



The Effect of the fourth industrial revolution from the perspective of the auditing Profession

Abdel- Wahab Nasr Ali ¹

Shehata Elsayed Shehata²

Noha Mohamed Zaki³

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¹ Professor of Accounting and Auditing – Faculty of Commerce – Alexandria University
Email: abdelwahab.nasr@hotmail.com.

² Professor of Accounting and Auditing – Faculty of Commerce – Alexandria University
Email:

³ Assistant Professor of Accounting and Auditing - Faculty of Commerce – Alexandria University
Email: Nmz71086@gmail.com, noha.m.zaki@alexu.edu.eg

1. Introduction:

The fourth industrial revolution (Industry 4.0) observed tremendous technological developments, that had repercussions on the business models in the first place. It also had repercussions on the Auditing profession worldwide.

In the regard with the Auditing Profession is considered as any other professions, because it fulfilled all requirements which related that. And the most important those requirements are the contribution of the profession to the welfare of society. To achieve that, the Auditing Profession must interact with the variables of its work environment, which affect it, accordingly, positively or negatively.

As a result of the rapid changes in the current business environment, especially what is known as the beginning of the industry 4.0, it began at the turn of this century and builds on the digital revolution. That was reflected in the digitization process of the auditing profession's clients, and then their Digital Transformation.

In general, this revolution has imposed several repercussions on the auditing profession, the most important of which are changing in the variety of the auditor's services hence the possibility of a gap in the supply side of his services, as well as its impact on how the auditor fulfills his professional, legal and societies responsibility.

Therefore, researchers like us should analyze this situation. Thus, the most logical question is what is the inevitable impact of that revolution on the auditing profession? This is what we aim to answer according to a critical analytical research methodology.

Accordingly, this paper aims to crystalize the most important of the industry 4.0 on the auditing profession, through studying and analyzing relevant professional publications and previous academic literature. Therefore, that paper acquires academic and practical importance, and it has logical motives, due to the scarcity of accounting research, especially the positive ones, in this field.

To achieve the goal of this working paper, we depend on a critical analytical approach for professional publications and previous academic literature, which related with the effect of the industry 4.0 on the auditing profession, as well as determine the future research in this field.

The remainder of this paper is organized as follows; **section 2** analyzes prior literature related with the definition of the industry 4.0 from perspective an accounting profession. **section 3** analyzes prior literature related with effects of the industry 4.0 on the auditing profession. **section 4** concludes and implication for the future research.

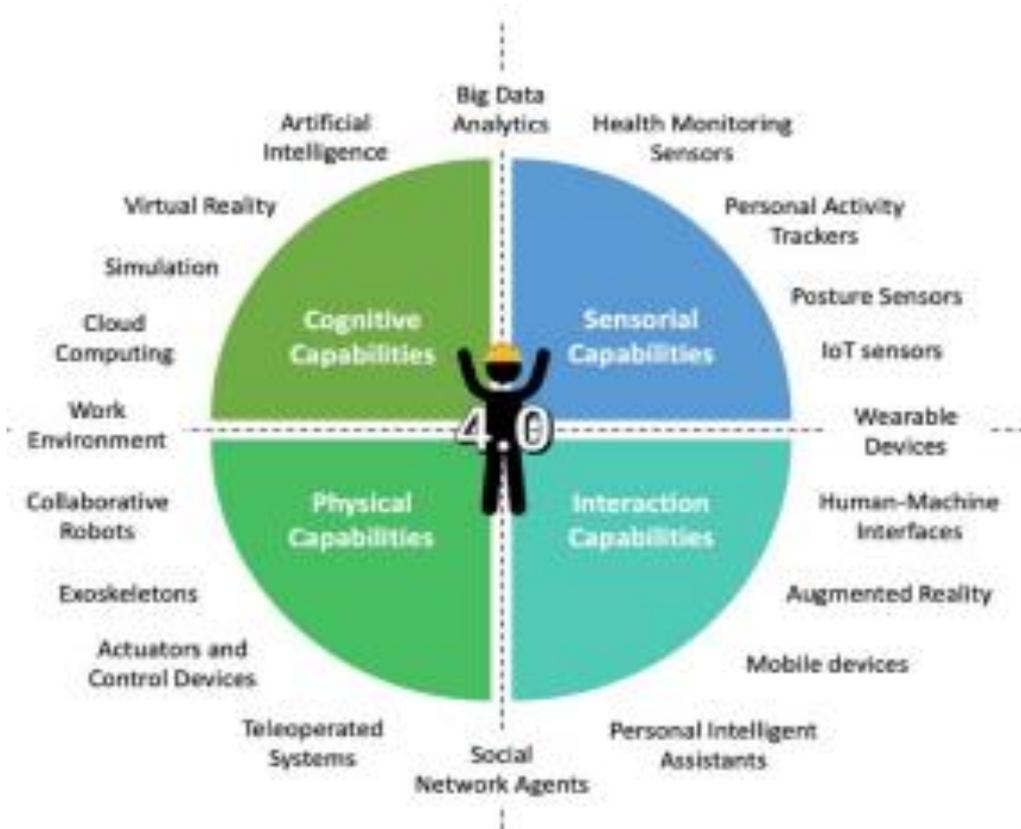
2. The industry 4.0 from perspective an accounting profession:

There is no doubt that the business environment now faces a state of radical and structural transformation in the methods of performing the firms' various operations. As a result of the increasing in globalization and the adoption of many new technological and digital tools, interest has increased in the need to verify the

repercussions resulting from the industry 4.0 on the auditing profession (Schwab, 2016; Lappi *et al.* 2019; Wu and Liu, 2019; Schmitz and Leani, 2019).

Regarding the definition of The Fourth Industrial Revolution (4IR) can be considered, according to analysis of pervious literature (Lin *et al.*, 2018; Babayeva and Manousaridis, 2020; Manita *et al.*, 2020; Tavares *et al.*, 2022; Hamid *et al.*, 2022) **as a radical** and structural change process through combination and integration of digital and electronic technologies tools into a current business model and society. **This is what** some pervious literature (Deloitte, 2018; Schmitz and Leoni, 2019; Ullrich *et al.*, 2019; Khanom, 2020) have called what is known as the process of digital transformation of the auditing profession’ clients.

Focusing on the digital transformation tools, which inherent to the occurrence of the industrial (4.0), According to the analysis of the pervious literature (Deloitte, 2018; Schmitz and Leoni, 2019; Khanom, 2020; Manita *et al.*, 2020) they include; Robotic Process Automation, 3D printing (additive manufacturing), Nanotechnology, Sensors, Internet of Things (IoT), Big data analytics, Artificial Intelligence, Blockchain, Bit Coins, Smart Contracts, Machine Learning, Social Maida, Cloud Computing System and Extensible Business Reporting Language (XBRL). According to (Gazzaneo *et al.*, 2020), **These tools can be explained as follows:**



Source (Gazzaneo *et al.*, 2020; p.221)

With regard to benefits resulting from the adoption of digital transformation tools, inherent to the occurrence of the industrial (4.0), **we can say that the greater achievements** from that are improve the efficiency and productivity of the production

process (potentially) monitor the entries process in a more automated way, and helping companies work more efficiently allocate resources (Lappi *et al.*, 2019; Tavares *et al.*, 2022). **And therefore**, the companies' merging of digital and electronic technologies tools into the business model and society, is reflected on improve the processes of value creation, through both; dynamization all operational process, reduction of human intervention, and reduce the risk of human errors as well as fraudulent data (Schwab, 2016).

In addition to the above and according to the analysis of the pervious literature (Gazzaneo *et al.*, 2020; Pedota and Piscitello, 2021; Ali *et al.*, 2022) there are **four main features** of industry 4.0 as follows; **Connectivity-** which the ability of machines, devices, sensors and people to connect and communicate with each other via the Internet of Things or Internet of People (IOP). **Information transparency** – which indicator to the ability of Industry 4.0 technology tools to provide operators comprehensive information for decision making. Interconnection allows operators to collect vast amounts of data and information at any point in the manufacturing process and identify key areas that can benefit from improvements to improve functionality.

Technical assistance – the technical ability of systems to assist people in decision-making and problem-solving, and the ability to assist people with difficult or uncertain tasks. **Decentralized** decision-making – the ability of cyber-physical systems to make decisions independently and perform tasks as autonomously as possible.

So we can take advantage of the benefits resulting from the adoption of digital transformation tools, inherent to the occurrence of the industrial (4.0), previous literature (Schmitz and Leoni, 2019; Ullrich *et al.*, 2019) indicated to several basic ingredients that must be available to the accounting profession client's facility, namely; **The availability of** the appropriate infrastructure for the application of technological technologies (including; hardware, software, etc.), **the presence** of a department specialized in regular data analysis that can provide appropriate information to predict future events and changes in the business environment and the ability to respond effectively to them, and **finally the availability** of qualified human resources to make the most of the benefits resulting from the adoption of a client The profession of modern technological techniques.

As for the reality of digital transformation, inherent to the occurrence of the industrial (4.0), in the Egyptian business and professional practice environments, the Ministry of Communications and Information Technology issued Decision No. (361) of 2020, to amend the executive regulations of the Electronic Signature Law No. (15) of 2004, in many aspects, including; Adding the electronic seal and time stamp services, and relying on the electronic signature tool instead of the smart card.

As well as, Ministry of planning and economic development, in accordance with Presidential Decree No. (89) and (105) of 2017, indicated the need to establish the Supreme Council for Digital Transformation, the National Council for Payments

(which aims to maximize the transformation of non-cash payments), as well as the Supreme Council for Cyber Security.

In the same way, the Information and Decision Support Center at the Council of Ministers launched a research program specialized in digital transformation, within the framework of Egypt's strategy and vision 2030, to achieve several goals, the most important of which are; Setting standards and frameworks for digital transformation strategies in the government apparatus, developing technical alternatives to support decision-makers in digital transformation, creating a platform of experts and researchers in the field of artificial intelligence, and enhancing societal awareness, especially with regard to cybersecurity.

From the perspective of the auditing profession, these digital transformation tools, inherent to the occurrence of the industrial (4.0), can be viewed from two angles; **The first** is that they are tools used by the client of the profession in performing his work to achieve the objectives of his establishments in a digital environment, **and the second is that** they are tools that can be used by the auditor to perform his professional services according to a modern technological approach that is consistent with the characteristics of his client's business on the one hand, and the environment surrounding these works on the other hand. **The outcome** of this is because the auditor has become in an inevitable confrontation with the repercussions of the digital transformation of his client, and in the work environment. **This is what we will show in the next section**

3. The effects of the industry 4.0 on the auditing profession:

If we look at the effects resulting from the digital transformation, inherent to the occurrence of the industrial (4.0), of the auditing profession client's facility, **in general, and according to some** (Lappi et al., 2019; Adiloglu and Gungor, 2019; Ramesh, 2019; Khanom, 2020) from the perspective of the nature and work environment of the client, it is reflected **that transformation on both; Radical** and structural change in the work environment of the profession's client, **the possibility** of changing the assortment of services and products provided to the auditor's clients and the methods of providing them, **automation** of the stages of the accounting cycle, minimizing costs Agency, reducing information asymmetry, reducing opportunistic behavior practices and committing fraud in the financial statements under traditional systems, increasing transparency, and improving the quality of accounting information and financial reports.

The digital transformation, inherent to the occurrence of the industrial (4.0), is also inevitably reflected in the face of the accounting profession **client's facility in many aspects, including; The need** to design electronic information security systems as a result of the increased security risks inherent in the adoption of technological and digital technologies. And the need to design an immediate control structure that includes appropriate internal control methods in light of electronic information systems.

In addition to the reflection of that transformation as well, on both; The need to identify and manage cyber security risks, increase the likelihood of committing

electronic fraud and other electronic crimes, the need to verify the extent of compliance with information security and safety requirements, the need to design a management of information technology risks, the need to work on the sustainability of information technology and government commitment to information technology, and finally the necessity Evaluate the appropriateness of the going concern assumption for the audit client's facility in light of the digital transformation environment.

As for the professional repercussions of the digital transformation, to the occurrence of the industrial (4.0), on the profession itself, some have indicated (Karlsen and Wallberg, 2017; Almaleeh, 2019; Ramesh, 2019; Mariia and Viktoriia, 2020; Manita et al., 2020; Khanom, 2020) due to the need for audit firms to develop their business models and adopt many technological and digital developments, including; Big Data Analytics, Block Chain technology, Data Mining, Artificial Intelligence (AI) tools, and Deep Learning.

Similarly, following previous studies such as (Almaleeh, 2019; Schimtz and Leoni, 2019), it is clear that we may divide those repercussions into two groups as follows; **The professional** impact of digital transformation on audit quality, **and the professional** impact of digital transformation on the diversity of audit services and the extent of their professional and legal responsibilities.

With regard to the effects of the digital transformation, to the occurrence of the industrial (4.0), on audit quality according to the analysis the pervious literature, such as (Almaleeh, 2019; Manita *et al.*, 2020; Babayeva and Manousaridis, 2020; Khanom, 2020), **it includes many aspects, including; Increasing** the accuracy of the professional judgments of auditors, taking into account the impact of the audit client's recognition of digital assets and cloud computing arrangements, as well as the mandatory disclosure of risks and cyber security risk management at the stages of the audit process.

In addition to the possibility of carrying out a comprehensive audit instead of sampling audit, increasing the ability to fulfill the professional responsibility of the auditor related to the detection and reporting of fraud, minimizing the Audit Report Lag, reducing the auditor's fees, the possibility of activating the continuous audit, increasing the efficiency and effectiveness of the audit process, and finally improving the actual audit quality.

As for the effects of the digital transformation, inherent to the occurrence of the industrial (4.0), on the diversity of auditor' services and responsibility, some agree (Karlsen and Wallberg, 2017; Deloitte, 2018; Ramesh, 2019; Almaleeh, 2019; Adiloglu and Gungor, 2019; Schimtz and Leoni, 2019; Manita et al., 2020; Khanom, 2020), **and we agree that** these the repercussions have become an inevitable reality, and the most important of them are the following:

- The inevitability of developing the performance of the current non-assurance professional services, so that the auditor can prepare the design structures for immediate control, and design electronic systems for the operations cycles of his client.
- The inevitability of the auditors' performance of non-financial electronic assurance services, such as Web-Trust and Sys-Trust.
- The inevitability of performing many non-financial electronic non-financial assurance services, such as professional assurance of trust in the social media platforms used by the client's facility, professional assurance of trust in the structure of the block chains of the customer's facility
- The inevitability of performing many non-financial professional assurance services on other reports such as; cybersecurity risk report, cybersecurity risk management report and information security governance report.
- The inevitability of performing non- assurance services, such as the auditor designing systems for electronic information security and designing ERM risk management for cyber security at his client's facility.
- Finally, the auditor must fulfill the current professional responsibilities in a digital environment (such as electronic fraud detection, electronic illegal acts detection, and electronic Going concern assumption assessment).
- The inevitability of fulfilling the new professional responsibilities (such as detecting electronic crimes).

4. Concludes and implication for the future research:

This paper aims to crystalize the most important of the industry 4.0 on the auditing profession, through studying and analyzing relevant professional publications and previous academic literature. Therefore, that paper acquires academic and practical importance, and it has logical motives, due to the scarcity of accounting research, especially the positive ones, in this field.

To achieve the goal of this working paper, we depend on a critical analytical approach for professional publications and previous academic literature, which related with the effect of the industry 4.0 on the auditing profession, as well as determine the future research in this field.

In this regard we concluded that the Fourth Industrial Revolution (4IR) could be defined as **a radical** and structural change process through combination and integration of digital and electronic technologies tools into a current business model and society. **Which refers to** companies adopting many digital and electronic technologies tools such as; Internet of Things (IoT), Big data analytics, Artificial Intelligence, Blockchain, Bit Coins, Smart Contracts, Machine Learning, Social Maida, Cloud Computing System and Extensible Business Reporting Language (XBRL).

We also conclude that the adoption of these tools could reflect on nature and work environment of the auditing professional' clients, through several aspects, including;

Radical and structural change in the work environment of the profession's client, **automation** of the stages of the accounting cycle, reducing information asymmetry, reducing opportunistic behavior practices and committing fraud in the financial statements under traditional systems, and improving the quality of accounting information and financial reports. **In addition to necessity of** design electronic information security systems, necessity of management cyber security risks, and increasing of the likelihood of committing electronic fraud and other electronic crimes.

The paper also concluded that there are many professional repercussions of the fourth industrial revolution on the auditing profession, which can be divided into repercussions related to the quality and how the external audit client performs the full annual financial statements on the one hand.

And the implications related to the diversity of the auditor's services and his responsibilities (such as; the need to fulfill the professional responsibility related to the electronic assessment of the going concern assumption and the detection of electronic fraud, the professional assurance services on disclosing the list of cybersecurity risks) on the other hand.

In conclusion, we believe in the importance of directing accounting research in Egypt in the future towards the following areas; The effect of assurance on disclosing cybersecurity risks on the investment decision - An Experimental study, the effect of using the big data analytics on the effectiveness of the detecting fraud in the financial statements - An Empirical study, the determinants of the quality of the auditor's professional judgment related with Going concern assumption according to continues audit approach- An Experimental study, the relation between Blockchain technology and planning audit procedures - An Experimental study.

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