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THEORY AND MODEL: INDUSTRIAL DEVELOPMENT

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Abstract: This article aims to explore the concept of industrial development, then discuss the theory and predominant models, mentioning their characteristics and gaps. In its first part, the article describes the history of industrial development in England, with this country being the pioneer in achieving industrialization. Next, the theory of surplus value is described, as well as the two models (Fordism and Taylorism) that marked this period, and finally a SWOT analysis pointing out the strengths and weaknesses. A qualitative approach was used to prepare the article as it presents a description of the characteristics of industrial development. And regarding the data collection technique, the research is bibliographic, because it relied on ideas from renowned authors who served as support for the preparation of the work. As possible results, the article illustrates improvement proposals (recommendations) presenting activities and indicators to solve existing gaps.

Keywords: Industrial Development; Theory; Models

INTRODUCTION

Industrial development represents a milestone in the history of humanity, because it was responsible for creating jobs and also structural change in human society. The article brings relevant aspects around industrial development, including its theory and models that can support the topic. And, this was possible through a bibliographical review based on several works. On the one hand, it is a transversal theme and a difficult literary search, as, to a certain extent, it can be confused with the industrial revolution, however, there is a line of knowledge that brings with it the understanding of an interdependence.

In the scope of developing the theme, we sought to bring some conceptual aspects, history, factors that conditioned industrial development in England, main gaps and

improvement actions. As for the predominant theory, it focused on the theory of surplus value (created by Karl Marx in the 19th century, which emerged to understand the relationships between the time needed to perform a job and its remuneration), as well as presenting the criticisms that this theory suffered. Regarding industrial development models, two models are presented: Taylorism and Fordism, their gaps and finally a brief comparison between them.

The article also presents an analysis of the study, which seeks to highlight the strengths, weaknesses, opportunities and threats in relation to industrial development and improvement proposals. It is in this aspect that readers are invited to appreciate the unfolding of the theme “Industrial Development”.

METHODOLOGY

To carry out the work, methodological procedures were involved, which are described based on the research paradigm, the approach method and data collection techniques.

As for the research paradigm, the type of research is interpretative, as it aims to deepen the understanding of Industrial Development and interpret the theory and predominant models in this type of development.

In terms of approach, the research is qualitative due to the fact that it presents a description of the characteristics, that is, context and gaps in industrial development.

As for the objectives, the research is descriptive in nature, because it aims to deepen the understanding of industrial development. To achieve this, the following are specific objectives:

- Conceptualize industrial development;
- Examine the history of industrial development;
- Describe industrial development in England;

- Discuss the theory and models of industrial development;
- Carry out SWOT analysis of industrial development;
- Propose improvement solutions.

Regarding the data collection technique, the research is bibliographic and included ideas from renowned authors who served as support for the preparation of the study.

LITERATURE REVIEW

According to Diniz (2010), development means improving society's living conditions, involving economic, sociological and political aspects, such as: combating urban poverty, creating jobs through industrialization (small and medium-sized companies), distributing goods and services for social equity.

"The concept of development, according to Rostow, is linked to economic growth, which would occur with industrialization, meaning, therefore, modernization" (Niederle & Radomsky, 2016, p.11)

Looking at the authors' ideas, it appears that the first resembles development with the quality and improvement of life, while the second thought creates a link between development and growth, since it is impossible for development to exist without first existing growth, and this way, development is seen as a result of industrialization.

In general terms, development consists of improving indicators of economic and social well-being, providing a better quality of life. Therefore, development can be:

- Economic;
- Endogenous;
- Sustainable;
- Industrial;
- Human;
- Cognitive (Information).

According to Diniz (2010), the period of the industrial revolution brought mechanization and *learning by doing* and the social division of labor, thus creating industrial development.

Industrialization is the process of Industrial Development, through which industry represents the fundamental sector of an economy, thus creating an increase in productivity and generation of wealth.

According to the United Nations Industrial Development Organization (UNIDO), to achieve industrial development it is necessary for a country's economy to reach high levels of industrialization.

HISTORY OF INDUSTRIAL DEVELOPMENT

INDUSTRIAL DEVELOPMENT IN ENGLAND

According to Garcia (2005), the industrialization process that began in the United Kingdom (England) during the 18th century was a milestone in the history of humanity, because it was responsible for the creation of jobs and also structural change in human society (growth of cities and the way of producing the goods).

Before industrial development, the production process was manual (use of the individual's hands and strength) and the worker carried out his work through his craftsmanship, however, with the development of machines, these became responsible for production.

England was the first country to have industrial development, this is justified by being the nation with the minimum conditions necessary to trigger this process, since it had a large reserve of two of the most important raw materials for industrial development, which was Coal and Iron, which allowed the construction of machines and their operation (the basis of water vapor heated by coal to

produce energy and reverse it into force to move the machines) and as a result of the use of machines there were large productions in scale, high profits, large investments, job creation in medium and large companies (Hobsbawm, 2014).

On the other hand, Industrial development occurred in England due to the early establishment of the bourgeoisie in English power, because it was the first absolutist country to undergo the bourgeois revolution that took place in 1688 (decision-making prioritized economic interests). The first machines that appeared in England responded to the needs of the textile market. Most of the machines created were intended to facilitate the clothing production process, as they had a much greater speed compared to the manual process.

As time went by, capitalists became richer and with the high profits of English industries they began to invest in the development of railways, allowing goods to be transported more quickly and in greater quantities.

According to Marcuse (1988), over time, alternatives were created for the use of new energy sources, in addition to coal, such as oil, electricity and technological evolution. Industrial development is also marked by the expansion of cities.

According to Hobsbawm (2014), the main consequences of industrial development were:

- New working relationships;
- Consolidation of capitalism;
- Rural exodus and Urbanization;
- Advances in the fields of medicine, telecommunications and transportation;
- Increase in production capacity;

FACTORS OF INDUSTRIAL DEVELOPMENT IN ENGLAND

From the perspective of Campos (1988), industrial development was achieved due to the following factors:

- **Capital accumulation** – After the Glorious Revolution, the English bourgeoisie became stronger and allowed the country to have the most important free trade zone in Europe. The financial system is one of the most advanced, which favored capital accumulation and the expansion of trade on a global scale.
- **Field control** – increasingly strengthened, the bourgeoisie also started to invest in the countryside and created enclosures (large rural properties). New agricultural methods allow for increased productivity and rationalization of work. Thus, many peasants no longer have work in the countryside or are expelled from their lands, going to look for work in the cities and being incorporated by the nascent industry.
- **Population growth** – Advances in preventive and health medicine and the control of epidemics favor demographic growth (with a high rate of population, both natives and migrants). This increases the supply of workers for the industry.
- **Coal reserves** – In addition to having large coal reserves, the English deposits are located close to important ports, which facilitates transport and the installation of coal-based industries. At this time, most European countries use wood and charcoal as fuels. Internal communications and trade are facilitated by the installation of networks of roads and navigable canals.

In 1848 England had 8 thousand km of railways.

- **Geographical situation** – England's location, in the western part of Europe, facilitates access to the most important international trade routes and allows it to conquer overseas markets. The country has many ports and intense coastal trade.

INDUSTRIAL DEVELOPMENT GAPS IN ENGLAND

From the perspective of Hobsbawm (2014), before the creation and use of machines for a worker to be hired, it was necessary to have artisanal skills, however, with the use of machines it was no longer necessary to have these skills and any worker who was hired used the machines and carried out any activity without support from another person. In view of this situation, wages became low throughout England.

In addition to the extremely low wages, workers were forced to accept an excessively high workload, reaching 16 hours of work per day and the worker only had a 30-minute break to have lunch, making it tiring. Workers who tried to express their dissatisfaction and request their rights lost their jobs and were replaced by other workers.

The work was carried out without protective equipment, that is, without respecting HST (Occupational Hygiene and Safety) rules. Work accidents were frequent, workers lost fingers, and in more serious cases their hands. Those who stopped working due to health problems were not compensated.

Work in the industries also involved children because the salary was lower and so they were hired more.

Capitalism reduced democracy, freedom and autonomy of the individual to a question of the market, the citizen was only free to buy (Marcuse, 1988).

IMPROVEMENT ACTIONS IN THE FACE OF GAPS IN INDUSTRIAL DEVELOPMENT

According to Hobsbawm (2014), the exploitation of workers led to the search for solutions for improvement, therefore, Workers Organizations (Trade Union) were created, commonly known as Unions. This action gave rise to two major movements in England:

- **Luddism:** aimed to invade factories and destroy machines, as they believed that machines were stealing men's jobs; This movement was short-lived due to repression by the authorities.
- **Chartism:** mobilized workers to fight for their labor and political rights (the working class must have representation in parliament), this movement achieved a reduction in daily working hours to 10 hours a day.

INDUSTRIAL DEVELOPMENT THEORY

Theory is the knowledge obtained through studies, hypotheses, experiments and observations that, when applied, present results to achieve the objective to be achieved, on the other hand, they explain phenomena and anticipate their occurrence (Montanari, 2004)

Development theories are those that accept that changes are more marked in periods of rapid transition, but changes occur throughout an individual's life, not just in these periods. Therefore, it is necessary to broaden the scope of understanding of what the study of human development is (Piaget, 1980).

According to Niederle & Radomsky (2016) The other aspect of Development Theory highlighted that development depended not only on the modernization of economic conditions, but also on the social, institutional and ideological conditions of countries.

Based on the authors' ideas, it appears that a theory is applied according to the context that is being experienced, therefore, it is not perfect for all situations. A theory applied in a given country may not fit the reality of another country, thus undergoing changes, thus generating another theory. And on the other hand, a central idea in Development Theory is the understanding of evolutionary development.

SURPLUS VALUE THEORY

Industrial development was marked by **Surplus value theory** created by the German philosopher Karl Marx (1818-1883), to understand the relationship between the time needed to carry out a job and its remuneration. For Marxist political economy, the value of work and the salary received by the worker means inequality (Diniz, 2010)

Marx argued that the worker receives less than he produces, with the remainder of production that remains with the employer called "surplus value", that is, it is the value produced that remains with the owner of the industrial company that is not paid to the worker in the future. its entirety.

The theory of surplus value is interpreted in two ways:

- a) Relative surplus value theory: occurs when the employer increases productivity by investing more in machines, without many benefits to workers;
- b) Theory of absolute surplus value: results in the extension of the worker's days of activity above what he produces equivalent to his salary, exhausting all his strength.

The theory of relative surplus value argues that the development of more advanced machinery and greater efficiency (reduction in costs and production time) does not translate into improvements for the worker, because

the work and product produced by workers is transformed into merchandise with the aim of profit. Thus, workers end up receiving a lower value that does not match the work performed.

The development of the Capitalist economy, even though it produced great wealth, still had great inequalities in the social and economic sphere of the bourgeois and working classes, Karl Marx pointed out that the socioeconomic abyss was explained by **theory of absolute surplus value** which defended:

Misery increased in the capitalist world due to low wages, therefore, the salary allocated to a worker could be paid with the wealth that he himself produces, thus creating improvements in the worker's quality of life.

GAPS IN THE SURPLUS VALUE THEORY

Due to the fact that the surplus value theory identifies injustices in obtaining profit, because the money resulting from production becomes part of the employer's profit, that is, the hours worked by the worker are not paid in full, there are criticisms of this theory, mainly by the liberal current (Marini, 2000).

For Liberals, profit is important for the sustainability of business and the economy in general, in this sense, in Marxist theory, capitalism allows the lower classes to move up the pyramid and people at the top to fall.

The theory of surplus value was refuted by economist and professor George Reisman who explained that capitalist workers are like auxiliaries in production and are not exploited. The employer's profits do not represent a deduction from the amount that the worker must be paid, but rather the profits are earned by the capitalists (employers) for their intellectual work, planning and investment in their businesses.

Workers are seen as helpers of businesspeople, where they are employed

to implement the employers' plans and consequently produce products that generate profits for the employer.

INDUSTRIAL DEVELOPMENT MODELS

According to Matias (2019), a development model is a process to be followed in order to promote the economic and social progress of a nation. The objective of a development model is to improve the quality of life. However, the success of a model that worked in a certain country does not mean that its implementation will also be successful in another country, because the reality can be completely different.

According to Matias (2019), Industrial development was marked by 2 Models:

- Taylorism; and
- Fordism.

Taylorism Model: was developed by Frederick Taylor where he created a mechanism that adapted the worker to the rhythm of the machine, thus, there were fewer interruptions, less waste of resources and more productivity.

Taylorism model gap: the worker did not need to know the reason for his role, but just carry it out. It was a period of low technical qualifications, in which the worker was only responsible for carrying out his tasks at an accelerated pace to maximize profits.

At the end of the 19th century, the Second Industrial Revolution considerably increased the production of goods and, consequently, the number of industries around the world. From that moment on, innovations were created to meet such demand, in order to further increase production in a shorter space of time, thus emerging the Fordism model.

Fordism Model: This model of industrial development was developed by Henry Ford through the improvement of the Taylorism model and adapted it to his automobile

industries, where productivity was high, and production time was very low, which resulted in a successful model at the beginning of its implementation.

This model allowed for a rigid division of activities: each worker performed a specific function, which increased productivity and reduced costs.

Gaps in the Fordism model: The Ford model accumulated large stocks, due to cheap and mass production. This issue led to an accumulation of goods, and there was a crisis of overproduction.

For both industrial development models, the indicators were:

- Production Pace;
- Division of Tasks;
- Quality control.

The following table illustrates the comparison between the two industrial development models.

Industrial Models	Production Pace	Division of Tasks	Quality control
Fordism	Assembly line and conveyor belts.	Serial and specialized work.	Made at the end of production, in the last stage of the conveyor belt.
Taylorism	Production controlled by the worker's time (scheduled); repetitive movements.	Rigid division of tasks, with great alienation of workers. Rigid division of tasks, with great alienation of workers.	Introduction of quality inspection in the final stages of production.

Table 2: Taylorism and Fordism model comparison.

Source: Matias (2019).

Looking at the two industrial models, based on the table it can be seen that Fordism was more industrial centered on machinery in relation to Taylorism which was focused on the worker and as a result of this in Fordism

productivity was higher and achieved in a short time. A clear example of this model (Fordism) is that before its implementation, the production of a vehicle took an average of 500 minutes to be completed, however, with the development of the model it started to take just 2 minutes for the vehicle to be ready.

SWOT ANALYSIS (STRENGTHS AND WEAKNESSES OF INDUSTRIAL DEVELOPMENT)

Fortresses	Opportunities
<ul style="list-style-type: none"> • Use of machinery • Large scale productions • Advances in the field of medicine, telecommunications and transportation 	<ul style="list-style-type: none"> • Continuous evolutionary development • Job creation • Population growth
Weaknesses	Threats
<ul style="list-style-type: none"> • Extremely low wages • Excessive workload • Workplace Safety Rules • Democracy • Socioeconomic Inequality 	<ul style="list-style-type: none"> • Closure of industries • Economic crisis

Table 3: SWOT Analysis

Source: Authors (2024)

table 3 illustrates the main strengths and weaknesses of industrial development, and it appears that in addition to production being massive, there is socioeconomic inequality that does not benefit workers.

Conclusion

In short, the study's main concern was the perception of industrial development, theory and model based on concepts, history, strengths and weaknesses, among other aspects.

From the study carried out, it can be concluded that, despite facing several difficulties, the Industrial Revolution brought economic-social transformations that consisted of expanding the limits of commercial relations and developing markets on other continents. And with this, expand as quickly as possible to all regions, whether

developed, undeveloped, or in the process of developing, based on the resources available in each region.

The present study made it possible to visualize the concepts, however not all authors agree with each other, but bring different approaches in which one elevates the other to a certain point. Where we see that development consists of improving indicators of economic and social well-being, providing a better quality of life. While, industrialization is the process of industrial development, through which industry represents the fundamental sector of an economy, thus creating an increase in productivity and generation of wealth.

It must also be noted that the history of industrial development began in the United Kingdom (England) during the 18th century and was a milestone in the history of humanity, because it was responsible for the creation of jobs and also structural change in human society (growth of cities and the way of producing goods), once the production process was manual it became industrial.

It was also observed that a theory is applied according to each situation, however, the same theory is not applicable in all situations. For example, a theory applied in a given country may not fit the reality of another country, thus undergoing changes, thus generating another theory. Therefore, the central idea of Development Theory is the understanding of evolutionary development. In this aspect, for industrial development, the predominant theory was the Surplus Value Theory created by Karl Marx, which aimed to understand the relationships between the time needed to carry out a job and its remuneration.

According to the theory of surplus value, there is a disparity between the salary that the worker receives and the value he produces from his work, that is, the hours worked that are not paid by the employer.

This way, Industrial development was

marked by the model of Taylorism and Fordism. In which the Taylorism model was developed by Frederick Taylor, where he created a mechanism that adapted the worker to the rhythm of the machine, thus, there were fewer interruptions, less waste of resources and more productivity, and the Fordism model was developed by Henry Ford through the improvement of model where productivity was high and production time was very low, which resulted in a successful model at the beginning of its implementation.

RECOMMENDATIONS/ IMPROVEMENT PROPOSAL

According to studies carried out in relation to theory and model: Industrial Development, it is recommended:

- Improving conditions for continued evolutionary development;
- Increase job creation;
- Make the expansion of theories and models more flexible;
- Improved salaries.

Problem/gap	Objective	Activity	Indicators	Results
Low salaries	Improving the salary situation	adjust the salary table define salary categories depending on the work performed.	Existence of unions (application of surplus value theory)	Improved salaries
Excessive workload	Reduce workload	Division of tasks	Definition of working hours governed by law	8 hours of daily work
Lack of material use	Improving workers' health conditions	Raise awareness among workers on the use of safety equipment	Existence of hygiene and safety equipment at work	Workers in occupational safety
Lack of democracy	Create freedom for the population	Encourage the population to make decisions	Vote and public opinion.	The population involved in decision making

Table 4: improvement proposals

Source: Authors (2024)

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