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# Industry Revolution 4.0: Rapid Growth of Technology May Affect Job Security in Auditing Profession: A Concept Paper

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**Abstract**

Auditing in IR 4.0 presents several challenges due to the changing nature of the business environment and the increasing complexity of organizational systems. One of the main challenges of auditing in IR 4.0 is the need for auditors to have a deep understanding of the emerging technologies that are being used by organizations. This includes the ability to analyze data generated by these technologies, understand how they are integrated into business processes, and identify potential risks associated with their use. IR 4.0 brings disruption with much more automated and technologically complex processes. The industry is entering the so-called "new generation," and keeping up with it is the most difficult challenge. Auditing firms need to consider technology investment so as to keep their competitiveness. IR 4.0 has severely impacted the labour market, including audit firms. To safeguard their profession, auditors will need to embrace the automation of current auditing procedures. This paper investigates factors that influence the job security of auditors due to the rapid growth of technology in the IR 4.0 era through an article review. Three factors are discussed which are technological, knowledge and skills, and environmental. With these insights, recommendations are proposed for auditors to be prepared for and well-suited to the IR 4.0 industry.

**Keywords**: IR 4.0, Auditors, Technology, Technological, Knowledge and Skills, Environmental

## Introduction

In today's Industrial Revolution 4.0 (IR 4.0) era, the global business market is confronted with many challenges particularly in adapting to the changing business environment. The transition from the use of computers and automated machines from Industry 3.0 towards the introduction of autonomous and smart systems driven by data, combined with the Internet

of Systems and cyber-physical system in IR 4.0 resulted in less human intervention in making a decision since all manual work now is being replaced by automated machines and systems. The fast-paced digital era in IR 4.0 creates a significant threat to the labour market including audit firms.

According to Pauceanu et al (2020), more than half of today's jobs will disappear and be replaced with advanced technology and systems by the year 2025. Automation and artificial intelligence will perform tasks normally handled by humans. This will definitely cause a major disruption to the labour market (De Villiers, 2021). The Organisation for Economic Co-operation and Development (OECD) offers support for this through its report in the OECD Employment Outlook 2019. According to research, automated machines and operations will eventually replace 14% of the work currently performed by humans. Furthermore, almost 32% of normal jobs face radical changes and transformations in this fast-paced digital era of Industry 4.0 (OECD, 2019).

As the nature of business changes with the rapid growth of technology, the current and traditional auditing practices will no longer be relevant. Auditors will have to embrace the automation of current auditing practices aligned with the agenda of IR 4.0 in order to secure their profession in the marketplace. Therefore, this paper aims to provide a better understanding of IR 4.0 in the auditing profession and the factors that influence the embracement of the rapid growth of IR 4.0 in auditors' job security.

**Background of Study**

Artificial intelligence (AI), data analytics, and blockchain technology advancements significantly affect audit and finance. Companies, the audit profession, professional bodies, and regulators worldwide are focusing more on the consequences of technology. There are numerous advantages that technology can provide, ranging from operational efficiency to financial inclusion and greater insight. However, these advantages are accompanied by a number of risks, some of which are still poorly understood (ICAEW, 2017).

Although auditors will benefit from using digital technologies in terms of efficiency, they must also be responsive to changes in societal expectations (Karlsen & Wallberg, 2017). Changes in the audit profession are unavoidable as the profession undergoes a paradigm shift toward a more digital organisation (Karlsen & Wallberg, 2017). They believe that using digital information enhances the effectiveness and credibility of the auditor's work, thereby influencing their working methods. Some believe that the audit profession will soon be completely reliant on digital information and working methods (Karlsen & Wallberg, 2017)

As a result, Industry Revolution 4.0 is something that everyone should adapt to in their life in order to keep up with the changes in technology. Auditors' profession is now experiencing rapid technological growth, it constantly gives both opportunities and challenges. In addition, auditors will need to be more adaptable to change in the future. The effects on the auditors' working methods are more noticeable than the effects on the tools. This is primarily because the profession is transitioning to a paperless environment, resulting in more flexible working methods. Flexibility, on the other hand, has a negative side effect (Karlsen & Wallberg, 2017) Therefore, the question of how rapid growth of technology may affect job security in the auditing profession.

**Problem Statement**

The current emerging technology of IR 4.0 in an organisation has significantly impacted the auditing profession. The technology-aided audit procedures have reduced auditors' time spent on clerical tasks, allowing them to devote more time to riskier, more judgement-intensive areas and potentially boosting audit quality (Sharma et al., 2022). The professional auditors' skills on information technologies (IT) are increasingly important to ensure the integrity of automated systems can be maintained. According to Sharma et al. (2022), previous studies on remote auditing have found that the auditing process will be efficient and effective because of technology.

If the adoption of technology is intended to increase the efficiency of audit firms by simplifying the audit process and lowering the number of manual activities, there will be a reduction in the workforce. Artificial Intelligence (AI) primarily influences the audit process by automating analysis that was previously conducted manually, therefore "reducing human error" and increasing employee productivity (Fedyk et al., 2022). However, if auditors do not have the necessary skills in these technologies, it will affect their position since there is an increase in audit firms' reliance on technologies. Based on the research conducted by Fedyk et al. (2022), there is an increase in AI-related employees in accounting firms, from 0.08% in 2010 to 0.37% in 2019. While the overall workforce and the proportion of AI-related employees are increasing, the percentage of accounting (audit and tax) employees has decreased by 11% over the past decade, suggesting a fall in accounting-related employment (Fedyk et al., 2022). These declines are due to the AI adoption in the firms, which results in auditors' displacement with AI technologies.

The challenges auditors face the labour displacement in this digitalization era must be overcome to ensure they can compete against technologies. Auditors should take the opportunity of their technical skills to adapt to the new environments of auditing. In this paper, we study the factors that influence the job security of the auditing profession due to the rapid growth of technology. We also come out with a few recommendations that auditors must prepare in order to overcome the technological challenges in the audit field.

**Gap of Research**

Many studies and research have been explored by researchers regarding Industry Revolution 4.0 and its impact on the auditing profession. One of the studies found is security threat: auditors and technology (Carr et al., 2013). Another study found regarding auditing in the new age of industry 4.0: The Need for More Research (IGI Global, n.d.). They have often looked at the impact and the benefits of industry revolution 4.0 on the auditing profession. Hence, this study mainly focuses on Industry Revolution 4.0 to see if the rapid growth of technology may affect job security in the auditing profession

**Literature Review**

**Factors Influencing the Job Security in Auditing Profession**

**Technological Factor**

The original purpose of auditing, according to Flint (1988) as cited in Karlsen and Wallberg (2017), was to determine whether certain duties were performed honestly, properly, and in accordance with regulations and specific instructions. Moreover, Nearon (2005) as cited in Karlsen and Wallberg (2017) exemplifies how, regardless of how competent the auditor is, a

user of an audit opinion will never expect the auditor to report a breach if he or she is not perceived to be independent. Similarly, if the auditor is perceived as inept, the user will not expect the auditor to discover obvious material misstatement.

Furthermore, companies may no longer need human auditors to audit their books as technology becomes more efficient at identifying errors and anomalies in financial data. This could result in significant job losses in the auditing sector and lower the quality of financial audits (Hemin, 2017, as cited in Noordin et al., 2022). According to one of the University of Oxford studies mentioned by the Institute of Chartered Accountants in England and Wales, 95% of accountants risk losing their jobs due to the development of new machine technology (ICAEW, 2016, as cited in Noordin et al., 2022).

A challenge with digital information, according to Nearon (2005), necessitates the auditor understanding and testing the information technology controls surrounding the evidence to ensure its authenticity and reliability (Karlsen & Wallberg, 2017). Nonetheless, intentional or unintentional data theft by ethical and unethical auditors is on the rise, with the motivation for an auditor to steal sensitive data directly related to the potentially enormous financial profit made from the transaction (Carr et al., 2013, as cited in Karlsen & Wallberg, 2017). "Today, the biggest security threat facing an organisation is internal, and companies have a bottom line need to protect both their customers and their business from data privacy breaches. Even if a company has a plan in place to prevent unauthorised users from accessing data, it needs a solution that provides insight into the actions of trusted users" (Application Auditing, 2007, as cited in Carr et al., 2013)

In addition, auditors have access to an organization's financial, sales and distribution, customer, and supplier records. Malicious activities such as the collection of data relating to the customer base of a retail company could be sold to competitors. The harm that an auditor could intentionally due to the business is significant. Jamie Hopper, a controller with Georgia Pacific, agrees, Auditors "have access to your entire systems, including customer and financial systems. An auditor could derive anything they wanted to know from very valuable information. For example, margins, profits, prices, etc." (Carr et al., 2013).

Most organisations work on the assumption that auditors are bound by professional standards and, therefore, pose no security risk. What if they are wrong and auditors are threats to the companies that hire them? They may intentionally steal data or unintentionally make data unsecure. While new technology will hopefully offer more ways for companies to protect themselves from outsiders, including their own auditors, vigilance is the price of a security. Hence, advancements in information technology not only affects business processes, but also the way auditors handle information through the use of new tools (Carr et al., 2013).

**Knowledge and Skills Factor**

Auditors need to evolve immediately when new technology is being introduced by the companies. Understanding the technologies associated with Industry 4.0 in audit work is important to help auditors in obtaining audit evidence. However, the challenge that auditors are facing is the lack of skills and knowledge in technologies which will affect their future. Auditors are not trained properly on technologies and many inexperienced auditors do not have sufficient knowledge to apply data analytics techniques (Jacky & Sulaiman, 2022). The

expectation gap between the work actually completed by the IT experts and the auditors' understanding of the work completed resulted from the lack of understanding. Such a lack of understanding might result in the obtaining of insufficient or inappropriate audit evidence.

According to Earley (2015), regulators are concerned that auditors may lack the necessary expertise to effectively implement data analytics techniques, and companies will extend their advice services to attract and recruit data scientists with data analytics skills. These data scientists have a distinct mindset compared to traditional auditors, and this possible change in focus from auditing to advisory services has regulators concerned about audit quality (Earley, 2015). The existing gaps in the auditor's expertise in data analytics have led to the possibility of outsourcing the majority of data analytics and providing only its output to the engagement auditors to inform additional audit testing procedures.

According to the study conducted by Taha et al (2021), when dealing with specialised technological concepts, such as how to control data and privacy and set up backups, how communication works ingress/egress of the cloud, how to identify management, and how to grant cloud permissions, most of the auditors struggle with weak skills and abilities. Therefore, these auditors are unable to identify risks in virtual networks and improperly configured security settings. It can be presumed that modern IT technologies are extremely specialised areas and need technical support. Auditors who lack technical knowledge need to seek technical support from professionals in order to deal with the complexity of these technologies' theory and practices.

IR 4.0 such as AI enables audit firms to streamline their operations, resulting in higher audit quality with fewer employees and lower audit fees. The increased reliance of audit firms on technology may be a contributing factor to the trends of increased auditor departures and turnover (Knechel et al., 2021). Currently, the auditing profession does not seem to have sufficient technological skills. The lack of relevant skills, such as IT skills can reduce the audit quality performed by the auditors. Therefore, audit firms and companies tend to hire more experienced auditors which in turn will affect the current auditors who are lacking skills and knowledge in these technologies of IR 4.0. Even though audit firms have the option to train the auditors, it will be more beneficial if they hire skilled auditors since the training will take up to two to three years.

**Environmental Factor**

The presence of IR 4.0 is said to pose threats to job security in the auditing profession as auditors need to adjust the current adoption of auditing standards due to environmental factors in such rapid technological advancement. Recent challenges in the audit market have caused several audit companies to drastically adjust their audit processes (Mansour, 2016). Audit businesses are persuaded to use new technology in order to improve the audit's performance and its value to clients (Berberich, 2005). Due to the rapid expansion of IR 4.0, many regulators and researchers have expressed worry about the ability of smaller audit firms to compete with larger firms in the IT environment (Handoko et al., 2018)

This demonstrates how competition forces auditing businesses to think about technological investments in order to remain competitive. By utilising newer and more effective methods of auditing, these auditing firms may be able to surpass their competitors as a result of

businesses adopting cutting-edge technologies. Such auditing businesses could position themselves as cutting-edge auditing firms by utilising cutting-edge technologies. Based on this, it is anticipated that competitive pressure may have a favourable impact on the job security of auditors as their profession may be negatively impacted by their unwillingness to adopt new technologies.

IR 4.0 brings disruption with much more automated and technologically complex processes. The auditing profession faces tremendous difficulty in keeping up with and adjusting to this environment as the industry transitions into the so-called "new generation." They consequently exert pressure on the surroundings of the entity to adapt and to be more confident in the degree of assessment and validation of the information that is presented. For instance, the adoption of database and cloud technologies has sparked the creation of software and applications for gauging the financial performance of businesses, demanding the certification of auditors as to whether there is a chance that the information could be materially falsified.

Furthermore, professional bodies are sources for helping members to remain well-informed and to sustain their relevance. Additionally, they make certain that members follow recognised professional guidelines from throughout the world (American Institute of Certified Public Accountants, 2012). There is no doubt that rules and laws pertaining to the development of IR 4.0 have raised auditors' awareness of the significance of implementing new technology (International Federation of Accountants, 2019). Curtis and Payne (2015) have underlined the connection between professional associations and technology adoption in earlier literature. It is deemed that auditors' acceptance of new technology would increase if they were encouraged by their professional associations to adopt these audit technologies. However, if they are reluctant to adopt audit technologies, it might affect their profession due to their inability to align with the new technologies in performing their work.

**The Proposed Conceptual Framework for Factors Influencing the Job Security in Auditing Profession**

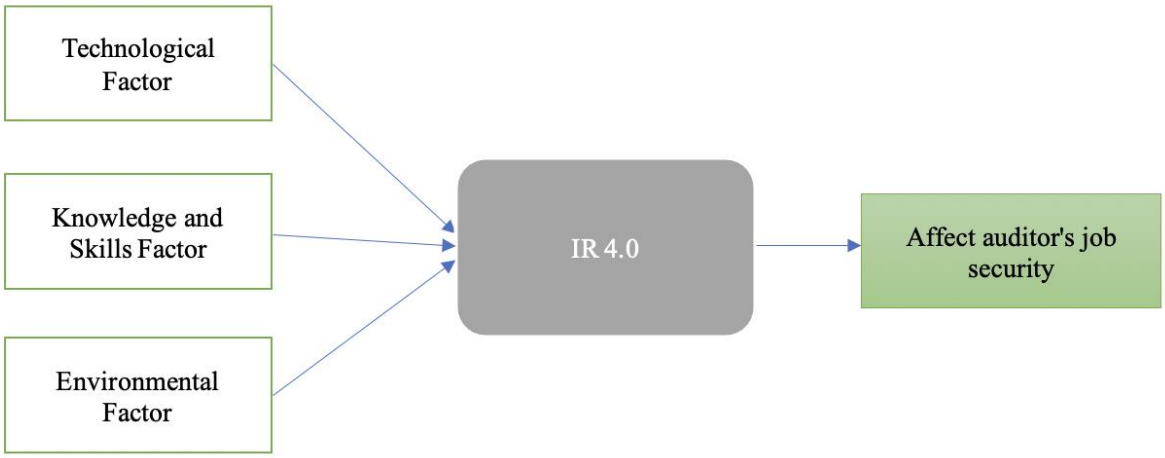


Figure 1: The Proposed Conceptual Framework for Factors Influencing Job Security in Auditing Profession may Affected due to IR 4.0

The relationship is based on the literature that has been stated above. There are three factors that are affecting the auditor's job security due to the presence of IR 4.0. Technological factors

are related to companies that may no longer need human auditors to audit their books as technology becomes more efficient at identifying errors and anomalies in financial data. Meanwhile, knowledge and skills factors are interrelated with each other. Due to a lack of knowledge, there will be no skills that can come out from the individual. The environmental factor also leads to an effect on the auditor's job security. There are two issues under these factors which are regarding competitive pressure and regulations of professional bodies.

**Conclusion**

This paper presents three factors that influenced the embracement of the rapid growth of IR 4.0 in the auditing profession which includes technological, knowledge and skill, and environmental factor. These factors clearly affected the job security of auditors, and it became the key that push auditors in changing their mindset regarding the evolution of IR 4.0 in auditing practices. The speed of technological and digital advances in Industry Revolution 4.0 has suggested the need for auditors to stay relevant with the current auditing practices in auditing in line with the era of IR 4.0 in order for the audit industry to move and expand globally in this fast-paced environment.

Furthermore, with the emergence of IR 4.0, there is no denying that these technologies have clear benefits for the operational efficiency of the auditing process. For example, the use of big data and the internet of things in audit work. According to the International Auditing and Assurance Standards Board (IAASB), clients who give out audit jobs nowadays expect touches of big data analytics in its execution. Given the existing use of randomly sampled data in audit work, big data analytics offers real-time data, tied to existing case histories which makes them comparable to new/ongoing events, as well as in the prediction of future ones (IAASB, 2016).

A study carried out by Yoon et al (2015) showed that big data utilities give room for additional information otherwise referred to as audit evidence in audit work. As a disrupting tool of industry 4.0, blockchain *proof-of-work* and *proof-of-stake* have also started gaining attention in auditing. A blockchain tool able to convert huge documents and data files into blockchain-based ones (Abreu et al., 2018). This means that loads of data, documents and information in audit work can be kept safely without auditors having to worry about the risk of data losses. The use of these technologies helps the auditor to refine their analysis, improve the quality of risk assessment and judgment, and provide more reliable and higher-quality audit evidence.

**Recommendations**

Assimilation and adaptation towards IR 4.0 working environment require auditors that are ready and well-suited to the IR 4.0 industry. The revision of current skill sets and standards of auditors is highly recommended to ensure the relevancy of the profession in IR 4.0. An auditor must redefine their skills by broadening their technological skills and knowledge in tune with the characteristics of IR 4.0. This is to ensure that they are able to anticipate and respond to clients' demands which are increasing in response to the technological advancement in the audit industry. Moreover, audit firms play a vital role in transitioning these rapid growths of technologies to auditors. To enhance their continuous audit offering, audit firms must invest in hiring tech-skilled personnel and change their internal structure to promote innovation and customer satisfaction.

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