Critical Review of the Interplay between the Fourth Industrial Revolution and Religion

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Abstract
The Fourth Industrial Revolution (4IR) or Industry 4.0 is rapidly changing technology, industries, and societal patterns and processes in the 21st century. Religion is not exempted from this transformation. This is due to the increase in interconnectivity and smart automation. The Fourth Industrial Revolution? How does the Fourth Industrial Revolution affect religion? How and when did it emerge? Does religiosity matter in the era of the Fourth Industrial Revolution? How are religious leaders, religious organizations, and religious adherents responding to this change? What are the roles of religious leaders, religious organizations, and religious adherents in the transformation? What are the challenges of the Fourth Industrial Revolution to the practice of religion? The aim of this study is to attempt to answer these questions by critically reviewing some recent literature on the interplay between the Fourth Industrial Revolution and religion. The study concludes with some recommendations to religious leaders, religious organizations, and religious adherents on how to practice religion in the era of the Fourth Industrial Revolution and preparation for future industrial revolutions.

Keywords: The Fourth Industrial Revolution, Religion, Religiosity, Religious Leaders, Religious Organizations, Technology, Social Change

Introduction
Technology, industries, and societal patterns and processes are being rapidly changed every day by the Fourth Industrial Revolution (4IR) or Industry 4.0 in the 21st century. Religion is not exempted from this transformation. This is due to the increase in interconnectivity and smart automation. This paper aims at examining how 4IR is affecting religion and the responses of religious leaders, religious organizations, and religious adherents to this inevitable and continuous change. This is done through critical review of some recent literature on the interplay between 4IR and religion.

What is the Fourth Industrial Revolution?
The Fourth Industrial Revolution is the current phase in the digitization of the manufacturing sector, driven by the rise of data and connectivity, analytics, human-machine interaction, and improvements in robotics. According to van den Berg (2020:2), the notion, "Fourth Industrial Revolution" is

> a heuristic key for the world of emerging technologies such as artificial intelligence, nanotechnology, quantum computing, big data, the internet of things, and biotechnology. Human civilization has entered a fundamentally new era, with the fusion of the physical, digital and biological spheres, and with

> the underlying basis in advances in communication and connectivity. Often the discourse on the Fourth Industrial Revolution is accompanied by promises of improved quality of life for societies and by warnings of potentially disruptive effects.

Explainers (2022) gave an insight that, the Fourth Industrial Revolution possibly will make products and services more easily reachable and communicable for trades, customers, and stakeholders from the outset. Initial data show that effectively scaling 4IR technology allows supply chains to be more well-organized and working hours more fruitful thereby reducing factory waste, and having limitless other benefits for workers, stakeholders, and customers.

How and when did the Fourth Industrial Revolution Emerge?

The initial or First Industrial Revolution was propelled by Steam from about 1760 to around 1840 with the construction of railroads and invention of the steam engine. The Second Industrial Revolution started in the late 19th century and into the early 20th century was powered by Electricity. This made mass production possible, fostered by the advent of electricity and the assembly line. The Third Industrial Revolution began in the 1960s. This is commonly referred to as the Computer or Digital Revolution against the backdrop that it was catalysed by the development of semiconductors, Mainframe Computing (1960s), Personal Computing (1970s and 80s) and the Internet (1990s). The Fourth Industrial Revolution, that is built on the inventions of the Third Industrial Revolution or Digital Revolution, is being shaped by cyber physical systems or intelligent computers (see Explainers, 2022; Schwab 2016).

The Importance of Religiosity in the Era of Industrial Revolution 4.0

The extent that a person is religious and the way a belief (or some beliefs) manifested in the person can be described as religiosity (Vitell, et al., 2008; Adnan, Yunus, & Ghouri 2019). Many mechanisms of religiosity have been identified by researchers in the field of religiosity. According to Adnan, Yunus, and Ghouri (2019: 9), there are six identified dimensions of religiosity, namely: "beliefs, experiences, religious charities, religious knowledge, individual moral consequences, and social consequences." Adnan, Yunus, and Ghouri (2019: 69) opined, "With the Fourth Industrial Revolution coming our way, religiosity might be the element that can balance humanity and insanity…." These scholars carried out a study to investigate the influence of religiosity on the work behaviour of Muslim officers in the higher learning institutions in Malaysia. The research study found out that religiosity has an influence on the work behaviour of these religious people to a certain extent (Adnan, Yunus, & Ghouri, 2019).

Adnan, Yunus, and Ghouri (2019), therefore, concluded that religiosity may not be the main influence that improves the performance of workers, yet, it still has a bearing on work behaviour. Companies need to remember that in the industrial revolution age, persons are still associated with their values and beliefs. Consequently, religiosity is crucial to offer a sense of meaning in work. The consequences of this have inferences for possible optimistic social change on the individual level and organisational level.

Responses of Religious Leaders, Religious Organizations, and Religious Adherents to this Change

The 4IR introduces new ethical questions surrounding issues like artificial intelligence, genetic engineering, and data privacy. There is an expected emergence of new professional roles that are related to the use of technology, in the future. AI and machine learning specialists, big data specialists, digital transformation specialists, new technology specialists, software and applications developers, analysts, information technology services specialists, etc. are examples of such. (World Economic Forum, 2016). Religious leaders, religious organizations, and religious adherents, who are employees may have to engage in dialogues to determine their stance on these technologies, and how to meet these challenges, based on their faith perspectives. They may have to increase their flexibility in how they perceive work time, wages, tasks, workspace, etc., and keep their skills and knowledge, related to new technology, up to date. Employees and future employees need to take into account that work arrangements are much more diverse and that working in a standardized form may no longer be dominant in the future. Working from home, from other continents, with multiple employers at once, project work, just for a limited time, using online platforms, etc. are increasingly common. Employees must also invest in the development of specific skills that will be harder to be replaced by artificial intelligence such as social skills, creative thinking, cross-cultural competencies, etc. In the digital era with hyper-connectivity and machine/human interactions, employees need to constantly keep up to date with their knowledge and develop new skills related to using new technology.

The goal of religious education should go beyond just promoting the strength of belief, piety, and noble morality to a learning process that includes openness, cross-cultural relationships, and expanding the field of professional works, regional and global context, and a religious education process that would upgrade the creativity and innovation competence for all the students through participative learning, problem-solving, and project (Rosyada & Andriyani, 2020).

Religious leaders and religious organizations have a responsibility toward future generations who stand the risk of having their kids become manufactured commodities that may be ordered for at will when it comes to tinkering with the genetic codes of organic species, including humans. Religious leaders and religious organizations can respond well to the problem posed by the inequality gap, which arose because not everyone has the skills and/or can afford these new technologies. Livelihoods of low-skill labour are threatened as they are easily displaced from the workforce. The largest beneficiaries of innovation tend to be the providers of intellectual and physical capital—the innovators, shareholders, and investors— which explains the rising gap in wealth between those dependent on capital versus labour (Schwab, 2016). Anger and frustration over the rising inequality destabilizenot only the domestic political scenes but also the global world order (Nguyen, et al, 2019).

By leveraging their influence and moral authority, religious leaders can play a vital role in stemming the tide of anger and frustration over rising inequality in the era of the Fourth Industrial Revolution 4IR. These leaders have the potential to mobilize

communities toward positive action, advocate for ethical practices, and provide spiritual and emotional support to those in need. They can combine spiritual guidance, social advocacy, and practical solutions e.g., educate their communities about the implications of the 4IR and how it affects different segments of the society. This includes explaining the technological advancements, their impact on jobs, and the resulting inequality, encouraging the responsible and ethical development of technology that takes into consideration the welfare of all members of society, rather than benefiting only a privileged few. Religious leaders can use their platforms to advocate for policies that promote social inclusion, such as progressive taxation, access to quality education and healthcare, and affordable housing, and emphasize the values of empathy, compassion, and solidarity within communities encouraging individuals to look out for one another and support those who are not well to do.

To stem the tide of the ethical challenges (i.e., upholding moral principles), religious leaders and religious organizations should have a serious ethical reflection on how far should we go in our development and implementation of these new technologies, being careful of covert and overt dehumanizing tendencies linked to the development and actual use of new technologies. In other words, embrace technology with caution. Christian theology will have to reflect critically on how to articulate what it believes are established foundations for protecting human dignity (Nguyen, et al, 2019).

For the challenge to the concept of humans being created in God's image (*imago Dei / eikon tou Theou*), religious leaders, religious organizations, and religious adherents should live as bearers of *imago Dei* is to be transformed by the Love incarnate whom Christians call Christ, the embodied Logos of God, whose Spirit pulls us into participating in the fellowship of love between the Father and the Son. To live as bearers of imago Dei is to learn to recognize one's limitations, deficiencies, and brokenness, as well as the deficiencies and brokenness of the neighbour (religious and secular), and to embrace them humbly as we receive and share the selfless love of the One who has emptied himself (therefore, *kenotic*) for our sake freely and unreservedly (therefore, *agape*) (Nguyen, et al, 2019).

The importance of religious leaders, and religious organizations as educators is obvious in this process (Nguyen, et al, 2019). Religious leaders and religious organizations will need to develop and adopt a comprehensive view of how technology is affecting our lives and impacting our environments. They can then be better positioned to speak critically and yet hopefully about the challenges of the Fourth Industrial Revolution, helping the students take responsibility for the future development of the Fourth Industrial Revolution and our world, instilling proper attitudes and values, which are the basis of personal and collective judgments about what is important in life - influenced by culture, religion, and laws. Attitudes and values are factors in our decision-making on social, environmental, and political matters, and on the best uses of our time, money, and valuable materials (Nguyen, et al, 2019). If we fail to put a proper emphasis on this in our school curricula, we may wake up into a bleak future of a dehumanized world in which robotized humanity will have lost its soul. (Schwab, 2016a). Religious leaders, religious organizations, and religious

adherents need to accept that there is a relationship between science and religion (Marwala, 2020). Religion and science may stand at opposing ends, but their positions are the means by which anything can be grasped (Marwala, 2020). Religious leaders and religious organizations can use religion to provide answers to some logical questions about the Fourth Industrial Revolution. Questions like who are we if our brains can be augmented? Do we still have free will, if technology can nudge us to act in a particular manner? Why are we here if machines can do many of the tasks that we are destined to perform? (Marwala, 2020). As science and technology advance, in the era of the 4IR, people will continue to look at religion to make sense of the world, religious leaders and religious organizations would do well to promote examples of science and religion working together to tackle challenging problems confronting our society i.e. the development of artificial intelligence (AI) ethics, by efforts of the Roman Catholic Church, Microsoft, and IBM (Marwala, 2020, November 10). Religious leaders, religious organizations, and religious adherents in Nigeria need a reassessment of how Nigeria has fared in the era of globalization. This is for their followers to take advantage of the era of computers, digitalised telecommunication and the internet is what the country cannot shy away from, but the positives of the times should be properly harnessed for the country to appropriately benefit from globalization (Ogueche, et al., 2021). However, with a caution on how they will not be swallowed by globalization by teaching the principle of selective acceptance, which should enable them not to accept all ideas they are exposed to but to know that it is only those ideas and values that are useful for healthy living that they should accept. Efforts should be made to ameliorate the negative effects and enhance the positive effects. Nigerian Christians need to exploit the process of globalization to promote their faith, for example, the internet can be employed to propagate the gospels. There could be a website where the youth could browse to learn proverbs and rudiments of the cultures of Nigerian people. There is a need for Nigeria to demonstrate her beliefs in indigenous technical knowledge and skills, instead of being subjected to the mercy of globalization without being globalized in the real sense of it (Ogueche, et al., 2021).

Citizenship practice changes as technological developments occur. The perspective of citizens in participating becomes more open, especially on social media platforms. Way of thinking in every citizen needs to be equipped with an understanding of diversity and tolerance in order to develop a good perception of difference. The emergence of various new habits is not uncommon and citizens feel free to speak anything and do anything with the sophistication it comes with. The exchange of opinions and comments on social media has become commonplace and seems to be a compulsory activity for citizens. The consequence of this is the rise of hoaxes and hate speech, easily spreading a lie or hate speech with a single touch, with a potential for an intolerant attitude to radicalism (Rahmelia & Apandie, 2019). Religious leaders and religious organizations can help foster religious moderation by promoting religious education that focuses on tolerance, understanding, and peaceful coexistence in an increasingly interconnected world.

Roles of Religious Leaders, Religious Organizations, and Religious Adherents in the Transformation

Religious leaders, religious organizations, and religious adherents can contribute meaningfully to the responsible and ethical integration of technology in the 4IR era, ensuring that it serves the betterment of humanity and aligns with their respective religious values and principles, thereby playing important roles in the 4IR transformation. Religious leaders can play the role of moral and ethical guides giving direction on how to handle the 4IR's ethical questions and difficulties, such as those involving genetic engineering, digital privacy, and AI ethics. Religious leaders can offer spiritual support and guidance to individuals who may be grappling with questions about the meaning and purpose of life in the face of rapid technological change. They can do this by offering interpretations of religious texts in light of technological advancements, helping believers understand how their faith can adapt to the changing times. Religious leaders can serve as advocates for social justice, promoting inclusivity, and the fair distribution of benefits from technological advancements, and ensuring that marginalized communities are not left behind. They can encourage adherents to cultivate qualities of compassion and empathy towards those who may be adversely affected by technological disruption.

Religious leaders can play the role of moderators fostering intra-faith dialogue and understanding between different faiths on how to approach and respond to the challenges and opportunities of the 4IR. Religious organizations are capable of developing educational programmes that give people the knowledge and abilities they need to function in the digital age, such as cybersecurity, ethical AI, and digital literacy. They can create supportive communities where members can discuss and address the ethical and moral implications of technological advancements together. Religious organizations can play a role in community development, engaging in humanitarian efforts and providing social services that address the needs of communities affected by the disruptions of the 4IR, such as job displacement.

Religious adherents can play a practical role by appropriately embracing technology in line with their religious beliefs. Religious adherents should also be conscious of the possibility for both good and bad uses. Other roles for religious adherents can be to be actively involved in community meetings, contributing to discussions and initiatives related to the ethical and moral implications of technological progress. Adherents living out the values of compassion, altruism, and service to others, particularly in the face of challenges brought about by the 4IR, are playing a significant role.

The Challenges of the Fourth Industrial Revolution to the Practice of Religion

The Fourth Industrial Revolution characterized by its great digitalization, higher connections between physical things and the virtual world, the development of genetics, artificial intelligence, hyper-connectivity, etc. has generated many changes in how work is done generally (Man & Man, 2019). Many jobs are predicted to be mechanized or transferred to artificial intelligence (AI) in the near future (Frey & Osborne, 2017)., it is also estimated that roughly 35% of today's children, when adults,

will have job types that exist today; the rest will have job types that do not yet exist (World Economic Forum, 2016). The knowledge, skills, and abilities required by employers in this era of the Fourth Industrial Revolution are different compared to the knowledge, skills, and abilities required in the past era.

Man and Man (2019) presented challenges that include the emergence of new working arrangements between employees and employers where employers do not guarantee any working time and work, and changes in the way work is performed. This is what Datta, Giupponi and Machin (2019) refer to as *zero-hours contracts*– an arrangement that allows a worker to be hired by a group of employers, or allows a single employer to hire two or more workers to fill a full-time job and so on. Farina, Green and McVicar (2019) also spoke more on this. It is having a project instead of a job which is a shift from having a job to having contracts with organizations, limiting the employee to specific problem solutions and provision of specific services (Eurofound, 2015; Leighton & Brown, 2013; Saxton, Oh & Kishore, 2013). Change in standard workspace (an office, factory, etc) to anywhere: in a coffee house, at home, etc and consequently, change in working time and wages (Messenger & Gschwind, 2016).

Other challenges include the need for employees to learn to work with technology and constantly update their knowledge and skills regarding technology in order to increase their employability because of an increased number of crowd workers – an employment arrangement where individuals solve problems and provide services for different organizations, mediated by online platforms; the increase in teleworkers, the development of the "internet of things", hyper connectivity, digitalization, the increase in artificial intelligence and increase human/ machine interactions and machine/human interactions (Wang, et al., 2016). Related to this is the emergence of new skills and abilities to be acquired. These include sense-making skills (to be able to find meaning and insights), social abilities, novel and adaptive thinking (creative), cross-cultural competencies, computational thinking, new-media literacy, transdisciplinarity, virtual collaboration, cognitive load management (ability to select important information and ignore irrelevant information) (Davies, Fidler, and Gorbis, 2011). All of these skills are in contrast with the skills needed for repetitive and physical tasks; tasks that have a greater possibility to be replaced by robots and machines (Frey & Osborne, 2017). According to Acemoglu and Autor (2011), the demand for high-skill occupations has also increased. This is corroborated by Strandell and Wolff (2018) who reveal that persons with higher educational levels have higher rates of employment compared with persons with a lower level of education. There is an expected emergence of new professional roles that are related to the use of technology, e.g., AI and machine learning specialists, big data specialists, digital transformation specialists, new technology specialists, software and applications developers, and analysts, information technology services specialists, etc, in the future. There is the fear that the 4IR will make humans irrelevant, resulting in mass job losses that will be difficult to curb (World Economic Forum, 2016).

Alteration of how work is done has the potential to influence religious practice in several significant ways: Changes in work patterns may impact traditional time and

the mode of worship associated with religious practice may bring about changes in how religious communities gather for worship. With the rise of remote work and flexible hours, people may find it easier to fulfil their religious obligations. This might encourage more people to actively engage in religious activities since they will not be constrained by the conventional 8 a.m. to 4 p.m. working hours. Automation and technological advancements affect how people pay tithes and donations to religious institutions. Disparities in the population of religious adherents in their skills and knowledge in the 4IR may lead to disparities in income distribution and this could influence how individuals contribute financially to religious institutions and impact the sustainability of religious organizations.

The global connectivity, brought about by the 4IR, exposes people to various cultures, ideologies, and customs. This exposure may encourage interfaith conversation and understanding and lead to sharing and exchange of religious viewpoints. Globalization has accelerated the migration of peoples and the speeding up of communication, especially by means of the internet. This has to do with the easy conveyance of religious teachings across distant areas of the world. It is now possible for most religion not only to spread their views but to proselytes around the world. The international radio and television networks have also enhanced opportunities of missionaries' enterprises of many religious groups as they are able to reach even those in the very remote places of the world (Ogueche, et al., 2021).

Technology moguls like Amazon, Facebook, Alibaba, and Netflix already have algorithms with a high degree of predictive capacity when it comes to consumer behaviour and habits, including those related to eating, dressing, dating, finding a job, watching movies, or listening to music (Nguyen, et al, 2019). The ability of AI to predict consumer habits and behaviour can cause religious organizations to use AI-generated consumer insights to customize their messages and outreach efforts. This could be helpful in identifying specific demographics or groups that are more likely to be receptive to their message and channel their resources accordingly. Religious experiences could be tailored to individual preferences e. g. AI might recommend specific scriptures, prayers, or rituals based on a person's past behaviour or expressed interest.

Excessive (and growing) online interaction has detrimental effects on social skills (for instance, communication, cooperation, leadership, relationship-building, and empathy), the development of which has suffered a negative trend among people who use modern electronic devices for communication and entertainment. There is a 40% decline in empathy among college students compared with their peers 20 or 30 years earlier, according to a 2010 study by the University of Michigan Institute for Social Research, with most of the decline occurring after the year 2000 (Schwab 2016). The implication of this is that as face-to-face interaction, declines due to excessive (and growing) online interaction, people will have difficulties developing their listening skills, making eye contact, or reading body language accurately. This, in turn, decreases the human capacity for empathy, causing human relationships to be shallow and unstable (Nguyen, et al, 2019).

Globalization has made so many Christians, particularly in Nigerian universities, involve in social vices such as the fraudulent act "*Yahoo-Yahoo*", etc. Globalization has tampered with the practice of many Christians' faith because they devote most of their time to the Internet, mobile phones, watching football games, watching pornographic and obscene materials and logging to satanic websites that teach them evil things (Ogueche, et al., 2021). Involving in such acts make the faith of many Christians wax cold and as a result, iniquities are at increase as is stated in the book of Matthew 24:12: "And because iniquity shall abound, the love of many shall wax cold" (Ogueche, et al., 2021).

The use of some internet materials exposes people to some western culture and orientation which are alien to our cultural norms and values, and most importantly our religion (Christianity) (Ogueche, et al., 2021). Globalization is linking together the world religions (Christianity, Islam, Hinduism and Buddhism). As quoted by Ogueche, et al. (2021: 227), globalization is when "peoples, cultures, societies and civilizations previously more or less isolated from one another are now in regular and unavoidable contact." The narrowing of the distances between people of the world has brought about the co-existence and interaction of human beings of different social backgrounds. In such a situation, pluralism is widely accepted, as a means of maintaining harmony in the midst of diversity (Ogueche, et al., 2021).

In Indonesia, because the source of information accessed by citizens in the digital age, has become unfiltered, the emergence of various new habits is not uncommon with citizens feeling free to speak anything and do anything with the sophistication it comes with. The exchange of opinions and comments on social media has become commonplace (Rahmelia & Apandie, 2019). The problem with this is with the contents and the way opinions are channelled. Then, the rise of hoaxes and hate speech, easy spread a lie or hate speech with a single touch, with a potential for an intolerant attitude to radicalism (Rahmelia & Apandie, 2019).

Conclusion and Recommendations

In conclusion, the authors of this paper will adapt the recommendations Adhikary and Floyd (2021) on Industry 4.0 for religious leaders as well. These recommendations inter alia are:

1. Provide forums and venues for the private sector, technical colleges and universities, and research and development institutions to work collaboratively and spur additional industrial innovation.
2. Increase spending and promote collaboration across government departments and agencies responsible for industrial innovation policy and support.
3. Invest more in capacity and skills building through STEM engagement.
4. Tap into higher segments of the value chain by engaging in sectors that are growing or have the potential to grow.
5. Support firms to become competitive among other lower middle-income countries where industrial innovation agendas are gaining prominence.
6. Improve access to finance and technical assistance for SMEs in the informal sector, and help them benefit from the innovation being made in larger or related industries by linking them to larger value chains.
7. Support tech hubs and innovation centers and avoid disincentivizing policies.

8. Move from technology transfers to technological learning and innovation capability building.
9. Develop robust, yet realistic, industrial innovation strategies that benefit from extensive input from the private sector.
10. See the role of the government as a facilitator for industrial innovation.

In addition, the authors of this paper also recommend that,

1. Religious leaders, religious organizations, and religious adherents should be ready to contribute in meaningful ways to the accountable and moral incorporation of technology in the era of Fourth Industrial Revolution.
2. Religious leaders should be promoters for social justice, and the impartial circulation of aids from technological progressions, and making sure that no one is left out.
3. Religious leaders should serve as moderators promoting intra-faith dialogue and understanding between diverse faiths on how to approach and react to the opportunities that the Fourth Industrial Revolution offers.
4. Religious adherents should also be ready to play practical roles in correctly accepting technology in line with their religious beliefs by being conscious of the possible benefits and hazards of its uses.

The Fourth Industrial Revolution will continue to influence every sphere of life. Religious leaders and other religious adherents should buckle up to respond to the revolution in ways that will enhance their religiosity by making good use of the Fourth Industrial Revolution. They should also be proactive towards other emerging industrial revolutions.

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