

The Impact of the Fourth Industrial Revolution on Human Resources in Unemployment Rates from an Islamic Perspective

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Abstract

The fourth industry revolution-IR4 reshapes global industries and societies with unique challenges and opportunities for Oman, more specifically through the prism of Islamic values. This paper attempts to research the various dimensions of the impact of IR4 on education, employment, and economic development in the Omani context by underlining the integration of Islamic ethical principles in governing these changes. The following research work will cover some of the important areas in which Islamic teachings could guide ethical technology use and policy development. The literature available on this topic was analyzed, and successful case studies were discussed in this research. It also shows serious challenges, gaps in competencies, and unemployment but at the same time shows how IR4 can create innovation opportunities and grow. Propose frameworks of how to include Islamic principles into the adoption of IR4 with some recommendations to policymakers, educators, and industry leaders. The study, therefore, advocates for future research that is focused on the confluence of Islamic values and IR4, particularly on the development of culturally sensitive models for education, finance, and entrepreneurship. The marriage of the traditional Islamic approaches with the modern technological developments will make Oman tackle not only the social but also the economic impacts of IR4, ensuring a balanced and inclusive response to support sustainable development while preserving cultural identity.

Keywords: Fourth Industrial Revolution, Human Resource, Unemployment, Islamic Perspective.

Introduction

The twenty-first century has set the threshold to a different turn in industry and production, as modern technologies and artificial intelligence integrate rapidly. This technological evolution transformed the very fabric of task organization and puts a question mark on the probable future role of human labor in production. These changes make their impact in labor markets at several levels while the global economy shifts towards models that are knowledge

based and not only industry-based: effects on economic structures, job-related relations, job content, and models of compensation (Babina et al., 2024).

The Fourth Industrial Revolution is the moment in history when this digital, physical, and biological fusion of technologies unfolds. This brings new opportunities and new challenges for economies in every part of the world. Its acceleration may fuel innovation and slash costs through increased productivity, reshaping labor markets. Acting as the central force behind global economic growth today, 4IR provokes the traditional theories and practices of economics (George, 2024).

A proper understanding of how 4IR is affecting human resources and the resultant unemployment is important from the Islamic philosophy of emphasizing social justice and equality in distribution (Alhammedi et al., 2024). The present study investigates how AI and other advanced technologies are changing job opportunities and what special challenges Oman faces in harnessing these technologies. It hence attempts at an all-rounded analysis of how best technological advancements can be exploited to ensure the creation of job opportunities, and in essence address challenges relating to unemployment and workforce displacement.

Furthermore, the study will compare and contrast the different experiences of Oman, Qatar, and Japan regarding how technology adoption has panned out and the effects this has had on the labor market. In the end, the study will seek to learn lessons from both localized and global trends in order to optimize benefits accruing from technological developments while lessening their harshest impacts on jobs.

Objective of the Study

This study will be focused on ascertaining how artificial intelligence and automation, among other Fourth Industrial Revolution technologies, have influenced roles of jobs, the skills required, and workforce dynamics. The paper examines these aspects to establish how technological changes are refactoring job functions, changing competence levels required of workers, and modifying the overall shape and nature of the workforce. This research also aims at trying to establish whether or not technological changes associated with the 4IR have some tendencies to create new jobs or reduce unemployment in economies. This is founded on an overview of whether the introduction of such technologies and their integration can create new job roles and therefore release the challenges of unemployment. The study would, therefore, touch on how increased innovation and productivity under the influence of 4IR technologies would address employment challenges and hence increase job opportunities. This part of the research looks into how technological progress can be harnessed in such a way that it solves employment problems and provides avenues of better job opportunities by drawing on the dividends from higher productivity and more innovation.

The 4IR and Human Resources

Concept of the 4IR

The 4IR is simply a deep shift in society, impacting political, economic, and social structures through unprecedented technological innovation. It bestrides the pedigree of major human discovery and invention that in the past catapulted major changes in society. From the

discovery of fire to successive key innovations like the steam engine, each age laid the pedestal for the next revolutions that have led to the current era of the 4IR (Lee et al., 2018). Characterized by the fact that advanced scientific and technological innovations are merged into cyberspace, the 4IR simply means digital transformation. Of course, it will comprise a set of innovations that include AI, nanotechnology, the Internet of Things, and biotechnologies. These technologies form a new reality, break traditional barriers such as distance and language, and extend human creativity and accessibility (Roblek et al., 2021).

The 4IR represents the transition to a new model of human civilization, with traditional industrial factors of all previous revolutions no longer needed. It was born from several converging developments, most noted for digital technology and AI, and first applied spectacularly to the German manufacturing sector early in the 21st century (Hamad and Jawad, 2024).

One of the critical components of the 4IR is its interaction with set ways of life, often referred to as Industry 4.0. This point of view is more strongly linked with the increased integration of intelligent machine systems connected via the Internet, putting a premium on the role of humans to build and manage these networks of intelligent machines or robots that are capable of autonomous decision-making throughout an entire production process (Javaid et al., 2022).

Stages of the 4IR

Characterized by tremendous technological leaps in areas like genetic engineering, the Internet, 3D printing, AI, and IoT, the Fourth Industrial Revolution began in the early 2000s. The term "Fourth Industrial Revolution" was adopted at the 2011 Hannover Fair and taken up by the German government, in 2013, as a strategy for advanced manufacturing. It builds on some technological milestones that preceded it: specifically, mapping the human genome; universal access to the Internet and mobile technologies; and breakthroughs in 3D printing and AI (Ejsmont, 2021).

The 4IR has been a phased occurrence, with each phase characterized by strong strides in technology and structural changes in the economy. Key among the phases is the Big Data explosion, driven by rapid diffusion of such things as smartphones, social media, AI, and IoT devices. Indeed, global data storage capacity since the 1980s roughly doubled every 40 months, allowing enhanced processing and analytics to bolster health, security, and research capabilities.

Another key development is from centralized to decentralized models of production, which comprehensive digitalization makes possible. Dominated at the beginning by industrial giants aiming at perfection in automation, the 4IR today comes with smart automation that personalized customer needs through AI-based self-learning systems. Businesses started recognizing the changing potential of Industry 4.0 in technology and business strategies. This involves fast-paced technological progress, ease of communication, and better access to information. AI systems now come up with more intelligent systems than what human programmers could do, bringing about ethical concerns on the relationship between humans and technology (Pelser & Gaffley, 2020).

The 4IR also comprises other highly complex tasks, previously done by humans, in the form of robots with developed emotional and cognitive advanced abilities. Despite early empirical evidence, studies using patent data suggest significant productivity gains, particularly in high-tech manufacturing sectors. In the long run, the 4IR has very huge potential in terms of significant improvements to economic welfare and quality of life. This would be driven by reduced costs and much-enhanced connectivity and efficiency, greatly enabled by IoT innovations that blur tangibles and intangibles in meaningful ways and build on the successes of the third revolution (Oosthuizen, 2022).

Challenges and Opportunities in the 4IR

The 4IR is a landscape riddled with both opportunities and challenges, characteristics that arguably have made previous industrial revolutions so transformative in nature. At the center of the debate about the impact of 4IR lie rapid advancements currently underway for technologies such as AI and automation, holding huge first-order benefits but also introducing multifaceted issues. This could lead to the possible increase in inequality, where machines substitute workers and feed into a wider wedge between the returns to capital and those to labor. It places a premium on talent and creativity as human resources that are more in demand compared with traditional labor and capital in an economy (Alsulaimani & Islam, 2022).

The ethical dimension in AI, automation, and genetic engineering is huge. For example, the application of genetic engineering for the eradication of hereditary diseases raises ethical issues concerning the limits of such interventions. Second, there is the risk that technological developments might increase existing gaps between countries, especially the competitiveness and sustainable development of developing countries. Drones, facial recognition, behavioral analytics, and other technologies could be misused in an authoritarian regime that may result in potential human rights abuses (Rigby, 2019).

Industry 4.0 is about more integrated systems rather than individual technologies. Take, for example, AI needs assessment within the frame of broader systems and not as isolated capabilities. To be able to do so, one has to have overarching understanding of the rapidly changing issues at hand and political and social commitment to the exploration of implications that come with the making of future systems. It is important that technological development is paralleled by education reform that would provide the relevant competencies to teachers so that new technologies will not enslave but empower their citizens. This collaboration of governments, industries, and interest groups working together toward developing norms and regulations could result in a more equitable and prosperous future.

However, the characteristic of the Fourth Industrial Revolution in speed, scope, impact, and complexity sets it quite apart from all previous revolutions. It embeds values and ethics within technologies that are much more advanced, efficient, and cost-effective in creation and implementation. Technologies are not some neutral tools. They can encode biases and ethical considerations, underscoring further why there needs to be a kick-back on ethical frameworks within technological advancement (Koloszár & Németh, 2020).

Objectives of the 4IR

The Fourth Industrial Revolution is the attempt at connecting billions of people to each other through mobile devices and greatly increasing processing power, storage capacity, and access to knowledge. This revolution is in the junction of new professional fields like artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3D printing, nanotechnology, biotechnology, material science, and energy storage. Such technologies, in their early stages of evolution, are beginning to converge to disrupt the boundaries between the physical, digital, and biological worlds (George, 2024).

The 4IR has the capability to enhance average income and the quality of life all around the globe. Its business, government, and individual effects spread far and wide. It aims at the integration of the physical, biological, and digital worlds; it has, in many instances, come to be termed a "digital revolution." Privacy remains a pressing concern at a time when new information technologies come into being. It is for this simple reason that the world economy needs 4IR to realign hierarchies and give humans a trajectory into the future of innovative solutions. Effective technologies in communication will extend opportunities in access to information, making better economic and social conditions, especially in developing countries (Chandra & Pouchous, 2017).

Mobile technology has overtaken fixed technology in growth by providing access to resources through portable smart devices (Keengwe & Bhargava, 2014). AI development gives a number of grandiose novelties in such huge fields as the military, industry, economy, technology, medicine, and education, with large-scale industrial and social changes. Big data processing and IoT have increased productivity and efficiency, giving way to new business models and smart city concepts that promote sustainable development and a better quality of life (Talebkhah et al., 2021).

Characteristics of the 4IR

The Fourth Industrial Revolution is a period of complete digitalization of both vertical and horizontal phenomena, visible and invisible. It contains the shift from centralized to decentralized models of production, integrating all economic units into real-time interaction. Unlike the previous revolutions, the 4IR relies on emerging technologies rather than new energy sources. It targets the enhancement of performance and the simplification of activities through advanced digitalization (Marwala, 2017).

Key features of 4IR include reduced time and space constraints, greater sharing of intellectual tasks with machines, and setting up complex communication networks. It is deeply integrated with AI, nanotechnology, VR, and RFID that drives innovation across industries and forms the backbone for smart factories, hence enabling machine-to-machine communication. These technologies, even though still at an experimental phase, hold a promise of very transformative solutions and accelerated digital transformation (Rudolf, 2022).

These innovations were necessitated by the rapid developments and deployment, which requires new skills such as critical thinking and emotional intelligence. Institutions require structural flexibility, coupled with value-driven promotion systems. The impact of 4IR is wide-ranging: from the reshaping of personal identities to privacy and social capital and posing

challenges and opportunities for both policy adaptation by governments and citizen engagement through digital platforms. Automation and digitization are going to disrupt economic and social policy; strategic government responses are needed in managing disparities and fostering wealth generation (Borrageiro & Mennega, 2023).

Advantages of the 4IR

The areas of innovation in the Fourth Industrial Revolution—robotics, artificial intelligence, nanotechnology, and biotechnology—are disrupting the very essence of the global economy and societal dynamics. Coupled with AI, robotics is revolutionizing health, education, and transportation sectors. With more than 2.7 million industrial robots already at work, the productivity and innovation the world is experiencing are driven by AI, which permits algorithms to make predictive and adaptive decisions (Lee et al., 2018).

Nanotechnology, with huge annual investments, allows for the development in materials science to be fast-tracked, thereby entailing quicker disease detection and biocompatible engineering. Biotechnology develops new products and techniques that enable an influence on human health, agriculture, and the environment. The IoT, thanks to its huge number of interconnected devices, strengthens decision-making and management in a very broad range of applications—smart homes and environmental monitoring (Elzein, 2024).

This makes these technologies very potent levers of economic growth, human welfare, and environmental sustainability when brought together. That being said, though 4IR allows disruptive opportunities, it is plagued with problems relating to privacy, security, and data management. Only if these matters are addressed effectively can the full potential of the Fourth Industrial Revolution be exploited.

Impact of 4IR on Unemployment and Societal Structures

Samir (2021), surveys the challenges of 4IR for universities and universities' adaptation requirements, with the realization that such a revolution would heighten the debate around unemployment within the Ministry of Labor in Oman. Watfa (2019), discusses the impact of digital technology on human identity and job markets with a focus on the dilemma of rapidly increasing unemployment. Joodah (2020), argues managements adapt to technological changes in production and its impact on unemployment in Oman. Al-Jazar et al (2022), contributes an analysis of the structural unemployment in Egypt and the prospective deficiency of skills coming out as an outcome of 4IR, comparing it with the situation in Oman. Kamel (????????????) explores the Islamic approach to unemployment as opposed to a secular strategy and proposes some Islamic solutions particularly for the case of Oman. Mostafa and Ali (2021) argues from the Islamic point of view on poverty and unemployment, consequently leading one to the conclusion that there is a necessity for assistance of small businesses in Oman. Sahel (2018) tries to find answers to the determinants of unemployment in Arab countries while giving relative levels of unemployment in Oman with respect to Qatar and Japan. Jreban (2021) revisits the prophetic solutions to the youth unemployment and compares them with the western solutions, applying formers' solutions in Oman. Al-Sheikh (2013) talks about the role of Islamic tenets of economics in such urgent global issues as combating poverty and unemployment, evidencing IR4 to keep societies stable.

Technological Adaptation and Future Developments

Fathallah (2021), looks towards the future and sees advances in education in the limelight of 4IR—especially the role of AI. Heeding these, he calls for the development of the curriculum and a change in the way of teaching. Khaled (2022), revisits the impacts the 4IR technologies are imparting to the design management processes and their impacts on industrial competitiveness. Amin and Ismail (2021), create a further discussion regarding how the technologies to support 4IR can contribute and be compatible with Islamic lifestyle expectations, showing not only the opportunities but also the threats attributed to this integration. Karim and Issa (2022), provide us with a comparison review of strategies regarding transitioning to 4IR technologies in Oman, Qatar, and Japan, driving lessons learned for effective implementation. Mouloud (2021), presents how the strategy of shifting from a rent-based economy to a productive one in Algeria takes shape with 4IR, and what chances are there to this specific aspect toward economic diversification. Hemeti and Hamlaoui (2023), talk about the benefits versus obstacles of 4IR technologies, having skills enhancements and data protection issues on top of the list. Mahmoud (2020), discusses 4IR as the driver of economic diversification toward leveraging the sustainable development goals in the region of Maghreb. Arama and Lotresh (2021), explore the impact of 4IR on SMEs and how digital enterprise transformation can drive economic development and sustainability. Whereas Sobhi (2022), focuses on what lies ahead in respect of global value chains as influenced by the coming technologies of 4IR, including AI and robotics. She evaluates the effect of 4IR and digital transformation on insurance, focusing in on innovation and digital culture building.

Educational and Skill Development

Hassan (2017), investigates the impact of 4IR on the discipline of cost accounting and whether there is a need to redesign the frameworks to move at par with technological advancement. Ahmed (2022), investigates the features of 4IR and their implications for ethical values in learning, putting forth the challenge of modifying the educational approach to suit technological change. Ahmed (2020), looks at the gap created by 4IR and comes up with strategies to enhance production efficiency by updating the legislative frameworks. Mahmoud (2020), talks about the effect of 4IR on industrial design philosophies, insisting that design processes have to become more flexible and responsive. Ibrahim (2019), is concerned about knowledge sharing among the Arab information institutions and argues for efficient frameworks within which information professionals could work in light of 4IR. Abdel Salam (2022), looks at how educational practice can be adapted to the requirements of 4IR and how teacher competencies may be improved. Enas Ahmed investigates technological needs for 4IR with preschool-age children and the integration of those technologies within early childhood education. Abdel Hamid (2022), reviews academic programs in Saudi universities related to emerging technologies and aligns them with the goals of Vision 2030. Abdel Atty (2021), presents the challenges of taxing robots and suggests frameworks for tax legislations in the context of 4IR. Ali (2020) describes a vision for required skill development for future jobs that focuses on strategies to address unemployment and meet 4IR demands.

General Overview and Comparative Studies

On the other hand, David and Kim (2018) treat the challenges and opportunities brought by IR4, tending towards its transformative effects on industry and life. Prisecaru (?????)

presents in-depth analysis of the IR4 features presented by the World Economic Forum and their implications for global industrial development. Kayembe and Nel (???????) present the challenges that exist in the educational sector of South Africa about the required infrastructures and human resource development for IR4. Stăncianu (2017) evaluates the implications of IR4 upon digitization and connectivity in various fields. The other contribution is a framework to integrate technological and social innovation in contexts of IR4 scenarios by Morrar et al (2021). Brown-Martin (2018) evaluates the preparedness of the emerging generation to IR4 and how they would be able to adapt. Man (2019) explores IR4-driven digitization and the way it impacts working practices. Li and Hou (2017) evaluate the impact of IR4 on the economy, industry, and society globally and prescribe policy actions to adapt to it. Sutherland (2019) assesses South Africa's IR4 strategy as far as their shortcomings in skills and failures within policy implementation are concerned. Sceanovič (2019) addresses the role of higher education in the context of challenges related to the preparation of future generations for the IR4 changes.

Field-Specific Impacts

Elayyan (2021), argues that the technologies of the Fourth Industrial Revolution should change the way communities are informed and educated, pointing out the necessity for reformation in the curriculum. López-Robles et al (2023), discuss precisely how the COVID-19 pandemic accelerated the integration of digital education technologies to handle the challenges in the shift to online learning. Chou (2019), remarks on the disruptions IR4 has caused in communication developments, saying it had very broad effects on the economic, social, and political spheres. Puhovichova and Jankelova (2020), add to the research about the effect of IR4 on human resource management, primarily based on the trends in automation. Burgess (2019) evaluates the readiness of human resource professionals in Australia to embrace IR4, as well as pinpointing the opportunity brought about by technology adoption for improved performance. Karimulla (2020) explores how human resources are aligning their strategy with IR4 technologies in the South African manufacturing and construction sectors. Bikse (2022) sets out the IR4-induced effects on the development of employment skills in Latvia and proposes a closer linking between vocational education establishments and enterprises regarding the coverage of new skill needs.

Gaps in the Literature

The literature available on Fourth Industrial Revolution (IR4) is rich in information about its effects in various domains but has several gaps itself, more specifically with respect to the Islamic perspective and its application in the Omani context. While some research deals with the alignment of IR4 technologies with Islamic lifestyle standards and economic principles, often it does not encompass a critical review of how the Islamic ethos and values can guide the integration and practical application of those technologies in Oman. Most of these studies are conducted generally focusing on the technological impacts or the Islamic perspectives, without really going deep into how the Islamic teachings would help in framing responses to the IR4 challenges in the unique socio-economic and cultural context of Oman. In addition, while there are general discourses on educational adaptation vis-à-vis IR4, it is evident that the exploration of the integration of Islamic educational values within curriculum development and teaching methodology toward addressing the challenges of technological advancement has remained largely inadequate. The literature also focuses on policy

development but in most cases fails to capture how Islamic law and principles have framed policies relating to IR4. Moreover, even though there is a review of poverty and unemployment from an Islamic viewpoint, it does not explain how Islamic finance models and entrepreneurial competencies can help harness and strengthen the small businesses in Oman during technological disruption. Further, there is a limited review on the application of prophetic measures and Islamic solutions in mitigating unemployment among the youth in the IR4 context. Last but not least, while there are discussions on Islamic economic principles, detailed discussions are not found on how these principles can be concretely implemented to mitigate the economic and social impacts of IR4 in Oman. These gaps need to be bridged for obtaining a better understanding of how Islamic perspectives might inform and form a response to the challenges and opportunities associated with IR4, specifically in the Omani context.

Future research areas could consider filling literature gaps, hence creating more comprehensive understanding related to IR4 from an Islamic perspective in the Omani context. There is a need to study how Islamic ethical principles can guide the adoption and implementation of IR4 technologies in Oman. These include developing frameworks that can resonate with Islamic teachings for ethical use of technology and use some of case studies that prove successful in the integration. Future research aligned with IR4 also could be conducted on how one can combine two teachings of Islamic values while developing curriculums and methods on teaching, with the aim of developing models of education where Islamic principles are combined with modern technological skills needed in IR4. Research would take place along those pathways in which Islamic law could influence the development of policy relevant to IR4, such as technology regulation, data privacy, and labor-market policies, by the establishment of empirically based policy recommendations which balance technological advance with Islamic ethical standards. Another important area of research may be in the domain of the use of Islamic finance and entrepreneurship models in the development of small businesses in Oman, especially during the phase of IR4.0 disruption. This would entail getting case studies and strategies for the promotion of Islamic finance tools and entrepreneurial best practices. Study and adaption of prophetic measures and other Islamic solutions to the context of youth unemployment in IR4, recasting them to suit modern challenges. Further, probing the applications of Islamic economic principles to alleviate such effects of IR4 in Oman will bring in insights toward the promotion of economic stability and social equity, and therefore sustainable development. A comparative interesting dimension would be the analysis of Islamic and secular approaches toward challenges in IR4, showing the strengths and weaknesses of both viewpoints toward insight into their integration. Finally, there needs to be research on how strategies for cultural adaptation, hence informed by Islamic values, could be developed in addressing the particular challenges of IR4 in Oman. This study should help clarify the extent to which cultural and religious considerations may impact the designing of IR4 technologies and policy considerations. The above directions will lead to a much more nuanced understanding of how Islamic perspectives are able to shape the response to the challenges and opportunities of IR4 in Oman.

Conclusion

This research epitomizes the transformative ability of IR4 across sectors, while also establishing the special challenges and opportunities brought by IR4 to Oman from the

specific lens of an Islamic perspective. It urges for the incorporation of ethics prescribed by Islam with technological growth in order to involve the dividends yielded from IR4, all the while maintaining cultural and religious values. The research, therefore, examines the influence of IR4 on education, employment, and economic development as a means of investigating how Islamic teachings may guide ethical technology use and policy development in Oman.

The analysis reveals that, on one hand, IR4 offers vast opportunities for innovation and economic growth; on the other hand, it challenges skill gaps, unemployment, and ethical dilemmas. Responses to these challenges demand an all-rounded approach that makes use of Islamic values in ensuring a balanced and inclusive approach. This research provides useful recommendations to policymakers, educators, and industry leaders based on a detailed analysis of successful case studies on the integration of Islamic principles into IR4 adoption. Future studies should go further in attempting the junction between values and IR4, mainly on education, finance, and entrepreneurship. Omani society needs models of development which are culturally sensitive and oriented towards the Islamic approach to help mitigate the social and economic effects of IR4. Further research into the adaptation of prophetic measures and Islamic solutions to modern challenges will also add to the discourse on how traditional approaches can be applied to contemporary issues.

The whole contributes to a deeper understanding of how Islamic perspectives can be drawn on in shaping responses to the opportunities and challenges of IR4 in Oman. Such ethical, sustainable, and culturally-bound strategies will help Oman steer a course through the complexities of IR4 while riding its potential for driving economic development and social progress and holding tight to its rich cultural heritage.

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