A Study on Gender Roles in the Information Technology Profession and its Impact on Human Resources

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A B S T R A C T

Information Technology (IT) is one of the fields that has an important role in the economic and social development of the world today. One important issue that continues to be of concern is the gender gap in the IT industry. This research aims to examine the role of gender in the IT profession and its influence on human resources. This research uses a qualitative methodology in the form of a literature review, which implies that the research will examine and explain data by utilising information and textual content from various sources. The study results show that gender roles in the Information Technology profession is an issue that is gaining increasing attention in the IT industry. Despite the increasing participation of women in IT careers, gender imbalance remains a significant problem. Factors such as gender stereotypes, inequality in opportunities, and differences in education contribute to this imbalance. As a result, unequal gender roles in the IT industry create inequalities in compensation and career opportunities, and also result in underrepresentation of women in leadership positions.

A B S T R A K

Teknologi Informasi (TI) adalah salah satu bidang yang memiliki peran penting dalam perkembangan ekonomi dan sosial dunia saat ini. Salah satu isu penting yang terus menjadi perhatian adalah kesenjangan gender dalam industri TI. Penelitian ini bertujuan untuk menelaah peran gender salam profesi TI dan pengaruhnya pada sumber daya manusia. Penelitian ini menggunakan metodologi kualitatif dalam bentuk tinjauan literatur, yang menyiratkan bahwa penelitian ini akan meneliti dan menjelaskan data dengan memanfaatkan informasi dan konten tekstual dari berbagai sumber. Hasil studi menunjukkan bahwa peran gender dalam profesi Teknologi Informasi merupakan sebuah isu yang semakin memperoleh perhatian dalam dunia industri TI. Kendati terjadi peningkatan partisipasi perempuan dalam karier TI, ketidakseimbangan gender tetap menjadi permasalahan yang signifikan. Faktor-faktor seperti stereotip gender, ketidaksetaraan dalam peluang, dan perbedaan dalam pendidikan berkontribusi pada ketidakseimbangan ini. Akibatnya, peran gender yang tidak seimbang di industri TI menciptakan ketidaksetaraan dalam kompensasi dan peluang karier, dan juga menghasilkan minimnya perwakilan perempuan dalam posisi kepemimpinan.

1. INTRODUCTION

Information Technology (IT) plays a central role in determining the direction of economic and social development around the world in the contemporary era (Kraugusteeliana et al., 2022; Touriano et al., 2023). The rapid growth in this sector has had a monumental impact, especially in increasing the demand for competent labour. IT-related professions, such as software developers, data analysts, network administrators, and cybersecurity experts, are becoming increasingly attractive to individuals seeking a rewarding and innovation-driven career (Ausat, 2023b; Sutrisno, Kuraesin, et al., 2023). This phenomenon not only reflects how IT continues to influence every aspect of modern life, but also offers vast opportunities for individuals looking to succeed in an increasingly technology-linked world of work. As such, there is no denying that Information Technology is an important driving force behind global economic and social transformation, while reinforcing its appeal as a highly promising employment sector.

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One issue that has consistently graced the Information Technology (IT) industry landscape is gender inequality, which remains in the spotlight. Despite increasing attention to gender equality, the reality is that the gender gap in the IT industry remains a deep-seated problem (Llorens et al., 2021). While there has been an increase in the number of women interested in technology and able to pursue higher education in this field, data confirms that the proportion of men and women active in the IT sector is far from equal. Complex challenges also confront women pursuing careers in IT, such as inequality in financial compensation, underrepresentation of women in leadership positions, and rampant gender discrimination in IT-oriented work environments (Galsanjigmed & Sekiguchi, 2023). On the one hand, the expansion of educational opportunities and accessibility has fuelled women's interest in pursuing careers in IT, which is a positive development. However, on the other hand, the tangible actions required to achieve equality in the industry have yet to reach the desired stage. Addressing this persistent gender gap requires concerted efforts from the industry sector, government and society to create an inclusive environment and support women in developing their potential in IT (Siscawati et al., 2019). Concrete measures, such as supporting training and mentoring programmes, promoting awareness of gender issues, and creating equitable policies within companies, are important steps in ensuring that IT professionals, regardless of gender, have equal opportunities to succeed and thrive in the industry.

The persistence of the gender gap in the Information Technology (IT) industry stretches a substantial impact on the human capital (HR) that forms the backbone of the sector (Cho & Lee, 2015). The existence of this gap can have a number of consequences that affect the entire IT ecosystem. Concretely, the imbalance of men and women in the industry can suppress the productivity and innovation capabilities of tech companies (Zastempowski & Cyfert, 2021). This is because each individual, regardless of gender, brings a unique set of knowledge, skills and experience to the table. As such, the presence of women in more significant numbers will help create richer collaborations and more diverse perspectives, which in turn can enrich companies' ability to pursue technological breakthroughs and create more innovative solutions. In addition to being a driver of innovation, increased representation of women in the IT sector is also considered a solution to enrich the diversity of thoughts and perspectives that can provide important stepping stone benefits in dealing with complex challenges. The more women involved in decision-making and leadership in the IT industry, the greater the opportunity for more holistic solutions to emerge that meet the needs of diverse global consumers (Lemon & Verhoef, 2016). Diversity in decision-making also reflects a commitment to inclusivity, sending a positive message to potential female employees and encouraging a more gender-friendly culture change in the IT workforce. So, balancing gender representation in the IT industry is not just an equality issue, but also a strategic step towards creating technology companies that are more innovative, productive and responsive to the needs of an increasingly connected world.

Therefore, this research will investigate gender roles in the IT profession and how they affect human resources in this sector. It will identify the factors that influence individuals' career choices in IT, particularly from a gender perspective, and analyse their impact on IT team structures and dynamics. The main objective of this research is to understand the extent to which gender factors influence career development and individual contributions within the IT sector, and how this gender gap can be addressed. This research is expected to provide valuable insights to technology companies, educational institutions and policy makers to encourage gender inclusion in the IT industry and maximise the potential of existing human resources. In addition, this research can also assist in identifying effective strategies to reduce the gender gap in the IT profession, which will have a positive impact on technological development and the advancement of society as a whole.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Gender

Gender refers to the roles, behaviors, and identities attributed by society to individuals based on social, cultural, and gender expectations associated with their biological sex (Karaçam Yilmaz et al., 2023). More specifically, gender encompasses social, psychological, and cultural aspects that differentiate the roles and behaviors between males and females in a given society. Gender does not always align with a person's biological sex, and society often extends this concept to include various gender identities, including men, women, transgender, genderqueer, and others (Cooper et al., 2020). It is important to understand that gender is not something inherent or natural but rather a social construct. This means that what is considered "male" and "female" and what is expected of them in society is a product of specific cultural norms and social constructs

that can vary from one place to another and from one time period to another. The concept of gender involves various aspects, including:

1. Gender Identity: This is how individuals identify themselves as male, female, transgender, genderqueer, or another gender identity. Gender identity is a personal feeling and understanding of oneself.
2. Gender Roles: This refers to the social norms and behaviors expected of individuals based on their gender or gender identity. For example, in some cultures, women are considered more suitable for childcare, while men are expected to be the primary breadwinners.
3. Gender Expression: This includes how individuals express their gender identity and roles through appearance, clothing style, behavior, and personal expression.
4. Gender System: This refers to the social structure that influences interactions and relationships between individuals based on gender or gender identity. It includes issues such as gender disparities, gender discrimination, and gender inequality.

An understanding of gender that is more inclusive has developed over time, recognizing the diversity of gender identities and supporting individuals' rights to identify themselves according to their gender identity. In many societies, efforts are made to challenge gender stereotypes that can hinder individuals' development and promote gender equality.

Information Technology (IT)

Information Technology (IT) is a term that refers to the use of computers, hardware, software, communication networks, and other systems to efficiently collect, manage, process, store, and disseminate information (Harahap, Kraugusteeliana, et al., 2023). Information Technology plays a key role in the management, processing, and exchange of information in various contexts, including business, education, government, and everyday life (Sutrisno, Ausat, et al., 2023). Here are some key elements associated with Information Technology:

1. Hardware: This includes computers, servers, storage devices, communication devices (such as routers and switches), input/output devices (such as keyboards, mice, monitors), and other hardware used to run software and process data.
2. Software: This includes computer programs and applications used to perform various tasks, such as word processing, spreadsheets, operating systems, and specialized applications. Software enables users to perform various operations, from data processing to software development.
3. Communication Networks: Networking systems allow various devices to connect and communicate with one another. This includes local area networks (LANs), wide area networks (WANs), and the internet. Networks enable data and information exchange between devices, users, and systems.
4. Information Systems: Information systems are structured frameworks designed to collect, process, store, and disseminate information within a specific organization or environment. This can include databases, project management software, financial management systems, and various systems that support business operations.
5. Information Security: Information Technology also includes practices and policies for information security designed to protect sensitive data and prevent unauthorized access or damage. This involves efforts to safeguard information from threats such as hacking, computer viruses, and data theft.
6. Data Management: Data management involves the collection, storage, processing, and analysis of data to generate valuable insights. Information Technology also includes data management techniques such as indexing, searching, and big data analytics.

Information Technology has transformed the way we work, communicate, shop, and interact with the world. The development of information technology has enabled efficiency, increased productivity, and global access to information. It has also become the backbone of many industries, including communication technology, e-commerce, media, and many others.

Human Resources (HR)

Human Resources (HR) is a term referring to the individuals or workforce working in an organization or work environment, which is the most valuable asset for an organization (Wahyoedi et al., 2023). Human Resources encompasses various aspects related to the management, development, and utilization of the workforce to achieve organizational goals (Diawati et al., 2023; Gadzali et al., 2023; Prastyaningtyas et al., 2023). Here are some key elements associated with HR:

1. HR Management: HR management is a discipline focused on the planning, management, and development of the workforce within an organization. It includes processes such as recruitment, selection, employee training, development, performance management, and HR administration.
2. Recruitment and Selection: This involves the process of finding, attracting, and selecting individuals with the qualifications and capabilities needed to meet the organization's requirements. Recruitment is the first step in bringing new human resources into the organization.
3. Training and Development: This is an effort to enhance employees' skills, knowledge, and competencies through training, education, and job experiences. Training and development are critical for improving employee productivity and capabilities.
4. Performance Management: Performance management involves processes designed to monitor, evaluate, and improve employee performance. It includes goal setting, feedback, performance evaluations, and development of improvement plans.
5. Compensation and Benefits: This includes the arrangement of salaries, allowances, bonuses, and other benefits provided to employees as compensation for their contributions to the organization.
6. Employee Relations: This involves managing the relationships between employees and the organization, including internal communication, conflict resolution, and maintaining employee satisfaction.
7. Employee Wellbeing: This encompasses efforts to maintain the health and well-being of employees, including health, safety, and wellness programs.
8. Gender Equality and Justice: Issues such as gender equality and justice in the workplace are also integral to HR management. Promoting gender equality and justice is a priority in many organizations.

Human Resources is a key element in achieving organizational goals and success. Effective HR management helps organizations optimize productivity, motivate employees, and achieve short-term and long-term strategic objectives. In other words, HR is central to organizational sustainability and success.

3. RESEARCH METHOD

This study involves a qualitative literature review, signifying its intention to thoroughly examine and clarify data by drawing from a wide range of sources. The primary objective of this qualitative literature review is to gather, assess, and integrate the existing body of knowledge on the topic at hand, specifically focusing on gender roles in the IT profession and their impact on human resources. Data will be collected from various relevant sources, including scholarly journals, books, research reports, and other academic articles, covering the period from 2012 to 2023. This time frame allows the researcher to observe how the subject has evolved, identify trends, and note changes that have occurred during this timeframe. The use of qualitative methodology in this literature review enables researchers to delve deeply into the complex and multifaceted aspects of the subject (Elo et al., 2014). This approach facilitates the incorporation of multiple sources of information and the exploration of diverse perspectives, thereby enhancing the analysis and strengthening the credibility of the findings. The data collection process includes thorough textual analysis, information retrieval, and the categorization of relevant data related to the research focus. As a result, the researcher will organize this data, compare and synthesize insights from various sources, and identify recurring patterns, themes, and trends in the collected information. A significant advantage of employing a qualitative literature review is its flexibility to understand and elaborate on complex phenomena, as it is not bound by numerical or statistical limitations (Rahman, 2016). This method also allows researchers to gain profound insights into the evolution of the subject of study over time, as well as the transformation of concepts and perspectives associated with the topic over the years. In this research endeavor, it is crucial to assess the reliability and credibility of the sources used and critically evaluate the gathered information. When adopting a qualitative approach, the researcher must present findings objectively and reflectively, offer clear and precise interpretations, and acknowledge the limitations of the methodologies and data sources employed (Bradshaw et al., 2017). The ultimate aim of this research is to provide a comprehensive overview of the subject's development from 2012 to 2023 and potentially propose recommendations for further investigations to enhance our understanding of the issues related to this topic.

4. DATA ANALYSIS AND DISCUSSION

When we consider the role of gender in the Information Technology (IT) profession, it is essential to recognise the vital role that the sector plays in the unrelenting growth of the global economy. The IT sector has under-

gone rapid development, becoming the backbone for technological innovations that affect almost every aspect of our lives (Arjang et al., 2023; Ausat, 2023a; Harahap, Ausat, et al., 2023; Kamar et al., 2022). In synergy with the growth of the IT industry, the participation of women in IT careers has also seen a positive increase. However, it needs to be emphasised that the gender imbalance that still exists in the industry is an issue that requires serious attention and concrete action. Recognising the importance of gender equality issues in IT is the first step towards solving this problem. It needs to be recognised that the issue of gender disparity in the IT industry involves a number of complex factors that need to be seriously addressed. In some cases, gender stereotypes remain strong, influencing career choices and expectations in the work environment (Tabassum & Nayak, 2021). In addition, differences in technology education and training have also played a role in creating a gender imbalance, emphasising the need for improvements in educational accessibility and equitable support for all individuals interested in IT. The working culture within the industry must also be taken into account, with concrete actions taken to create an environment that is inclusive and supportive of women in developing their potential in IT. Thus, efforts to address the gender imbalance in the IT industry must include addressing these complex issues and providing support for women who want to succeed in an IT career.

The role of gender in the Information Technology (IT) industry has a profound impact, permeating a number of key aspects of the workplace. One of the most obvious impacts is in terms of opportunities and compensation (Maley et al., 2020). In many cases, gender inequality manifests itself in the form of men getting more promotion opportunities and higher wages compared to equally qualified women (Stamarski & Son Hing, 2015). The distribution of these inequalities creates a clear injustice in the IT workforce and illustrates the need for further action to balance the opportunities and compensation afforded to every individual, regardless of gender. This issue also has profound implications when it comes to leadership in the IT industry. When women face difficulties in achieving leadership positions, the IT world loses diverse perspectives and the ability to formulate policies and decision-making that reflect the diversity of the communities they serve (Batson et al., 2021)). As such, gender roles in IT not only affect individuals, but also affect the industry as a whole. It is important to continue advocating for cultural and policy changes that support gender diversity in leadership and level the playing field for all individuals striving to succeed in the industry.

The importance of gender roles in the Information Technology (IT) industry encompasses a widespread impact, affecting not only individuals, but also the entire Human Resources (HR) of the sector. Gender diversity in the workforce offers great potential to present diverse perspectives and solutions to complex IT challenges (Patrick & Kumar, 2012). In this context, gender diversity is not only levelling the playing field, but is also key in harnessing collective creativity and enhancing innovation in the industry. However, when gender roles in IT are unbalanced, the sector may lose access to valuable talent that can make significant contributions to technological improvements and advancements (Stewart et al., 2021). In addition, a non-inclusive work culture can create conflict and dissatisfaction in the workplace, which in turn affects the well-being and productivity of all people in the IT industry. In addition, unbalanced gender roles also have wider social and economic impacts. Gender balance in the IT industry is not just a matter of equality, but also a strategic issue related to economic and social development. When the IT sector provides equal opportunities for all individuals, regardless of gender, it can result in positive effects in terms of increased expertise and sustainable economic growth. Therefore, awareness of the role of gender in IT must be supported by concrete actions that promote gender equality, remove existing barriers, and create an inclusive working environment for all individuals who wish to participate in the IT industry.

To address the gender roles affecting the Information Technology (IT) industry and minimise its impact on Human Resources (HR), a collaborative effort involving various parties is required. A number of initiatives that need to be taken involve concrete actions that will create positive change within the IT industry sphere. Firstly, raising awareness of gender issues in the IT industry is a crucial first step. This awareness-raising can change the corporate culture and the wider society to value individual contributions regardless of gender. Furthermore, inclusive education and training is a key cornerstone to creating equality in the IT industry. By ensuring that all individuals have equal access to quality training and education, we can ensure that the workforce within the sector is made up of diverse individuals who are ready to tackle technological changes and challenges. Additionally, supporting the ascension and leadership of women in IT is key. This involves concrete actions such as mentorship and professional development programmes specifically designed to help women succeed in their IT careers. In addition, implementing company policies that support gender inclusion will create a safer work environment and stimulate individual development without fear

of discrimination or inequality. Finally, encouraging women's active participation in the IT community, such as professional societies and collaborative projects, can help create the necessary networks and support for women in the industry. With these concerted efforts, we can address gender roles in IT and make the sector more inclusive and beneficial to HR and society as a whole.

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

The issue of gender roles within the Information Technology field is becoming progressively more prominent within the IT sector. Although more women are getting involved in IT professions, a substantial gender disparity continues to persist. Elements like gender stereotypes, unequal access to opportunities, and disparities in educational opportunities are key contributors to this inequality. Consequently, unequal gender roles within the IT industry generate disparities in both compensation and career prospects and further lead to the insufficient representation of women in leadership roles.

The implications of gender role imbalance in the IT industry are significant. Inequalities in compensation and career opportunities not only impact individuals, but are detrimental to the industry as a whole. Furthermore, a lack of gender diversity can stifle creativity and innovation in the industry and create a less inclusive work culture.

To address these issues, various measures can be taken, including awareness-raising on gender role issues and efforts to address gender stereotypes in the IT industry. It is also necessary to ensure that education and training in IT is open and inclusive to all individuals, regardless of gender. Furthermore, encouraging the promotion and leadership of women in the IT industry can create a motivating example. In addition, companies need to implement policies that support gender inclusion, such as diversity programmes, equality training, and support for workers with family responsibilities. And last but not least, support and encourage women's participation in the IT community, conferences and industry organisations.

However, keep in mind that gender issues can be very complex and vary depending on the specific country, culture, and organisation. Therefore, effective solutions may require a customised approach. Furthermore, the implementation of gender inclusion policies at the company level can be a complex task and requires support across multiple parties. Resistance to changes in culture and working practices that have been in place for years can also be an obstacle that needs to be overcome. Despite the limitations, addressing gender roles in the Information Technology industry is a must, as this will provide great benefits to Human Resources and society as a whole.

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