OBSERVATORIO de Sapiencia

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Challenges and opportunities of the

4th INDUSTRIAL REVOLUTION

The 4th industrial revolution represents a fundamental shift in the way we live, we work and we interact with each other. The speed, the range and the depth of this revolution forces us to rethink how the organizations create value, the way the countries generate development and also what it means to be a human being. This issues note explores what are the challenges that we are facing and what opportunities have been created from this revolution.

1. Impact on jobs and skills

Work is one of the activities that has been most impacted by the Fourth Industrial Revolution. The biggest challenges are related to the rapid changes in the needs of the industry and that are hardly followed by talent training institutions, this causes gaps between the skills that employers need and those that potential employees have; In addition, the increase in the possibilities of remote work has eliminated the space barrier, creating the possibility of working from anywhere in the world. This opening increases the competitiveness of labor markets, but at the same time increases the risk of brain drain, especially in less developed countries.

Given the depth of this technological change and its subsequent challenges, there is a pressing need to create more effective ways to help people develop new skills and reduce job losses, starting with fostering STEM 1 skills. To successfully meet these challenges, companies will need to recognize the importance of investing in their employees.
Likewise, proactive talent management strategies are needed where the profiles and not the professions are connected, it is neccessary a permanent dialogue and collaboration between companies, governments, education providers and the civil society.

2. Agile governance

Governments can take advantage of new technologies to govern better, be more accessible, increase transparency, trust and improve the monitoring of public goods. Cities like Barcelona are already using technologies like the Internet of Things to better monitor waste collection and save electricity used on street lights. However, technology also creates governance challenges, for example the increased use of online social media has created situations where the electorate has been manipulated and misinformed; Likewise, the risk of cyber attacks has increased, which demonstrates the need to create international data protection regulations. In the future, agile governance will require governments to find ways to reinvent themselves and go beyond simply understanding major technological advances in order to mitigate risks, shape technology and harness it to govern better.

3. Corporate disruption

La relación entre las empresas y sus clientes ha tenido principalmente tres grandes cambios. Primero, se ha impulsado un modelo “siempre conectado” a través de la comunicación digital. Segundo, se ha transformado la forma en la que da valor a los productos o servicios; por ejemplo, en ciertos sectores económicos se realizan análisis para medir el rendimiento de un servicio con la finalidad de mejorar la precisión de los precios. Y finalmente, se han creado nuevas formas de colaboración, donde las nuevas organizaciones participan de un ecosistema fluido de creación por el que logran reducir costos y hacer un uso más eficiente de la energía y la automatización. El reto entonces es poder permear las bases de los negocios tradicionales para que se adapten a estos nuevos modelos, especialmente en países de ingresos bajos donde ya existían brechas de productividad y tecnologías antes del inicio de la cuarta revolución industrial.

4. Inclusion and access to technology

Giving people greater access to the Internet can potentially improve their quality of life by allowing them to access government and educational resources more easily . This need was highlighted widely by COVID-19, when restrictions to limit contagion made remote learning the only school option. However, according to the International Telecommunications Union (ITU), only just over half of the world's population (53.6%) used Internet at the end of 2019. Additionally, digital adoption and access have not been distributed evenly; according to the ITU, in 2019, 52% of women were still not using internet, compared to 42% of men, and only 28.2% of the population in Africa was online, while in Europe there was a rate of Internet penetration of 82.5% and 93% of people lived in range of a 3G network (or higher).

Creating more inclusive digital communities is essential to bridging the digital divide. It is important not only to reinforce affordability but also to increase digital skills and awareness in the use of ICT. Greater digital accessibility also presents an opportunity to better empower communities with more specific needs, such as indigenous peoples, rural communities, people with disabilities (through assistive technologies such as voice recognition software), women and girls, and young people who have historically presented an access gap. Finally, it is an opportunity to improve access to public services and citizen participation.

5. Ethics and Identity

Innovations in disciplines such as biotechnology and artificial intelligence are redefining what it means to be human, because they are pushing the boundaries of life expectancy, health, and knowledge in ways that were previously out of reach. As knowledge progresses, an ethical and moral debate is essential to face the new challenges. Issues relating to privacy, data security, and identity are becoming increasingly important to policymakers, regulators, and businesses, as this represents the opportunity for an inclusive, human-centered future. Proactive steps must be taken to ensure that the adoption of any technology, be it 3D printing or satellites, or others, does not enable the abuse of power, does not instill and exacerbate systemic racism, does not widen wealth disparities, or dispossess vulnerable people of their means of life.

6. Safety and conflict

The 4th industrial revolution will drastically affect the scale and character of conflicts. Modern conflicts are increasingly hybrid in nature, combining traditional battle techniques with elements previously associated with non-state actors, such as the Internet. It is undeniable that future conflicts will include an online dimension where combatants can disrupt, confuse and destroy communications and the ability to make decisions. In addition, the possibility of creating autonomous weapons capable of identifying targets and deciding whether to fire without human intervention is increasing; Neurotechnologies that can interact with a human brain to solve medical problems are also being implemented, which could have military uses in the future. The great challenges in security reaffirm the importance of the parties involved cooperating in new and greater ways in order to control events that could be detrimental in the long term. The challenge is to achieve this without hampering innovation and economic growth.

7. Fusion of technologies

The fourth industrial revolution is different from the previous ones, as it was created from the fusion of technologies and a growing harmonization and integration between research disciplines. Today almost all advancements in the fields take advantage of digital capability. For example, precision in genome editing would not be possible without the relentless improvement in processing power and data analysis; however, technologies require careful regulation and supervision if they are to contribute to the common good. Respect for human dignity, the concerted effort to create attainable inclusive benefits for anyone regardless of gender, race, or ethnicity, and legitimate attempts to establish trust in the new technologies must drive any technological development or regulatory efforts.

This Issues Note draws on the collective intelligence of the World Economic Forum's network of experts to explore the key trends, interconnections and interdependencies in the educational sector. It was found that between June and July 2021 the most relevant critical search factor for the topic of Education and Skills was The Fourth Industrial Revolution.

Additionally, 5 of the 6 Education and Skills topic areas interrelate with The Fourth Industrial Revolution. This shows how interconnected and interdependent these sectors are today. This topic is related to artificial intelligence (A.I.) and robotics, quantum computing, the future of computing, data science and the future of production, these being the topics with the most scientific production in 2021.

[1] Science, technology, engineering and mathematics

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