

The Impact of Industry 4.0 on the Different Social Classes of the Industrial Pole of Amazonas

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Abstract— Industry 4.0, also known as the 4th revolution, directly intervenes socially in people's lives, as it pressures new concepts and the use of the workforce, combined with production that is increasingly interconnected virtually and with great technological appeal. Thus, social impacts are inevitable due to this business model reached as social classes, and as this technological vision is a reality with no return, now it is more water and steam, because the optimism with this advance is immense and the interconnection with artificial intelligence and others will really interfere in the life and daily life of the classes that do not have access to certain forms of revolution, because academic privileges with an education in the state of Amazonas can also suffer an abyss of connection with the best statistics of institutions with technological mediations associated with the culture that still creeps in the technological and professional milieu that still exists in our country and that is how it should be divided as a social that will always determine some dominant class or technology in the middle of living together.

Keywords— Industry 4.0; Industrial Pole Amazon; Artificial intelligence.

I. INTRODUCTION

In Brazil and mainly in the state of the Amazon, a classification of social classes is defined according to family income and basically divided into classes such as: high, medium and low. These economic classification criteria are the Secretariat for Strategic Affairs (SAE) and the Brazilian Association of Research Companies (Abep), each group (high, medium and low) is registered by letters, to know: class A, B, C, D and E. As some groups have subdivisions, for example, a class A (A1, A2), a class B (B1, B2) and a class C (C1, C2).

Social classes are those formed by a group of people with common interests and socioeconomic parity. In society as a whole there are several social classes, since there is a hierarchy between rich and poor. But hierarchy can also arise by caste, knowledge and external factors.

Being a class A with greater economic power and its members, or higher educational level, a technological adaptation is something quick and easy to send, but another is detected in Class E, low class, that is, with less purchasing power and low quality of life. Family income, assets and education are taken into account. IBGE classifies partner classes in six categories, taking into account family income:

Table.1: Classification of Social Classes.

Class A	Above 20 minimum wages
Class B	10 to 20 minimum wages
Class C	4 to 10 minimum wages
Class D	2 to 4 minimum wages
Class E	Up to 2 minimum wages

Source: Authors, 2020.

ABDI calculates a minimum annual estimate of reduction of industrial expenses in Brazil, from the implementation of industry 4.0, it will be around R \$ 73 billion / year.

The whole scenario that exists today in the industrial market is going to change and the concern is related to social classes. We know that the first classes will be recognized and privileged, but the classes with less purchasing power would operate that constitute the majority existing in the industrial centers, how to survive this technological avalanche, it is necessary to invest massively in education (propaedeutic, and professional and technological) , and in science, technology and innovation. Due to the unimaginable impacts on the world of work, it is also necessary to develop public policies to protect these workers, to address issues related to employment and income generation in industries.

II. BIBLIOGRAPHIC REVIEW

2.1 Industry 4.0

In very specific lines, we can understand industry 4.0 as a new production model applied to companies, resulting from the fourth industrial revolution, which brought about a significant advance in the connection between man and machine.

However, industry 4.0 is, currently, what promotes a sequence of continuous advances in the productive progress, causing a more elaborate aspect in relation to the use of technology, consecrating the principle of automation to a stage well above what the industry is used to. As a result of its particular connection with attributes such as: connectivity, artificial intelligence, data science, big data, IoT, machine learning and others; An extremely large event takes place within organizations, changing the way machines are repeated and using references to

enhance the production process, making it more accessible, efficient and autonomous.

2.3 How Will the Industry 4.0 Professional Be?

Undoubtedly, it cannot be said that it will result in new ways of working, a transition in the profile of professionals and the tasks required to excel in the market. In addition, there are some drivers who have driven Industry 4.0 and will cause several changes at work. However, we can mention, among them, demographic and socioeconomic factors: adaptable work, the growth of the middle class in emerging markets, climate change and political inconsistency. As the technological vectors treated in the research include the mobile internet, cloud technology, Big Data, new energy sources and the Internet of Things.

Below are the graphs with complete data from the World Economic Forum report:

Demographic and Socioeconomic Vectors

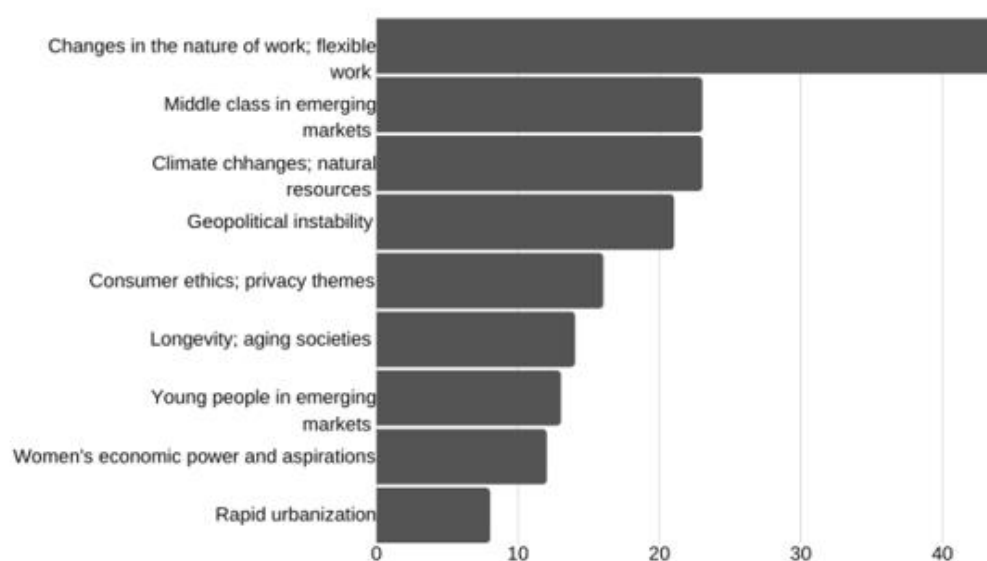


Fig. 1: Demographic and Socioeconomic Vector

Source: Authors, 2020.

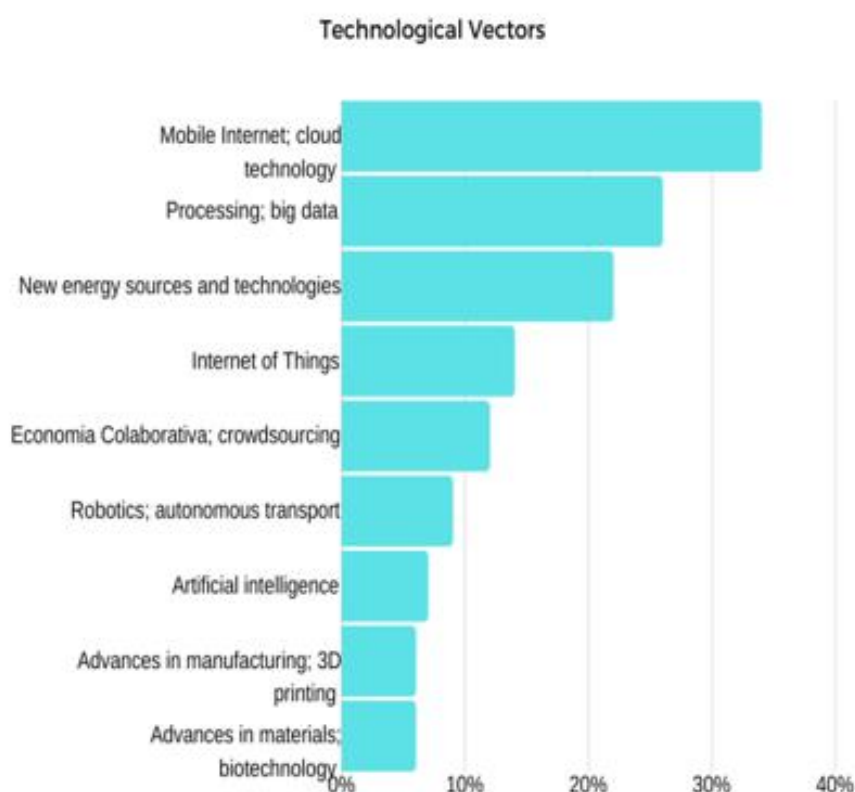


Fig. 2: Technological Vector

Source: Authors, 2020.

2.4 Negative Impacts of the Fourth Industrial Revolution

Certainly, it is justified to challenge industry 4.0 for several reasons. For example, possible cyber-attacks are a problem. Industrial espionage is based on the assumption that the more connected it is, the more vulnerable it becomes.

In the same way, another possible unfavorable impact is the division of power to technocrats, those who have technical knowledge in relation to today's technologies. In addition to commercial purposes, innovations must be applied as noble results, in the same way to contain entire nations economically, ending with their domestic market.

It is also worth mentioning the use of artificial intelligence in a dishonest way, such as coup, wars and fake news. However, none of the problems mentioned disturbs as much as the results of the Fourth Industrial Revolution on the labor market. It is clear that industry 4.0 will be able to generate a great impact on industries.

2.5 The Labor Market in the Age of Industry 4.0

Empowering automation, therefore, machines are assigned even more humane functions. An example of this is Google, with the creation of a robot journalist who plans to write 30,000 news a month. However, broader ways of

extracting from professionals should be studied, whose position may cease to exist, reallocating them to strategic activities and, also, the emergence of new professions, such as the data scientist. The ingenious machines will certainly cause layoffs, specifically in Europe, however the government is already taking steps to resolve this impasse.

Consequently, improving social welfare was one of the ideas offered, based on Nordic countries, such as Denmark by economist Erik Brynjolfsson. In his book entitled “The Second Age of Machines”, Brynjolfsson proclaims the idea that society should discuss the prosperity divide as soon as possible, after all, industry 4.0 will lead to the success of some, but the resignation of millions. Thus, for the economist, the increase in tax or universal basic income may be one of the solutions to address all these negative issues.

2.6 Workplace Qualifications in Amazonas

Public domain behavior in the municipal, state and federal sectors needs to be improved in order to become more effective within the conception of the Fourth Industrial Revolution. The State Administration must have a long-term vision to comply with market practices and provide security for the owner to invest. As well as the prominence of idealizing technological education tools

within educational institutions, they offer good possibilities for training future qualified workers.

The Entrepreneur needs to imagine that there will be a reduction in tariffs and an increase in quality, consequently initiating the main investments in this machinery. The market itself will have to analyze the willingness to qualify the workforce within companies or service providers. However, one should not depend only on the private body, it is essential that the State also integrates.

In summary, it would require preparing the debate to improve the actions of entrepreneurship, training young people, within the argument of respect for discussions of nature. Thus, obliging the viability of business incubators and the enhancement of the most structured and appropriate consecutive and productive stages. In this way, the State would help to generate possibilities for business training, technological management and assistance with credits, guiding and investing in infrastructure.

III. MATERIALS AND METHODS

After a successful research, but also frustrating, that at first elements were found that would help Industry 4.0 in its applicability in the most diverse areas. Certainly, used as a bridge for studies, SENAI-AM is an industrial teaching institution, so it tends to enjoy a more detailed and detailed perspective of this advanced manufacture. In other words, the material contains fragments that result in strategies for companies, according to what was presented in congresses such as IEEE (Institute of Electrical and Electronics Engineers) and CMS (Conference on Manufacturing Systems) that were presented for a new change on your production line. Total automation should be implemented and using other technologies, promoting an investment with lower personal costs, solving the absence of demand. Therefore, taking into account that there are a large number of people working with no future prospect of qualification in their area, the difficulty of maintaining this desire is obstructed by a series of problems, such as the distance between the educational and industrial poles, causes in these workers give up. Since the best way to produce higher quality products, with greater innovation and, above all, with security, there is a need for a greater investigation of these needs on company employees, so that everything does not turn into something very scary and difficult to learn.

For a better use of the results and complementation, surveys from the Government of Germany (PLATAFORM INDUSTRIE 4.0, 2017) and cases mentioned by the Government of Japan (Robot Revolution Initiative, 2017) were used, however 38 cases were identified. Result of

several cases and not involving the presentation process carried out.

IV. RESULTS AND DISCUSSIONS

SENAI, the National Service for Industrial Learning, found that there must be a major implementation in several areas of industrial services, mainly in automation, in order to achieve the objective of increasing productivity in factories. As the development in Professional Education is expanded in Technical High School, however improving and giving more support to future working people, the improvement and qualification tends to supply the lack of precarious manufacturing. In short, courses in Mechatronics, Information Technology, Electronics, Electrotechnics, Mechanics and Civil Construction (Buildings) have the greatest demand for specialists in the area in the industry in Amazonas. There are those that demand specializations, with a focus on: Industrial Electrician, Installer and Repairer of Air Conditioning and Refrigeration Devices, Quality Inspector, Welder, Production Line Operator and among others. In addition, the development of activities linked to renewable energy is a point to be highlighted as well.

Table.2: Areas with higher demand for training – Technicians.

Areas	Demand 2019-2023
Transversal	10.819
Metalworking	4.922
Transport equipment and vehicles	4.321
Electronics	3.681
Energy and telecommunications	3.291

Source: Authors, 2020.

Industrial occupations with higher demand for training inside and outside the industry – Technicians

Table.3: Areas with higher demand for training – Higher.

Areas	Demand 2019-2023
Management	2.752
Computing	2.460
Production	1.080
Transversal	761
Construction	722

Source: Authors, 2020.

Industrial occupations with higher demand for training inside and outside the industry – Superior.

Table.3: Professional qualification by area

Occupations	Professionals to be qualified
Information technology analysts	1.934
Production, quality, safety and related engineers	1.080
Production and operations managers in an extractive, processing and utility company	667
Engineering and technology researchers	606
Civil and related engineers	536
Electrical, electronics and related engineers	478
Supply and related managers	279
Mechanical and related engineers	238
Information technology administrators	237
Maintenance and related managers	190
Production control technicians	6.407
Automotive vehicle assemblers (assembly line)	4.093
Electronics technicians	2.629
Production planning and control technicians	2.501
Electricity and electrotechnical technicians	2.023
Mechanical technicians in the manufacture and assembly of machines, systems and instruments	1.967
Civil construction technicians (infrastructure works)	1.208
Civil construction technicians (buildings)	717
Transport logistics specialists	697
Supervisors of electrical assemblies and installations	647

Source: Authors, 2020.

V. CONCLUSION

Given the importance of the subject, it is clear that Brazil has a late development in relation to its industrialization. In addition, it is classified as almost a century of technological backwardness compared to other countries, such as Europe, the United States, Japan and others, which started their process under the regime of the First Industrial Revolution. However, it is also worth

mentioning that Brazilian involvement has declined considerably, around 50% in 20 years, according to the 1st Brazilian Congress of Industry 4.0 in 2017. The lack of investment in workers' specialization results in a grotesque fall in the area of free trade, more precisely, in the State of Amazonas, the bad custom of hiring people with low education levels leads to precarious competition with international and also national markets. The strengthening of the local commercial sector is based on investment in raw materials using tax incentives, however, the Government must treat as a primordial stimulus in companies, both private and state, to implement better conditions of labor and the use of training resources for its employees. As a result of this, both the number of jobs and the Brazilian economy need all this industrial construction to progress and, with that, result in growth in the manufacturing sphere.

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