

THE EFFECTS OF INDUSTRIAL REVOLUTIONS ON
UNEMPLOYMENT



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YEDİTEPE UNIVERSITY

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PLAGIARISM

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Date: 04.10.2022

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ABSTRACT

The notion that we describe as the Industrial Revolution is not actually a phenomenon that happened all at once, and there is a common belief that the Industrial Revolution consisted of a single revolution. Before and after the Industrial Revolution, the social structure caused a great change in their lives, and we will talk about the effects of these revolutions on unemployment. While determining the subject of my thesis, it is necessary to have the opinion that the Industrial Revolution did not occur suddenly, that it did not occur from a single revolution, that the social and economic aspects before and after the revolution and unemployment were also taken into account and should be emphasized. The questions we seek to answer in our study are: What is the Industrial Revolution ? What are the factors that led to the Industrial Revolution and how did it arise ? Why did it first occur in England ? What are the four main Industrial Revolutions ? What are the social structure and changes of people before and after the Industrial Revolution ? What do the notions of job, worker and employer mean ? What are the types of unemployment ? What are the unemployment theories ? Sources Primary sources, secondary sources, library sources, and methods of examining translations of electronic sources. The answers we got; The Industrial Revolution, the factors that led to the formation of the Industrial Revolution and how it occurred, why it was first seen in England, information about the four main industrial revolutions, the social structure before and after the Industrial Revolution, the notions of work, worker, employer, types of unemployment, unemployment theories, Industrial Revolution The positive and negative effects of revolutions on unemployment.

Keywords: *Industrial Revolution, Industrial Revolutions, Effects on Unemployment, Industrial Revolution and Society*

ÖZET

Endüstri Devrimi diye açıkladığımız kavram aslında bir anda meydana gelmiş bir olgu değildir ve Endüstri Devrimi tek bir devrimden oluştuğu hakkında yaygın bir kanı vardır. Endüstri Devrimi öncesi ve sonrası insanların sosyal ve ekonomik açıdan yaşamlarında büyük bir değişikliğe neden olmuştur ve bu devrimlerin işsizlik üzerine etkilerinden bahsedeceğiz. Tezimin konusunu belirlerken Endüstri Devrimin bir anda oluştuğuna dair bir kanının olması ve tek bir devrimden meydana gelmediğini ve devrim öncesi ve sonrası sosyal ve ekonomik açıdan ve işsizlik üzerinde durulması gerekmektedir. Çalışmamızda cevap aradığımız sorular şunlardır; Endüstri Devrimi nedir ? Endüstri Devriminin oluşmasına neden olan etkenler nelerdir ve nasıl ortaya çıkmıştır ? İlk neden İngiltere’de meydana geldi ? Dört ana Endüstri Devrimleri nelerdir? İnsanların Endüstri Devrimi öncesi ve sonrası toplum yapısı ve değişiklikler nelerdir ? İş, işçi ve işveren kavramları ne demektir ? İşsizlik türleri nelerdir ? İşsizlik teorileri nelerdir ? Endüstri Devrimlerinin işsizlik üzerine olumlu ve olumsuz etkileri nelerdir ? Bu sorularımıza cevap ararken faydalandığımız kaynaklar Birincil kaynaklar, ikincil kaynaklar, kütüphane kaynakları ve elektronik kaynakların çevirilerini inceleme yöntemleridir. Ulaştığımız cevaplar; Endüstri Devriminin, Endüstri Devriminin oluşmasına neden olan etkenler ve nasıl meydana geldiği, neden ilk İngiltere’de görüldü, dört ana Endüstri Devrimi hakkında bilgi, Endüstri Devrimi öncesi ve sonrası toplum yapısı, iş, işçi, işveren kavramlarını, işsizlik türleri, işsizlik teorileri, Endüstri Devrimlerinin işsizlik üzerine olumlu ve olumsuz etkileri.

Anahtar Kelimeler: *Endüstri Devrimi, Endüstri Devrimleri, İşsizlik Üzerine Etkileri, Endüstri Devrimi ve Toplum*

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INTRODUCTION

In the first chapter, the first part will begin by explaining what the Industrial Revolution means. Later on, in order for the research on Industrial Revolutions to be fully understood, it is necessary to examine all phases of human history as a whole from the very beginning. It is necessary to start with the first of these stages, ‘ Hunting and Gathering ’. With the control of fire in this period, people were enabled to be more active in the field of hunting and used fire as a weapon and defense tool against wild animals. With the control of the fever, there was a change in the way people consume food, and accordingly, changes began to occur in the physical characteristics of people.

As a result of insufficient or depletion of food resources in the region, people started to migrate from their regions to places where food and water resources were abundant, and this new system emerged. This is the ‘ Nomadic Life ’ style. In this order, people used to go to cooler and more livable areas where water and food resources are abundant in summer and continue their lives there. In winter, they migrated to places where it was warmer and where food and water resources were more abundant and continued their lives there.

After this system, one of the biggest turning points for humanity, the ‘Agricultural Revolution ’ took place. In this period, people started to settle down and started production. In this period, people were producing with small and simple hand tools. These tools were generally based on human power, animal power, water power and wind power. This production system was actually a form of production made to meet people’s own needs. Later on, people started to produce more than they needed, and after a certain time, the excess products they produced caused decay and even people got sick as a result of this decay. For this reason, they started to feel the need

of people to somehow get rid of the products that they produced in excess. This caused people to start a new search, and eventually people started to sell their products in places such as market places. Of course, these manufactured products were sold at very expensive prices. Therefore, people began to look for new ones. Of course, in order to reach these market places, people started to create certain ways to reach them in the easiest and safest way, and the Silk Road and Spice Road that we all know became a good important trade route. However, over time, these two great and important trade routes came under the control of other states in every period. Before the Industrial Revolution, these two important trade routes were under the rule of the Ottoman Empire. This prompted other states to seek new trade routes. Of course, this was not something that could happen overnight.

The subject we will deal with first is ‘ Renaissance and Reform ’. The reason why we dealt with this in the first place is that it caused people to think freely. People began to question some things that people could not question before. Accordingly, the technology necessary for the production of ships resistant to the harsh weather and sea conditions necessary for geographical explorations would develop and an alternative could be found for the two major trade routes under the dominance of the Ottoman Empire. For this, geographical discoveries are supported by other countries. These geographical discoveries gained momentum. As a result of these geographical discoveries, a large amount of raw materials flowed to Europe. Europe suddenly gained great wealth. It can be seen this as the preparation of the economic infrastructure necessary for the Industrial Revolution.

It will be now consider the intellectual stages necessary for the Industrial Revolution.

The Renaissance and the Reformation were mentioned earlier. The Renaissance and the Reform actually form the basis of the Industrial Revolution. In the 16th and 17th centuries, the Renaissance and the Reformation led primarily to the questioning of dominant patterns. Religion came first, and people who started to question religion tended to think in political, philosophical and scientific fields. Philosophers and scientists began to come to the fore together with the ' Age of Enlightenment ' that followed right after this. Accordingly, with the development of scientific methods, rationalist thinking began to develop. With the 'French Revolution', this rational thought began to spread rapidly to Europe and people began to adopt this rational thought.

Due to the situations listed above, most of the scientific discoveries necessary for the Industrial Revolution have been completed.

Other necessary elements are the social and economic structures of people. With the increase in mechanization in agriculture, the need for human power has started to decrease. People living in villages and rural areas have started to migrate to big cities or places close to those regions in large masses. There was already rapid population growth in Europe at that time. The great migrations from these countryside and villages caused the population of Europe to explode. In this way, many unemployed people occurred in Europe. This would mean cheap labor for the future Industrial Revolution.

The biggest factor that triggered the situation we mentioned above was the emergence of colonial activities as a result of geographical discoveries and the acceleration of colonial activities by European countries and the establishment of

colonies in regions rich in underground resources. As a result, petty-bourgeois began to develop and the middle class began to prosper.

The law that develops as a result of securing the commercial and economic rights of private property and accordingly the formation of a more stable, more comfortable and safer economic environment. Capitalism began to develop, so the development of the middle class accelerated and new investment areas began to emerge. Accordingly, companies with more than one partner and, accordingly, the establishment of insurance companies and banks paved the way for the Industrial Revolution, which will occur as a result of the increase in insurance, banking and entrepreneurship as a new business field, and the development of commercial law, as we mentioned above. As a result of geographical discoveries, it was understood that it was possible to go to distant regions and developments in the field of transportation occurred.

For the first chapter, we will talk about why the Industrial Revolution, which is our last topic, took place in England first.

It is possible to say that the biggest reason for this is the management style of England. Because as it is known, there was a Constitutional Monarchy system in England. The biggest advantage of this was that people had private property rights and people's individual freedoms, and these rights were guaranteed. As a result, the private sector developed rapidly since it did not impose any restrictions on issues such as buying and selling between people. Depending on the steady progress of the financial situation in England, it became the economic center of the period. As a result, banking came into existence and progressed. Accordingly, the stock market gained an upward momentum. This was followed by the competition in the field of

capital, and as a result of this competition, an integrity was achieved in the country. This caused another incident. At first, small companies started to be established, and later these small companies merged and turned into companies with large partners. The Stock Exchange was established and raw material resources such as coal and iron, which were of great importance for the period, were offered for sale. This meant preparing the groundwork for the Industrial Revolution. As it is known, England has the largest colonial share in the world. Thanks to the colonies he had, he did not have a problem in terms of raw material source. In addition, the ' Battle of Plassey ' that took place between the British and the French in this period, with the victory of the British in the war that took place on June 23, 1757, England had a great treasure in India. This provided another step necessary for England to realize the Industrial Revolution.

As another factor, as we mentioned earlier, there was already a rapid population growth in Europe. However, this population increase in England has been quite high. This gave rise to two events. The first means a large number of active workers. The other has led to an increase in my consumption. Accordingly, it has caused an increase in the demand for some consumption needs of people and an increase in the production of these products. These are products that used to be considered luxury. These; products such as coffee and tea. As a result of the ease of transportation of these products, they ceased to be a luxury product and became accessible to everyone. This has led to an increase in the welfare level of people.

As another reason, we see that you are the geographical location of England. Because as you know, England is an island country. This means that it was not affected much by the turmoil in Europe. Accordingly, there was no need to invest too

much in the defense industry. It further strengthened its economy by using its investments in the defense industry in other areas.

Then we will talk about the processes starting from the First Industrial Revolution (Industry 1.0) to the Fourth Industrial Revolution (Industry 4.0).

After giving detailed information about Industrial Revolutions, we will deal with all Industrial Revolutions in itself, starting from the First Industrial Revolution (Industry 1.0), which is our main topic, and we will deal with the positive and negative effects of Industrial Revolutions on unemployment in a comparative way.

Later, we will give detailed information about the second part, Industrial Revolutions.

The First Industrial Revolution (Industry 1.0) is the name given to the period that started in the 1760s and lasted until the 1830s. So, what changes occurred during this period ? Before this revolution, it was based on a production system based on human and animal power. In this process, there was a transition from human and animal power to machine power. Although these machines have improved in terms of both quality and quantity, the use of coal has become more widespread than the use of wood in the period after the use of steam power. This revolution, which was first seen in England, soon spread to Europe and the United States of America.

This radical change in production brought many changes with it. These other changes have led to fundamental changes in the social structure, especially in the economy. It has caused an increase in people's average lifespan, but also a faster increase in the already growing population. It was not limited to this, but led to great convenience in people's lives, and accordingly, it was effective in raising people's living standards. As a result of the rapid production brought by this new era, as a

result of the increase in the goods produced in Europe and the raw material in hand, it led to the need for resources. In this context, European countries started to search for new markets for the goods they produced in excess, and they also turned towards the Middle East, Near East and Far East lands in order to find new raw material sources. After that, it resulted in the redrawing of the borders that would not only complete the Industrial Revolution, its first period, but also directly affect the international relations that would later take place.

Another issue that we will talk about is the use of machines that developed and started to be used in the Second Industrial Revolution (Industry 2.0) and the First Industrial Revolution (Industry 1.0), combined with technology in this period. As a result of the development of science and technology day by day, the Second Industrial Revolution (Industry 2.0) started slowly. This process will generally cover the 1840s and 1870s. This period will be called the Second Industrial Revolution (Industry 2.0) or, in other words, the ‘ Technology Revolution ’. At the beginning of this revolution, there were developments in the field of transportation. The biggest development in this area was in terms of railways. As a result, getting from one place to another has become easier and less costly. In addition, the products produced can be transported faster and easier, as well as reach longer distances. As a result of the development of electrical technology and then integrating it into production in the Technology Revolution, a power superior to steam power was obtained. This new technology has led to a faster development of machines and a noticeable increase in production. Thus, the world met a new notion. This notion is the notion of ‘ Mass Production ’. As a result of the widespread use of iron and steel raw materials, the emergence and development of heavy industry was ensured. Now the leading countries producing

heavy industry in the world were England, the United States of America, Germany and Japan.

Later on, the Third Industrial Revolution (Industry 3.0) could not develop as quickly as the other first two revolutions. The reason for this was the First and Second World Wars that took place in the early 20th years. The biggest effect was the small time difference between the two wars. In this period, even the countries that could not enter or complete the First and Second Industrial Revolutions (Industry 2.0), even the countries that completed these two revolutions, experienced the economic negative effects of the 1929 Global Crisis. In this process, reducing the negative effects of the crisis, which was effective all over the world, was necessary for the re-development and continuation of the industry. Of course, this was only possible with the end of the Second World War. This date could only be realized after 1950. After the calming of the environment, it could be realized with the development of digital technology. As we mentioned above, this date will coincide with the 1950s. In this period, the cornerstones of the new Industrial Revolution, namely the Third Industrial Revolution (Industry 3.0), began to form. For this period, a series of digital developments took place, from the production of ‘ Calculators ’ working with a mechanical electrical system to computers. These developments have greatly benefited the production processes. Another factor in the emergence of the Third Industrial Revolution (Industry 3.0) was the innovations in the field of communication, which developed with the computer. As a result of the use of computer and communication technologies together in the production processes, many new products have entered the production process, which are very small but have increased functionality and accordingly make our lives easier. While the machines in this process are of great importance not only for business life but also for

our daily life. It has started to gradually disappear from human power in the natural life process.

In this period, which is called the fourth and last Industrial Revolution, the need for human power has decreased to such an extent that it has almost disappeared. Thanks to the technology used in this process, a self-managing technology has developed at every stage of production. The biggest share in the development of this technology has been great breakthroughs in the fields of computer, internet and communication.

‘ Internet of things ’ (IoT), ‘ Industrial internet of things ’ (IIoT), ‘ Cyber-physical systems ’ (CPS), ‘ Smart Manufacturing ’, ‘ Smart factories ’, ‘ Cloud computing ’ and finally the biggest and the most influential factor is ‘ Artificial Intelligence ’

At the end of the second chapter, after talking about the Industrial Revolutions, we will talk about the important turning points for humanity that we talked about in the first part. However, we will examine in detail and comparatively the effects of these turning points on the social structure of people before the Industrial Revolution and the social structure after the Industrial Revolution, and the new notions that emerged in this period.

In the third chapter, we will start by explaining the notions of job, worker and employer, then we will talk about the types of unemployment and talk about the theories on unemployment.

In the last chapter, namely the fourth chapter, the need for human power began to decrease with the use of systems based on water and steam power in production with the First Industrial Revolution (Industry 1.0), starting with the First Industrial

Revolution (Industry 1.0). With the widespread use of machines in production instead of people, the employment opportunities of people have begun to decrease. Accordingly, people started revolts against the machines.

During the Second Industrial Revolution (Industry 2.0), many new job opportunities emerged. In this period, with the increase in the use of steel, a new sector emerged. The first of these sectors is the construction sector. There have been many worker shortages for this sector and many job opportunities have been created in this field. The other sector is the arms industry. The situation in the arms industry is somewhat different. Only during the periods of war preparations employment increased considerably.

With the Third Industrial Revolution (Industry 3.0), electronic and information technologies were used in production, thus leading to complete automation in production. Digital technology has developed and has paved the way for the emergence of information technologies. Access to information is easier and more accessible than in other periods. In fact, this information has begun to be counted and used among the factors of production.

As the most important feature that distinguishes it from the Fourth Industrial Revolution (Industry 4.0) and the Third Industrial Revolution (Industry 3.0); This is because the interaction of digital, biology and physical fields is much faster than in other eras and has a great impact on the system and scope. Compared to other Industrial Revolutions, the Fourth Industrial Revolution (Industry 4.0) is a much faster development of technologies and this developing technology is very effective in the fields of marketing, management, communication and production. As a result of this change, it causes the redefinition of jobs and the change or adaptation of existing

occupations. It even causes the disappearance of some professions. However, it means the emergence of new business.



RESEARCH METHODS

Written Resources and Research Works

At first, a comprehensive literature review necessary for our thesis was made. The resources related to our thesis topic were selected from among them. These resources are primary and secondary sources, journal articles, various reports, library resources, electronic resources.

After this literature study we have done, among the resources required for the first part of our thesis, we first started with explaining the concept of Industrial Revolution in order to better understand our subject, and then ‘ factors that caused the Industrial Revolution ? ’, which is the other subject headings of our first chapter. ‘ how did the Industrial Revolution occur ? ’ A study was conducted among the sources related to ‘ why was the Industrial Revolution First Seen in England ? ’.

Then, we discussed the Industrial Revolutions and the social structure before the Industrial Revolution, which is the main title of our thesis.

Our third main topic is a study has been made among the resources we have obtained from the literature we have done for the ‘working class, Unemployment types and the theories of unemployment, and we have prepared this section.

It has been prepared this section after the literature review for our last main title, ‘ the effects of Industrial Revolutions on unemployment.

FIRST CHAPTER

1. WHAT DOES INDUSTRIAL REVOLUTION AND ELEMENTS OF THE INDUSTRIAL REVOLUTION

1.1. What does Industrial Revolution mean ?

“ The First Industrial Revolution began in England in about 1750–1760 that lasted to sometime between 1820 and 1840. It is one of the most distinguished turning points in human history. ” (Mohajan, 2019).

“ Industrial Revolution, in modern history, the process of change from an agrarian and handicraft economy to one dominated by industry and machine manufacturing. These technological changes introduced novel ways of working and living and fundamentally transformed society. ” (Wallace, 2022)

The Industrial Revolution first started with the effect of inventions between the 18th and 19th centuries and the use of machines based on steam power in production and the process that occurred as a result of the accumulation of capital in Europe day by day was called the Industrial Revolution.

1.2. Factors That Caused The Industrial Revolution ?

We must first consider the factors in the formation of the Industrial Revolution. In order to understand whether the formation process of the Industrial Revolution was a natural process or was created by some sovereign power, we need to consider this issue carefully.

There are a few things we should mention before we start this topic. Before we start this topic, there are a few important points that we should mention. First of all, from these periods, the first to emerge among these periods is the period of Hunting and Gathering. during this period, people were able to survive by Hunting and

Gathering. As a matter of fact, we can consider the hunting and gathering periods of humans in two periods. It can be examine this in two periods, before and after the period when people took the fire under control. The main reason why it was consider this period in this way is that before people took the fire under control, they were mainly living by foraging. It was a situation where fire already existed in nature, fires caused by lightning strikes etc. It was a situation caused by. After people took the fire under control, people started to use the fire with a lighting tool, thanks to this, they started to gather at night, and prevented other creatures in nature from attacking people. Because it caused animals that saw the fire not to approach people, and people increased their hunting activities in this way. People began to use fire as a weapon against animals. Of course, with the control of the fire, people's diet changed and they started to adapt to nature accordingly.

Later, when there was not enough food source or material in their region, they had to transition to the nomadic system. The nomadic lifestyle has been easy for some societies, while for other societies it has been quite challenging. Accordingly, some societies have voluntarily settled life, some societies have settled life because they are obligatory and some societies maintain their lives with a nomadic system, albeit in limited numbers. But in the end, humankind has passed from a nomadic system to a settled life or had to be. The Agricultural Revolution happened, which corresponds to 8000 BC. . The reason we mention these issues is that after the Agricultural Revolution, certain production systems were established. But as it is known, these systems were small hand looms, production systems based on human power, namely muscle power, animal power, water and wind power. In the first place, these systems were used to meet people's own needs. But then people started to produce more than they needed. These are also established in the market areas, etc. They started to sell in

such places, but these products were sold dearly. At first, the Industrial Revolution was seen as a useful method to meet people's needs both faster and to produce cheaper.

After clarifying this issue, we can deal with our main subject.

The first facts we encounter are the Renaissance and Reformation, The reason why we put this in the first place is the emergence of the idea of free thought as a result of this stage, accordingly, great studies in ship technologies and the emergence of new ships for the geographical discoveries that followed, and the increase in countries supporting geographical exploration. If we need to open a parenthesis here, all the famous and known trade routes in the world at that time were in the hands of the Ottoman Empire, forced other countries to make these geographical discoveries in a way. As a result of these geographical discoveries, many sources of raw materials came to Europe. In an instant, Europe became extremely wealthy. Thus, we can say that it paved the way for the First Industrial Revolution (Industry 1.0). Of course, this was not enough.

In this section, we will talk about the mental stages necessary for the realization of the Industrial Revolution. The Renaissance and Reform, which formed the basis of the mental structure, also formed the basis of the ' Industrial Revolution '. Because the Renaissance and Reformation movements, which appeared in the 16th and 17th centuries, firstly caused the dominant patterns to be questioned, religion came first, and people who started to question religion turned to philosophy, to think in political and scientific fields. As a result of the Enlightenment Age, which came right after this, more philosophers and scientists began to come to the fore, the development of scientific methods and the development of rational thinking, the

scientific discoveries needed by the Industrial Revolution emerged thanks to technological developments. Thanks to the 'French Revolution', these developments spread rapidly in Europe and were adopted by the people. The developments in the 17th century have filled the great gap in the field of scientific discoveries.

Another necessary fact for the formation of the Industrial Revolution, Social and economic structure of people.

Thanks to the developments in the field of agriculture, as a result of the decrease in the need for human power compared to the past, large masses of migration from the villages or rural settlements to the cities began. This triggered the next factor.

First of all, there was already a rapid population growth around the world. Therefore, the human population that came to the already increasing population of European countries or nearby countries and cities thanks to these migrations enabled the current population to reach the explosion point.

Thanks to this, the number of people to work in the factory suddenly appeared more than the capacity needed and these people were unemployed, which was an invaluable blessing for the Industrial Revolution.

The reason that triggered this factor was the accumulation of excessive raw materials and capital in Europe as a result of the acceleration of colonial activities and the colonial activities of European countries, which were the result of the Geographical Discoveries I mentioned above, and the establishment of colonies in some resource-rich regions during this time. Accordingly, the petty bourgeoisie began to develop and the middle class got richer.

The legal system that develops as a result of securing commercial and economic rights of private property and accordingly the formation of a more stable, more comfortable and safer economic environment. Capitalism began to develop, so the development of the middle class accelerated and new investment areas began to emerge.

As a result, companies with more than one partner, and accordingly insurance companies, banks were established, and as a result, insurance, banking and entrepreneurship increased as new business areas. As we mentioned above, with the development of commercial law, it paved the way for the Industrial Revolution.

Maybe this is a factor that brought about all these developments that we mentioned above or the reasons above brought about the reason we will talk about now. As a result of technological developments, the invention of the steam engine as a result of combining steam power with a machine and the use of this new invention as a production tool.

In fact, we can consider many of the factors mentioned above as a result. Of course, this will not be a wrong approach. After addressing this issue, we can move on to the next important issue gradually.

1.3. How Did The Industrial Revolution Occur ?

The Industrial Revolution first started with the effect of inventions between the 18th and 19th centuries and the use of machines based on steam power in production and the process that occurred as a result of the accumulation of capital in Europe day by day was called the Industrial Revolution. But this is not something that happened all of a sudden in the 18th and 19th centuries. It certainly has a historical background.

At first, overseas expeditions and explorations were made between the 15th and 16th centuries. Development of science and technology, It provides a meaning when taken as a whole as a result of a sudden increase in capital in Europe and the emergence of Protestantism. It is a situation that has arisen as a result of the fulfillment of all these conditions.

The Industrial Revolution was first seen in England. This revolution, which was seen in England, was seen in North America, Japan and Western Europe in a short time. After then, it spread all over the world. There was a very rapid population growth in the 16th century.

The Black Death, also known as the Black Plague.

“ The Black Death that decimated populations in Europe and elsewhere during the middle of the 14th century. The plague of 1347 to 1351 was one of the deadliest epidemics in human history, killing about 75 million people, according to some estimates, including up to 50% of the European populations affected. ” (Dunham, 2008).

However, according to some sources, death is thought to be higher. “ The epidemic killed 30 to 50 percent of the entire population of Europe. Between 75 and

200 million people died in a few years' time, starting in 1348 when the plague reached London. '' (Shipman).

The reason we give this information here is for the 15th and 16th century demographics. which we will give from now on. '' The population in the 15th century was about 350,000,000. In the 16th century, this number has reached around 450,000,000. '' (Worldometer). The reason we mention these numbers here is that the population has increased so much after such a big epidemic. This rapid population growth led to the development of agriculture, but some of the people in these regions voluntarily, some by force, started an intense migration movement from the villages to the big cities. As a result, human power to work in the factories has begun to be provided. At that time, sugar, tea and coffee began to be produced, which were seen as luxury consumer goods. As a result, people's quality of life began to improve. The production we are talking about here is a small-scale production before the Industrial Revolution. Thanks to such developments, almost the entire environment was prepared for the Industrial Revolution to take place.

1.4. Why Was The Industrial Revolution First Seen in England ?

It can be say that the first reason for the Industrial Revolution to occur in England is due to the management style. Because as it is known, there was a Constitutional Monarchy in England. According to this understanding, people had individual freedoms and private property rights, and it can be said that these rights emerged because they were under guarantee. As a result, the private sector has developed faster than other countries since it does not impose any restrictions on issues such as human-to-human trade.

As a result of the stable financial situation in England, it became an economic center of the period. Accordingly, the development of banking and the stock market, which is another link in this chain, gained upward momentum. This was followed by the competition in the field of capital, and as a result of this competition, an integrity was achieved in the country. This triggered another event. Previously, small companies were established and these companies merged to form companies with large partners. The Stock Exchange was established and raw material resources such as coal and iron, which were of great importance for the period, were offered for sale. This meant the formation of the groundwork for the Industrial Revolution. As it is known, England has the largest colonial share in the world. Since it held this large share, it did not have a problem in terms of raw material source. In addition, as a result of the Battle of Plassey between the British and the French on 23 June 1757, England, which was victorious, became the owner of the underground resources in India. It had taken the groundwork for England's Industrial Revolution one step further.

As another factor, there was already rapid population growth in Europe at that time. However, population growth in England was quite high compared to other European countries. This created two events in England. The first meant a large number of new active workforces. Another event led to an increase in consumption. However, people have increased the demand for some consumer goods and a rapid increase has been seen in the production of these products. These products have facilitated the transportation of products such as tea and coffee, which were called luxury in the past, and these products have come out of luxury products and provided easy access. Due to such reasons, people's living standards have increased, and accordingly they have started to work to produce faster and in greater numbers.

Another element is Geographical Location, as everyone knows, England, which is an island country, did not have to make huge investments in the field of defense like other states. This allowed the investment to be used in this area to be used in different areas. It was an advantage that it was not affected by many turmoils in Europe, as it was a more isolated region compared to other countries. Its advantage, depending on another geographical region, is that it is rich in underground resources, which is the most important factor for the Industrial Revolution, and in addition to these underground resources, it was not limited to the colonies of African and Middle Eastern regions. Even in America they had thirteen colonies and they ruled these colonies in two different ways. Their administration was managed on the basis of property or through commercial companies.

The factors listed above are the biggest and most effective in this process. But could this last element be perhaps the most important element in the emergence of the Industrial Revolution ? This element, on the other hand, “ The steam engine that started the Industrial Revolution was invented in the coal mines. ”. (Kırmızıgül, 2008). If we come to what this has to do with our subject, we will discuss it in detail under the subject of ‘ The First Industrial Revolution ’ (Industry 1.0).

SECOND CHAPTER

2. INDUSTRIAL REVOLUTIONS AND LIFE BEFORE THE INDUSTRIAL REVOLUTION

2.1. What Do The First, Second, Third and Fourth Industrial Revolutions Mean?

The topics it will talk about here, after briefly talking about how the First Industrial Revolution came about and what kind of process it followed, we will discuss the process of the Second Industrial Revolution, which is our other topic, then, after talking about the Third Industrial Revolution, it will briefly talk about the Fourth and last Industrial Revolution.

2.1.2. First Industrial Revolution (Industrial 1.0)

Before the Industrial Revolution, people used production systems based on human and animal power to meet their own needs, as we mentioned under the title of ‘ Factors That Caused The Industrial Revolution ? ’. As it is known, the products produced were more limited. If we need to give examples of these, small hand tools, agricultural tools, pottery, etc. They are products that are mostly used in everyday areas and relieve the workforce of people, in addition to these, they are products that meet other human needs such as carpets, rugs and sweaters.

As we mentioned above, everything has existed to meet human needs. The best example can give is the one we quoted in the section ‘ Why Was The Industrial Revolution First Seen In England ’ ‘ ‘ The steam engine that started the Industrial Revolution was invented in the coal mines. ’’. (Kırmızıgül, 2008), we will consider in detail. As it is known, the most important factor in the Industrial Revolution is the control of ‘ Steam Power ’ or making it usable by people.

First of all, we see that a system based on human, animal power or a combination of both is used in the process of evacuating the accumulated water in the coal mines. This system was able to function quite successfully near the ground. However, as we went deeper, this evacuation process started to become difficult or even impossible. Thereupon, British engineers started working to make this job easier. In 1698, English engineer Thomas Savery invented the first steam-powered pump. However, considering the conditions of that time, Thomas Savery's invention was not very effective, since this pump worked with high pressure, it was difficult to use it safely, and the fuel used to heat this water was very costly. But this steam-powered pump would be a source of inspiration for future inventors. This invention has been called Savery's machine.

On the pump Savery had found, Thomas Newcomen, another British engineer, took it a step further. He integrated the pistons into the machine he had developed. This invention has been called Newcomen's Steam engine.(1712). Newcomen's steam engine was less risky, but still not yielding enough and was still costly

Everything would change when James Watt was summoned to fix the accidentally broken Newcomen Machine. He repaired the machine, but the efficiency of this machine was not very good and he decided to improve Newcomen Machine. The latent heat he had learned earlier from his friend Joseph Black here knew how costly it was to heat a room. If two rooms were built, one would be kept constantly hot and the other constantly cold. It would be in the hot room while the steam was doing its job, and when it needed to turn into water, it would be taken to the cold room with the valve system. This was obviously a sensible idea, and was a less costly and convenient option.

When the dates show the year 1765. The previously developed machine. James Watt took this pre-developed machine one click away. This machine began to be produced in 1776 and was put on the market.

This machine, which was found by James Watt, was mostly sold for the purpose of draining the accumulated water in the mines. This was the area where steam power was first used. This laid the foundations of the Industrial Revolution.

As we mentioned above, the main factor that brought about the First Industrial Revolution (Industry 1.0) and changed the rules of the game was the control of steam power by humans. So, what changes did steam power make ? The first area for public using were weaving looms. Until then, an incredible time saving was achieved in the production process of the products produced on hand looms, and there was an incredible decrease in costs. This has brought about a situation that people could not even imagine until then.

As a matter of fact, we can consider the beginning of the Industrial Revolution in two stages. It can be call the period from the 18th century to the middle of the 19th century as the machine revolution. The period after the 19th century was a period that focused more on technology. The main issue here should be why it was handled in two stages. Because the event we call the machine revolution was due to the combination of steam power with the machine, but when technology got involved, production started to be done more effectively. To summarize briefly, when the machine was combined with steam power, production increased a little, and it started to be manufactured faster and cheaper. But when this technology and science came to work, a big step was taken for the establishment of factories, and the process of factoryization was accelerated. In addition, production accelerated and started to be

produced cheaper. At a time when supply and demand increased, this had a great impact.

We see that the first place where the Industrial Revolution emerged was England. But the Industrial Revolution soon had a great impact around the world. In 1830 and 1840, it spread all over the world, including the United States.

If we need to explain why it was first used in weaving looms, England, as previously known, had a deep-rooted history of producing linen, cotton and wool. However, before the Industrial Revolution, production in England mostly consisted of 'summer clothes and product', that is, textile products that were easier to produce. But when we look at that period, we see that there was a very developed textile production. The system, which was already advanced according to the conditions of that time, gained an upward momentum when it entered mechanization.

While the textile products produced with the old method in England meet the needs in their own country, with the mechanization, it started to sell the textile products it produced to other countries. In this process, when the raw materials in hand began to be insufficient, the British began to buy the raw materials in their colonies cheaply and then process and sell these raw materials, which led to their further enrichment.

So, what kind of breakthroughs occurred after the Industrial Revolution ?

The biggest breakthrough and development here was the breakthroughs in the textile field. The breakthrough we saw at first occurred in looms.

In England, an inventor named John Kay made a great breakthrough in textiles in 1733 with the invention called 'Flying Shuttle'. Although the work done by this tool seems small when we look at it now, it brought a great innovation for that time. It

increased the fabric weaving speed noticeably. Later, an English inventor named James Hargreaves found a spinning wheel that could spin 8 reels at the same time in 1764. James Hargreaves named his invention the ' Spinning Jenny '. In later times, this invention paved the way for spinning 120 reels with a single spinning wheel. In the first established textile factories, spinning wheels and shuttles were powered by the power of the river or the stream. The first textile factories working with steam power were established by England, after James Watt found the mechanism that allowed movement in a circular way. After that, England produced cheaper and higher quality products in the field of textiles, put them on the world market and started to export them. Then, as we said at the beginning, the steam powered pumps used to evacuate the excess water in the coal mines. It was later developed and used to extract coal from coal mines. This provided a great increase in the rate of coal extraction and the amount of coal extracted. In the past, charcoal was used to extract metal from iron mines. Of course, obtaining charcoal took a very long time and required human power, and it could be obtained in lesser quantities. In addition, it was very costly. The coking coal obtained as a result of the use of steam power in the coal mines mentioned above can be obtained in a shorter time, cheaper and more. After that, the technique of using coking coal to extract metal in iron mines was found. Thanks to this newly found technique, England took a big step forward.

Thanks to the increased use of steamships, British goods began to arrive overseas very quickly, with the use of steam trains, both raw materials and industrial products were delivered to the ports in a safer and faster way. As a result of all these developments, the "Industrial Revolution" started in England. After that, new investors from other European States and the United States began to flock to the England, causing a spike in England national income.

So, have developments based only on these areas occurred ? Of course no.

Advances were made in the fields of agriculture and medicine.

It would be a better option to start with agriculture first. After the Industrial Revolution, new breakthroughs began to occur in agriculture. Previously used hand tools were developed a little more, but this was not enough. Crops planted before the Industrial Revolution was taking a long time to be harvested. Those who wanted to finish this job in a shorter time had to hire more workers. This was an extra cost burden. However, some products such as cotton were wasted as long as they remained in the soil depending on the climatic conditions. This has resulted in a much higher cost to the planter. Since it was not enough to develop these hand tools over time, In the United States, a revolutionary ‘ harvester ’ machine was invented in 1835 by Hiram Moore. If we talk about what the Harvester machine does. This machine, which was mostly used for grain harvesting, could do the harvesting and threshing process at the same time. It was John Deere who took this machine further. John Deere is an American tractor manufacturer. He was the founder of the Deere & Company brand in 1837. He developed the first self-cleaning steel plow, which was an important first step, and this was an important turning point for world trade. Later, while it focused on tractor production, it also produced machinery such as sugar beet, harvester, cotton harvester, spraying equipment machines, silage machines, front loaders and balers. This Deere & Company firm still continues to operate today.

Human to human blood transfusion was performed for the first time in the medical field. Animal to human blood transfusions have been performed before. It was made to a 15-year-old teenager in 1667 by Jean Baptiste Deny, Professor of Mathematics and Philosophy at the University of Montpellier. He performed this

blood transfusion from a lamb to the sick young person, and this transfusion was successful. But many subsequent attempts ended in death.

“ Thanks to the thin syringe invented by Doctor Thomas Blundell in 1818, he administered fresh blood drawn from many people to a dying person. Since this person was already on his deathbed, not much scientific data could be obtained. It resulted in the death of the person who received the blood transfusion. After ten years passed, the blood taken from other people for the first time was transferred to another person for the first time in 1825, and this person was kept alive. ”. (Wattpad, 2020).

During this revolution, a number of studies were carried out on infectious diseases and almost all infectious diseases of that period were prevented.

In the meantime, many small-scale enterprises were established in the world, but these enterprises began to fail to survive in the face of the developing world economy. However, in order to exist in this developing economy, we see that these companies are companies form well-established that have come to the present day by merging.

2.1.3. Second Industrial Revolution (Industrial 2.0)

The biggest factor of the Second Industrial Revolution (Industry 2.0) is the use of electricity and steam power together, and in addition, the emergence of new raw materials. Here a new mode of production emerges. This type of production is 'Mass Production '. This new mode of production greatly accelerated the current rate of production. This is an event that occurs as a result of integrating electricity into production systems. In the First Industrial Revolution (Industry 1.0), more of the steel we mentioned started to be extracted and a great breakthrough started with the effect of oil. In addition, we see that all Industrial Revolutions have emerged in certain regions. England as the center of the First Industrial Revolution (Industry 1.0), this time the United States of as the center for the Second Industrial Revolution (Industry 2.0).

A new invention occurred in the period when the First Industrial Revolution (Industry 1.0) was approaching the end. As a result of the invention and use of the telegraph, developments in the field of communication began to occur. According to some quarters, the telegraph was not viewed as a new invention. The reasons for this can be given as follows:

“ The Semaphore Optical Telegraph was invented by the Chappe brothers in France in 1792. Claude Chappe, the primary inventor, first called this device a tachygraph, 'that which writes fast.' It was eventually renamed the telegraph, 'that which writes at a distance' by the French army, who used the Semaphore Telegraph system for coordination in battle. ” (Dominguez)

“ Gale was a professor of chemistry and familiar with the electrical work of Princeton's Joseph Henry, a true pioneer in the new field. Well before Morse had his

shipboard idea about a telegraph, Henry rang a bell at a distance by opening and closing an electric circuit. In 1831. ’’. (LIBRARY OF CONGRESS)

It can be say that it is not seen for these two reasons. However the history we take here as the invention of the telegraph. “ Samuel Morse created his first model telegraph in 1835. ’’. (Chodos & Ouellette, 2002). However the use of electromagnetics had a great impact at that time. As a result, a new sector has emerged. We see that this sector is the communication sector. In the Second Industrial Revolution(Industry 2.0), this communication sector exploded. The most important explosion occurred with the invention of the telephone by Graham Bell on March 7, 1876. It made a huge impact on the whole world. This invention spread almost all over the world in a short time. Accordingly, a new notion began to emerge. This notion is ‘ operator ’.

The ‘ steam machines ’, which were found in the First Industrial Revolution (Industry 1.0) and started to be used, were further developed in this new period. Accordingly, the speed of production has increased. Further development and use of existing ships as a result of the increase in the extraction of steel, which we mentioned in the First Industrial Revolution (Industry 1.0), and the increase in its use as a raw material, and, as we mentioned, the development of steam machines. There has been an incredible growth in the transportation sector due to the increase in intercontinental travel, and the cheaper cost. In addition, the cost of the existing trains, and railways, which are currently used, and continued to be produced, were quite high. As a result of steel being a more durable material than iron, it started to be used, and resulted in the establishment of railway networks that could reach longer distances. Accordingly, a significant decrease was achieved in the construction of trains, and the costs of railways. In addition to these developments, new alternatives have started to be

produced in the transportation sector, as in many areas. As a result of the extraction, and processing of petroleum, gasoline-powered automobiles were produced. The greatest invention of the Second Industrial Revolution (Industry 2.0) was the invention of the internal combustion engine.

Accordingly, as a result of sheet metal production, and the widespread use of steel cables, it has led to developments in the field of construction, and in the production of weapons, and, accordingly, in the fields of defense. The first development in this area occurred in the construction sector, as a result we see skyscrapers, and suspension bridges being built at this time. Another developing sector has been in the arms, and defense industry, for example the first examples of tanks, and the production of semi-automatic weapons, rifles.

As we mentioned at the beginning, electricity was the biggest guiding factor for this period. Before the Industrial Revolution, studies were carried out in the field of electricity. Studies on electric currents began to accelerate even more. While these studies are still ongoing. The step to move the Second Industrial Revolution (Industry 2.0) forward even faster has been found. This step became ‘ Direct Current ’. With the discovery of this direct current, electric tools that can rotate very quickly began to be produced. The first of these was the invention of the first electric motor. “ At the same time, the discovery of electro-chemicals that emerged with electrification took place during this period. ”. (Arslan & Demirbağ, 2017, p. 6).

Of course, the tools, and equipment produced in the Second Industrial Revolution (Industry 2.0) were not limited to these. As in many revolutions, in this revolution, there were the first examples of new products that have survived to the present day, and there were products that came unchanged in some manufactured

goods. Some of these are cooling systems, and accordingly, inventions such as refrigerator, paint, plastic, paper, microscope were found in this period.

2.1.4. Third Industrial Revolution (Industrial 3.0)

It was thought that the Third Industrial Revolution (Industry 3.0) could happen faster than the First, and Second Industrial Revolutions (Industry 2.0). But things did not turn out as expected. It is possible to attribute this to two reasons. The first reason was the World War I, which came between the years 1914-1918, which was closely related to the whole world. While some nations were concerned about their independence due to this war, some states were not content with the colonial areas they had, and aimed to expand into more areas. This meant that many people had to quit their jobs, and join the war. After the end of the war, when people started to return to their old occupations. In this period, the countries that were turned upside down, the small-scale countries with changing borders, the countries that never started or completed the First, and Second Industry periods suffered great economic losses. It has caused great economic depressions around the world. This was a harbinger of the Global Crisis that took place in 1929. Just slowly, the states around the world were starting to gather themselves. This time, the Second World War, which took place between 1939, and 1945, took place. In order for the Third Industrial Revolution (Industry 3.0) to regain its functionality, the world needed to be freed from the effects of this war. Almost all of these negativities have been overcome in a short period of about 4-5 years. In the 1950s, this stalled revolution started to take off again. Of course, this could, and did happen as a result of the development of the already existing digital technology that enabled this rearing. The biggest breakthrough in this period was the invention of the first ‘ Calculator ’ that worked with mechanical, and electrical systems. After that, the process of finding, and using the computer came

into use, and these events continued in a chain. This has increased the use of digital machines rather than people in the production process. This enabled the current production to continue uninterrupted, and at an accelerated pace. Perhaps the biggest factor in this period was the widespread use of computers, and great breakthroughs in the communication sector. In this process, it was accelerated by its participation in both production, and human life. Computer, and communication technologies have been used together in these production processes. Besides, this has enabled the production tools used during production to be reduced. However as a result of this shrinkage, it was thought to lose its functionality, but on the contrary, it gained even more functionality. Among the many new inventions, it was the discovery of 3D printing that left its mark on this period. Thanks to these 3D printers, we can print, and use almost anything we want in the sizes we want or need.

The tools made available in this process are not only used in a single Industry sector. Now they have become tools available to everyone. Although these tools are still used today, they make our lives easier in many areas of our lives.

2.1.5. Fourth, and Final Industrial Revolution(4.0 Industrial Revolution)

The biggest advantage of the Fourth, and Last Industrial Revolution was that it gathered, and used all the data of the three revolutions we mentioned at first. What we mean here is to have the knowledge, and experience of all inventions.

This has been the further development, and use of almost all previously found inventions. The following situations occur in the Fourth Industrial Revolution (Industry 4.0). Great breakthroughs were achieved at this stage by integrating all production systems with each other. Automation has combined production systems, and added data exchange systems, making it a time when a faster human power is almost not needed.

What does the Industrial Revolution mean above, what are the factors that led to the Industrial Revolution, how did the Industrial Revolution occur, why was the Industrial Revolution first seen in England, and finally after clarifying what the First, Second, Third, and Fourth Industrial Revolutions meant, we need to talk about the important turning points in the entire history of humanity before the Industrial Revolution.

2.1.5.1. ‘ The Internet of Things ’ (IoT) :

“ It define the internet of objects as “the ability of send and receive with the connection of objects to the internet in daily life. ”. (Commission, 2015).

What exactly does this mean ? It can be give an example to explain this more easily. This means that with any internet-enabled vehicle, we can dominate anything with internet access, be it smartphone, tablet, computer, whatever we can think of. If we need to give examples of these;

Smart Cities: It means that we can control all electronic objects in cities with an internet connection. Lighting systems in parks and gardens can keep traffic lights and city lights under control from a single command center. This provides an opportunity to use resources more efficiently.

Smart Home: Lighting, ventilation, kitchen appliances and bathroom etc. in the house. like controlling vehicles.

It also offers innovations such as smart livestock systems and smart agriculture.

2.1.5.2. ‘ The Industrial Internet of Things ’ (IIoT) :

What is happening here is the application phase of the systems applied to ‘ the Internet of Things ’ to the production area. Here, in addition, it is possible to remotely monitor every moment of the incoming system production phase. During production, the designer has the opportunity to make changes during production. It is possible to add and remove the desired changes.

2.1.5.3. ‘ Cyber - Physical Systems ’ (CPS) :

In this system, the main purpose is to place an event in the digital environment on a background or data. It provides the opportunity to experience it in our lives. Another name is ‘ Simulation ’. Today, new virtual life lives are provided. This new virtual life system is called ‘ METAVERSE ’.

2.1.5.4. ‘ Smart Manufacture ’ and ‘ Smart Factories ’ :

It can be gather these two titles under one title. The main issue here is to obtain the highest quality product by making the least expenditure during production. Here, all data is entered into a computer environment and the quantities used during each production are calculated and produced with that amount.

2.1.5.5. ‘ Cloud Computing ’ :

It can be explain this system as follows. Before smartphones and digital cameras, we used to store our photos in photo albums. With the emergence of smart phones and digital cameras, we started to record them on external disks. Cloud computing, on the other hand, can combine these two phenomena and do this job, which does not take up space in real life and at less cost. This gives an advantage to both the producer. In addition, the demanding segment can reach a more reasonable price.

2.1.5.6. ‘ Artificial Intelligence ’ (AI) :

It is the name given to the notion made and produced by a human being that produces various movements and reactions of a computer or robots or devices controlled by a computer, just like a living thing. The reason why we say that it is made and produced by human, which we emphasize here, is because it was the first to create it. However, today, in line with the developments made on artificial intelligence, they can give movements and reactions that are not coded by humans. Although this is seen as a danger by some scientists, some scientists say that since we are the ones who produced it, we are the ones who can put an end to this ‘ Artificial Intelligence ’ at any moment.

Well, all of the resources it has been described above were developed to meet the human needs in the production area, in fact, they were all designed as a production tool. Almost all of these innovations have been accessible to everyone today.

It may be possible to say that the Fourth Industrial Revolution (Industry 4.0) provided a development that appeals to a more general area.

2.2. Important Turning Points in The History of Humanity Before The Industrial Revolution

Before coming to the effects of the Industrial Revolutions on unemployment, there are a few important issues that we need to explain. As we mentioned at the beginning of the factors that caused the Industrial Revolution, as it is known, humanity at first made a living by hunting, and gathering. However as a result of the depletion of the food sources in their region, they started to migrate to other places, and seek new food sources. As a result, the new system, the nomadic lifestyle, was adopted. In the nomadic system, people still maintained their food sources by gathering, and hunting. In addition to these, they also started animal husbandry. The main fact in this system is animal husbandry. Humans have moved more for the food sources of their animals, and for them to be less affected by heat, and cold. After this system, the Agricultural Revolution occurred. Agricultural Revolution, BC. It corresponds to 8000's. After The Agricultural Revolution took place, people began to produce, and they started to produce certain simple hand tools, animal, and human power-based tools to facilitate their production. Thanks to this, they started to produce more than their needs. This event prompted them to dispose of the goods they produced, and as a result, markets began to be established, and people began to dispose of the goods they overproduced. With the realization of the Agricultural Revolution, we come across slave societies as the first social structure. This society consists of two classes. One class is the slave class, and another class is the free people class. In this period, as it is known, there was a production system based on human, and animal power.

When it started to come from the first ages to the middle ages, it started to take the Feudal System instead of the slavery system. The order here is a completely land-

based order, and a kind of land-dependent order. This system has its own hierarchy. The most widely known segments of this are the Nobles (landowners), Clergy, and serfs (peasants). People began to organize their entire order based on land. For this reason, the general population distribution in the world is gaining weight in rural areas. Before the Industrial Revolution in Europe, there was a social structure in which the agricultural population was dense. In addition, the settlement is generally concentrated in rural areas. The common denominator here is land, and the biggest measure of wealth is land. Accordingly, although agriculture is the main source of livelihood, there is also a section dealing with trade, and handicrafts in the cities established. As it is known before the Industrial Revolution, there was a ‘ Guild ’ system in societies. “ The Guild, an association of craftsmen or merchants formed for mutual aid and protection and for the furtherance of their professional interests. ”. (Stefon.)

If we look at the working order in social relations before the Industrial Revolution. As we said before, it had an agriculture-based economy. Of course, there is also the production of goods. As it is known, the production of goods here had a small scale production.

“ Before the Industrial Revolution, in the production structure based on small-scale enterprises, where labor-intensive production style was dominant, working relations were also carried out within the framework of the master- journeyman-apprentice relationship, and the guild system, which is a professional organization. ”. (Balcı, 1996, p. 77).

During this period, there was a one-to-one relationship between the master, apprentice, and journeyman during production, and work. Before the Industrial Revolution, they were getting paid for their labor in every way.

As they witness at every stage of the production from the very beginning to the end, they add all their efforts, knowledge, and experience to the work they do in their own souls. The resulting product was valuable both to the person who made it. The product was worth the price paid for the person who had it done.

Vertical solidarity existed in the working order of this period. Master, and apprentices were working at the same time, eating at the same table. This prevented any class difference. As a result, it led to the establishment of more cordial relations. The master, and apprentices lived in the same neighborhoods, and lived in the same environments. The apprentice, and journeyman could marry the master's daughter. The biggest reason for this was that the masters had a lot of confidence in their apprentices, and journeymen.

An important event in this period is the flexibility during work, and production. As we emphasized before, since the mode of production was based on human labor, that is, on human power, flexibility was observed during the work. The biggest reason for this is that the workplaces are built in the house or in the garden of the house or in the outbuildings inside the house. There was no working order with heavy conditions as after the Industrial Revolution, there was a very flexible working model according to the situation of the work, for example, according to the seasonal situation or the intensity of other work. “ A number of artisans carried out their activities in addition to agriculture. In this period, it is seen that the distinctions

between ‘ work – work ’, ‘ workplace – home ’, ‘ work - leisure time ’, and worker - owner of the job are not clear, and rigid. ’’. (Balci, 1996, p. 78).

Before the Industrial Revolution, ‘ home ’ was very important in the social structure. In these periods, houses where large families lived in general were the basis of life. “ The work was done at home, the patients were cared for at home, and the children were educated at home. The family had fun at home. The place where the elderly were cared for was the home. ”. (Toffler & Toffler, 1995, p. 87).

If we move on to the working order in the society after the Industrial Revolution. The Industrial Revolution has been a very important turning point in the history of humanity, and in addition, it has caused a radical change in production. With the Industrial Revolution, the labor-based production system would change completely. “ The mode of production that emerged with the Industrial Revolution is based on machine-based capital-intensive techniques. ” (Balci, 1996, p. 79).

With the Industrial Revolution, as a result of the use of steam power in production tools, more goods started to be produced in less time. This has prepared an environment where capital is needed in addition to human power, that is, in addition to labor. This is the transition from the small-scale production style before the Industrial Revolution to the large-scale production style.

At the beginning of the Industrial Revolution, we can call the segment that owns the means of production as the capitalist class, they have extensively exploited their workers. This enabled the former master, apprentice, and journeyman to be replaced by the boss or employer, and worker or employee.

“ Machines worked as long as there was demand for their products in the factories, and as the machines worked, the workforce remained at work all day. Where they depended on water energy, their operation was subject to seasonal interruptions. But when steam power was used, and gas lamps were used to illuminate the factories during the day, and at night, only the commercial depression could stop the factories from operating. Men, women, and children worked 12-16 hours a day or night in continuous shifts. ” (Deane, 1988, p. 128).

As a result of these radical changes, the vertical solidarity between master, and apprentice, which used to be, has been replaced by vertical conflict. If we look at the Industrial Revolution in general, it was completely built on a conflict-based system. This vertical conflict between the boss, and the worker, solidarity between the same groups, between workers or between bosses has turned into horizontal solidarity. People in the same group united, and formed various unions or organizations.

As a result of this conflict environment, the class difference between the boss, and the worker started to become more evident. As a result of the worker, and the boss starting to work in separate places in the workplaces, this has caused them to be different in the places they live. This has created an economic, political, social, and even class difference between the boss, and the worker. This led to a struggle between the worker, and the boss. As a result, workers saw that their individual bargaining with the bosses was insufficient. As a result of individual bargaining, the bosses exploited the labor, and rights of the workers excessively. Workers began to act collectively, bargaining collectively, and all other actions collectively. This has led to the establishment of various organizations such as trade unions, as it has been mentioned before.

Before the Industrial Revolution, the flexible working system in the mode of production became more principled as a result of mechanization, and technology. As a result of this principled or strict working style, a new notion has emerged. This is the notion of ‘ workplace ’. As people move from home to workplaces as workplaces, it has led to a great change in working life. Of course, besides this, it has led to various, and great changes in family, society, and settlements.

“ The work has been transferred to the factory or office. Patients began to go to the hospital, children to school, couples to the cinema. The elderly were sent to nursing homes. When all these things went outside, what was left was the ‘ nuclear family ’.’. (Toffler & Toffler, 1995, p. 87).

As a result of all these, the workplace has emerged as a permanent notion. Working hours have become very strict in this new order. Working hours, which were previously flexible, can now be determined due to the introduction of certain systems during entry, and exit. Breaks during working hours are clearly defined by individual labor law, and collective or individual agreements

After clarifying these details, we can move on to our main topic, the effect of Industrial Revolutions on unemployment.

THIRD CHAPTER

3. THE WORKING CLASS, THE TYPES OF UNEMPLOYMENT AND THE THEORIES OF UNEMPLOYMENT

3.1. What Do The Notions Work (Job), The Emergence of The Working Class, Worker (Employee), and Unemployment Mean ?

First, we will start by explaining the notion of work, worker, and unemployment.

“ Work, in economics, and sociology, the activities, and labour necessary to the survival of society .” . (Britannica, Work, 2006).

“ Increasing urban population, new residential areas has led to its establishment outside the city centers. While these new settlements were called 'suburbs ', it caused socio-cultural differences between the suburbs and those living in the city centres. This migration movement, which spanned a long period, led to the birth of a new class. ”. (Koca, 2020, p. 4535).

This class is the working class.

“ Worker, someone who is paid to work for someone else. ”. (Dictionary, Worker).

“ Employee, someone who works in a particular job or in a particular way. ”. (Dictionary, n.d.).

“ Unemployment, the condition of one who is capable of working, actively seeking work, but unable to find any work. ”. (Britannica, Unemployment, 2020).

After clarifying these notions, after the Industrial Revolution, there were various processes and causes of unemployment in the society. As we mentioned

before, before the Industrial Revolution the simple and individual relations between the master and the apprentice in the social structure. After the Industrial Revolution, these simple and individual relations have become complex between the employer and the worker. Agricultural technology developed suddenly with the emergence of the Industrial Revolution, and accordingly, people living in rural areas began to migrate to big cities as the need for human power in agriculture decreased. Some of the people from the rural areas were able to find jobs in the established factories, but many could not find job. As time went on, as the industrial society developed, people's chances of finding a job increased. The notion of unemployment is actually not that simple.

“ Unemployment, the condition of one who is capable of working, actively seeking work, but unable to find any work. ”. (Britannica, Unemployment, 2020). This is how we can explain the general definition of unemployment. However the notion of unemployment is not such a simple notion. unemployment has its own sub-branches. we will not examine all the sub-branches of unemployment here, and there are some theories.

Increasing urban population, new residential areas has led to its establishment outside the city centers.

After explaining these notions, we will look at the types of unemployment and the theories produced on unemployment.

3.2. The Types of Unemployment and The Theories of Unemployment

We think that the reason for mentioning these issues is that we should briefly touch on the subject so that we can understand it better.

3.2.1 Theory of Effective Demand and Say's Law

We think that we should start by explaining this theory at first. “ When effective demand is mentioned, it is understood the action that affects the supply and demand balance and finalizes the change. ” (İKTİSAT SÖZLÜĞÜ).

“ Effective demand refers to the willingness and ability of consumers to purchase goods at different prices. It shows the amount of goods that consumers are actually buying – supported by their ability to pay.

Effective demand excludes latent demand – where the willingness to purchase goods may be limited by the inability to afford it – or lack of knowledge. ”.

(Pettinger, 2018)

“ It is worthwhile to remark that a product is no sooner created than it, from that instant, affords a market for other products to the full extent of its own value. This view suggests that the key to economic growth is not increasing demand, but increasing production. If a businessman produces a good, then he will be keen to sell it. This production creates wages for workers and income for the businessman. Therefore, the production has increased wealth and leads to demand for other goods. Say argued it was irrational to hoard money because ‘he is most anxious to sell it immediately, lest its value should diminish in his hands‘ i.e. inflation may reduce the value of cash. This theory assumes that markets clear and that businessmen produce goods that are demanded by the market. ”. (Economicshelp, Say's Law, n.d.)

“ According to Keynes, crises can occur and result from a lack of effective demand; in other words Say's Law is invalid ”. (Aydın Y. , 2013).

3.2.2 Voluntary Unemployment

“ A situation in which someone chooses to not work, either because they will not take a job with low pay. ”. (Dictionary, Voluntary Unemployment). “ It is the result of the decision not to participate in working life as a result of behaviors such as not looking for a job, giving up on looking for a job, and despairing. ”. (Özdemir M. Ç., p. 115).

Of course, today there are other reasons why this voluntary unemployment is preferred. Factors such as unemployment benefits applied by some developed states are another reason for preferring voluntary unemployment.

“ The most important factor in the formation of voluntary unemployment is the endurance shown in the choice of not working. This power is usually influenced by income, qualifications and experience, but it can also be fed by reasons arising from unrealistic expectations, work style preferences or human temperament. ”. (Özdemir M. Ç., p. 115).

The notion of voluntary unemployment has no meaning on its own. The notion of involuntary unemployment has emerged as another notion that makes this notion meaningful.

3.2.3 Involuntary Unemployment

According to classical economics, unemployment is temporary or voluntary.

“ However, today, the notion of unemployment is understood mainly as an involuntary situation since Keynes and after. ” (Özdemir M. Ç., p. 115).

“ Involuntary unemployment is a situation where workers are willing to work at the market wage or just below but are prevented by factors beyond their control. These factors could include deficiency of aggregate demand, labour market inflexibilities, implicit wage bargaining and efficiency wage theory. ”. (Economicshelp, Involuntary unemployment, n.d.)

It is the most common type of unemployment that we encounter today and in the past.

3.2.4. Frictional Unemployment

“ Frictional unemployment is the result of voluntary employment transitions within an economy. Frictional unemployment naturally occurs, even in a growing, stable economy. Workers choosing to leave their jobs in search of new ones and workers entering the workforce for the first time constitute frictional unemployment. It does not include workers who remain in their current job until finding a new one, as, obviously, they are never unemployed. ” (Kagan & Potters, 2021).

The most important factor in this type of unemployment is the process by which the person seeks a job with better opportunities for their current job. It can be also call it as the process in which seasonal workers or permanent workers seek new jobs to work under better conditions than their current job.

Frictional unemployment is one of the three major types of unemployment.

3.2.5. Structural Unemployment

“ Structural unemployment is caused by a mismatch of skills between the unemployed and available jobs. Structural unemployed is caused by changes in the economy, such as deindustrialisation, which leaves some

unemployed workers unable to find work in new industries with different skill requirements. ’’ (Pettinger, 2019)

‘‘ Economic activities in a country are carried out depending on different layers of the economy. Structural unemployment is defined as the type of unemployment that arises from the change of economic activities according to different layers of the economy. ’’. (Yıldız, 2014).

The supply and demand for labor required in various job markets may differ. While there may be an excess supply of labor in one job market, there may be a demand for labor in another, there may be an equilibrium in another. The first reason for the imbalance in this situation may be the incompatibility of the skills required by the vacant jobs and the skills of the job seekers.

Sometimes the reason for this inconsistency is technological developments. For this reason, in some places, this type of unemployment also appears as ‘Technological unemployment’.

3.2.6. Cyclical Unemployment

‘‘ Cyclical unemployment is a type of unemployment which is related to the cyclical trends in the industry or the business cycle. If an economy is doing good, cyclical unemployment will be at its lowest, and will be the highest if the economy growth starts to falter. ’’. (Economicshelp, Cyclical Unemployment, n.d.)

This type of unemployment is more common in developed countries. Among the biggest reasons for this is the decrease in economic activities in the country, that is, in situations such as economic crisis.

After clarifying these issues, we can move on to our main topic, the effects of industrial revolutions on unemployment.

FOURTH CHAPTER

4. THE EFFECTS OF INDUSTRIAL REVOLUTIONS ON UNEMPLOYMENT

As a matter of fact, if we consider the effects of the Industrial Revolutions on unemployment in their own periods, we think that we can obtain more useful information.

4.1. Positive and Negative Effects of The Effects of The First Industrial Revolution (Industrial 1.0) on Unemployment

It has been explained in the details about the First Industrial Revolution (Industry 1.0) before, and now it will be talk about the effects of the First Industrial Revolution (Industry 1.0) on unemployment.

Before the Industrial Revolution, it was made with human and animal power and some hand tools in agriculture. The subject we call agriculture is an activity done to meet the nutritional needs of people, which are the most basic needs.

As it is known, agriculture is one of the most important economic activities for all societies. We can base this on two main elements. The first reason, first of all, it is the sector that directly meets the nutritional needs of people, which are the most basic needs. The second reason is that it is a resource that ensures the sustainability of economic development, which has become an obligatory goal for all societies today. If it examine the economic processes of industrialized countries. It is seen that it is caused by developments in agriculture and mining fields. Before the Industrial Revolution in Europe, developments in all activities in the field of agriculture accelerated and improvements were made. Countries that started the Industrial Revolution as a result of the completion of the developments in this field of agriculture, instead of primitive hand tools in agriculture, they entered the

mechanization process in agriculture thanks to the technological developments that took place with the Industrial Revolution. As a result, landowners have reduced the number of working people both in the planting process and in the cropping process. This has led to a decrease in the number of people working in agriculture. This means an increase in unemployment in rural areas. Since job opportunities in rural areas are already limited, people have started to migrate to cities or have been forcibly displaced.

Before and in the early days of the Industrial Revolution, the unemployment rate was very low. We can say that the biggest reason for this is the factories established in cities and close to cities. This, as we mentioned before, has led people who migrated from rural areas or people who were forced to migrate to find jobs easily. As a result, the need for people to work in factories emerged. People who came to these cities meant cheaper labor to work in factories. Because the people who came to these big cities were mostly poor and had lost their jobs because they came from the countryside. In a situation where there is no purchasing power, population growth cannot meet the effective demand and this event shows the theory of effective demand fully applied. They preferred to employ child workers instead of male workers in newly established factories. This is because child workers were able to work for longer hours and with lower wages. The other major cause of unemployment came later, though not so much in the beginning. We mentioned that there are large migrations from rural areas. At first, they could easily find a job in the industrial regions they came from, but due to the fact that the labor supply was more than the demand for labor, this is because there are workers who will unconditionally accept the employer's terms. People have to make a living in a certain way, meant the

exploitation of people's labor by employers. As a result, those who wanted to work could not find a job and as a result, involuntary unemployment emerged.

After the Industrial Revolution took place and the machines were put on the market, the development of technology accelerated and the change in the industrial structure, which had an advanced technology according to the conditions of that day, was forced. Frictional unemployment is thought to have emerged at that time.

After The First Industrial Revolution (Industry 1.0), the biggest change for production was in the weaving industry. The biggest reason for this is that we see the biggest market share in weaving at that time. There was already an existing production, and since the developments in this current production would be faster and easier, it was a very logical idea for people to turn to developments in this field, since the weaving sector was the biggest source of income for people. Of course, this would be a great opportunity for employers. For example, there was the Spinning Jenny tool invented by James Hargreaves. As we mentioned earlier, ' Spinning Jenny ' was a spinning wheel that could spin 8 reels at the same time. This meant that the work that 8 people could do could be done by one person. It provides a great advantage for employers.

“ Hargreaves kept the machine secret for some time, but he produced a number for his own growing industry. The price of yarn fell, angering the large spinning community in Blackburn. Eventually they broke into his house and smashed his machines, forcing him to flee to Nottingham in 1768. There he set up shop producing jennies in secret for one Mr. Shipley, with the assistance of a joiner named James. Eventually Hargreaves applied for a patent on the jenny in July 1770. By this time a number of spinners in Lancashire

were already using copies of the machine, and Hargreaves sent notice that he was taking legal action against them. ” (Acamedia, n.d.)

It is thought that he does it so that people who already have a job do not become unemployed, as another reason for keeping it a secret. Of course, it is not possible to give an exact source for this.

In addition, when ‘ machines ’ came to people who were already struggling to find a job, it was inevitable that people would revolt as a result of one machine doing the work that many people could do.

“ Because the "machine" has begun to be seen as a substitute for the worker who has the capacity to use a single tool. Thus, seeing the machines as the basis of the unqualification and alienation of labor caused the workers to revolt against the machines. ”. (Koca, 2020, p. 4536).

“ This first labor movement, which is called ‘ Luddism ’ and means ‘ Machine Breakers ’, made a significant contribution to the consciousness and organization of the working class. ” (Taş, 2012, p. 64).

In the first Industrial Revolution (Industry 1.0), job opportunities were very limited, and as can be seen in the examples it has been given here, in a situation where people have limited job opportunities thanks to the Industrial Revolution and developing technology, the size of the decrease in employment has gradually increased with the inclusion of machines and it can be said that it has become impossible for people to find a job.

4.2. Positive and Negative Effects of The Effects of The Second Industrial Revolution (Industrial 2.0) on Unemployment

It has been explained the Second Industrial Revolution (Industry 2.0) in the details before, and now it will be talk about the effects of the Second Industrial Revolution (Industry 2.0), which is our main topic, on unemployment.

It has been mentioned that the biggest impact in this period was the integration of electricity with steam engines. This has led to the introduction of mass production into our lives.

“ Taylorism, which emerged for the first time in the USA at the end of the 19th century, essentially means that all stages of the production process are in the hands of the management. It is based on the principle of separating head and arm power from each other and simplifying all stages of the production process by breaking them down. ”. (Koca, 2020, p. 4537).

This division of the production line resulted in the specialization of workers in only one field. This enabled him to get ahead of the system that led to the replacement of humans by machines in the First Industrial Revolution (Industry 1.0), to some extent. Of course, there were some downsides to this situation as well. The biggest disadvantage of this was that the machines were not stable and there were great problems in the process of moving a manufactured object to another machine. This meant both loss of time and fatigue of the workers and, as a result, a decrease in productivity. In order to eliminate these negativities, a system called ‘ assembly line in production ’ was adopted, another name for this is ‘ fordism style system ’.

“ By the 1960s, some negativities began to appear in the fordist production process. In the classical belt type production type system, the fact

that a part had to be finished until it was brought to the next stage and that these finishing processes took place at different times caused some time losses. On the other hand, from the point of view of workers, the dissatisfaction caused by specialization is intensely unskilled labor force. The use of and the separation of production down to the smallest parts were the main problems of fordist production. '' (Koca, 2020, p. 4538).

As the use of steel became widespread in this period, a new field emerged. This is the construction industry. Since the construction sector is a new sector, a great deal of employment has been provided in this sector as human power is utilized in this sector.

Heavy industry and weapons industry emerged in the Second Industrial Revolution (Industry 2.0). This has been an important factor in providing new job opportunities. However, it was observed that there were concentrations in these areas only a few years before the war times.

Of course, it should be said that the effects on employment and unemployment in the arms industry are in various ways. First of all, it is necessary to distinguish between civil wars, wars for territorial division and regional wars. Of course, these factors vary depending on the size and power of the warring parties, that is, how big or small the economy they have in terms of economy and, accordingly, how advanced their war industries and war technologies are. Before and during the First and Second World Wars, there was a serious increase in the number of workers employed in countries that were economically strong at that time, especially the United States and England, while there was a great decrease in the unemployment rate. However, this situation did not lead to an increase in the general welfare level of the people. This

situation has led to a change in the nature of employment. In this case, the first thing that draws attention is the decrease in the employment in the civilian sectors and accordingly the increase in the employment in the military, war and weapons sectors. In addition, employment was carried out in the form of conscription or shifting to sectors in the military field. As a result, the events that directly affect the lives of the workers, such as working hours and conditions, began to be like the conditions of military camps.

“ During the Second World War, the share of civilian employment in the total workforce in the United States fell from 82.4% in 1940 to 59.5% in 1945. On the other hand, the share of military sector employment increased from 1.8% to 39.2% in the same years, while the rate of civilian unemployment decreased from 15.7% to 1.3%. During this period, the labor force participation rate increased from 85.4% in 1940 to 98.1% in 1945. ”. (Durmuş, 2016, p. 33).

“ In United Kingdom, the unemployment almost doubles from 3.7% to 7.8% at the year of 1907. And unemployment decreases a lot from 7.7% to 4.7% at the year of 1909. Norway had unemployment of 2.5% at the year of 1907 and doubles to 5.0% at the year of 1909 and decreases to 2.9% at the following year. ”. (Park, 2008).

According to the data we have given above, a new income source has been provided for people in the arms industry and heavy industry. Of course, thanks to the innovations that came with the Industrial Revolutions, breakthroughs were made in many new areas, provided many job opportunities in these fields. But the most important point here is that the new job opportunities that emerged during the

previous revolution were beginning to replace human power with machinery or other newly found technologies in other revolutions. Telecommunications industry that occurred during this period. It will be one of the best examples in this field.

4.3. Positive and Negative Effects of The Effects of The Third Industrial Revolution (Industrial 3.0) on Unemployment

It can be call this period as information technology, which started after the Second World War and developed rapidly after the 1970s. The most important and most effective factors for this period; it can be say computer technology, biogenetics, synthetic products, laser technology, fiber optics and biofarming. “ Again, the globalization of Industry and Trade took place in this period. The basic components of this revolution are information processing techniques, communication techniques and micro-electronics, which is their common realization tool. ”. (Davutoğlu, 2020, p. 179).

As a result of the dominance of computers and the internet in all areas in the Third Industrial Revolution (Industry 3.0), it provided a faster development compared to the other first two revolutions. In fact, it was thought that the Third Industrial Revolution (Industry 3.0) would develop more slowly and ineffectively than the other two revolutions. The biggest reason for this is the two great world wars and the great economic crisis, but contrary to expectations, the Third Industrial Revolution (Industry 3.0) made rapid progress despite all these negativities.

With the Third Industrial Revolution (Industry 3.0), robots began to enter our lives. The introduction of robots into our lives was in the field of production at first. Robots have begun to reduce the need for human power in production. The biggest

reason for this is that robots work without interruption in production and do not have much economic requirements.

“ This increase in productivity emerged from the combination of coal and printing in the First Industrial Revolution (Industry 1.0), the combination of oil and electrical communication tools in the Second Industrial Revolution (Industry 2.0), and the combination of internet-based communication with renewable energy in the Third Industrial Revolution (Industry 3.0). ”.
(Davutoğlu, 2020).

As a result of the introduction of computers and robots into the production process in the Third Industrial Revolution (Industry 3.0), productivity in production increased and gained a great speed. Of course, as a result of this, the need for human power, that is, for workers, began to decrease. Accordingly, they realized that their employees needed to gain new skills in order to keep up with the new order and not lose their jobs, and that they needed to gain new technological skills to improve themselves. By blending their own skills with newly learned information. They have become more qualified individuals. As a result of these trainings, they started to access all the necessary information from a single place and with a single button, and to develop these skills through the computer environment, that is, the virtual environment.

As a matter of fact, a new job opportunity has been opened in the process of raising people who can provide these trainings. As a matter of fact, with each new Industrial Revolution, job opportunities in factories were decreasing, but instead, job opportunities were being created in newly established sectors.

In short, the Third Industrial Revolution (Industry 3.0) occurred more slowly at first compared to other revolutions, but its impact was greater than the previous two industrial revolutions.

4.4. Positive and Negative Effects of the Fourth Industrial Revolution (Industrial 4.0) on Unemployment

The period we will be discussing now is the Fourth Industrial Revolution (Industry 4.0), which is the last of the Industrial Revolutions and still continues. First, let's talk about when the Fourth Industrial Revolution (Industry 4.0) was first named. “ The terminology, which was first used at the Hannover Fair in Germany in 2011, is now settled as the Fourth Industrial Revolution (Industry 4.0). ”. (Trenkle, 2014).

The notion of the Fourth Industrial Revolution or Industrial 4.0. is to provide communication between all units in the production process and to ensure that all data created can be accessed simultaneously and simultaneously, and, as a result, to determine the most appropriate value. As another definition,

“ a new industrial revolution was needed against the cheap labor and production capacity of the East, by transforming the developing technology into benefits in production and industry, increasing efficiency in factories, making maximum use of information technology, and creating smart production systems. It is called Industry 4.0. ” (Aydın N. , 2018, p. 5).

Nowadays, digitalization, robotization, smart automation etc. This period, which is called technological systems, is the innovations brought by the age as a result of technological developments. Of course, these technological advances will have a huge impact on the workforce. This will cause the termination of some business and occupational groups due to technological innovations, but with it, new business and

occupational groups will emerge. Of course, unemployment will arise as a result of robots, smart tools and digitalization of jobs and the control and execution of jobs by these objects.

It is thought that with the Fourth Industrial Revolution (Industry 4.0), employees in the field of law, senior managers, “ emergency management directors, mental health and substance addiction social workers, audiologists, occupational therapists, orthotics and prosthetics specialists, health care social workers, oral and maxillofacial surgeons, primary care supervisors of firefighting and prevention workers, dietitians and nutritionists, senior, ”. (Çark, 2019, p. 28) officials experts, some agriculture and livestock sector workers, people dealing with a certain craft and tradesmen will be less affected than other sectors. “ In the 1970s, the share of health personnel and teachers in total employment in England increased by 11.1% and reached 12.2% from 1.1%. ”. (Çakır, 2018, p. 101). In the study of that period, we see that the job opportunities of health personnel and teachers increased.

In addition, there are sectors that will be directly adversely affected by this situation. These; clerks, shop and service workers and workers in the market sales area, technicians, employees in the food court, baby sitter and elderly caregiver, gardener, machine operators, “ watch repairers, accountants, library technicians, insurers, cargo and freight agents, ”. (Çark, 2019, p. 28) etc. assemblers will be factory workers. “ According to the McKinsey Global Institute's Earned and Lost Professions report; By 2030, 75 to 375 million professionals will face the threat of unemployment. Thus, robots will take over 60 percent of the existing workforce. ”. (Öcal & Altıntaş, 2018, p. 2078)

The Fourth Industrial Revolution (Industry 4.0) is a system that focuses on highly skilled people. The main goal in this new system is to reduce the costs in production. As a matter of fact, this is a valid event in other Industrial Revolutions. However, smart systems, robots and autonomous systems that started to be used with the Fourth Industrial Revolution (Industry 4.0) were able to reduce costs in a significant way. It has reached its goal. By minimizing the errors during the production of the produced product, the efficiency in production has been increased and this has reduced the demand for labor.

With the Fourth Industrial Revolution (Industry 4.0), the working system based on human power in factories began to be replaced by robots and machines managed by artificial intelligence. As a result, the need for workers in factories will decrease and layoffs will begin. Of course, self-developed workers will be needed to use robots and machines managed by these artificial intelligences. The structural unemployment we have mentioned before and the increases in reluctant unemployment will be observed.

It has a significant impact on Robot and human collaboration in the Fourth Industrial Revolution. (Industry 4.0) Robots are designed to use in difficult jobs for people. For example, it is produced to replace the employees under exhausting and heavy conditions to alleviate the burden of human beings. In short, robots are built to work with humans as a whole. However, employers' use of robots instead of humans has increased due to the fact that robots are less costly and uninterrupted than humans.

“ The use of robots, which is becoming more and more widespread in business life and factories, is increasing rapidly according to the data of the International Robotics Federation, which is the most important indicator of

how widespread Industry 4.0 is. Global robot installations increased by at least 18% in 2017, robot supplies in the Americas increased by 16%, Asia/Australia by 1%, and Europe by 8%. From 2018 to 2020, global robotic facilities are projected to grow at an average of at least 15% per year. 15% in the Americas and Asia/Australia and 11% in Europe. Total global sales will reach approximately 520,900 units in 2020. It is estimated that more than 1.7 million new industrial robots will be installed in factories around the world between 2017 and 2020. ’’. (Efeoğlu & Bozkurt, 2018, p. 293).

It is seen that the sales made by the International Federation of Robotics do not keep statistics for 2020. The biggest reason for this is thought to be Covid 19, which emerged on November 17, 2019. However, despite this pandemic, robot sales have increased slightly.

“ The World Robotics 2021 Industrial Robots report shows a record of 3 million industrial robots operating in factories around the world – an increase of 10%. Sales of new robots grew slightly at 0.5% despite the global pandemic, with 384,000 units shipped globally in 2020. This trend was dominated by the positive market developments in China, compensating the contractions of other markets. This is the third most successful year in history for the robotics industry, following 2018 and 2017. ’’. (Robotics, 2021).

According to the data of the same International Federation of Robotics, “ a 13% increase in sales is expected in 2021 compared to the previous year. From 2021 to 2024, the rate of increase in sales is predicted to be 6% every year. ’’ (Robotics, 2021).

As a matter of fact, the only area where robots enter our lives is not the only industrial establishments or factories. In short, they did not enter our lives in a single production area. Robots have become a part of our daily life. These areas have entered the service sector and our homes today.

“ 2019 and 2020 unit sales in the world's top 5 areas for Professional Service Robots.

- ✓ Transportation and Logistics; 2019: 33,000 and 2020: 44,000
- ✓ Professional Cleanning; 2019: 18,000 and 2020: 34,000
- ✓ Medical Robotics; 2019: 7,000 and 2020: 18,000
- ✓ Hospitality; 2019: 13,000 and 2020: 15,000
- ✓ Agriculture; 2019: 7,000 and 2020; 7,000 ’’.

(Robotics, 2021)

According to the data given above, we can see how quickly the sales data of robots to be used in the professional field increase in a year.

According to McKinsey & Company’s research for the above-mentioned sectors,

“ A study was conducted to analyze the automation potential of more than 800 occupations and more than 2,000 business activities in the US economy, and the analysis was extended to the global economy as a whole of the research the findings are as follows: 49% of the jobs people do for wages in the global economy are adapted to existing technology. It is anticipated that there is potential to be automated. It is predicted that almost 5% of the surveyed professions have the potential to be fully automated with the current technology, and that 60% of the activities in these professions have the

potential to be fully automated with the existing technological infrastructure in at least 30% of them. While the technical automation potential of tasks such as data collection and processing, physical activities and operating machines is high, the automation potential of tasks such as interacting with stakeholders, expert decision-making processes, planning, creative tasks, managing and developing people is very low. While jobs such as sewing machine operator, graders, agricultural product classifiers, stock exchange clerks, travel agency workers, watch repairers, chemistry assistants, maintenance assistants, web developers have a high level of automation risk, fashion designers, chief executives, statisticians, psychiatrists and legislators need automation. the risk is low. Considering the automation levels on the basis of sectors, such as accommodation and catering services, manufacturing industry, transportation and storage, retail sales, mining. It is seen that the automation potential in the sectors is over 50%, while it is below 40% in the construction, electricity, water and gas services, wholesale, finance and insurance, art, entertainment and recreation and real estate sectors. It is seen that the highest automation risk is in the field of accommodation and catering services, and the lowest automation risk is in the field of education services. ’’. (Yeşiltaş & Artar, 2021, p. 47).

In addition to the data given above. Along with the order that comes with this new system, the characteristics that employers look for in workers have also changed. Again, the data here are given over the United States. Because the United States is a country that digitizes faster than many other countries.

“ From 2002 to 2016, U.S. jobs and businesses that require a significant amount of digital information due to changes in the digital content

of existing occupations or shifts in the distribution of occupations towards medium and high-level digital activities share of employment increased rapidly. Compared to 2002, it is seen that employment in occupations with high digital content increased from 4.8 to 23%, and from 39.5% to 47.5% in occupations with medium level of digital content. On the other hand, employment in occupations with low digital content decreased from 55.7% to 29.5%. In absolute terms, more than 32 million workers in highly digital jobs while employed, approximately 66 million people work in jobs in medium digital positions. In contrast, only 41 million jobs require low digital skills. In line with these trends, digital-focused professions have given great support to the process of business transformation and creation over the past few years. Specifically, approximately 4 million of the 13 million new jobs created in the country since 2010 are high-end digital requires skills and almost two-thirds of new jobs require either high- or intermediate-level digital skills. ’’ (Yankın, 2019, p. 24).

With Covid 19, our lives have completely changed. Because it has brought a new order that people have never encountered before. People’s social lives, working lives, home lives, eating habits, in short, the whole of people’s lives have changed completely. With Covid 19, the robotic systems in our lives started to be a little more effective. The biggest reason for this is that robots or contactless systems have started to be developed in many areas in order to minimize the contact of people with each other. Due to this extraordinary situation, robots, which started to be a part of our lives with the Fourth Industrial Revolution (Industry 4.0), suddenly took their place in the middle of our lives. The best example of this is the ‘ Robot Vacuum Cleaner ’, which was first released in 2001. According to the data announced by the iRobot

branded robot vacuum cleaner company, whose headquarters is in the United States, they announced that they sold 40 million robot vacuums in 2021. iRobot announced a 44% increase in sales in 2021 compared to the previous year. It is useful to underline that the data here is only the data given over a single brand. Considering that all companies selling electronic goods around the world produce ‘ Robot Vacuum Cleaners ’, we need to realize how big a sales and market share this is in the world. After people bought robot vacuums, they started to terminate the jobs of people working in the field of cleaning in their homes. This has led to an increase in unemployment rates.

The situation gained a slightly different dimension with the reflection of robots and artificial intelligence used in the food and beverage industry and tourism to almost all services offered by businesses. In places such as cafes, hotels and restaurants, the technological systems used in these areas will be used to minimize the cost and time in the preparation phase. The result of service through robots or service bands will minimize customers’ waiting times and save labor costs. It is time to clarify about the information it has been given.

The first change was in the menus of restaurants and cafes. As it is known, the menus consisted of materials such as paper. Of course, the menus produced from this paper had various problems and additional costs, such as getting old after a certain period of time or making them from the beginning when a change was made in the menu. Of course, they had many negative effects on the environment.

“ In addition to the systems where consumers can order with the help of tablets integrated into tables or kiosks in the restaurant, QR menus are the most common digital menus. In this way, the menus are displayed on the

device screen thanks to the mobile decoder applications installed using the built-in cameras on the smartphones. With the digital menus, customers can access the calories, weight, allergen, raw material, gluten, nutritional values, price and many more information of the meals with their visuals, and they can also make payment transactions by ordering. ’’. (Yazıcı Ayyıldız & Eroğlu, 2021, p. 1105)

Another system used is digital systems.

“ POS systems, which started to be used in retail sales points and food and beverage businesses in the 1970s; It had a process where the customer’s order was taken at the restaurant entrance and the order was printed in the kitchen simultaneously via a printer. Thus, the customer order was transmitted to the kitchen quickly and the service speed increased. In the following years, POS systems have been developed in terms of hardware and software, and they have become more functional by integrating the features such as transferring the orders received from the customers to the main computer and sending them to the relevant units (waiter-kitchen-safe-accounting-warehouse), issuing accounts, and obtaining statistical data. These programs provide convenience to businesses such as purchasing, storage, shipment from the warehouse, creation of standard food and beverage recipes, menu planning, and adjustment of sales prices. ’’. (Kocaman & Kocaman, 2014, p. 30).

Of course, in addition to these, at first, food orders started to be given over the internet, then with the introduction of smart phones into our lives, the orders directly reach the relevant units.

The other system used is robots. Smart restaurant, cafe, hotels, airports, convention centers etc. In places that serve many people, the process of including robots in these systems has been accelerated considerably. In places that provide food and beverage services such as restaurants and cafes, these robots are used to take orders during the service and during the preparation of the meals. Again, robots are used during service in hotels, in the areas where hotel operations are carried out, in receptions, and during luggage transport. Its use in the entertainment industry is becoming widespread in the places we have mentioned and in independent areas.

Need to talk about the advantages and disadvantages of robots and smart systems used in the food, beverage and tourism sectors that we have mentioned above.

Adhering to the order mentioned above: The things it can be count as advantages are shortening the waiting times for people, completing their orders more easily, minimizing the use of paper and creating environmentally friendly systems. The disadvantage is that it can lead to increased unemployment. In this way, there are advantages such as increasing customer satisfaction and reducing costs, as well as minimizing errors during the information given by customers during the order and transferring order details. The advantage of using a robot is that services are provided quickly, completely and without errors, and it is less costly. As a disadvantage, of course, it can lead to an increase in involuntary work.

Another area where artificial intelligence and robots are used is the automobile industry. “ The auto industry is on the verge of a revolution to switch to the self-driving automobile industry. The driving force behind this is the rapidly evolving

technology, the Internet of Things (IoT). ’’. (Şimşek, 2019, p. 68). First, we need to briefly explain how these automobile work.

‘‘ IoT Sensors; Today, there are many types of sensors that make autonomous cars a reality. Blind spot monitoring, forward collision warning, radar, camera, LIDAR and ultrasonic sensors work together to create the navigation of a self-driving car. IoT Connectivity; Self-driving cars use cloud computing to move between traffic data, weather, maps, cars and other variables based on surface conditions. This helps them better monitor their environment and make informed decisions. Even if edge computing hardware can solve small computing tasks natively, self-driving cars need to be connected to the internet. Software Algorithms; All the data the tool collects needs to be analyzed to determine the best course of action. This is the main function of control algorithms and software. This is the most complex part of the self-driving car because it has to make the decisions flawlessly. A "flaw", like Uber's self-driving crash, can be fatal. ’’. (Engin, 2020).

At first, it started to be used in self-driving individual automobile. The most important reason for this was to check whether this system works efficiently or not. The next phase of this is ‘ intelligent public transport systems ’. What are these ‘ intelligent transport systems ’ ?

‘‘ Internet of Things (IoT) and artificial intelligence (AI); It enables a new class of intelligent transportation systems (ITS) for road, air, rail and sea. These solutions are; It connects vehicles, traffic signals, toll booths and other infrastructure to help reduce congestion, prevent accidents, reduce emissions and make transportation more efficient. Examples include fleet management,

intelligent traffic management, V2X communication (all vehicles, infrastructure systems, passengers being aware of each other with the network system.), electric vehicle charging, electronic toll collection and various other mobility solutions. ’’. (Intel).

With the introduction of these smart vehicles and transportation systems into our lives, it is planned to minimize traffic accidents. When the number of accidents decreases, this will provide a great benefit to the economy of the state. However, it is thought that this situation may lead to unemployment of the workers working in this sector if it is in the disadvantage dimension.

The biggest transformation in the factories, which formed the basis of the Industrial Revolutions, was experienced. Today, the notion of ‘ factory ’ has changed. The new factories are called ‘ Smart Factories ’. What does ‘ Smart Factories ’ mean ? With the Fourth Industrial Revolution (Industry 4.0), it led to a decrease in the production of human power in factories, with the automation systems developed, all the production tools in the factory have become machines that can communicate among themselves, learn by themselves and make decisions. Systems that provide self-processing of the data obtained as a result of the application of these innovations and developments and all of these processes are called. Human power is not used during production in smart factories. The number of working workers is the least and these workers are interested in the machines that enable the production to take place. For this reason, another name used for smart factories is dark factories. ‘‘ The main purpose of smart factories is to eliminate human-induced errors, slowdowns, and long decision-making processes, and to provide faster and less faulty production. In addition to these, another effect is to reduce the production cost. ’’. (Barut, Ünver, Kayım, Toprak, & Uysal, 2020, p. 32). We have been feeling the

effects of the Fourth Industrial Revolution (Industry 4.0) in our lives more recently. The reason for this is the complete digitalization of our lives that came with Covid 19. The notion of workplace, which entered our lives with the Industrial Revolution, has caused people to work from their homes again today. People are starting to gain flexibility in working hours again. It can be say that it is a structure similar to the social structure before the Industrial Revolution that it has been mentioned before. It is possible to say that our whole life has changed with the Fourth Industrial Revolution (Industry 4.0).

In line with the information given above, there are three opinions about the Fourth Industrial Revolution (Industry 4.0) worldwide. There is an optimistic point of view, a balancing point of view, and a pessimistic point of view.

Those who have an optimistic view argue that technology will increase employment. They describe it generally as follows. At first, they argue that working conditions will improve. They argue that technology will not cause unemployment, on the contrary, there will be unemployment as a result of not using technology. However, they argue that this unemployment rate will be very low and this will compensate for this rate with the increase in welfare level and productivity, and they argue that as a result, new job opportunities will be created.

According to the balancing view, they argue that the results of the developing technology will be determined by how technology is used by people and for what purpose. They argue that this developing technology will have an effect on employment, but this effect can be eliminated with technology. In short, they argue that technology will not have a direct impact on employment.

Those who support the pessimistic view think that unemployment may occur as a result of this developing technology and the increase in mechanization as a result, the decrease in production costs with each new technology and the increase in production costs based on human power. In other words, the need for human labor will decrease day by day. They argue that as a result of the use of machines and robots in the production process, the need for labor will decrease and there will be a decrease in employment, and this will lead to technological unemployment, namely structural unemployment.

As a result, we need to look at the positive and negative aspects of the Industrial Revolutions by taking them into consideration at first. Then, the Industrial Revolutions are not independent of each other and should be considered as a whole.

CONCLUSION

In this study, it has been started by explaining the Industrial Revolution in order to understand exactly what the Industrial Revolution means.

Are the processes in the formation of the Industrial Revolution a natural process ? Or is it a deliberate process by some sovereign Powers ? For clarification, it has been touched on the first survivalist ‘ Hunting and Gathering ’ in human history, and it has been talked about the length of time they lived and how this system changed people’s lives. As it has been mentioned later, when the food sources for hunting and gathering in the region decreased or disappeared, people started to go to other regions to find new food sources, and it has been mentioned that this caused a new system, the nomadic system. The ‘Agricultural Revolution ’, which can be considered the most important turning point for humanity, took place. In other words, people settled down and started to produce as a result, and various means of production were needed to realize this production. These means of production were small tools or mechanisms based on human power, animal power, water power and wind power. These means of production were first used to meet people’s own needs. However, these means of production have caused people to produce more than they need, and this has caused the goods produced to remain in their hands. These goods began to rot over time. In order to prevent this, people started to sell their surplus goods in market places etc. However, the products sold in this market were expensive and could not be bought by everyone due to the high production costs and the fact that they were sold by certain people. The purpose of the Industrial Revolution was to sell goods to people cheaper and faster. We explained this.

After clarifying the important periods of humanity before the Industrial Revolution, We can explain the events and facts required for the Industrial

Revolution to take place. We will first clarify these with the Renaissance and the Reformation. The main reason why we put the Renaissance and the Reformation in the first place, as a result of these revolutions, the idea of free thought of people emerged. Thanks to this free thought, it thus led to the development of technology for that period. As a result of these studies, ship technology has advanced and these ships have become more durable. this made the ships more resistant to harsh weather conditions. Thanks to these developing technologies, it paved the way for geographical discoveries and there were countries that supported geographical discoveries. As a result of these geographical discoveries, many raw materials flowed to Europe. In this way, a phase of the Industrial Revolution for Europe was completed.

Then, we clarified another important issue for the Industrial Revolution. Renaissance and Reformation, which emerged in the 16th and 17th centuries, led to the questioning of unexamined structures thanks to the innovations they brought in the field of thought. This first started with the questioning of some religious situations and this religion became understandable to everyone. Philosophy emerged as religion began to be questioned. People began to think more in political and scientific fields. The ‘ Age of Enlightenment ’, which immediately followed this, caused more scientists and philosophers to come to the fore. Meanwhile, thanks to the ‘ French Revolution ’ initiated by Napoleon, it spread rapidly in Europe and was immediately adopted by the people. In this way, the lack of technological inventions was eliminated thanks to the technological developments necessary for the Industrial Revolution.

Another necessary element for the formation of the Industrial Revolution is the social and economic structure of people. Thanks to the developments in the

agricultural field, the need for human power in agriculture had decreased considerably. As a result, large masses of people migrated from villages and rural settlements to cities. There was already a rapid increase in the world population, and thanks to these migrations, there was a great increase in the population of Europe and nearby countries and cities. This meant that there were workers to work in the factories. As a result of geographical discoveries, colonial movements began in Europe and gained momentum. There was an excessive flow of raw materials and capital in Europe. As a result, the petty bourgeois started to get richer and the middle class got richer. Securing private property, commercial and economic rights, and with it, a safer, stable and comfortable economic environment has emerged. This led to the development of the legal system. Capitalism began to flourish, middle class development accelerated and new investment areas emerged. Thanks to these developments, companies with more than one partner emerged and as a result insurance companies and banks were established. New job opportunities were created in the fields of insurance, banking and entrepreneurship. With the development of commercial law, the way of the Industrial Revolution was opened. As a result of technological developments, the Industrial Revolution took place with the use of steam power together with the machine.

The reason why the Industrial Revolution first appeared in England is that England was ruled by the Constitutional Monarchy. People had rights such as individual freedoms and private property rights. As a result of winning the Battle of Plassey in England, he owned many raw materials and had a faster population growth than other countries in Europe. It had two important factors for the Industrial Revolution. It is a great economic advantage that England has not invested much in

the defense industry and arms industry like other countries thanks to its geographical conditions.

Then we examined the social structure of people before and after the Industrial Revolution by comparing them.

We examined the Industrial Revolutions in their own periods and talked about the important inventions and important events of these periods in detail.

Then, after talking about the notion of work, the notion of worker, the notion of employer, the notion of unemployment, the notion of working class, then we talked about the theories produced on unemployment and the way they are applied. We talked about the most common types of unemployment today; voluntary unemployment, involuntary unemployment, frictional unemployment, structural unemployment, cyclical unemployment.

Finally, after the First Industrial Revolution (Industry 1.0), we talked about the job opportunities in their time and the effect of using the steam engine in production on employment and the revolt of those who lost their jobs against the machines (Luddism), and then the revolt of the manufacturers against this machine with the machine called Spinnig Jenny. The new job opportunities brought by the Second Industrial Revolution (Industry 2.0) and the changes in people's lives of these job opportunities. With the Third Industrial Revolution (Industry 3.0) that came later, the need for people decreased even more and the process of laying off people accelerated. However, during the war, this rate decreased considerably, as we have stated. When we came to the Fourth Industrial Revolution (Industry 4.0), it was realized that people needed to improve themselves, causing unskilled people to lose their current jobs. As a result, it became a competition with robots and machines

among people and with this developing technology. This created an opportunity for employers. Because, with the participation of people in the competition with each other in their robots, people who do not want to lose their current jobs have started to compete with each other to work cheaper. On the other hand, these people have developed themselves and become better equipped individuals, and this has affected their self-confidence and their criteria when looking for a job.

As a result, it is a great fact that the Industrial Revolutions had an impact on employment. After each Industrial Revolution, the number of employees in the professions that emerged in the previous revolution decreased and increased from time to time. The biggest reason for this is that while the working class emerged in the First Industrial Revolution (Industry 1.0), robots were included in the production systems in the Fourth, that is, the Last Industrial Revolution. As a result, it caused humans and robots to work together. In this process, it is foreseen that people who improve themselves will be able to find a job and those who constantly improve themselves will have the opportunity to find a job more easily. In this period, it is foreseen that it will be difficult and impossible for unskilled people to find a job. With this revolution, it is predicted that the works based on muscle power done by humans will now be done by robots and machines. As a result, it is thought that there may be an uprising against robots in the future, like the revolt against the Machines in the First Industrial Revolution (Industry 1.0). However, in addition to these situations, all lifestyles of people have changed with Covid 19 around the world in the recent period. It is possible to add working conditions, workplaces, working hours, etc. to this. Considering these conditions, there is not much more to say about the consequences.

REFERENCES

- ABC/Reuters. (2008, 01 29). *Black Death 'Discriminated' Between Victims*. Retrieved 09 02, 2021, from ABC/Reuters:
<https://www.abc.net.au/science/articles/2008/01/29/2149185.html>
- Acamedia. (n.d.). *Spinnig Jenny*. Retrieved 03 19, 2022, from Acamedia: <https://en-academic.com/dic.nsf/enwiki/205177>
- Adıgüzel, O., & Yüksel, H. (2011). Tarihsel Süreçte Çalışma Kavramı ve Bir Kırılma Noktası Olarak Sanayi Devrimi. *Finans Politik & Ekonomik Yorumla*, 48(553), 69 - 81.
- Akagündüz, Ü., & Tanilli, S. (2013). Sanayi Devrimi ve Sanayileşme. In Ü. Akagündüz, & S. Tanilli, *Uygarlık Tarihi* (pp. 422 - 423). İstanbul: Cumhuriyet Kitapevi.
- Akben, İ., & Avşar, İ. İ. (2018, 04). Endüstri 4.0 ve Karanlık Üretim: Genel Bir Bakış. *Türk Sosyal Bilimler Araştırmaları Dergisi - Journal of Turkish Social Sciences Research*, 3(1), 27 - 37 . Retrieved 03 05, 2022, from <http://tursbad.hku.edu.tr/en/download/article-file/465518>
- Akben, İ., & Ös, M. (2019). Akıllı ve Veriye Dayalı Tedarik Zincirleri. 3. *International EMI Entrepreneurship & Social Sciences Congress*, (pp. 346 - 353). Lefkosa. Retrieved 03 30, 2022, from https://www.researchgate.net/profile/Ibrahim_Akben2/publication/335352293_Akilli_ve_Veriye_Dayali_Tedarik_Zincirleri_Intelligent_and_Data-Driven_Supply_Chains/links/5d5fe2c2a6fdccc32cca22f1/Akilli-ve-Veriye-Dayali-Tedarik-Zincirleri-Intelligent-and-Data-D

- Akın, Ö. (2017, 12 25). Hızla Artan Endüstriyel Robotların Üretim Süreçlerinde Yarattığı Değişimler ve Türkiye İşgücü Piyasasında Yaratacağı Olası Etkilerin Değerlendirilmesi. *İş ve Hayat*, 3(6), 42 - 71. Retrieved 03 29, 2022, from <https://dergipark.org.tr/en/download/article-file/404399>
- Aksoy, A. (2016). Geleneksel Devletten Modern Devlete Sanayi Devrimi ve Kamu yönetimi Abdülkadir aksoy. *Uluslararası Politik Araştırmalar Dergisi*, 31 - 37. Retrieved 01 05, 2022, from <https://dergipark.org.tr/tr/download/article-file/598770>
- Aksoy, S. (2017, 04). Değişen Teknolojiler ve Endüstri 4.0: Endüstri 4.0'ı Anlamaya Dair Bir Bakış". *Sosyal Araştırmalar Vakfı Katkı*(4), 34 - 44. Retrieved 01 09, 2022, from <http://www.katki.org/wp-content/uploads/2020/02/SAVKatki4.pdf#page=34>
- Altan, Ö. Z. (2009). *Sosyal Politika Dersleri*. Eskişehir: Anadolu Üniversitesi Yayınları.
- Ansal, H. (1996). *Esnek Üretim İşçiler ve Sendikalar (Post - Fordizm'de Üretim Esnekleşirken İşçiye Neler Oluyor?)*. Retrieved from http://www.birlesikmetal.org/kitap/kitap_99/1999-3.pdf
- Arslan, Ü. Ç., & Demirbağ, Y. H. (2017). *Sanayi Devrimi: Sonuçları ve Ulusal Sisteme Yansımaları*. Ankara: Başkent Üniversitesi. Retrieved 01 05, 2022, from https://www.academia.edu/35814711/Sanayi_Devrimi_Sonu%C3%A7lar%C4%B1_ve_Uluslararası%C4%B1_Sisteme_Yans%C4%B1malar%C4%B1

- Aydemir, H. (2018, 04 30). Sanayi 4.0 ve Türkiye Ekonomisi Açısından Etkileri. *Sosyoekonomi*, 26(36), 253 - 261. Retrieved 12 15, 2021, from <https://dergipark.org.tr/tr/download/article-file/456879>
- Aydın , Y. (2013, 10 2013). Say Yasası: Keynes'in Yorumu ve Son Dönm Tartışmaları. *İstanbul Üniversitesi İktisat Fakültesi Mecmuası*, 63(01), 81 - 130. Retrieved 01 03, 2022, from <https://dergipark.org.tr/tr/download/article-file/8863>
- Aydın, E. (2018, 02 01). Türkiye’de Teknolojik İlerleme ile İstihdam Yapısındaki Değişme Projeksiyonu: Endüstri 4.0 Bağlamında Ampirik Analiz. *Yönetim Bilimleri Dergisi*, 16(31), 461 - 471. Retrieved 01 28, 2022, from <https://dergipark.org.tr/tr/download/article-file/698731>
- Aydın, E., & Demiral, G. (2019). İşgücü Farklılığını Dikkate Alarak Endüstri 4.0’ın Zorlukları ve Yararları: Kavramsal Bir Çerçeve. *İşletme Araştırmaları Dergisi*, 1976 - 1990. Retrieved 09 16, 2021, from https://www.isarder.org/2019/vol.11_issue.3_article47_full_text.pdf
- Aydın, N. (2018). *Endüstri 4.0 Dördüncü Sanayi Devrimi*. İksad.
- Bağcı, E. (2018). Endüstri 4.0: Yeni Üretim Tarzını Anlamak. *Gümüşhane Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 9(24), 123 - 146. Retrieved 04 01, 2022, from <https://dergipark.org.tr/tr/download/article-file/564552>
- Balcı, Y. (1996). Geçmişten Geleceğe Çalışma İlişkileri. *Çerçeve*, 77 - 85. Retrieved 09 19, 2021, from <https://www.musiad.org.tr/uploads/yayinlar/cerceve-dergileri/pdf/cerceve17.pdf>

- Barut, B., Ünver, M., Kayım, C. T., Toprak, E., & Uysal, E. (2020). Otomotiv Endüstrisinde Akıllı Fabrika Uygulamaları ve Türkiye’de Adaptasyon Süreci. *İleri Mühendislik Çalışmaları ve Teknolojileri Dergisi*, 28 - 38. Retrieved 01 19, 2022, from <https://dergipark.org.tr/tr/download/article-file/1214432>
- Baştaymaz, T. (1983). İşsizlik Kavramı ve Gelişen Ülkeler. *Uludağ Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 245 - 258. Retrieved 12 15, 2021, from <http://acikerisim.uludag.edu.tr/jspui/handle/11452/20357>
- Baum, C. (2003, 01 14). So Who's Stealing China's Manufacturing Jobs. Retrieved 10 01, 2021, from sddt: <http://www.sddt.com/News/article.cfm?SourceCode=20031014fw#.YoOZH6hBzIV>
- BBC. (2017, 01 19). Yüzde 20'yi Aşan Genç İşsizlik Oranı Azaltılabilir Mi? Retrieved 09 05, 2021, from bbc: <https://www.bbc.com/turkce/haberler-turkiye-38677839>
- Bernal, J. D. (1996). *MODERN ÇAĞ ÖNCESİ FİZİK* (3. ed.). (D. Yurtören, Trans.) Ankara: Tübitak.
- Besson, J. -L. (2013). *Keşifler ve İcatlar*. (N. Kula, Ed.) Ankara: Tübitak Yayınları.
- Bilgili, E. (1998, 12 31). Dış Ticaret, Ekonomik Kalkınma ve Sanayi Devrimi. *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*(13), 35 - 50. Retrieved 01 22, 2022, from <https://dergipark.org.tr/tr/pub/erciyesiibd/issue/38180/445950>

- Braind, C. (2019, 08 25). A Primer on Cloud Computing. Retrieved 02 02, 2022, from MEDUIM: https://medium.com/@colinbaird_51123/a-primer-on-cloud-computing-9a34e90303c8
- Britannica, E. (2006, 09 22). *Work*. Retrieved 01 25, 2022, from Encyclopaedia Britannica: <https://www.britannica.com/topic/work-economics>
- Britannica, E. (2020, 03 26). *Unemployment*. Retrieved 01 25, 2022, from Britianica: <https://www.britannica.com/topic/unemployment>
- Bulut, E., & Akçacı, T. (2017, 06 05). Endüstri 4.0 ve İnovasyon Göstergeleri Kapsamında Türkiye Analizi. *ASSAM Uluslararası Hakemli Dergi*, 4(7), 55 - 77. Retrieved from <https://dergipark.org.tr/tr/pub/assam/issue/31544/345689>
- Buyruk, H. (2018, 04 25). Gelişen Teknolojiler, Değişen İşgücü Nitelikleri ve Eğitim. 8(14), 599 - 632. doi:<https://doi.org/10.26466/opus.404223>
- Chodos, A., & Ouellette, J. (2002, 05). 1844: Morse and the Telegraph. 11. Retrieved 09 02, 2021, from <https://www.aps.org/publications/apsnews/200205/history.cfm>
- Chu, Y., Pan, L., Leng, K., Fu, H.-C., & Lam, A. (2020, 03). Research on Key Technologies of Service Quality Optimizationfor Industrial IoT 5G Network for Intelligent Manufacturing. *The International Journal of Advanced Manufacturing Technology*, 1071 - 1081. doi:<https://doi.org/10.1007/s00170-019-04389-4>
- Clare, J. D. (1996). *The Age of Expansion, 1750 - 1914*. İngiltere: Nelson Thornes Ltd.

Clickworker. (2020). *Internet of Things - (IoT)*. Retrieved 02 02, 2022, from

Clickworker: <https://www.clickworker.com/ai-glossary/internet-of-things-iot/>

Commission, A. F. (2015). *Internet of Things Privacy & Security in a Connected World*.

Çakır, N. N. (2018). Endüstri 4.0 ve Çalışmanın Geleceği. *Electronic Journal of Vocational Colleges*, 97 - 105. Retrieved 12 22, 2021, from

<https://dergipark.org.tr/tr/download/article-file/598042>

Çark, Ö. (2019). Dijital Dönüşümün İşgücü ve Meslekler Üzerindeki Etkileri.

International Journal Entrepreneurship and Management Inquiries, (pp. 19 - 34). Retrieved 12 18, 2021, from <https://dergipark.org.tr/tr/download/article-file/1257387>

Çark, Ö. (2019). *Kurumsal Kaynak Planlama (KKP) Sistemleri* (1. ed.). Ankara: Gazi.

Çoşan, B. (2019, 12 21). Sanayi Devrimi'nden Çok Uluslu Şirketlere Çocuk İşçiliğin:

Şahin Pençesinde Yavru Kuş. *Bandırma Onyedil Eylül Üniversitesi Sosyal Bilimler Araştırma Dergisi*, 02(02), 286 - 303. Retrieved 12 15, 2021, from <https://dergipark.org.tr/tr/pub/banusad/issue/51426/628575>

Dannreuther, R. (2017). *Energy Security*. -: -.

Davutoğlu, N. A. (2020, 11). Üçüncü ve Dördüncü Sanayi Devrimleri Arasındaki

Temel ve Sistematik Farklılıkların Determinist Bir Yaklaşımla Analizi. 179 - 194. Retrieved 10 05, 2021, from <https://dergipark.org.tr/tr/download/article-file/1110924>

Deane, P. (1988). *İlk Sanayi İnkılabı* (1. ed.). (T. GÜRAN, Trans.) Ankara: Türk Tarih Kurumu.

Dictionary, C. (n.d.). *Employee*. Retrieved 12 15, 2021, from Cambridge Dictionary :

<https://dictionary.cambridge.org/tr/s%C3%B6zl%C3%BCk/ingilizce/employee>

Dictionary, C. (n.d.). *Voluntary Unemployment*. Retrieved 12 15, 2021, from

Cambridge Dictionary :

<https://dictionary.cambridge.org/tr/s%C3%B6zl%C3%BCk/ingilizce/voluntary-unemployment>

Dictionary, C. (n.d.). *Worker*. Retrieved 12 15, 2021, from Cambridge Dictionary :

<https://dictionary.cambridge.org/tr/s%C3%B6zl%C3%BCk/ingilizce/worker?q=WORKER>

Doğru, B., & Meçik, O. (2018). Türkiye’de Endüstri 4.0’ın İşgücü Piyasasına Etkileri:

Firma Beklentileri. *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi - Suleyman Demirel University The Journal of Faculty of*

Economics and Administrative Sciences(23), 1581 - 1606. Retrieved 01 08,

2022, from <https://dergipark.org.tr/tr/download/article-file/1037053>

Dominguez, A. (n.d.). Optical Telegraph (Semaphore System). Retrieved 09 02, 2021,

from [https://kimon.hosting.nyu.edu/physical-electrical-](https://kimon.hosting.nyu.edu/physical-electrical-digital/items/show/1353#:~:text=The%20Semaphore%20Optical%20Telegraph%20was,%2C%20'that%20which%20writes%20fast.)

[digital/items/show/1353#:~:text=The%20Semaphore%20Optical%20Telegraph%20was,%2C%20'that%20which%20writes%20fast.](https://kimon.hosting.nyu.edu/physical-electrical-digital/items/show/1353#:~:text=The%20Semaphore%20Optical%20Telegraph%20was,%2C%20'that%20which%20writes%20fast.)

Dunham, W. (2008, 01 29). Black Death 'Discriminated' Between Victims. Retrieved

09 02, 2021, from

<https://www.abc.net.au/science/articles/2008/01/29/2149185.htm>

Durmuş, M. (2016, 07 01). Savaşlar ve İşçi Sınıfı. *Türk Tabibler Birliği Mesleki*

Sağlık ve Güvenlik Dergisi, 16(58), 29 - 44. Retrieved 03 07, 2022, from

<https://dergipark.org.tr/tr/download/article-file/821469>

EBSO. (2005). *Sanayi 4.0: Uyum Sağlamayan Kaybedecek*. Retrieved 10 08, 2021,

from http://www.ebso.org.tr/ebsomedia/documents/sanayi-40_26908939.pdf

Economicshelp. (n.d.). *Cyclical Unemployment*. Retrieved 03 05, 2022, from

Economics Help: <https://economictimes.indiatimes.com/definition/cyclical-unemployment>

Economicshelp. (n.d.). *Involuntary unemployment*. Retrieved 05 02, from Economics

Help: <https://www.economicshelp.org/blog/glossary/involuntary-unemployment/>

Economicshelp. (n.d.). *Say's Law*. Retrieved 02 03, 2022, from Economics Help:

<https://www.economicshelp.org/blog/glossary/says-law/>

Economist. (2013, 01 07). *A growing number of American companies are moving*

their manufacturing back to the United States. Retrieved 03 05, 2022, from

Economist: <https://www.economist.com/special-report/2013/01/17/coming-home>

Efeoğlu, R., & Bozkurt, E. (2018). Sanayiİ 4.0 ve İşgücü Piyasasına Etkisi. IV.

International Caucasus - Central Asia Foreign Trade and Logistics Congress,

(pp. 288 - 296). Aydın. Retrieved 08 09, 2021, from

<https://ulk.ist/media/kitap/IV-UKODTLK/sanayi-40-ve-isgucu-piyasasina-etkisi.pdf>

Eğilmez, M. (2017, 05 08). Endüstri 4.0. Retrieved 01 05, 2022, from mahfiegilmez:

<https://www.mahfiegilmez.com/2017/05/endustri-40.html>

Ekin, N. (2003). Türkiye’de İşsizlik: İş Aramayan İşsizler – Kırsal Yoksullar –

Kentsel Kayıtdışı Yapay İstihdamdakiler – Açık İşsizler. *Kamu - İş Dergisi*, 2

- 21. Retrieved 12 08, 2021, from

<https://www.yumpu.com/tr/document/read/30864975/turkiyede-issizlik-is-aramayan-issizler-krsal-yoksullar>

Elektrikport. (2014, 02 28). *Endüstri 4.0 Nedir? 4. Sanayi Devrimi Gerçekleşiyor.*

Retrieved 02 09, 2022, from Elektrikport:

<https://www.elektrikport.com/teknik-kutuphane/endustri-4-0-nedir--4-sanayi-devrimi-gerceklesiyor/11563#ad-image-0>

Engin, F. Y. (2020, 03 20). Kendi Kendine Giden Arabalar Nasıl Çalışır? Retrieved

02 11, 2022, from ioturkiye: <https://ioturkiye.com/2020/03/kendi-kendine-giden-arabalar-nasil-calisir/>

Erkan, H. (1994). *Bilgi Toplumu ve Ekonomik Gelişme*. İstanbul: İş Bankası

Yayınları.

Etymonline. (n.d.). *Telegraph*. Retrieved 09 02, 2021, from Etymonline:

<https://www.etymonline.com/word/telegraph>

Fidan, A. (2013, 02). Tarım, Sanayi ve Bilgi Toplumunda Üretim ve Tüketim

İlişkilerinin İşletme ve Yöntemleri Üzerindeki Etkileri. *Mevzuat Dergisi*(62).

Retrieved 11 11, 2021, from

<https://www.mevzuatdergisi.com/2003/02a/03.htm>

- Filizöz, B., & Orhan, U. (2018). İnsan Kaynakları Yönetimi Bağlamında Endüstri 4.0: Bir Yazın Çalışması. *Cumhuriyet Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 110 - 117. Retrieved 12 15, 2021, from <http://esjournal.cumhuriyet.edu.tr/tr/download/article-file/586569>
- Fırat Oktay, S. Ü., & Fırat, . O. (2017, 11 01). Endüstri 4.0 Yolculuğunda Trendler ve Robotlar. *İstanbul Üniversitesi İşletme Fakültesi Dergisi*, 46(2), 211 - 223. Retrieved 01 05, 2022, from <https://dergipark.org.tr/tr/download/article-file/448402>
- Fırat Oktay, S. Ü., & Fırat, O. Z. (2017). Sanayi 4.0 Devrimi Üzerine Karşılaştırmalı Bir İnceleme: Kavramlar, Küresel Gelişmeler ve Türkiye. *Toprak İşveren Dergisi*(114), 10 - 28. Retrieved 12 19, 2021, from https://www.researchgate.net/publication/318316976_Sanayi_40_Uzerine_Karasilastirmali_Bir_Inceleme_Kavramlar_Kuresel_Gelismeler_ve_Turkiye
- Gabaçlı, N., & Uzunöz, M. (2017). IV.Sanayi Devrimi: Endüstri 4.0 v e Otomotiv Sektörü. *Uluslararası Politik, Ekonomik ve Sosyal Araştırmalar Kongresi (ICPESS)*, (pp. 149 - 174). İstanbul. Retrieved 10 05, 2021, from <http://registericpess.org/index.php/ICPESS/article/view/2166/415>
- Genç, Ö. (2011, 05-08). Kara Ölüm: 1348 Veba Salgını ve Ortaçağ Avrupas'ınaEtkileri. *Tarih Okulu Dergisi*, 123-150. Retrieved 09 02, 2021, from WIKIPEDIA: <https://dergipark.org.tr/tr/download/article-file/144812>
- Gençoğlu, A. Y. (2020, 12 23). Kapitalizme TeoriYaklaşımlar: Kapitalist Ekonomik Sistemin Temel Nitelikleri Üzerinden Karşılaştırmalı Bir Analiz. *Temaşa Erciyes Üniversitesi Felsefe Bölümü Dergisi*(14), 237-256. Retrieved 01 09, 2022, from <https://dergipark.org.tr/tr/download/article-file/1426558>

Gies, J., & Gies, F. (1969, 01 22). *Life in a Medieval City*. New York: Harper Collins.

Retrieved 03 22, 2022, from WIKIPEDIA: <https://en.wikipedia.org/wiki/Guild>

Gilpin, R. (2017). *Uluslararası İlişkilerin Ekonomi Politikası* (5 ed.). İstanbul: Kripto.

Göle, N. (2016). *Mühendisler ve İdeoloji*. İstanbul: Metis.

Gözükeleş, İ. (2019, 03 19). Dördüncü Sanayi Devrimi nedir? Retrieved 04 05, 2022,

from <https://bilimvegelecek.com.tr/index.php/2019/03/21/dorduncu-sanayi-devrimi-nedir/>

Gümüş, N. (2020). *Pazarlamanın Yükselen Gözdesi Yaşlı Tüketiciler* (1. ed.). Ankara:

Detay Yayıncılık.

Günay, D. (1998). Teknolojinin Ontolojik Temeli. *Elektrik-Elektronik Dergisi*, 54.

Retrieved 12 19, 2021

Günay, D. (2001). Mühendislik, Teknoloji ve Tarih. *Mimar ve Mühendis Dergisi*, (30),

6 - 14. Retrieved 12 19, 2021, from

https://www.researchgate.net/publication/317662052_Muhendislik_Teknoloji_ve_Tarih

Günay, D. (2002). Sanayi ve Sanayi Tarihi. *Mimar ve Mühendis Dergisi*, (31), 8 - 14.

Retrieved 12 19, 2021, from

https://www.researchgate.net/publication/317662230_Sanayi_ve_Sanayi_Tarihi

Günay, D., & Arıdur, A. (1999). Bilim ve Teknolojiye Yöneliş. *I. Teknoloji Kalite ve*

Üretim Sistemleri Kongresi, (pp. 22 - 44). Adapazarı. Retrieved 12 15, 2021,

from

https://www.researchgate.net/publication/317662173_Bilim_ve_Teknolojiye_Yonelis

Günay, D., & Arıduru, A. (2001). Teknolojinin Konumu ve Neliği. *II.Teknoloji, Kalite ve Üretim Sistemleri Konferansı*. Abant/Bolu. Retrieved 10 19, 2021, from https://www.researchgate.net/publication/317662317_Teknolojinin_Konumu_ve_Neligi

Güney, A. (2009). İşsizlik, Nedenleri, Sonuçları ve Mücadele Yöntemleri. *Kamu-İş Dergisi*, 135 - 159. Retrieved 11 28, 2021, from <https://www.tuhis.org.tr/pdf/1046.pdf>

Gürz, U. (2019, 11 17). İngiltere'de Sanayi Devrimi. Retrieved 04 15, 2020, from <https://www.academia.edu/>: https://www.academia.edu/41654208/%C4%B0NG%C4%B0LTEREDE_SANAYI%C4%B0_DEVR%C4%B0M%C4%B0

Güzel, S. (2005, 06 15). Bir Sosyal Değişme Süreci Sosyolojik Bakış Açısından Sanayi Devrimi. *Muhafazakar Düşünce Dergisi*, 2(5), 189 - 198. Retrieved 01 29, 2022, from <https://dergipark.org.tr/tr/download/article-file/1197417>

Hartwell, R. M. (Yaz Güz 2005). İngiltere’de Sanayi Devriminin Nedenleri. *Piyasa Dergisi*(15-16), 1 - 16. Retrieved 12 15, 2021, from <http://www.libertedownload.com/Piyasa/15-16/02-r-m-hartwell-ingilterede-sanayi-devriminin-nedenleri.pdf>

Hobsbawm, E. J. (2019). *Devrim Çağı 1789 - 1848*. Dost Yayınevi ve Kitabevi.

Hobsbawm, E. (1996). *The Age of Revolution 1789-1848*. New York: Vintage Books.

Huberman, L. (2021). *Feodal Toplumdan Yirminci Yüzyıla* (20 ed.). (M. Belge, Trans.) İstanbul: İletişim.

Ibm. (n.d.). IBM 608 Calculator. Retrieved 02 02, 2022, from IBM:

https://www.ibm.com/ibm/history/exhibits/vintage/vintage_4506VV2214.html

İKTİSAT SÖZLÜĞÜ. (n.d.). Efektif Talep Nedir ? Retrieved 03 01, 2022, from

<https://www.iktisatsozlugu.com/tr/nedir/efektif-talep/1546>

Intel. (n.d.). *Akıllı Ulaşım Sistemleri*. Retrieved 04 04, 2022, from Intel:

<https://www.intel.com.tr/content/www/tr/tr/transportation/overview.html>

İTÜ. (2019). Yapay Zeka. Retrieved 10 09, 2021, from İTÜ:

https://web.itu.edu.tr/~sonmez/lisans/ai/yapay_zeka_icerik1_1.6.pdf

Kabaklarlı, E. (2021). *Endüstri 4.0 ve Paylaşım Ekonomisi Dünya ve Türkiye Ekonomisi İçin Fırsatlar, Etkiler ve Tehditler* (2. ed.). Ankara: Nobel Akademik Yayıncılık.

Kagan, J., & Potters, C. (2021, 08 30). Frictional Unemployment. Retrieved 04 05, 2022, from

<https://www.investopedia.com/terms/f/frictionalunemployment.asp#:~:text=Frictional%20unemployment%20is%20the%20result,first%20time%20constitute%20frictional%20unemployment.>

KALAMAZOOSHOW. (n.d.). Moore Harvester Model. Retrieved 02 02, 2022, from

KALAMAZOOSHOW:

http://www.kalamazooshow.com/Images/Grain_Harvester_Photos/Moore%20Harvester%20Model.jpg

- Kamber, E., & Sönmeztürk Bolatan, G. İ. (2019, 12 28). ENDÜSTRİ 4.0 TÜRKİYE FARKINDALIĞI. *Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi - Mehmet Akif Ersoy University Journal of Social Sciences Institute*, 11(30), 836 - 847. doi:<https://doi.org/10.20875/makusobed.630453>
- Kara, F. (2012, 05 01). Birleşik Krallık Avam Kamarası Çalışma Usul ve Esasları Üzerine. *Yasama Dergisi*(21), 07 - 50. Retrieved 08 09, 2022, from <https://dergipark.org.tr/tr/download/article-file/1121029>
- Kayatürk, E. İ. (2016). İnsan Kaynakları Gözünden Sanayi 4.0. Retrieved 12 05, 2021, from <https://www.hrpicks.com/insan-kaynaklari-gozunden-sanayi-4-0/>
- Kerns, J. (2017, 08 23). First 3D Printer SLA-1. Retrieved 02 02, 2022, from SCULPTEO: <https://www.machinedesign.com/3d-printing-cad/article/21835865/3d-printing-the-machine-that-started-it-all>
- Keser, A., & Kümbül Güler, B. (2016). *Çalışma Psikolojisi*. Kocaeli: UMUTTEPE YAYINLARI.
- Keynes, J. M. (2018, 03 10). *The General Theory of Employment, Interest and Money*. United Kingdom: Palgrave Macmillan. Retrieved 03 19, 2022, from WIKIPEDIA.
- Kırmızıgül, E. (2008). *Buhar Gücü İcadının Küreselleşmeye Etkileri*. İstanbul: İstanbul Ticaret Üniversitesi. Retrieved 11 10, 2021, from https://www.academia.edu/37999317/Buhar_G%C3%BCc%C3%BC_%C4%B0cad%C4%B1n%C4%B1n_K%C3%BCreselle%C5%9Fmeye_Etkileri

Knopf, J. (n.d.). Watt's Steam Engine - 1765. Retrieved 02 02, 2022, from SUTORI:

<https://www.sutori.com/es/elemento/watt-s-steam-engine-1765-james-watt-description-he-invented-a-steam-engine>

Koca, D. (2020). Sanayi Devrimlerinin Tarihsel Arka Planı ve İşgücü Becerileri

Üzerindeki Yansımaları. *Uluslararası Toplum Araştırmaları Dergisi* -

International Journal of Society Researches, 4533 - 4558. Retrieved 12 18,

2021, from <https://dergipark.org.tr/tr/download/article-file/1009168>

Kocaman, E. M., & Kocaman, M. (2014). Yiyecek İçecek İşletmelerinde Otomasyon

Sistemleri Kullanımının Yönetim Süreci Etkileri. *Standart Ekonomik ve*

Teknik Dergisi, 28 - 33. Retrieved 04 03, 2022, from

https://www.researchgate.net/publication/270580716_Yiyecek_ve_Icecek_Isletmelerinde_Otomasyon_Sistemleri_Kullaniminin_Yonetim_Surecine_Etkileri

Koştı, G. (2020). Sanayi 4.0 ve Teknolojik Bileşenleri. *Journal of Business*

Innovation and Governance, 131 - 144. Retrieved 12 15, 2021, from

<https://dergipark.org.tr/tr/download/article-file/1485763>

Koşunalp, S., & Arucu, M. (2018, 02 28). Nesnelerin İnterneti ve Akıllı Ulaşım. *Akıllı*

Ulaşım Sistemleri ve Uygulamaları Dergisi - Journal of Intelligent

Transportation Systems and Applications, 1(1), 1 - 7. Retrieved 12 23, 2021,

from <https://dergipark.org.tr/en/pub/jitsa/issue/35759/393470>

Koyre, A. (2002). *Bilim Tarihi Yazıları 1*. (K. Dinçer, Trans.) Ankara: Tübitak.

Kozak, İ. E. (1988). İşçi Sendikalarının Tarihi Gelişimi. *Sosyal Siyaset Konferansları*

(pp. 63 - 81). İstanbul: İstanbul Üniversitesi İktisat Fakültesi. Retrieved 12 16,

2021, from <https://dergipark.org.tr/tr/download/article-file/9610>

Küçükkalay, M. (1997). Endüstri Devrimi ve Ekonomik Sonuçları Analizi. *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi - Suleyman Demirel University The Journal of Faculty of Economics and Administrative Sciences*, 51 - 68. Retrieved 12 16, 2021, from <https://dergipark.org.tr/tr/download/article-file/195233>

LIBRARY OF CONGRESS. (n.d.). Invention of the Telegraph. Retrieved 09 02, 2021, from <https://www.loc.gov/collections/samuel-morse-papers/articles-and-essays/invention-of-the-telegraph/>

Mahiroğulları, A. (2005). Endüstri Devrimi Sonrasında Emeğin İstismarını Belgeleyen İki Eser: Germinal ve Dokumacılar. *Sosyoloj, Konferansı*, (pp. 41 - 53). Retrieved 12 15, 2021, from <https://dergipark.org.tr/tr/download/article-file/100969>

Marczinik, J. (2019, 12 19). Modern Talking 4.0 – the Internet of Things and intelligent information. Retrieved 02 02, 2022, from QUANOSCONTENT SOLUTIONS: <https://www.quanos-content-solutions.com/blog/en/2019/12/11/the-internet-of-things-and-intelligent-information/>

Merriam-Webster. (n.d.). Industrial Revolution. Retrieved 01 05, 2022, from <https://www.merriam-webster.com/dictionary/industrial%20revolution>

Mohajan, H. K. (2019, 10). The First Industrial Revolution: Creation of a New Global Human Era. *Journal of Social Sciences and Humanities*, 4(5), 377 - 387. Retrieved 03 19, 2022, from https://www.researchgate.net/publication/336675822_The_First_Industrial_Revolution_Creation_of_a_New_Global_Human_Era/stats

- OGGITO. (2017, 09 20). Antique Illustration of Mechanical Industry Factory, Workers and Machines. Retrieved 02 02, 2022, from <https://oggito.com/icerikler/sanayi-devrimi-belgesel/40079>
- Öcal, F. M., & Altıntaş, K. (2018). Dördüncü Sanayi Devriminin Emek Piyasaları Üzerindeki Olası Etkilerinin İncelenmesi ve Çözüm Önerileri. *Uluslararası Toplum Araştırmaları Dergisi - International Journal of Society Researches*, 2068 - 2092. Retrieved 12 15, 2021, from <https://dergipark.org.tr/tr/download/article-file/522860>
- Öksüz, E. (n.d.). Feodal Düzen ve Sosyal Değişmeler. *Sosyoloji Konferansları*, (pp. 81 - 92). Retrieved 04 05, 2022, from <https://dergipark.org.tr/tr/download/article-file/101184>
- Ören, K., & Yüksel, H. (2012). Geçmişten Günümüze Çalışma Hayatı. *Toplum ve Emek*, 35 - 59. Retrieved 12 15, 2021, from <https://dergipark.org.tr/tr/download/article-file/84742>
- Özdemir, M. Ç. (n.d.). İradi İşsizlik. Retrieved 03 12, 2022, from https://sesam.sakarya.edu.tr/sites/sesam.sakarya.edu.tr/file/iradi_issizlik.pdf
- Özdemir, Ş., & Kılıç, D. (2019). *Geleceğin Meslekleri, Veri Bilimi, Yapay Zeka* (4. ed.). İstanbul: Abaküs Kitap.
- Özdemir, U. (1992, 12). İşçi Sınıfının Tarihsel Misyonu Tanımlar, Teknolojik Süreçler. *Gelenek*(41). Retrieved 12 15, 2021, from <https://gelenek.org/isci-sinifinin-tarihsel-misyonu-tanimlarteknolojik-surecler/>
- Özdoğan, O. (2019). *Endüstri 4.0: Dördüncü Sanayi Devrimi ve Endüstriyel Dönüşümün Anahtarları* (2. ed.). İstanbul: Pusula Yayıncılık ve İletişim.

- Özel, H. (1990). Keynesci Teorinin "Yeniden" Yorumlanması Hakkında Bir Değerlendirme. *Hacettepe Üniversitesi İktisadî ve İdari Bilimler Fakültesi Dergisi*, 8(2), 117-127. Retrieved 01 13, 2022, from WIKIPEDIA: <https://yunus.hacettepe.edu.tr/~ozel/Keynes90.pdf>
- Özkiraz, A., & Talu, N. (2008, 06 01). Sendikaların Doğuşu; Türkiye ve Batı Avrupa Ülkeleri Karşılaştırması. *Sosyal Bilimler Araştırmaları Dergisi*, 03(02), 108 - 126. Retrieved 11 05, 2021, from <https://dergipark.org.tr/tr/download/article-file/801854>
- Özsoylu, A. F. (2017, 06 28). Endüstri 4.0. *Çukurova Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 21(1), 41 - 64. Retrieved 12 11, 2021, from <https://dergipark.org.tr/en/download/article-file/416062>
- Öztuna, B. (2017). *Endüstri 4.0 Dördüncü Sanayi Devrimi İle Çalışma Yaşamının Geleceği* (1. ed.). Ankara: Gece Kitaplığı.
- Pamuk, N. S., & Soysal, M. (2018, 01 31). Yeni Sanayi Devrimi Endüstri 4.0 Üzerine Bir İnceleme. *Verimlilik Dergisi*(1), 41 - 66. Retrieved 02 26, 2022, from <https://dergipark.org.tr/tr/pub/verimlilik/issue/34982/388198>
- Park, Y. J. (2008, 11). ZUM. *History of Unemployment in Industrial Society*. Retrieved 12 05, 2021, from ZUM: <https://www.zum.de/whkmla/sp/0910/ferrari/ferrari2.html#iii2>
- Parlak, Z. (2000). Yeni Uluslararası İş Bölümü Yaklaşımının Eleştirel Bir Değerlendirmesi. *Prof. Dr. Nusret Ekin'e Armağan*, 661 - 688. Retrieved 11 11, 2021, from <https://ses.org.tr/wp-content/uploads/nidl.pdf>

- Pettinger, T. (2018, 12 23). Effective Demand. Retrieved from <https://www.economicshelp.org/concepts/effective-demand/>
- Pettinger, T. (2019, 08 07). Structural unemployment. Retrieved 04 05, 2022, from <https://www.economicshelp.org/blog/27657/unemployment/structural-unemployment/>
- Philipkoski, K. (2001, 10 03). Black Death's Gene Code Cracked. Retrieved 01 23, 2022, from Wired: <https://www.wired.com/2001/10/black-deaths-gene-code-cracked/>
- PROTENTE. (n.d.). Akıllı Cihazlar ve Akıllı Fabrikaların Avantajları. Retrieved 03 30, 2022, from <https://proente.com/akilli-cihazlar-akilli-fabrikalar/>
- Razzaq, A., Shaikh, R. A., Qureshi, M. A., Baig, M. A., & Gill, S. H. (2017, 12). Internet of Things (IoT) Applications: An Overview. *INTERNATIONAL JOURNAL OF COMPUTER SCIENCE AND EMERGING TECHNOLOGIES*, 44 - 48. Retrieved 05 17, 2022, from https://www.researchgate.net/publication/330994611_Internet_of_Things_IoT_Applications_An_Overview
- Robotics, I. F. (2021, 10 28). International Federation of Robotics Presents World Robotics 2021 Reports ' Robot Sales Rise Again '. Retrieved 01 25, 2022, from ifr.org: <https://ifr.org/ifr-press-releases/news/robot-sales-rise-again>
- Rostow, W. (2012). Sanayi Devrimi Nasıl Başladı. *İstanbul Üniversitesi İktisat Fakültesi Mecmuası*, 30(1 - 4), 255 - 278. Retrieved 05 09, 2022, from <https://dergipark.org.tr/tr/download/article-file/8594>
- Sander, O. (2000). *Siyasi tarih: İlk çağlardan 1918'e*. Ankara: İmge.

SCIENCEPHOTO. (n.d.). Newcomen Atmospheric Engine, 1712. Retrieved 02 02,

2022, from SCIENCEPHOTO:

<https://www.sciencephoto.com/media/1005055/view/newcomen-atmospheric-engine-1712>

Sevim, C. (2012). Küresel Enerji Jeopolitiği ve Enerji Güvenliği. *Yaşar Üniversitesi E*

- *Dergi*, 4378 - 4391. Retrieved 12 15, 2021, from

<https://dergipark.org.tr/tr/download/article-file/179360>

Shipman, P. L. (n.d.). The Bright Side of The Black Death. Retrieved 09 02, 2021,

from <https://www.americanscientist.org/article/the-bright-side-of-the-black-death>

SHUTTERSTOCK. (2019, 06 19). Smart Factories. Retrieved 02 02, 2022, from

PHOTONICS: <https://techgenix.com/tgwordpress/wp-content/uploads/2019/05/smart-factories-Shutterstock.jpg>

Soyak, A. (2017, 06). Teknolojiye Dayalı Sanayileşme: Sanayi 4.0 Ve Türkiye

Üzerine Düşünceler. *Marmara Sosyal Araştırmalar Dergisi*(11), 68 - 83.

Retrieved 01 28, 2022, from

<https://arastirmax.com/en/system/files/dergiler/5668/makaleler/1/11/arastirmax-teknolojiye-dayali-sanayilesme-sanayi-40-turkiye-uzerine-dusunceler.pdf>

Soylu, A. (2018, 07 13). Endüstri 4.0 ve Girişimcilikte Yeni Yaklaşımlar. *Pamukkale*

Üniversitesi Sosyal Bilimler - Pamukkale University Journal of Social

Sciences Institute(32), 43 - 57. doi:<https://doi.org/10.30794/pausbed.424955>

Stefon., M. (n.d.). Guild trade association. Retrieved 03 02, 2022, from

<https://www.britannica.com/topic/guild-trade-association>

Sürgevil, O. (2020). *Çalışma Yaşamında Farklılıkların Yönetimi*. Ankara: Nobel Akademik Yayıncılık.

Şener, S., & Elevli, B. (2017, 06 03). Endüstri 4.0'da Yeni İş Kolları ve Yüksek Öğrenim. *Mühendis Beyinler Dergisi*, 1(2), 25 - 37. Retrieved 12 05, 2021, from <https://dergipark.org.tr/tr/download/article-file/310191>

Şimşek, A. (2019, 04). Otomotiv Sektöründe Nesnelerin İnterneti Uygulamaları Üzerine Bir Derleme. *Black Sea Journal of Engineering and Science*, 2(2), 66 - 72. Retrieved 12 15, 2021, from <https://dergipark.org.tr/tr/download/article-file/655327>

Tameroğlu, S. (2001). *Bilimlerin Tarihi*. İstanbul: Birsan Yayınevi.

Tanilli, S. (2013). *Uygarlık Tarihi* (30 ed.). İstanbul: Cumhuriyet Kitabevi.

Tanyeri, İ. (1998). Keynes'in İstihdam ve Ücret Analizi. *Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 16(1-2), 29-46. Retrieved 05 09, 2021

Taş, H. Y. (2012). Toplumsal Sınıfların Değişim Sürecinde, Sendikalar ve Sendikaların Geleceği. *Emek ve Toplum Dergisi*, 07 - 109. Retrieved 12 15, 2021, from https://www.researchgate.net/publication/326881919_TOPLUMSAL_SINIFLARIN_DEGISIM_SURECINDE_SENDIKALAR_VE_SENDIKALARIN_GELECEGI

Taş, H. Y. (2018). Dördüncü Sanayi Devrimi'nin (Endüstri 4.0) Çalışma Hayatına ve İstihdama Muhtemel Etkileri. *Emek ve Toplum Dergisi*, 1819 - 1836.

Retrieved 12 15, 2021, from <https://dergipark.org.tr/tr/download/article-file/588712>

Therapy, I. (n.d.). Flying Shuttle Patent dated 1773 Shown with Standard Fabric Lathe. Retrieved 02 02, 2022, from INVENTIONTHERAPY: <https://www.inventiontherapy.com/john-kay-and-the-flying-shuttle/>

Tietz, T. (2018, 05 10). Thomas Savery and the Invention of Steam Power. Retrieved 02 02, 2022, from SCIH: <http://scih.org/thomas-savery-invention-steam-power/>

Tikkanen, A. (n.d.). Spinning Jenny 1764. Retrieved 02 02, 2022, from BRITANNICA: <https://www.britannica.com/technology/spinning-jenny>

Timurcanday Özmen, Ö. N., Eriş, E. D., Süral Özer, P., & Zerey, H. (2019, 12 11). Endüstri 4.0'A Bütüncül Bir Yaklaşım: Örnek Olay Analiz ve Stratejik Yol Haritası. *Dokuz Eylül İşletme Fakültesi Dergisi*, 20(2). Retrieved 01 05, 2022, from <https://dergipark.org.tr/en/download/article-file/911635>

Toffler, A., & Toffler, H. (1995). *Yeni Bir Uygarlık Yaratmak-Üçüncü Dalganın Politikası* (1 ed.). (Z. DİCLELİ, Trans.) İstanbul: İnkılap Kitapevi.

Tokol, A. (1984, 03). İngiltere' de Sendikacılık ve Toplu Pazarlık Sistemi. *Uludağ Üniversitesi İktisat ve İdari Bilimler Dergisi*, 5(1), 221 - 228. Retrieved 12 09, 2021, from https://acikerisim.uludag.edu.tr/bitstream/11452/20632/1/5_1_22.pdf

Topak, O. (2004). İşçiden İş Kavramına Geçiş ve Değişikliğin Gizli İdeolisi. *Türk Tabibler Mesleki Sağlık ve Güvenlik Dergisi*, 5(18), 07 - 12. Retrieved 12 15, 2021, from <https://www.ttb.org.tr/MSG/dergi/haziran18/isciden.pdf>

Tours, B. I. (n.d.). *Automating Cotton Weaving and Spinning (Flying Shuttle)*.

Retrieved 02 02, 2022, from Baltimore Industry Tours:

<http://www.baltimoreindustrytours.com/automating-cotton.php>

Trenkle, A. (2014, 12 05). Industry 4.0 Challenges Applications and Potentials.

Uluslararası İleri Endüstriyel Otomasyon Kongre ve Sergisi. Retrieved 05 05, 2021

Tunçkan, E. (2008). Endüstrileşme Olgusu ve Endüstriyel Reklamcılık. *Selçuk*

İletişim Dergisi, 114 - 120. Retrieved 11 05, 2021, from

<https://dergipark.org.tr/tr/download/article-file/177909>

Turak, Y. (2015). *Nesnelerin İnterneti ve Güvenliği*. Retrieved 11 29, 2021, from

<http://www.yigitturak.com/wp-content/uploads/IoTGuvenligi.pdf>

Ünal, Y. (2009). Bilgi Toplumunun Tarihçesi. *Tarih Okulu*(5), 123 - 144. Retrieved

09 09, 2021, from <https://dergipark.org.tr/tr/download/article-file/144913>

Wallace, A. F. (2022, 08 23). *Industrial Revolution*. Retrieved 05 05, 2022, from

Britannica: <https://www.britannica.com/event/Industrial-Revolution>

Wattpad. (2020, 04 20). *Wattpad*. Retrieved 05 01, 2020, from Wattpad:

<https://www.wattpad.com/536240436-d%C3%BCnyan%C4%B1n-ilkleri-ilk-kan-nakli-%F0%9F%92%89>

Worldometer. (2021, 12 18). *World Population by Year*. Retrieved 12 18, 2021, from

Worldometer: <https://www.worldometers.info/world-population/world-population-by-year/>

- Yankın, F. B. (2019). Dijital Dönüşüm Sürecinde Çalışma Yaşamı. *Trakya Üniversitesi İktisadi ve İdari Bilimler Fakültesi E - Dergi*, 1 - 38. Retrieved 08 10, 2021, from <https://dergipark.org.tr/tr/download/article-file/639636>
- Yazıcı Ayyıldız, A., & Eroğlu, E. (2021). Restoranlarda Kullanılan Akıllı Teknolojiler ve Robot Restoranlar Hakkında Tripadvisor’da Yapılan Yorumların Değerlendirilmesi. *JOURNAL OF TOURISM AND GASTRONOMY STUDIES*, 1102 - 1122. Retrieved 03 03, 2022, from https://jotags.org/2021/vol9_issue2_article27.pdf
- Yeşiltaş, C., & Artar, O. (2021, 03 15). Ekonomideki Dijital Dönüşüm ve İstihdam Üzerindeki Etkisi. *Working Paper Series*, 2(1), 43 - 52. Retrieved 04 05, 2022, from <http://workingpaperseries.ticaret.edu.tr/index.php/wps/article/view/36>
- Yeşilyurt Temel, H., & Yapraklı, H. (2015). Küreselleşen Dünyada İşsizlik. Retrieved 01 06, 2022, from https://www.researchgate.net/publication/283123031_Kuresellesen_Dunyada_Issizlik
- Yıldız, K. (2014, 09 - 11). İşsizlik Türleri, Her Bir İşsizlik Türünün Toplam İşsizlikteki Payı ve Çeşitli Demografik Parametlerle İlişkisi. *Akademik Bakış Dergisi Uluslararası Hakemli Sosyal Bilimler E-Dergisi*(45), 5. Retrieved 12 15, 2021, from <https://www.akademikbakis.org/file/45.pdf>
- Yılmaz, Ç. (2013). İşçi Sınıfı Bilinci Üzerine Güncel Yaklaşımlar. *Çalışma ve Toplum : Ekonomi ve Hukuk Dergisi*, 348 - 373. Retrieved 12 10, 2021, from <https://kutuphane.dogus.edu.tr/mvt/pdf.php?pdf=0014573&lng=1>

Yılmaz, M. (2016, 04 25). Dördüncü Sanayi Devrimi ve İşçi Sınıfı. *Yol Dergisi*.

Retrieved 11 09, 2021, from <https://www.yolsiyasidergi.org/dorduncu-sanayi-devrimi-ve-isci-sinifi-mehmet-yilmaz>

Yüksel, H. (2014, 06 01). Emek Kavramının Ortaya Çıkışında Rol Oynayan Tarihi

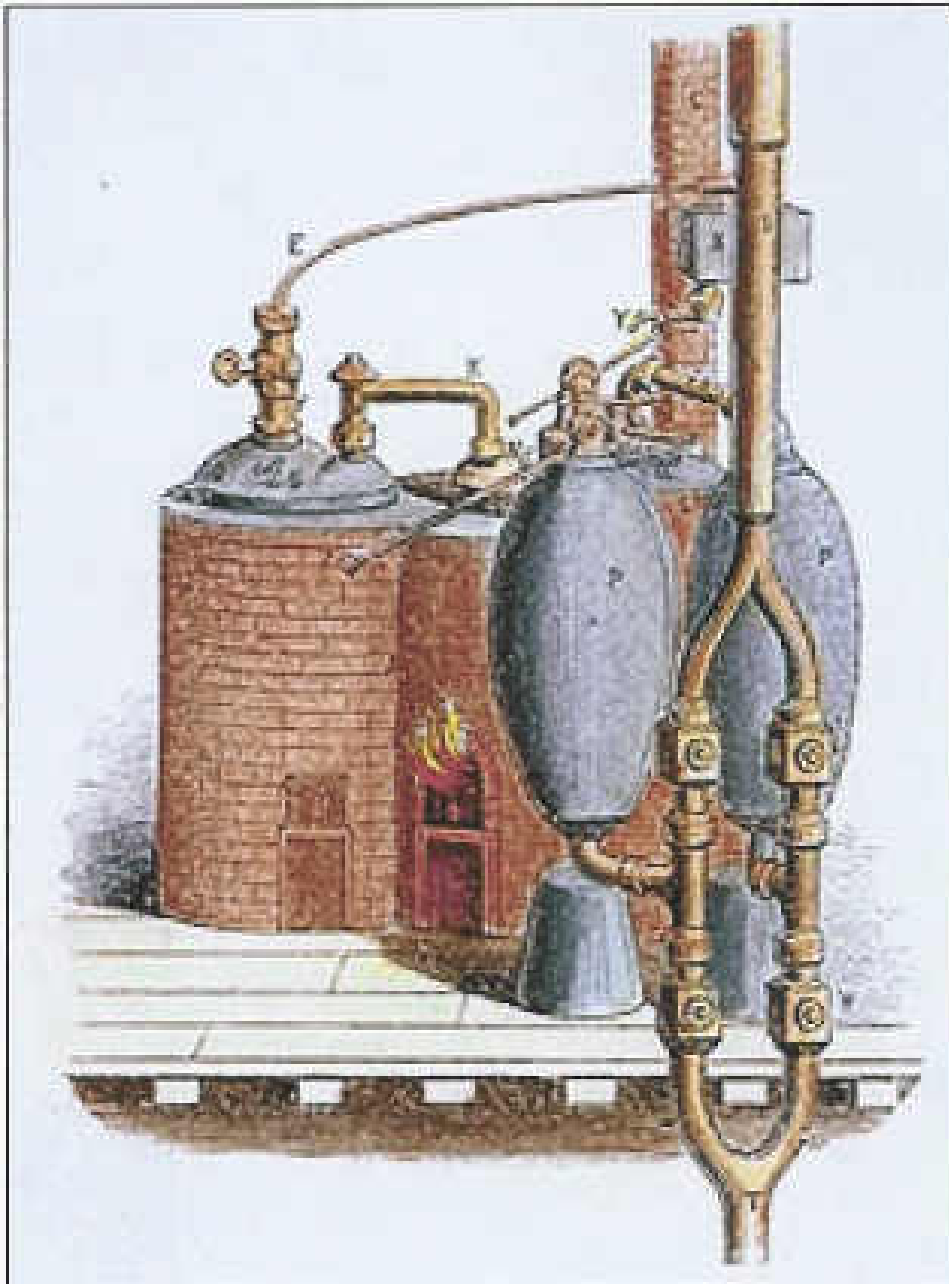
Dönüm Noktalarının Süreç Merkezli Değerlendirilmesi. *Süleyman Demirel*

Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi - Suleyman Demirel

University The Journal of Faculty of Economics and Administrative Sciences,

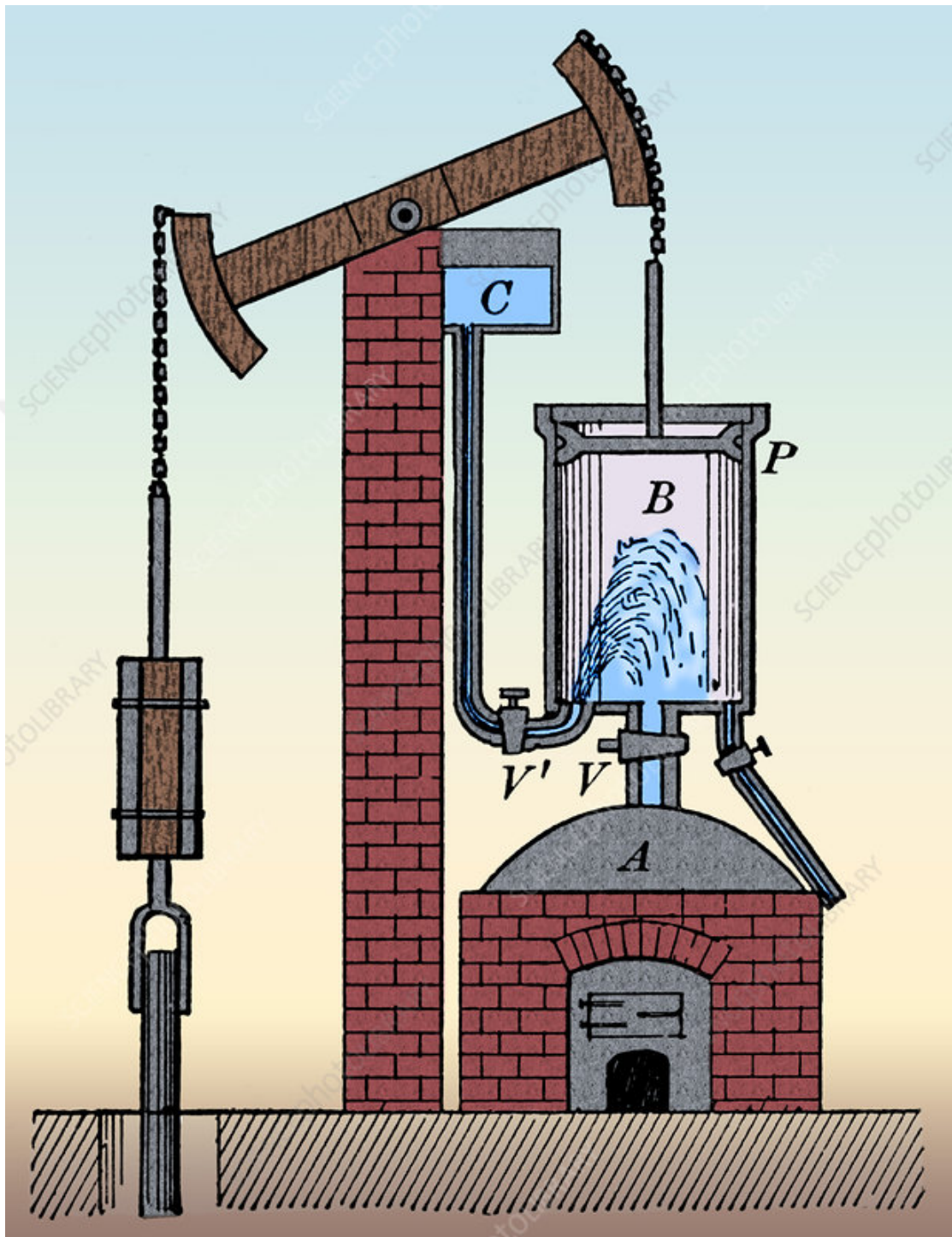
19(02), 257 - 273. Retrieved 12 15, 2021, from

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APPENDIX A**Figure 1** Thomas Savery and the Invention of Steam Power

(Tietz, 2018)

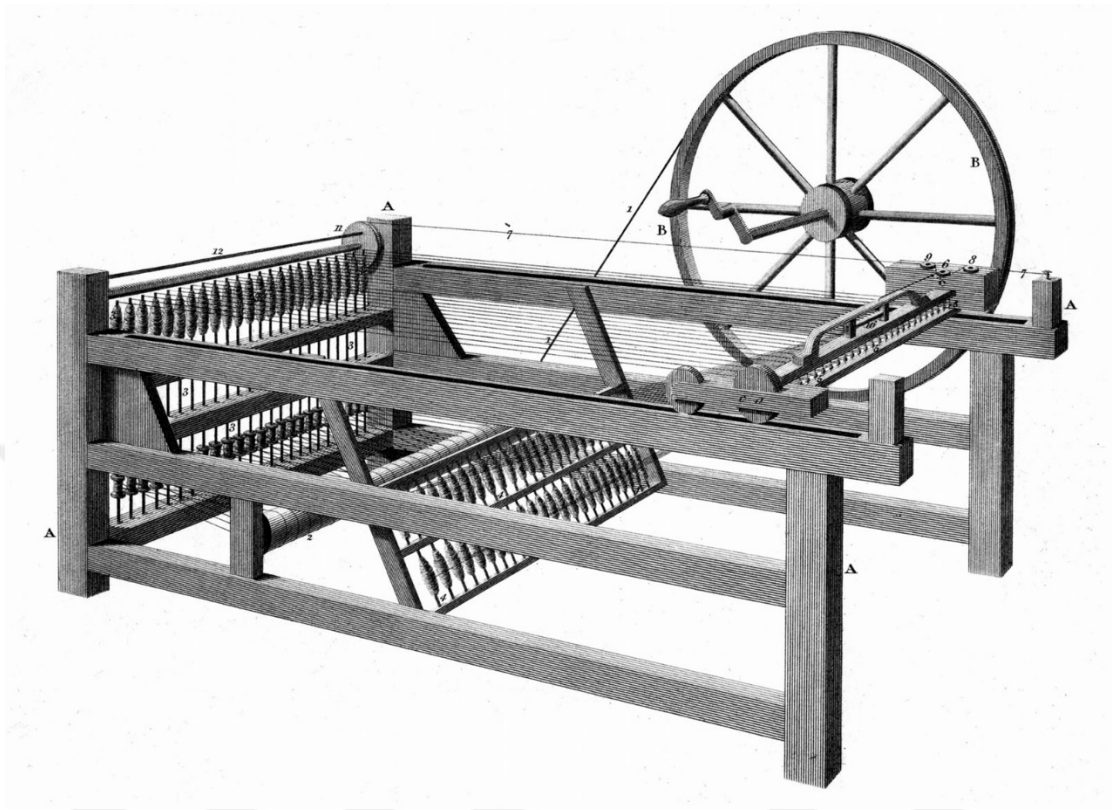
APPENDIX B

Figure 2 Newcomen Atmospheric Engine, 1712

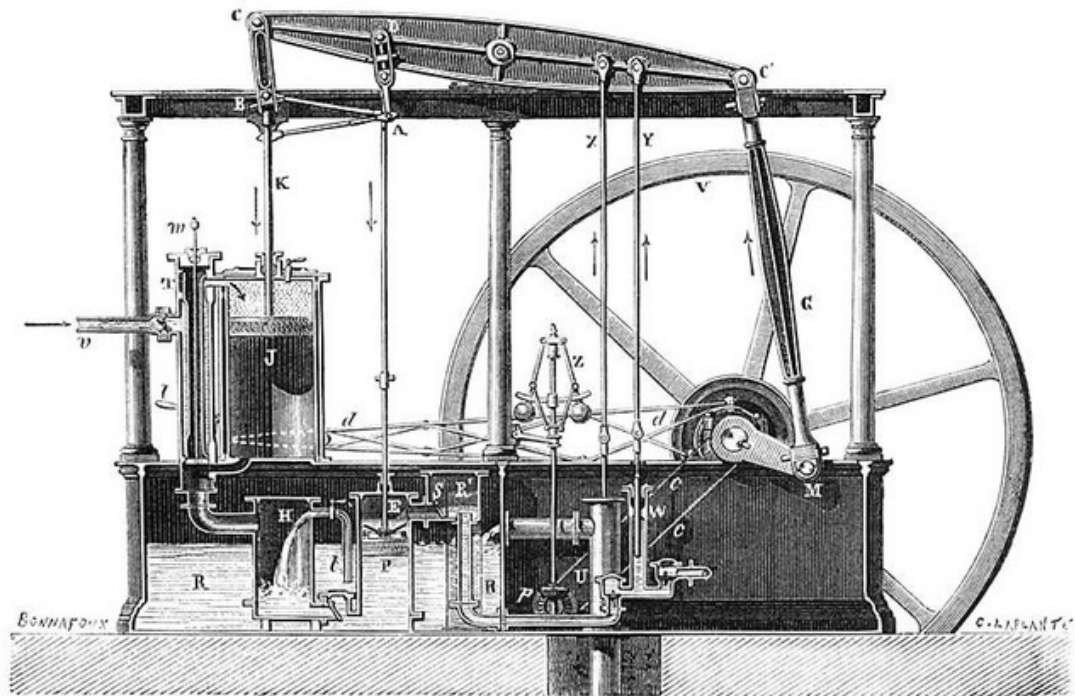
(SCIENCEPHOTO)

APPENDIX C**Figure 3** Flying Shuttle, (1733)

(Tours, n.d.)

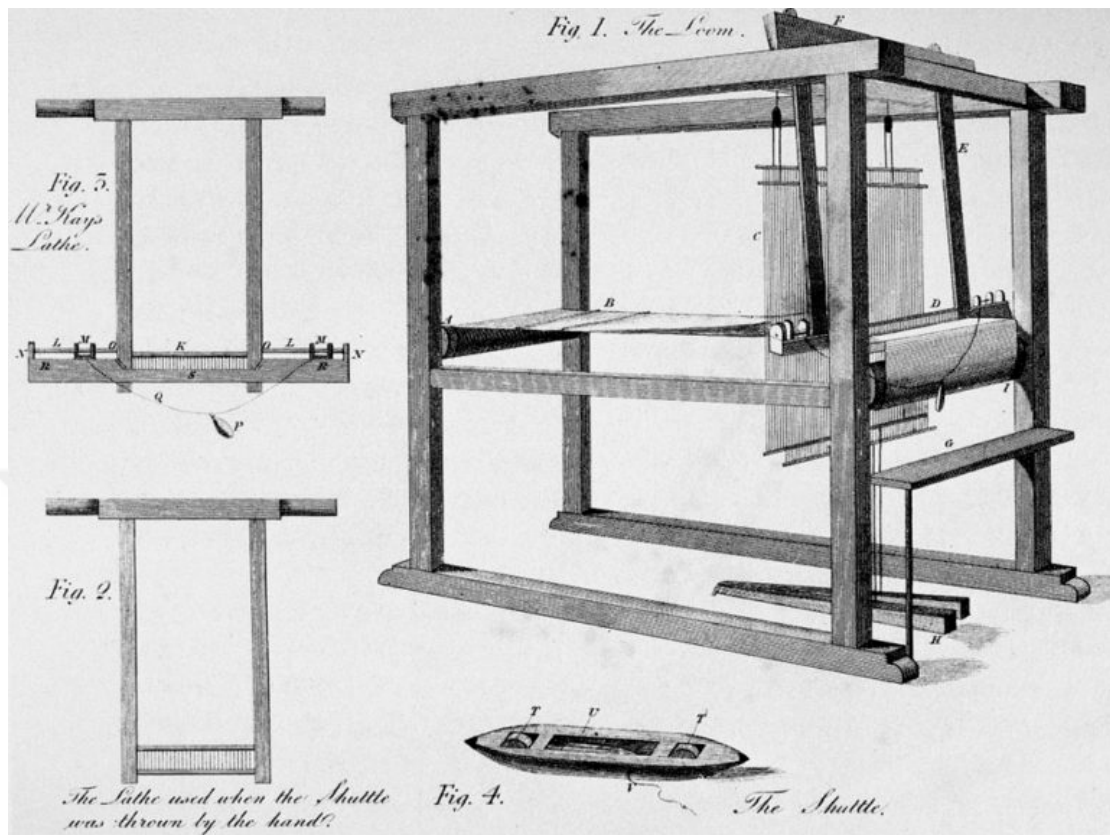
APPENDIX D**Figure 4** Spinning Jenny (1764)

(Tikkanen)

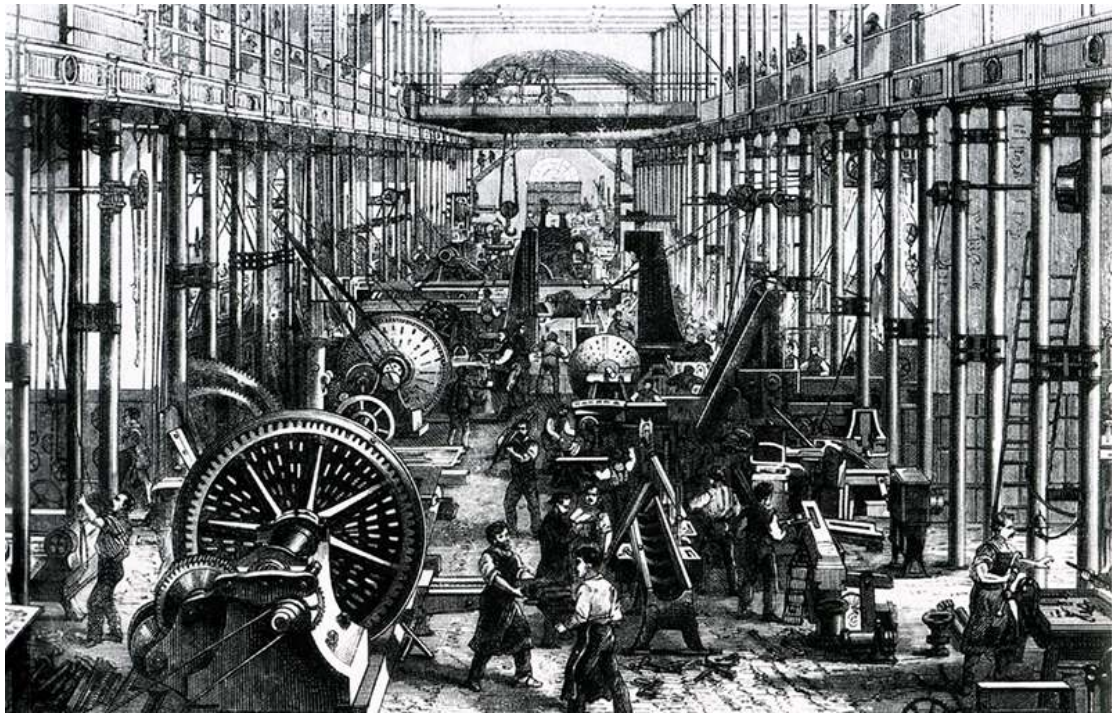
APPENDIX E**Figure 5** Watt's Steam Engine - 1765 - James Watt

(Knopf)

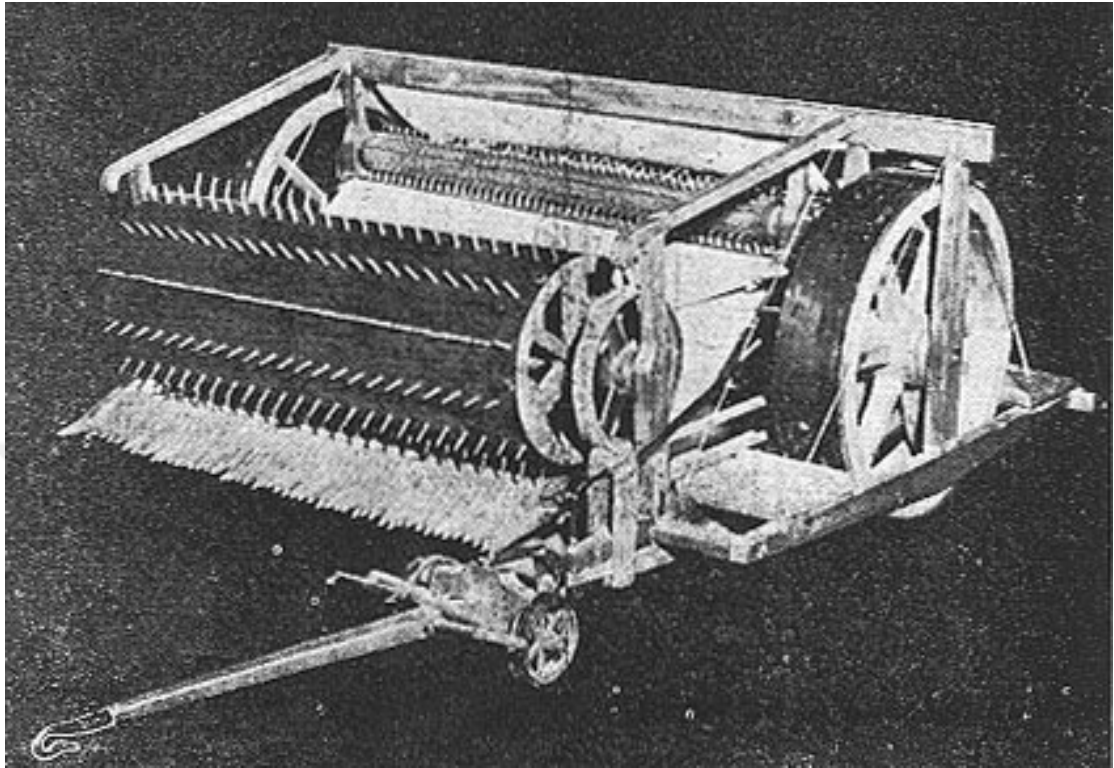
APPENDIX F

Figure 6 Flying Shuttle Patent dated 1773 shown with standard fabric lathe

(Therapy)

APPENDIX G**Figure 7** Antique Illustration of Mechanical Industry Factory, Workers and Machines

(OGGITO, 2017)

APPENDIX H**Figure 8** Moore Harvester Model (1835)

(KALAMAZOOSHOW)

APPENDIX I**Figure 9** IBM 608 Calculator

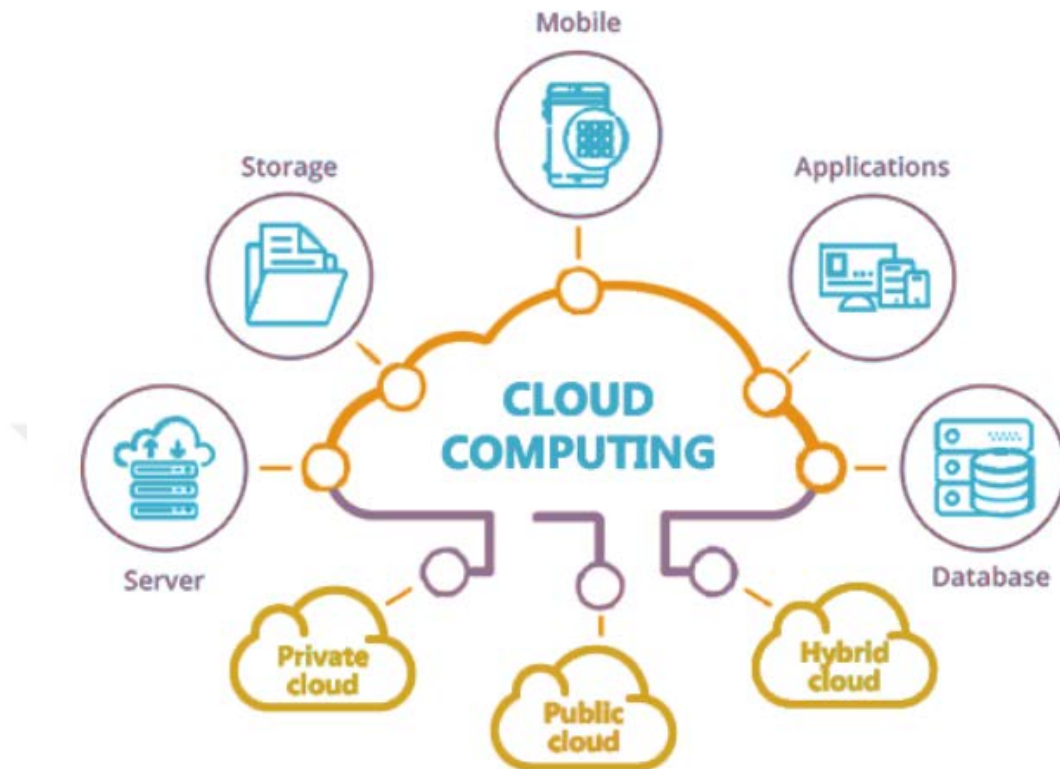
(Ibm)

APPENDIX J**Figure 10** First 3D Printer SLA-1

(Kerns, 2017)

APPENDIX K**Figure 11** Internet of Things - (IoT)

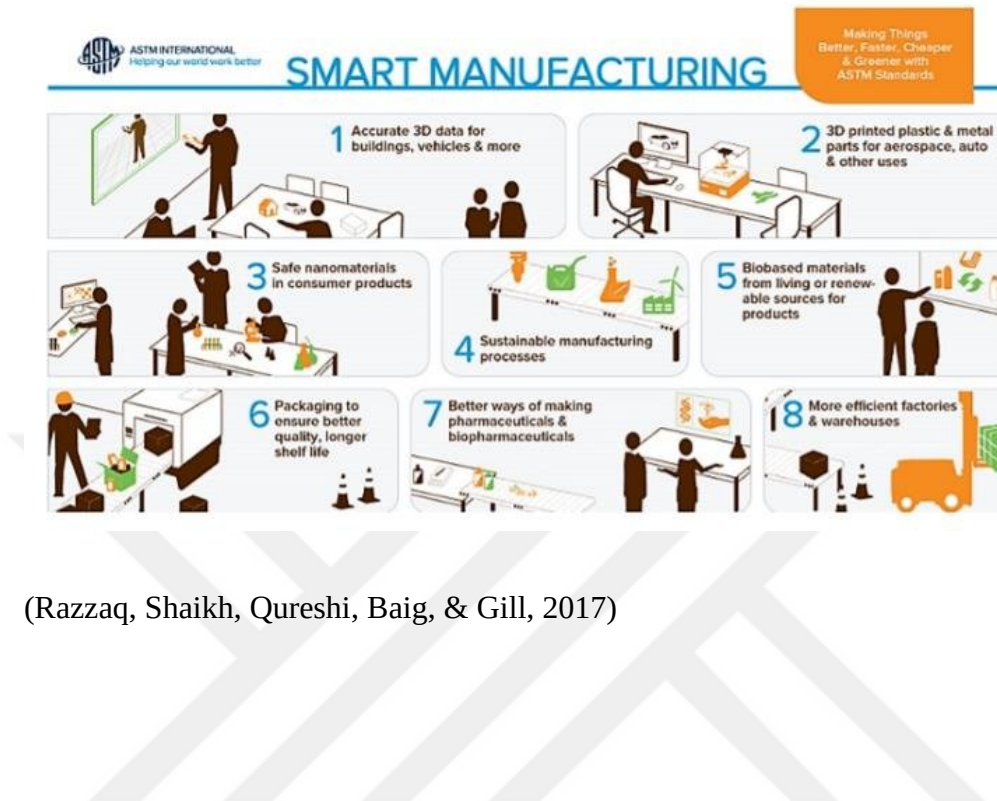
(Clickworker, 2020)

APPENDIX L**Figure 12** A Primer on Cloud Computing

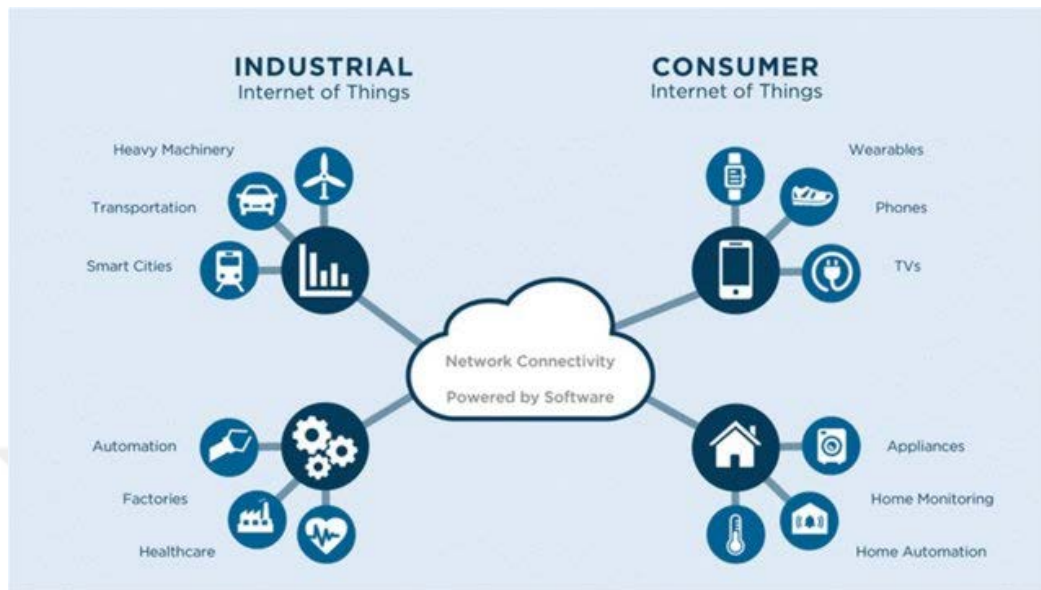
(Braind, 2019)

APPENDIX M

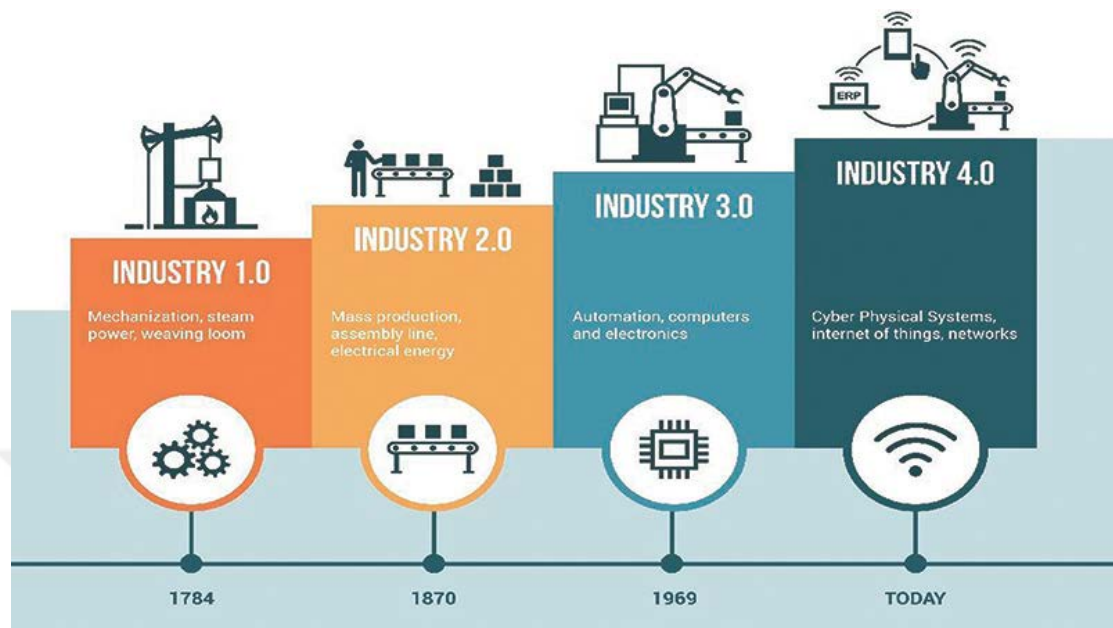
Figure 13 Internet of Things (IoT) Applications: An Overview



(Razzaq, Shaikh, Qureshi, Baig, & Gill, 2017)

APPENDIX N**Figure 14** Structure and composition of the industrial Internet of Things

(Chu, Pan, Leng, Fu, & Lam, 2020)

APPENDIX O**Figure 15**

(Gözükeleş, 2019)