

The Skills of the Future of Work in the World and a Mexican Region

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Abstract

Technologies such as Artificial Intelligence and Automation are shifting the human workforce to new roles, creating the need for new skills. This research aimed to understand the expectations of companies in Chihuahua, Mexico, regarding the skills required for the future of work and compare them with the results presented by the World Economic Forum in its 2018 Future of Jobs Report. A survey was conducted among 359 companies on this topic. The main findings reveal a 60% match between the top 10 skill groups prioritized globally and locally. However, skills such as "Technology Design and Programming," "Emotional Intelligence," "Reasoning, Problem-Solving, and Ideation," and "System Analysis and Evaluation" are considered crucial globally but not locally.

Keywords: Future of Work, Skills, Future Skills, Automation, Artificial Intelligence, Employment.

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BACKGROUND

Constant, permanent, disruptive, and exponential change is a phenomenon that both new and older generations must inevitably adapt to. Technology plays a central role in the modernity experienced by humans, where practically all aspects of life are related to technological development.

Similarly, in daily life, many individuals spend a significant portion of their day with a smartphone in hand, whether interacting on social media, staying informed, ordering an Uber, responding to a work email, or chatting on WhatsApp, among many other functionalities. These activities practically turn this electronic device into an extension of the body.

Klaus Schwab (2016), founder of the World Economic Forum (WEF), describes this era of digitalization as the Fourth Industrial Revolution. What makes this revolution different from the previous three is the fusion of technologies and their interaction in the fields of digitalization, biology, and physics. The increased connectivity and convergence generated by the Fourth Industrial Revolution has a strong impact on the labor market (Eberhard *et al.*, 2017). Unlike the previous three revolutions, this one not only seeks to replace physical labor or help humans perform their work but goes beyond, with the possibility of replacing cognitive work and human labor in general (Hirschi, 2018).

Diamandis and Kotler (2012) argue that these technological changes compel countries, companies, and individuals to analyze the skills and abilities necessary to face future challenges. Countries must establish public policies that continuously identify changes in skills needed for work and incorporate them into educational curricula. Companies, on the other hand, must establish reskilling programs to maintain a globally competitive workforce. Finally, individuals must stay vigilant about these skills to develop their personal education and training projects.

The replacement of human labor by technology is not a new phenomenon in human history. In 1900, 41% of the labor force in the United States worked in activities related to agriculture; however, by 2000, agriculture accounted for only 2% of the workforce (Autor, 2015). What has changed in relation to this phenomenon is the speed with which it has occurred in recent years. The fear of new technology's effects has grown partly because it is arriving during a period of slow real income growth for workers and a declining share of low-skilled labor in national income (Peralta-Alva & Roitman, 2018).

The World Economic Forum published its second Future of Jobs Report (World Economic Forum, 2018) to better understand the potential of new technologies, including algorithms and automation, to create new jobs and improve labor quality and productivity.

The report highlights the importance of early action by companies to reskill their workforce, proactive lifelong learning by individuals, and the establishment of a conducive environment by governments to assist these efforts.

The WEF (2018) notes that there will be a decline in demand for manual and physical skills, as well as for skills related to financial resource management and basic technical installation and maintenance skills.

Another finding from the study is that 50% of companies expect automation to reduce their workforce. Additionally, 38% expect their workforce to adopt new roles to enhance productivity.

In Mexico, the report identifies the top ten skills that companies consider necessary for development by 2022 (Table 1).

Table 1: Emerging Skills - Mexico

Analytical Thinking and Innovation	Leadership and Social Influence
Creativity, Originality, and Initiative	Critical Thinking and Analysis
Active Learning and Learning Strategies	Complex Problem-Solving
Technology Design and Programming	Emotional Intelligence
Reasoning, Problem-Solving, and Ideation	Resilience, Stress Tolerance, Flexibility

Note: Source: World Economic Forum (2018).

RESEARCH PROBLEM

This study represents a regional effort to identify the challenges posed by changing work skills requirements. The city of Chihuahua, Mexico, must address this new labor market reality by redirecting efforts in both the private and educational sectors to prepare people with the skills identified by global experts.

There is a lack of awareness among business owners and the educational sector in Chihuahua about how the Fourth Industrial Revolution will affect the demand for new skills in the workforce. The lack of preparation for these new skills by the private sector in Chihuahua could create a competitive disadvantage in the near future.

Research Question

What is the degree of alignment between the future work skills defined by the WEF in its 2018 report and the perception of the private sector in Chihuahua regarding these skills?

METHODOLOGY

A quantitative, non-experimental, cross-sectional descriptive design was used for this research, conducted in Chihuahua, Mexico, between February and November 2021.

Instrument

The survey instrument included a questionnaire with closed-ended and mixed (quantitative and qualitative) questions. It was completed by HR managers, general managers, or directors.

Population and Sample

According to the National Institute of National of Statistic and Geography (INEGI, 2018), there are 4,251 economic units with more than 10 employees in Chihuahua. Using probabilistic sampling with a 95% confidence level and a 5% margin of error, the sample size was determined to be 353 companies. A simple random sampling method was used, with invitations sent to members of various business chambers in Chihuahua.

RESULTS AND DISCUSSION

Technology Adoption Intentions

A significant difference was found between the main technologies intended for adoption worldwide over the next four years and the intentions expressed by companies in Chihuahua. As shown in **Table 2**, the main technologies of interest globally are "Big Data Analytics," "Internet of Things," "App and Web-Enabled Markets," and "Machine Learning," with adoption intentions of 85%, 75%, 75%, and 73%, respectively. However, in Chihuahua, these technologies are intended to be adopted by only 49%, 30%, 39%, and 27% of companies, respectively. In no case do these intentions reach even half of the companies.

Table 2: Comparison of Technology Adoption Intentions between WEF, and Companies.

Technology	WEF Global (%)	WEF Mexico (%)	Chihuahua Companies (%)
Big Data Analytics	85	87	49
Internet of Things	75	54	30
App and Web-Enabled Markets	75	54	39
Machine Learning	73	80	27
Cloud Computing	72	72	46
Digital Commerce	59	76	69
Augmented and Virtual Reality	58	43	24

Technology	WEF Global (%)	WEF Mexico (%)	Chihuahua Companies (%)
Encryption	54	60	17
New Materials	52	51	33
Wearable Electronics	46	63	26
Distributed Ledger (Blockchain)	45	65	13
3D Printing	41	59	27
Autonomous Transport	40	22	17
Stationary Robots	37	32	8
Quantum Computing	36	76	10
Non-Humanoid Ground Robots	33	35	16
Biotechnology	28	78	25
Humanoid Robots	23	24	3
Aerial and Underwater Robots	19	41	4

Note: Source: Own elaboration.

Skills Prioritization

The report highlights a gap between the skills prioritized globally and those emphasized by companies in Chihuahua. The top skill group sought by companies in Chihuahua is "Reading, Writing, Mathematics, Active Listening," which does not appear among the top 10 skill

groups sought globally. However, some skills, such as "Analytical Thinking and Innovation," "Active Learning and Learning Strategies," and "Critical Thinking and Analysis," are common priorities at both the global and local levels.

Table 3: Top 10 Skill Groups Currently Sought by Companies

Rank	Chihuahua Companies	WEF Global
1	Reading, Writing, Mathematics, Active Listening	Analytical Thinking and Innovation
2	Analytical Thinking and Innovation	Complex Problem-Solving
3	Active Learning and Learning Strategies	Critical Thinking and Analysis
4	Attention to Detail and Integrity	Active Learning and Learning Strategies
5	Creativity, Originality, and Initiative	Creativity, Originality, and Initiative
6	Coordination and Time Management	Attention to Detail and Integrity
7	Complex Problem-Solving	Emotional Intelligence
8	Leadership and Social Influence	Reasoning, Problem-Solving, and Ideation
9	Emotional Intelligence	Leadership and Social Influence
10	Critical Thinking and Analysis	Coordination and Time Management

Note: Source: Own elaboration.

Future Skill Prioritization (2024)

By 2024, companies globally and in Chihuahua expect a convergence in skill needs. Both place "Analytical Thinking and Innovation" and "Active

Learning and Learning Strategies" as the top two groups of skills. However, technical skills like "Technology Design and Programming" are absent from Chihuahua's top priorities.

Table 4: Top 10 Skill Groups for 2024

Rank	Chihuahua Companies	WEF Global
1	Analytical Thinking and Innovation	Analytical Thinking and Innovation
2	Active Learning and Learning Strategies	Active Learning and Learning Strategies
3	Reading, Writing, Mathematics, Active Listening	Creativity, Originality, and Initiative
4	Creativity, Originality, and Initiative	Technology Design and Programming
5	Attention to Detail and Integrity	Critical Thinking and Analysis
6	Coordination and Time Management	Complex Problem-Solving
7	Leadership and Social Influence	Leadership and Social Influence
8	Complex Problem-Solving	Emotional Intelligence
9	Critical Thinking and Analysis	Reasoning, Problem-Solving, and Ideation
10	Resilience, Stress Tolerance, and Flexibility	System Analysis and Evaluation

Note: Source: Own elaboration.

CONCLUSIONS

The study identified the key skills that the private sector in Chihuahua considers important for

2024. These include "Active Learning," "Innovation for Work," "Analytical Thinking," "Learning Strategies," and "Complex Problem-Solving" as individual skills.

Regarding skill groups, local companies will seek "Analytical Thinking and Innovation," "Active Learning and Learning Strategies," "Attention to Detail and Integrity," "Reading, Writing, Mathematics, and Active Listening," and "Creativity, Originality, and Initiative."

Additionally, the study correlated the expectations of Chihuahua's private sector regarding future work skills with the results presented by the WEF in its 2018 report. Of the top 10 skill groups sought globally for 2024, there is an alignment in the first two groups: "Analytical Thinking and Innovation" and "Active Learning and Learning Strategies." However, four skill groups—"Technology Design and Programming," "Emotional Intelligence," "Reasoning, Problem-Solving, and Ideation," and "System Analysis and Evaluation"—are absent from Chihuahua's top priorities. Thus, there is a majority alignment but not a complete one.

A notable finding is that Chihuahua companies do not view technological changes and the need for new workforce skills as their primary challenges for the next four years. Instead, their concerns are more focused on current economic problems.

The primary obstacle companies face in adopting new technology is the lack of capital and financing, as well as insufficient information about new technologies.

RECOMMENDATIONS

For the Private Sector in Chihuahua

The research showed that the exponential technological changes and the consequent need for new workforce skills are not among the main concerns of Chihuahua companies for the coming years. Instead, they are more focused on overcoming immediate economic challenges. Companies need to understand the projections of technological impact in the short and medium term and how these will affect skill requirements.

For the Government:

1. Become a Linkage Factor:

State and federal governments should act as a bridge between businesses, workers, and educational institutions to ensure proper coordination in addressing these challenges.

2. Establish Public Policies:

Develop policies to raise awareness among labor unions about the need to acquire new skills and

create support programs to assist these organizations in preparing the workforce for the future.

3. Develop Permanent Projections:

Conduct ongoing assessments to measure the impact of technological advancements on future workforce skill requirements and anticipate the necessary public policies.

4. Review Legal Frameworks:

Legislative bodies at both local and national levels should review and adapt legal frameworks to support businesses, unions, and educational institutions in maintaining workforce competitiveness amidst technological challenges.

5. Conduct Regular Studies:

Since the WEF plans to release its Future of Jobs Report every four years, similar studies should be conducted locally to maintain an ongoing comparison with global perspectives.

REFERENCES

- Autor, D. H. (2015). Why are there still so many jobs? *The History and Future of Workplace Automation*. doi:10.1257/jep.29.3.3
- Diamandis, P., & Kotler, S. (2012). *Abundance: The future is better than you think*. New York: New York: Free Press.
- Eberhard, B. (2017). Smart work: The transformation of the labour market due to the fourth industrial revolution (I4.0). *International Journal of Business & Economic Sciences Applied Research*, 10(3), 47–66. doi:10.25103/ijbesar.103.03
- Hirschi, A. (2018). The Fourth Industrial Revolution: Issues and Implications for career Research and Practice. *Career Development Quarterly*, 66(3), 192–204. doi:10.1002/cdq.12142
- INEGI. (2018). Minimonografía: Chihuahua - Censos Económicos 2014. Retrieved from <https://www.inegi.org.mx>
- Peralta-Alva, A., & Roitman, A. (2018). Technology and the Future of Work. IMF. Retrieved from <https://www.imf.org/~media/Files/Publications/WP/2018/wp18207.ashx>
- Schwab, K. (2016). *The Fourth Industrial Revolution*. Geneva: World Economic Forum.
- World Economic Forum. (2018). *The Future of Jobs Report 2018*. Centre for the New Economy and Society. Geneva: World Economic Forum.