THE FOURTH INDUSTRIAL REVOLUTION

As we gain speed in the Fourth Industrial Revolution (4IR), it is, and will continue to change how we earthlings live, work and communicate. It 'IS' irreversibly reshaping the labour market, industries, communities, education, government, human values and emotions ¹².

The 4IR is being described as "an era of rapid change, immense challenges, and incredible opportunities for the current and future workforce" ³.

It is drastically influenced by new emerging and rapidly expanding – at times disruptive - technologies, such as automation, artificial intelligence, the internet of things, cloud computing, large data, X-reality, cybernation, nanotechnology and biotechnology ⁴.

The fuel at the core of the 4IR is the aspiration to integrate and merge computational and physical capabilities between humans and machines.

"The Fourth Industrial Revolution, finally, will change not only what we do but also who we are. It will affect our identity and all the issues associated with it: our sense of privacy, our notions of ownership, our consumption patterns, the time we devote to work and leisure, and how we develop our careers, cultivate our skills, meet people, and nurture relationships."

-Klaus Schwab, The Fourth Industrial Revolution

What to expect – looking through the kaleidoscope!

EMPLOYMENT AND EQUALITY

Many see the impact of the 4IR as increasing human productivity and quality of life – with technologies such as AI and automation augmenting our professional lives and enabling us to make smarter choices, design more creative solutions to previously insurmountable problems, faster and more effectively than ever before ⁵.

Conversely, some see the impact of the 4IR as a disruptive effect where technologies such as artificial intelligence will increase the number of automated jobs, potentially increase social inequalities, deteriorate work conditions, and consequently reduce the demand for work and forcing workers into unemployment ⁶⁷.

Notwithstanding these opposing views and regardless of the nature of the business, customers are progressively the focal point of the economy and companies are driven by the expectations of customers, the enhancement of products and services and striving for innovative processes to increase profits ⁸.

New technologies allow for physical products and services to be enhanced with digital capabilities that increase their value and can make assets more durable and resilient, while data and analytics are transforming how they are maintained.

This increasing demand for new goods and services will lead to the creation of new jobs, new companies and new markets and the efficient functioning of these new businesses will require highly qualified and talented employees to exploit limitless opportunities ^{9:10}.

LIFESTYLE

The innovations of the 4IR are also redefining the essence of lifespan, health, and cognition and as new biological breakthroughs are made that challenges social norms, issues of ethics become more critical. Technological advancements confront the issue of identity, both physical and digital identities as there is the propensity to accept that these are disconnected from one another ⁶.

The inevitable integration of technology in our lives even affects some of our typical human capacities, such as compassion and cooperation, as seen by our relationship with our smartphones where the constant connection may deprive us of the vital benefit of time to pause, reflect, and engage in meaningful conversation ¹¹.

Digital media platforms, sites or spaces of multidirectional instantaneous communication is becoming the primary driver of our individual and collective framing of society and community. It connects people to individuals and groups in innovative ways, promoting friendships and creating new interest groups and transcend many traditional boundaries of interaction ¹².

With more than a third of the global population using social media platforms to connect, learn, and share information, the interactions offer the opportunity for cross-cultural understanding and cohesion. The interactions can, however, also generate and propagate unrealistic expectations as to what signifies success for an individual or a group. It can offer opportunities for radical ideas and ideologies to spread but also compel us to reexamine our moral and ethical boundaries ^{10/12:13}.

In order to reside in the changing world in which the nature of the dialogist (human or artificial) and the milieus (real or virtual) in which relationships are understood will not always be obvious, we are required to develop skills and consider and redefine some typically social attitudes such as delegation, control, trust, autonomy and responsibility to deal with the society of the future at both individual and collective levels ^{10:12}.

EDUCATION

The increase of affordable mobile devices, available internet broadband and accessible rich education content is already transforming how education is delivered.

Digital technology also facilitates the access of all people (in developing and developed countries) to education giving them the chance to improve their knowledge and their skills by attending educational and training programs by distance.

In this way, the barriers in access to quality education for all are reduced, and the improvement of their skills enforces the self-confidence and the competitiveness of individuals in labor market, helps them to be smoothly and quickly adapted to the new conditions, gives them the incentives to live and work in their country (and not to immigrate), and helps them to efficiently deal with their economic problems by becoming more productive in their work ¹⁴.

Already, a new form of a higher education institution is emerging. It still does teaching, research and service, but is interdisciplinary with virtual classrooms, laboratories, libraries and teachers. The educational experience is not downgraded but augmented by technology¹⁶.

Since automation and robots are capable of replacing/augmenting labor, education of the future should equip humans to exploit their competitive advantages such as cognitive skills, ability to think creatively and 'out of the box' and to manage complex situations ¹⁴.

"Let us together shape a future that works for all by putting people first, empowering them and constantly reminding ourselves that all of these new technologies are first and foremost tools made by people for people."

-Klaus Schwab, The Fourth Industrial Revolution

As the 'horizon' unfolds....

There are significant economic and social opportunities that exist now that have potential to contribute to sustainable socioeconomic growth. The emergence of global platforms and new business models means that talent, culture, and organisational structures need to be revised.

In order to capatalise on these, governments and businesses should consider to ^{15;16}:

- • give priority to education and the training for people of all ages to obtain the cognitive and social skills required by the labour market;
- • create new well-paid jobs to moderate the potential for job losses due to automation and to deal with income and socioeconomic inequality;
- • revise organisational structures as flexible hierarchies;
- • implement new ways to attract, retain and manage qualified individuals that are capable of implementing innovative ideas and strategies;
- • develop innovative ways to evaluate and reward performance;
- • support co-operation among enterprises, businesses, research institutes public and regional authorities;
- • facilitate access to multilevel platforms that offer digital transformation programs for businesses in order to help businesses remain updated and sustainable;
- reduce bureaucracy and barriers for business to be expanded in new markets and diversify their activities;
- • establish guardrails that keep the advances of the 4IR on a track to benefit all of humanity.

OPINION

Taken overall, the 4IR is an unescapable, unfolding reality that promises humanity a future which, we can at this point in time, only imagine in glimpses. What stands out in this epoch is the unwavering commitment to the evolution of technology. As we engage with this reality, we may want to also consider the following questions -

- • Are we spending enough effort and resources to focus on and address the 'human' side of the 4IR equation, both inside organisations and in society more broadly?
- • Can we collectively call on our knowledge, intuition and foresight to better plan for the future 'we want'?
- • Has our history allowed us to gain experience to prevent having to deal retrospectively with unintended economic, social and other consequences and outcomes?

And finally....

• Is it possible that the 'event horizon' some see in the 4IR actually calls for a turn of the lens on the kaleidoscope (only a small fraction), to see the 'horizon of new opportunities'?

"Industrial revolutions, appear, not as an event, but rather as a constantly unfolding multi-faceted continuum of change and transformation fueling adaptation "

-Chair in Automation and Future Work Skills, 2021.

REFERENCES

- 1 Mayer, C. 2020. "Key Concepts for Managing Organizations and Employees Turning Towards the Fourth Industrial Revolution."
- 2 Rogers, W., Pratt, M., Mustafa, K., Drews, FA., Powell, K., Haight, JM., Wang, Y., Baxla, K. & Sobalkar, M. 2019. "Automation in the Mining Industry: Review of Technology, Systems, Human Factors, and Political Risk."
- 3 DeLoitte. 2016. The Future of the Workforce. Critical Drivers and Challenges.
- 4 Hirschi, A. 2018. "The Fourth Industrial Revolution: Issues and Implications for Career Research and Practice."
- 5 Trailhead. 2022. Understand the Impact of the Fourth Industrial Revolution on Society and Individuals.
- 6 Schwab, K. 2017. The Fourth Industrial Revolution. Penguin Books Limited.
- 7 Chung, H. 2021. "Adoption and Development of the Fourth Industrial Revolution Technology: Features and Determinants."
- 8 Rossouw, J. 2018. "What Does the Fourth Industrial Revolution Mean for Your Business?"
- 9 Ivaldi, S., Scaratti, G. & Fregnan, E. 2021. "Dwelling within the Fourth Industrial Revolution: Organizational Learning for New Competences, Processes and Work Cultures."
- 10 Caruso, L. 2018. "Digital Innovation and the Fourth Industrial Revolution: Epochal Social Changes?"
- 11 Clark, D. & Downs, E. 2018. "What Will the Mine of the Future Be Like?"
- 12 Davis, N. 2016. "What Is the Fourth Industrial Revolution?"
- 13 Nordin, N. & Norman, H. 2018. "Mapping the Fourth Industrial Revolution Global Transformations on 21st Century Education on the Context of Sustainable Development."
- 14 Zervoudi, EK. 2020, "Fourth Industrial Revolution: Opportunities, Challenges, and Proposed Policies,"
- 15 Schwab, K. 2016. "The Fourth Industrial Revolution: What It Means, How to Respond."
- 16 Seet, P., Jones, J., Spoehr, J. & Hordacre, A. 2018. <u>The Fourth Industrial Revolution: The Implications of Technological</u> <u>Disruption for Australian Vet</u>. NCVER, Adelaide.



Funded by





CQUNIVERSITY | BMA CHAIR IN AUTOMATION AND FUTURE WORK SKILLS

The Chair in Automation and Future Work Skills role was established to focus on the impact of automation on regional cities and communities.

The role is funded by CQUniversity and BHP Mitsubishi Alliance (BMA) to coordinate research, outreach and engagement with relevant industries across Queensland, as well as to drive the development of new innovative training qualifications and courses in automation and new workplace skills beyond the mining sector, including in METS, Agriculture, SMEs and Construction.

The purpose of the partnership between BMA and CQUniversity is to bring people and resources together to unlock and accelerate skills, training and educational outcomes for the future in the communities of which they are part.

COPYRIGHT AND DISCLOSURE

The work was prepared in accordance with the terms of the Contract between BMA and CQU dated 20 November 2020. Except where otherwise stated it is licensed for non-commercial purposes only. The Chair in Automation and Future Work skills cannot be held responsible for errors or any consequences arising from the use of information contained in this work. Any views and opinions expressed do not necessarily reflect those of CQUniversity, BMA or any other contributing organisation.

© 2022 CQUniversity.

Scan this code using a QR Reader app on your smartphone to access THE INDUSTRY 4.0 SERIES.