8

4.4.5 Emerging Technologies and Specialized Skills

Emerging technologies like AI, big data analysis, and cybersecurity are shaping future technical positions. Specialization in these areas is essential to meet market trends, involving proficiency in AI for problem-solving, analytics, and security measures. These roles require ongoing training and education to integrate new technology into products and services, targeting specific technologies and addressing unseen needs to stay relevant.

“We will focus more on data science and AI, leveraging big data for predictive analytics and AI-generated content.”- R3

“We anticipate significant evolution in technical employment due to technological advancements, emphasizing interdisciplinary collaborations, integration of emerging technologies, and growing demand for specialized skills in AI, cybersecurity, and data science.”- R6

These insights reflect the evolving nature of job roles and pathways, driven by AI integration, continuous learning, interdisciplinary collaboration, workflow optimization, and specialization in emerging technologies.

4.5 Theme 05 –Challenges and Opportunities

4.5.1 Adaptation to New Technologies

Various reasons make situations involving the changes in technologies challenging for different jobs in technical employment.

R1- integrate new technologies like AI and automation into business processes to improve operational efficiency and reduce manual tasks. *“So in my industry, I would say I've been seeing AI that could code right now, and there's lots of technologies coming up with no code that require less coding requirements. So it's either we have to adapt or just research on those fields and find out how we please ourselves among other competitors because we have to keep ourselves notified of how our competitors use those platforms, and we have to make changes and adapt ourselves to keep our leverage in this ever-changing technological industry.”*

R6 -oversee the adoption of emerging technologies within projects, ensuring they meet business objectives and enhance productivity through innovation. *“Rapid technological changes pose a challenge for companies’ technical employment, and job displacement is a recurring challenge.”*

Areas of skill shortfall and training opportunities therefore pose real issues in organizational and technical employment requirements for jobs in technical employment in various fields and industries (Pauliina Rikala et al., 2024). To close these gaps, one must take formal courses or pursue supplementary learning in the form of training, seminars, or personal development to sharpen the skills and keep up with the current progression of technology. The technical skills may also be missing when one moves to a different technology type like the use of artificial intelligence or cloud computing which might need one to go back to training again to get skills on how to deal with the various technologies.

Identifying and managing weaknesses of skills and training Activities calls for active participation from the leaders in an organization. Another factor in addressing issues that arise from large numbers of employees is to offer numerous training programs, mentorship, and various kinds of personal development initiatives, which allow freeing up time for learning in the framework of career development (Sekar, 2024). Through encouraging enterprise learning, and for delivering strategic training to its technical staff, organizations can ensure the fast and flexible adjustment of its technical personnel amidst the changing requirements in the industry.

R3- They organize training sessions and knowledge transfers to upskill teams on new technologies and bridge skill gaps, especially focusing on data science and AI.

“One major challenge we face is the skill gap in new technologies, especially when recruiting. Many developers have experience with legacy systems, but adapting to new platforms poses difficulties.”

R8- They enroll in courses to learn advanced coding techniques and new architectural patterns to stay updated in a rapidly evolving tech landscape.

4.5.2 Job Displacement Concerns

This issue of job insecurity has implications for the technical job roles and more broadly for technical employment. Technologies like AI and automation can pose a threat in displacing these positions because they will become obsolete due to the efficiency of these technological developments. (Hötte, Somers and Theodorakopoulos, 2023).

R4 - They anticipate potential role transformations due to advancements in AI and automation, preparing to adapt their skills accordingly to remain relevant. *“The challenge is that advanced AI could potentially replace developers, but the opportunity lies in leveraging human creativity and problem-solving skills alongside AI.”*

R9 - They strategize on how to mitigate job displacement risks by aligning workforce skills with emerging technologies and fostering a culture of continuous adaptation. *“One of the main challenges our company faces regarding technical employment is the rapid pace of technological change. Keeping our workforce up to date with the latest skills and technologies while addressing potential job displacements remains a constant challenge.”*

4.5.3 Enhancing System Performance

Improving and optimizing system efficiency is a problem when performing job responsibilities in the technology sector because nowadays there is a high expectation and requirement for the effectiveness and dependable performance of applied technology. Many stakeholders have expectations to meet, including technical employees who are constantly striving to optimize systems to suit the changing technological environment.

Using innovation to optimize system performance and productivity that includes applying Artificial Intelligence and automated systems is one opportunity highlighted.

R2- They utilize AI and automation to optimize system performance and streamline operations, aiming to improve overall efficiency within their domain.

R8- They integrate AI-driven solutions to enhance system performance, scalability, and reliability, ensuring robust software architecture and improved user experiences.

4.5.4 Security and Performance Testing

Security and performance testing are two areas that present a challenge to employment in technical jobs because they consider multiple aspects. As it often happens in cases where enhanced security measures must be implemented while retaining good levels of System-related performance, it is crucial to consider this situation prior to its actual occurrence.

R5- They implement automated testing tools for security and performance testing, ensuring software products meet rigorous quality standards and are resilient against cyber threats. *“I would say it's performance and security testing. So far, security testing I have done only manually, but automating such a thing could be really difficult and. Performance testing is quite OK when compared to security testing, but I think that security testing is more challenging and it's crucial”*

R4- They develop and integrate AI-based solutions for automated security testing, focusing on enhancing application security and reducing vulnerabilities.

5. Discussion

This study seeks to establish the impact of the current influx of changes in various technologies on the Software Engineers, Quality Assurance Engineers, and Implementation Engineers and the nature and demand for the skill sets, employment opportunities of technical personnel in Sri Lanka. Thus, through an analysis of the interview results, one can engender recurrences and patterns that reveal how best those roles have been transformed with changing technology dispensation and what vices and virtues came along with the transformation.

Impact of Technological Advancements on Job Roles

The development and implementation of advanced technologies such as artificial intelligence, automation and big data analytics has led to changes in the Organization of work and responsibilities of the software engineers. Some of the benefits include assisting in giving useful recommendations to improve coding velocity and reducing time-consuming tasks like debugging and coding implementation, which can be facilitated by tools like GPT models (R4). But it is possible to mention that these advancements also have their drawbacks that have to be faced, for instance, the potential job displacement of junior positions by AI-based solutions (R4). They are also utilizing automated report generation systems to analyze the data. Analysis of data is automated consequently more time is available to engage on other difficult coding and integration tasks (R8).

In comparison with the above results of the current review, it was found that technology increases work complexity, workload, and role expectations, leading to increased job speed and workload pressure. Employees need strategies to manage these demands, take responsibility for their professional identity, and adapt to constant availability, flexibility, and learning opportunities (Beer and Mulder, 2020).

Another study by Torosyan et al explored the impact of technological change on similar occupations and their implications for employment alternatives. It uses Principal Component Analysis to cluster 756 occupation titles based on knowledge, skills, abilities, education, experience, training, activities, values, and interests. The results show significant job losses in low-skill, low-wage occupational groups, while many mid-skilled and highly skilled jobs are projected to grow. The study concludes that the occupational

classification scheme is useful but suggests a need for skills upgrading and workforce development for workers in declining jobs, especially vulnerable workers like older individuals and minorities (Torosyan et al., 2023).

Skill Requirements and Continuous Learning

Since the adoption of technology is inevitable, it is imperative that current and new employees remain relevant and constantly learning and absorbing more knowledge about their respective fields of technology. Most of the Implementation Engineers pointed out the necessity of training and developing their human-capital including learning new technologies, especially those involving artificial intelligence and automation (R1, R2). They recommend online learning tools including but not limited to Udemy as well as Codecademy and ensure that one is updated with the latest trends (R1). Likewise, the Project Managers put in place sound training initiatives to close skills and experience gaps and to make sure their teams have the necessary competencies in those areas (R3, R6, R9). They also engage third-party industry and working professionals to guarantee relevant learning is continually offered.

Quality Assurance Engineers and Software Engineers also recognize the importance of continuous learning. QAs plan to pursue advanced courses and certifications to keep their skills up to date (R5, R7). SEs use online platforms to learn new frameworks and tools, ensuring their skills remain relevant in the face of rapid technological change (R4, R8). The overarching theme across all roles is the necessity of staying agile and adaptable through continuous learning to meet the demands of the evolving tech landscape.

A similar study done by Ra et al., (2019) discovered that the technological advancements are causing a rapid change in specialized skills demand, reducing their shelf life. To adapt, it's crucial to unlearn old technologies and relearning new ones. New technologies offer innovative education methods, but cultivating learnability is crucial. Continuous learning is necessary for both current and future workers, and existing education systems alone are insufficient. A learning society is needed.

Also, (Beer and Mulder, 2020) had a theoretical framework developed to understand the relationship between technology and work characteristics like complexity, autonomy, and meaningfulness. A systematic literature review of 21 studies revealed an increase in complexity and mental work with automated systems and robots. Workload and workflow interruptions increased with autonomy, especially with digital communication devices. Role expectations and development depend on the relationship between technology and profession. Implications for formal learning environments include incorporating work demands, equipping teachers, and using flexible instruction models.

Employment Dynamics

Currently, Implementation Engineers commonly dubbed as IEs are finding new ways of navigating through and incorporating AI and automation in business. Concerning the integration, this objective seeks to minimise consumption of time on mundane issues and optimise business working (R1, R2). IEs are much more involved in engaging AI tools with the primary goal of automating the repetitive work that is left for managers such as making reports, developing applications and so on which optimizes processes and makes decision making easier (R2). However, managing new technologies, where one can spend a considerable amount of time updating themselves with the new technologies, it was cited that time was a major constraint in doing this (R1, R2).

It is essential to learn as a professional and advance training, especially in the current world that is dominated by technology. Implementation Engineers stress the importance of continuous learning and development with special reference to new concepts, products and information including those on AI & automation (R1, R2). According to them, people should also embrace the concept of online learning such as

from Udemy and Codecademy websites in order to catch up with the rapidly changing trends (R1). In the same manner, PMs support the conduct of essential training activities to remove skill differences and guarantee that their teams have the proficiency in the technologies utilized in the projects (R10, R10, R9). They also need to link up with other industry players and entities to facilitate ongoing learning.

Other professionals that are categorized by the Job Portal include Quality Assurance Engineers and Software Engineers, and all these agree to the fact that there is always something new to learn. QAs will agree and intend to further their knowledge and gain more certification programs in order to accommodate the updates in the field (R5, R7). The rise of technology compels SEs to update their knowledge through online mediums in order to ensure that they are of optimal standard (R4, R8). The common thread running throughout all these positions is the need to be adaptable and to remain throughout one's career currently to learn constantly so as to meet the new changes in the modern world of technology.

Challenges and Opportunities

Technology advancement is a problematic success in that there cannot be advancement in technology without advancement in its challenges or issues. One of the significant factors of business exposed in the case study is the continuous advancement of the software technologies in which people have to grasp the need to familiarize methods and in fact incorporate software into the prior processes (R1, R3, R5, R8). Another major disadvantage is that due to the differentiation of skills the broader gap in IT of higher levels may lead to even greater problems in new technologies such as AI and cloud computing. Employers are aware of the importance of initiating proper training programmes which should enable employees to be trained and improved to address this shortcoming as averred by Programme Managers (R3, R6, R9).

Nevertheless, as will be discussed now, there are several possible developments associated with technology growth. Higher and higher VAI(Virtual Assistant Interfaces) and automation and AI experts perceive as increasing the efficiency of the system to address further and more intellectual activity (R2, R8). On demand, probable solutions, and scalability provided by cloud computing let companies to utilize solutions and perhaps enlarge systems with minimum effort (R3). Furthermore, big data analysis makes decision making and development of strategies and other plans to be implemented from strategic management easier and effective Graduate (R3, R6).

6. Conclusion

This paper aims to reflect on the current changes in the specified technology profession roles of the Software Engineers, Quality Assurance Engineers, and Implementation Engineers in Sri Lankan IT sector. Reasons include these advancements that have resulted in changes in the job descriptions, skills demands and employment characteristics. It is imperative to continue learning and training in order to overcome these changes, which are not necessarily negative as they bring about the possibility of growing new ones; some of the challenges that are found to be a result of changes include job loss and lack of employable skills. Hence, one can agree that by incorporating these technologies and constantly learning, technical skilled personnel would attain the flexibility and search for constant change that is characteristic of this field. Specifically, gaps in knowledge and competency conforming to modern trends such as AI and automation emerged. Consequently, the process of professional development through learning and skills enhancement has become a necessity among professionals to address the emerging trends. While organizational training and development efforts are an essential means of filling these gaps, training programs and courses available through online sources such as Udemy are also effective. Further, the fear that the increase in efficiency through the use of AI and automation may result in people losing their jobs

especially in repetitive tasks is also common. In this scenario, AI is deemed to replace junior workers but it concurrently points to the fact that the nature of work changes with the progress of technology hence a call to upskill in looking for other roles that are created by advancement in technology.

Through technology, experts are able to achieve innovative and analytic nature of work. It has been found quantifiably increases productivity and gives workers more time to focus on problem solving and creativity. Furthermore, employment of big data analytics and AI in the analysis of big data will continue to improve how the data is collected and analyzed and used in devising efficient ways of decision making hence increasing the competitive advantage of the technology markets. Based on the above conclusions, one can discern that the progression of technology contains threats as well as opportunities in the context of year-2000 Sri Lanka for technical professions. One can also continue with the learning process to build competency in new technologies that appear in the market. The benefits, such as efficiency, accuracy, and good decision-making, are clear in the matter. The vision that is being shown for the future of work is characterized by automation and the introduction of artificial intelligence to various companies, which in turn alters the types of jobs that are available and the ways in which the economy can be developed.

Altogether, based on such conclusions the following advice can be suggested for the stakeholders: Thus, for truly concerned companies the need to upscale continuous training to help regimes back up the gaps to a certain level cannot be overemphasized. Incorporators with education and relevant training from such educational platforms as well as industry big players can enhance learning and flexibility in the organizations. Further while adapting AI and automation tools in the companies to improve performance and productivity, particular attention should be paid to training the personnel to perform new tasks. For the employees, the process of learning and training must be seamless to ensure that they align with the changes that are taking place within the technological sectors. The incorporation of technology through the learning management system as well as MERS and other company-sponsored training can help to capitalize on opportunities presented by AI and automation by redirecting employees' efforts towards more valuable work that relies on creativity and analysis. Introducing the topic concerning the curricula in educational institutions, it is necessary to stress that education should meet the demand in the concerning industry and denote such important skills as AI, big data analytics, and automation. Paying internships and working with technology firms will give the youth practical knowledge that meets the present job market's demands. There is a need for policymakers to provide funding to programs aimed at developing the existing skills and/or learning new ones in the tech sector. The need for some incentives that will encourage firms to contribute to the investment in training and development cannot be overemphasized. To develop a supportive legal environment, the following possibilities should be taken into account. The government's ability to move fast in response to technological advancements will also strengthen the legal environment and inspire confidence in institutional investors.

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Appendix 1: Interview Scripts

1.1 SE, IE, QA Script

1. Name:
2. Designation:
3. Could you share a bit about your professional background and experience in this field?
4. How do you perceive the recent technological advancements, especially in automation and AI, influencing your role within the company?
5. In what specific ways do you anticipate these advancements altering your day-to-day tasks and responsibilities?
6. Do you believe that the integration of new technologies will enhance the efficiency of your job functions? If so, how?
7. From your perspective, how pivotal is your role in contributing to the overall operations of the company?
8. Given the rapid pace of technological change, do you feel adequately prepared with your current skill set to handle these changes, or do you foresee a need for further upskilling or education?
9. Are there any particular training programs or educational initiatives you're considering to adapt to these technological shifts?
10. Looking ahead, where do you see yourself professionally in the next five years, taking into account personal growth and the trajectory of your field?
11. Considering the ongoing technological evolution, do you envision your current job role nexisting in 10 years? If not, how do you anticipate it transforming or being replaced by new roles?
12. How do you plan to stay updated and relevant in your field amidst these rapid technological changes?
13. In what ways do you think the company can support employees like yourself in navigating and adapting to these technological shifts?
14. Can you provide examples of how you've already adapted to or leveraged new technologies in your role?
15. What do you perceive as the biggest challenges and opportunities presented by technological advancements in your industry?

1.2 Management Script

1. Can you provide an overview of the history and evolution of your company, specifically highlighting the impact of technological advancements on technical employment?

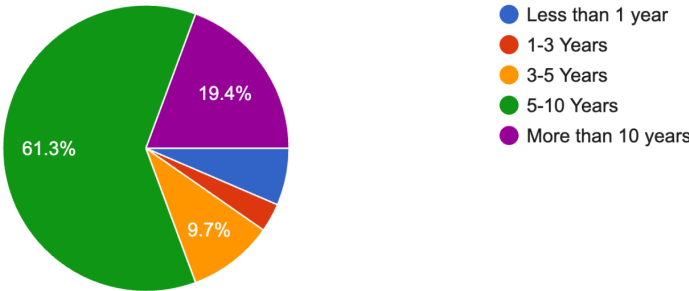
2. How have advancements in technology and automation influenced the roles and responsibilities of software engineers within your company?
3. What changes have you observed in the skillsets and qualifications required for quality assurance engineers as a result of technological advancements?
4. In what ways have the roles of implementation engineers within your organization evolved over time, particularly in response to technological shifts?
5. How does your company adapt to emerging technologies and trends to ensure the effectiveness and efficiency of your technical workforce?
6. Can you discuss specific challenges or opportunities your company has encountered regarding technical employment in light of technological advancements?
7. How does your company promote a culture of continuous learning and skill development among technical staff to keep pace with technological changes?
8. What strategies does your company employ to attract and retain top talent in technical roles amidst rapid technological changes?
9. How do you foresee the future of technical employment within your company, considering ongoing technological advancements?
10. Can you share insights or lessons learned from navigating the intersection of technology and technical employment within your company?
11. How does your company prioritize diversity and inclusion within technical roles, especially considering their evolving nature?
12. Can you discuss any initiatives or programs your company has implemented to address potential job displacement or upskilling needs among technical employees?
13. How has technology influenced the organizational structure and hierarchy within your company, particularly in technical roles?
14. What measures does your company take to ensure the well-being and job satisfaction of technical employees amidst rapid technological changes?
15. In what ways do you collaborate with educational institutions and industry partners to align technical education and training with evolving demands?
16. How does your company balance the utilization of automation and technology with preserving human-centric aspects in technical roles, such as creativity and problem-solving?
17. Can you share examples of successful projects or initiatives that demonstrate the positive impact of technological advancements on technical employment within your company?
18. How does your company address ethical considerations and societal implications of technological advancements in technical employment?
19. How do you envision the role of leadership evolving within your company in response to challenges and opportunities presented by technological advancements in technical employment?
20. Finally, what advice would you offer to aspiring software engineers, quality assurance engineers, and implementation engineers navigating the changing landscape of technical employment?

Appendix 2: Survey Results

2.1

How long have you been working in the technology sector?

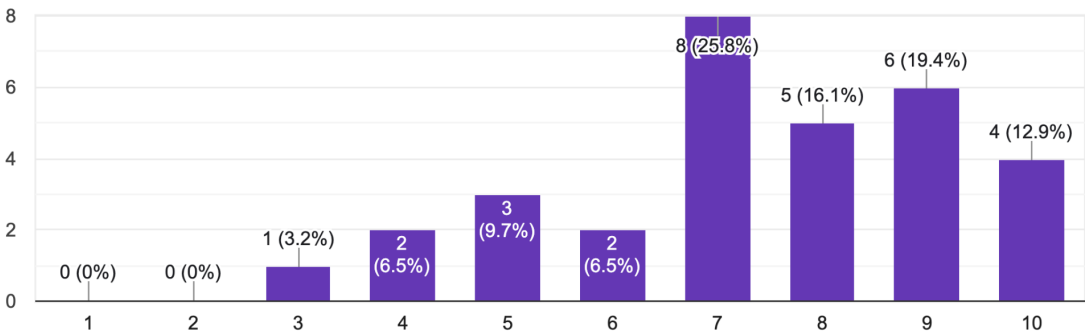
31 responses



2.2

Have you experienced automation and other technological advancement affecting your daily job tasks? If yes, rate your experience on scale 1-10.

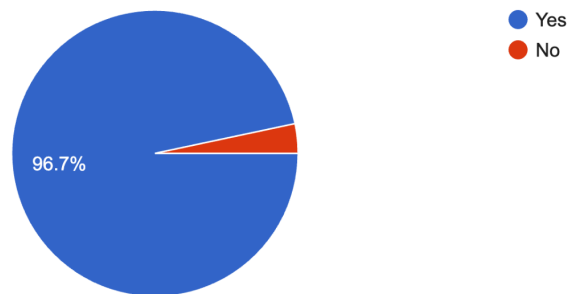
31 responses



2.3

Have you had to acquire new skills or adapt existing ones to keep up with technological advancements in your field?

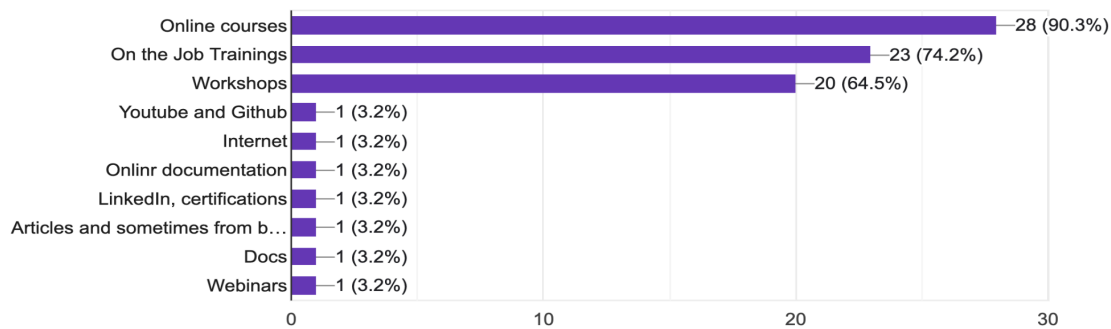
30 responses



2.4

How do you access resources to learn new skills required by technological advancements?

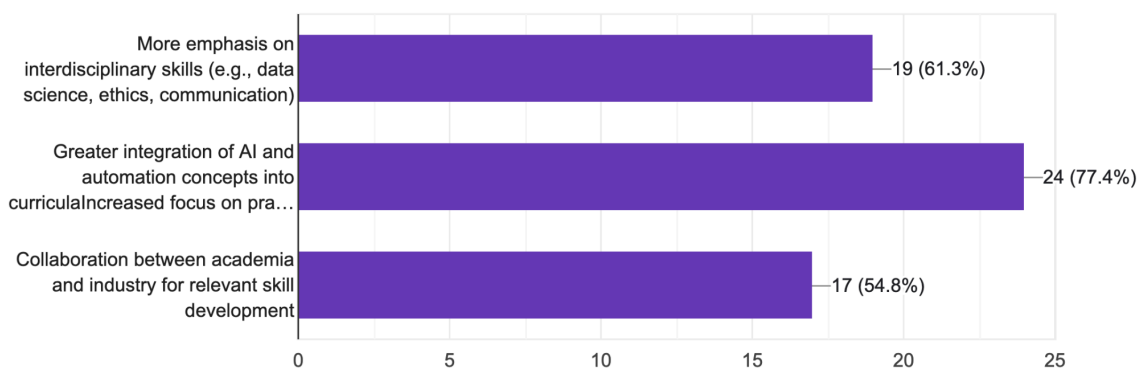
31 responses



2.5

How do you think the education and training of tech professionals should evolve to keep pace with technological advancements such as AI and automation?

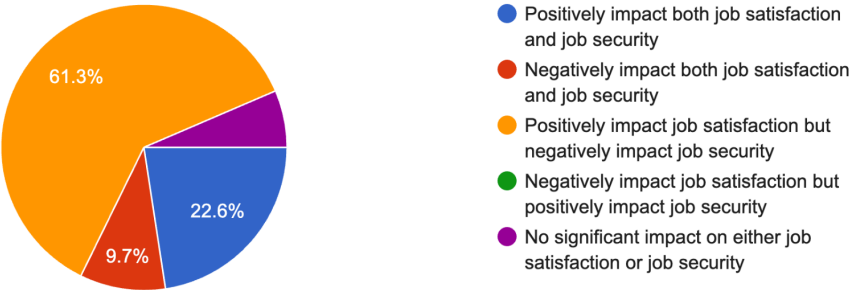
31 responses



2.6

How do you think AI and automation will impact the overall job satisfaction and job security of tech professionals?

31 responses



2.7

Do you believe that AI and automation will create more job opportunities than they eliminate in the technology sector?

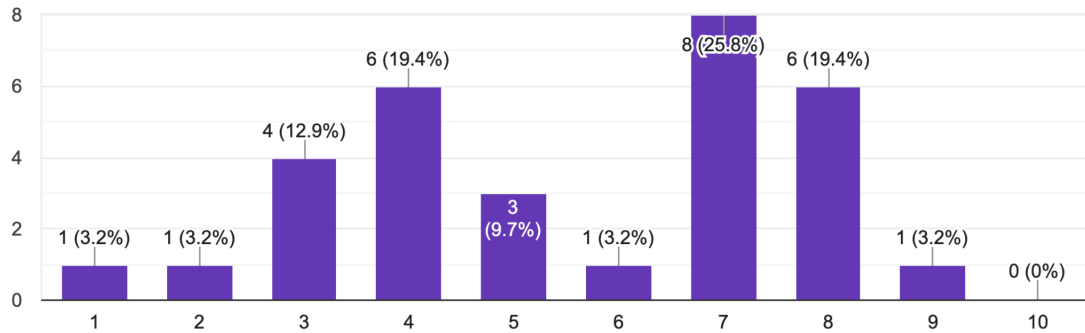
31 responses



2.8

How do you perceive the level of job security for tech professionals in the era of AI and automation compared to the past?

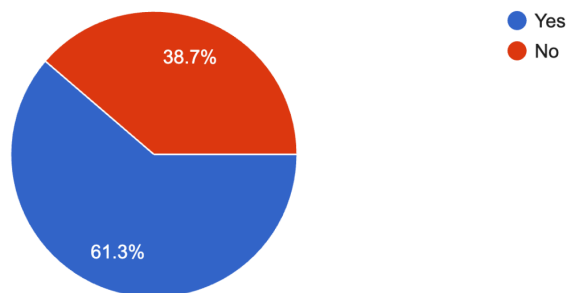
31 responses



2.9

Have you noticed any changes in the workplace culture or dynamics as a result of technological advancements?

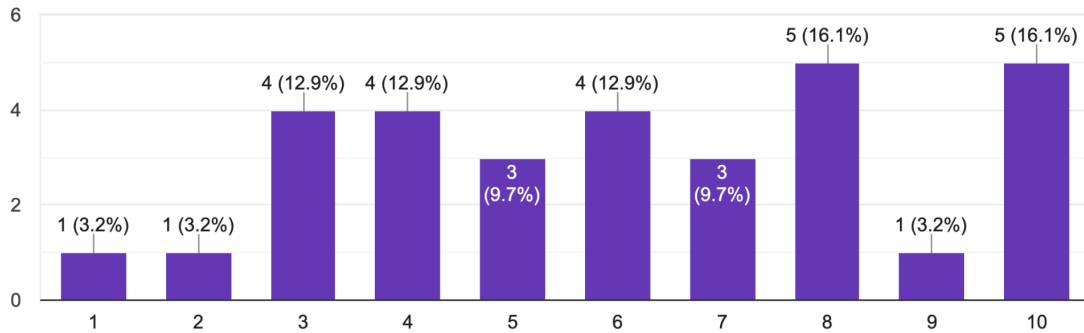
31 responses



2.10

How do you think the increasing automation of routine tasks will affect the skill level required for entry-level positions in the technology industry?

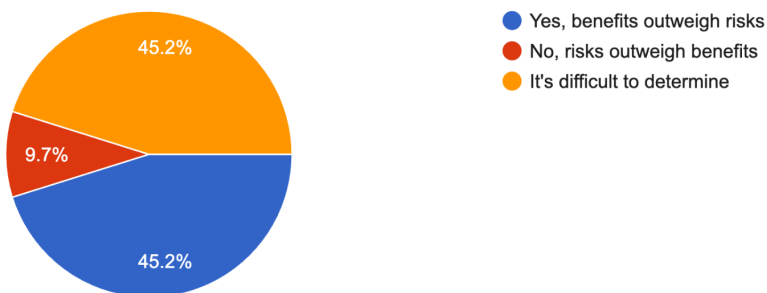
31 responses



2.11

Do you believe that the benefits of AI and automation in the technology industry outweigh the potential risks and challenges?

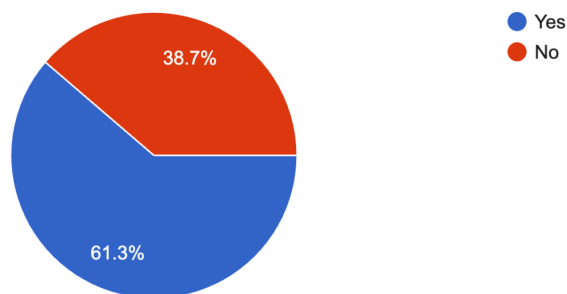
31 responses



2.12

Have you experienced any resistance or skepticism from colleagues or superiors towards the adoption of AI and automation technologies in your workplace?

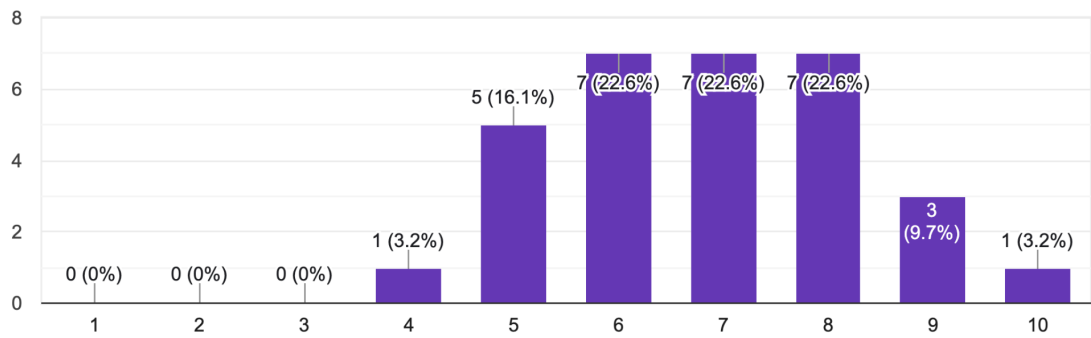
31 responses



2.13

How prepared do you feel personally to adapt to future technological advancements in the technology industry?

31 responses



2.14

How optimistic are you about the future of employment opportunities for tech professionals in the age of AI and automation?

31 responses

