FUTURIST THINKING IN URBANISM:
A RETROSPECTIVE & PROSPECTIVE VIEW IN THE GLOBAL CONTEXT OF
TRANSFORMING SOCIO-ECONOMIC STRUCTURES

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HULUSİ EREN EFEOĞLU

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submitted by **Hulusi Eren Efeoğlu** in partial fulfillment of the requirements for the degree of **Master of Science in Urban Design in City and Regional Planning, Middle East Technical University** by,

Prof. Dr. Halil Kalıpçılar
Dean, Graduate School of **Natural and Applied Sciences**   _____

Prof. Dr. H. Çağatay Keskinok
Head of Department, **City and Regional Planning**   _____

Assoc. Prof. Dr. Olgu Çalışkan
Supervisor, **City and Regional Planning Dept., METU**   _____

Examining Committee Members:

Prof. Dr. Adnan Barlas
Department of City and Regional Planning, METU   _____

Assoc. Prof. Dr. Olgu Çalışkan
Department of City and Regional Planning, METU   _____

Prof. Dr. H. Çağatay Keskinok
Department of City and Regional Planning, METU   _____

Prof. Dr. Güven Arif Sargın
Department of Architecture, METU   _____

Assist. Prof. Dr. Zeki Kamil Ülkenli
Department of City and Regional Planning, TED University   _____

Date: 05.07.2018

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.

Name, Last Name: Hulusi Eren Efeoğlu

Signature   :

ABSTRACT

FUTURIST THINKING IN URBANISM:
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Efeoğlu, Hulusi Eren

M.S., Urban Design, Department of City and Regional
Supervisor: Assoc. Prof. Dr. Olgu Çalışkan

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The idea of future has always emerged as a major concept for humanity. Each and every period of the civilizations, there has been always a motivation for people to manifest their ideal futures. In the context of urbanism, the intellectual capacity of utopian thinking has influenced most of the discussions on urbanism during the history. In this regard, destructive impacts of industrial revolutions have become the triggering forces to construct the ideal image of the future city. When the first industrial revolution occurred, most of the people were not aware of the forthcoming changes that were going to affect their life significantly, as it happened in the second and the third industrial revolutions. While each industrial revolution brought unexpected outcomes, utopian thinking has generated responses to overcome those negative impacts. Today, we are on the verge of another industrial revolution. Unlike the previous ones, the fourth industrial revolution is expected to change not only the way to produce things but also to change 'us' (Schwab, 2016). Therefore, it is possible to claim that the forthcoming era will completely alter the current socio-economic

structure. The subject is a newly emerging issue, yet the intellectual history of futurist thinking together with the contemporary future urban models and speculative projects would provide the guidance to generate prospective ideas for the possible future. In this context, the main purpose of the research is to examine the existence and validity of futuristic thinking in urbanism in the context of emerging concepts of the Fourth Industrial Revolution, and to revisit the reconstruction of the idea of future urbanism within the framework of utopian thought.

ÖZ

ŞEHİRCİLİKTE GELECEKÇİ DÜŞÜNCE: KÜRESEL BAĞLAMDA SOSYO EKONOMİK YAPILARIN DÖNÜŞÜMÜNE GEÇMİŞE DÖNÜK VE GELECEĞE YÖNELİK BİR BAKIŞ

Efeoğlu, Hulusi Eren

Yüksek Lisans, Kentsel Tasarım, Şehir ve Bölge Planlama Bölümü

Tez Yöneticisi: Doç. Dr. Olgu Çalışkan

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Gelecek fikri, her zaman insanlık için önemli bir kavram olarak ortaya çıkmıştır. Medeniyetlerin her döneminde, insanların ideal geleceği ortaya koymaları için bir motivasyon kaynağı olmuştur. Şehircilik bağlamında ise ütopik düşüncenin entelektüel kapasitesi, tarih boyunca kentler üzerine yapılan tartışmaların çoğunu etkiledi. Bu bağlamda, sanayi devrimlerinin yıkıcı etkileri, ideal olan şehrin imajını oluşturmak için tetikleyici bir güç haline gelmiştir. İlk sanayi devrimi gerçekleştiğinde, insanların çoğu, tıpkı ikinci ve üçüncü sanayi devrimlerinde olduğu gibi, yaşamlarını önemli ölçüde etkileyecek olan değişikliklerin farkında değillerdi. Her sanayi devrimi beklenmedik sonuçlara yol açarken, ütopik düşünce bu olumsuz etkilerin üstesinden gelmek için yanıtlar üretti. Bugün ise başka bir sanayi devriminin eşiğinde bulunmaktayız. Önceki devrimlerden farklı olarak, dördüncü sanayi devriminin yalnızca üretim biçimini değil, 'biz'i de değiştirmesi beklenmektedir (Schwab, 2016).

Bu nedenle, önümüzdeki dönemin mevcut sosyo-ekonomik yapıyı tamamen değiştireceğini iddia etmek mümkündür. Dördüncü Sanayi Devrimi, oldukça yeni tartışılmaya başlanan bir konu olmasına rağmen, gelecekçi düşüncenin entellektüel tarihi, geleceğin kentsel modelleri ve spekülatif projeleri ile birlikte ele alındığında geleceğe yönelik fikirler üretmeye rehberlik edecektir. Bu bağlamda, araştırmanın temel amacı, şehircilikteki gelecekçi düşüncenin varlığını ve geçerliliğini, Dördüncü Sanayi Devrimi ile ortaya çıkan kavramlar çerçevesinde incelemek, ve gelecekçi şehircilik düşüncesinin yeniden inşasını ütopyacı düşünce biçimi çerçevesinde yeniden ele almaktır.

Anahtar Kelimeler: Endüstri 4.0, Ütopyacılık, Gelecekçi Düşünce

To my lovely family,
and to the one…

ACKNOWLEDGMENTS

TABLE OF CONTENTS

LIST OF TABLES

TABLES

LIST OF FIGURES

FIGURES

CHAPTER 1

INTRODUCTION

1.1 Aim and Scope of the Research

The main purpose of this study is to investigate the existence and validity of futurist thinking in urbanism by examining the emerging concepts, trends and tendencies of the Fourth Industrial Revolution (Industry 4.0) and by revisiting the notion of utopia regarding the construction of futurist thinking in urbanism. This study shall examine the topic within a retrospective and prospective view of the transforming socio-economic structures of the communities through the history.

The concept of the future lead people to imagine what will be the next in advance. The ambition to reach the ideal one has always become the main concern of the humanity from the beginning. Throughout the history, most of the great thinkers have speculated the time and space duality by foreseeing the alternative futures. From Classic Age to Post Modern Era, there has been always a motivation for people to manifest their desired and ideal future. The need to anticipate an ideal future can be seen in the passage of all of the scriptures as well. Polak (1973) claims that intellectual capacity of people is composed of two different categories and he argues that *"his mental capacity to categorize and reorder reality within the self (present reality) and in relation to perceptions of the not-self (the Other) enable him to be a citizen of two worlds: the present and the imagined."* (p.1). Therefore, the duality between 'the present' and 'the other' provides a basis for the intellectual construction of the futurist notion. The belief of *"the future not only must be perceived; it also must be shaped"* generates a path from idea to image (Polak, 1973, p.5). In this regard, one can argue

that notion of future has appeared in varied forms and argued from different disciplinary perspectives during the history. The patterns, trends and concepts of futurist thinking have differed by reflecting the conditions of the related time period (Bottorff, 1971). The idea of future has been conceptualized with the literature of utopian thinking. Utopian literature offers influential examples regarding social and spatial structures of the ideal society.

It is possible to argue that each and every futurist proposal was developed to respond to the social, economic, political and spatial problems of the related period. During the history, one can claim that impacts of industrial revolutions became the main reasons for most of these problems. From the late-18th century to the 21st century, our civilization has experienced three different industrial revolutions. First industrial revolution emerged when the steam engine was introduced to the mechanical production. Then, thanks to the invention of electricity and assembly line, the second industrial revolution occurred in the late-19th century. Lastly, the third one revealed itself when the information technologies dominated the industry after the mid-20th century. It had not been possible to anticipate the impact of the industrial revolutions on our lives in advance. Because of this reason, neither the people nor cities have become prepared for any industrial revolutions. It is always inevitable that each and every industrial revolution has affected our lives significantly.

Now, we are on the verge of the Fourth Industrial Revolution. Industry 4.0 will offer us a new production mode by combining physical, digital and biological systems. By this way, it will provide a new perspective of time and space. Possible socio-economic consequences of the fourth industrial revolution will provide a framework on the idea that how the future life of a post capitalist society will be. It is inevitable that this revolution will affect the spatial structure just like previous ones as well. In this regard, Wial (2012) says that *"Any discussions on the spatial impacts of these new manufacturing systems is inevitably speculative because no data are available to analyze the spatial impacts of technologies that are still very new."* (p.57). Although this subject is still brand new topic, we might make speculations on the spatial consequences of the Industry 4.0 and in this context, on the evolving futurist thinking

on urbanism.

Problem statement of this study is that Industry 4.0 as an emerging industrial revolution has a serious potential to generate the futurist notion for urbanism. However, its conceptual background is currently deprived of certain and definite framework. As it is mentioned in the very first paragraph of this chapter, **the aim of this study is to investigate the existence and validity of futurist thinking in urbanism by examining the emerging concepts, trends and tendencies of the Industry 4.0 and by revisiting the notion of utopia regarding the construction of futurist thinking in urbanism.**

After making a retrospective view on the notion of future in the spatial construction of societies by considering the socio-economic condition of the related periods, prospective view on the emerging conditions of the incoming industrial revolution would be defined. Based on the theoretical perspective, the research would aim to discuss the impact of Industry 4.0 in the construction of new futurist notion in urbanism. This research would be conducted within the framework of the four specific research questions.

- **'what are the emerging concepts of Industry 4.0 that would generate a futurist notion in urbanism?'**
- **'would the Industry 4.0 be able to provide a basis for generating the new futurist thinking in urbanism?'**
- **'does the futurist notion that Industry 4.0 produces correspond to the contemporary utopianism discussion?'**
- **'to what extent futurist aspects of the Industry 4.0 are correlated with contemporary future urban models and conceptual projects envisioning the future of the city?'**

1.2 Method and Structure of the Research

This research is conducted by an exploratory research method due to the fact that Industry 4.0 is a quite brand new topic for the urban agenda. The theoretical framework is constructed by examining the retrospective and prospective view for the futurist notion. In this regard, futurist notion in the history within the scope of urbanism would be comprehensively reviewed. Afterward, contemporary discussions in urbanism would be examined. Therefore, comprehensive literature review would be the main methodology to identify the specified research questions. In this context, descriptive and interpretive qualitative research approach is used to conduct the study.

Figure 1.1: Retrospective and prospective view on futurist notion

Structure of the research is organized within the five chapters. The very first chapter provides an introductory section in which aim of the study and some background information are introduced. In addition, it is the section that problem statement and research questions are defined.

Within the second chapter of the research, idea of future and the utopian literature would be examined. Five different periods, starting from Classic Era to Post Modern Era would be discussed in the context of their economic and technologic structures and socio-political conditions. After introducing the socio-economic characteristics of each era, the protagonist examples of the how the future life was imagined would be presented. At the end of this chapter, general characteristics of the futurist notion from Classical Era to Post Modern Period would be discussed.

The third chapter would be constructed based on the incoming industrial revolution: Industry 4.0. Before identifying the characteristic features, main indicators and possible spatial impacts of the Fourth Industrial Revolution, the evolving dynamics of production modes throughout the history from a materialist perspective would be identified. Afterward, the transition from late capitalist era to post-capitalism would be discussed. In chapter three, it is aimed to describe the Industry 4.0 by considering the recent trends and tendencies derived from emerging factors of contemporary economy and structure of the post-capitalist society.

In the fourth chapter, the study focuses on the idea of hypermodern urbanism. With the context of futurist thinking in urbanism, emerging concepts of the Industry 4.0 are defined. Then, the question of Industry 4.0 and the possibility of the generation of a new genre of futurist thinking in urbanism within the context of contemporary discussions and emerging concepts would be discussed. At the end of this chapter, several speculative and innovative projects are investigated to understand the opportunities and limitations of them in the context of new futurist thinking in urbanism.

Chapter five with concluding remarks generates critical answers for the research questions of *'does the futurist notion that Industry 4.0 produces correspond to the contemporary utopianism discussion?'* and *'to what extent futurist aspects of the Industry 4.0 are correlated with contemporary future urban models and conceptual projects envisioning the future of the city?'*.

RETROSPECTIVE VIEW ON THE NOTION OF FUTURE

PROSPECTIVE VIEW ON THE NOTION OF FUTURE

CLASSICAL PERIOD
PRE-INDUSTRIAL ERA
INDUSTRIAL AGE
MODERN PERIOD
POST-MODERN PERIOD

// ECONOMY
// TECHNOLOGY
// SOCIETY
// POLITICS

CHANGING MODE OF THE PRODUCTION

ASIATIC MODE OF PROD.
ANCIENT MODE OF PROD.
FEUDALISM
CAPITALISM

POST-CAPITALISM
// PRODUCTION MODE

// SOCIETY .... POST-CAPITALIST SOCIETY
// PLACE

INDUSTRY 4.0

// CHARACTERISTIC FEATURES
// MAIN INDICATORS
// SPATIAL IMPACTS

CONTEMPORARY DISCUSSIONS
ON URBANISM

EMERGING CONCEPTS OF INDUSTRY 4.0
GUIDING THE FUTURISM

IMAGINATION OF THE CITY
EPISODES OF UTOPIAN THOUGHT

NEW FUTURIST THINKING IN URBANISM

SPECULATIVE
PROJECTS

TECHNOLOGICAL
MEGATRENDS

Figure 1.2: Relational framework of the study

6

CHAPTER 2

RETROSPECTIVE VIEW ON THE NOTION OF FUTURE IN THE SPATIAL CONSTRUCTION OF SOCIETY

2.1 Image of the Future and Utopian Thinking

When time-consciousness of the people become more complex, intellectual capacity to comprehend the present and future increases. In his seminal book, 'The Image of the Future', Polak (1973) claims that *"once man understood that 'here' could be yesterday or tomorrow, he had discovered the two formal Kantian[1] categories of the temporal and the spatial."* (p.3). According to Polak (1973), these categories become the tools to shape the image of the future within the new time and space. When the intellectual capacity of the person progress, he or she would be eligible to imagine other dimensions such as 'before this world, this world, after this world and beyond all worlds' (Polak, 1973, p.3).

The concept of future does not have boundaries by nature but one might able to draw his boundaries to overcome the uncertainty of it. By this way, one increases his knowledge. This notion of future can be found in the Sumerians and Babylonians time. The concept of future has always been associated with the ideal one. The idealization of the society, city and social order have always been the part of the construction of the future image. In this regard, the concept of 'utopia', coined by Sir Thomas More in 1516, became the main domain of the futurist thinking. It was revealed itself first in the Plato's Republic and after the Renaissance, it has recognized as a remarkable concept to envision the future. The concept of utopia has always renewed itself and maintained its validity against problems of industrial revolutions, increased

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[1] Regarding the philosophy of German philosopher Immanuel Kant.

population, rapid urbanization and some other unfavorable conditions. Urbanization and utopian activities have always supported each other in the spatial construction of society. In this regard, Barlas (1992) claims that *"Although there exist utopian sensibilities in the evolution of planning, they are not sufficient to transcend the realities of the existing order."* (p.44).

2.2 Episodes of Utopian Thought

In this section, it is aimed to clarify how the notion of 'future' have been reproduced in spatial context while economic and political structure of the society keeps evolving. The discussion will be made a chronologically starting from classical age to the post-modern era. In each historical period, after introducing the socio-economic characteristics of the era, the protagonist examples of how the future life and cities were imagined will be presented. So that, each socio-economic structure will be investigated in specific time intervals in which certain futuristic ideas emerged.

Economy, technology and politics are the major constitutional determinant factors of any society. From a historical-materialist perspective, we can claim that any change and transformation in these four factors result from the evolving modes of production. How the production modes evolve will be the main point to be discussed in the following chapter. It is important to keep in mind that, forces and relations are the basic factors which characterize a production mode. While production relations emerge due to the interaction between people who have the power of controlling the production activity and people who do not have, production forces evolve with the new developments in methods and techniques in production processes.

In this regard, economic conditions, technological developments, political relations and structure of the society are subject to be examined with reference to the relational scope of the dynamics of the production modes, historically. In addition, for each historical period, most influential social or/and spatial utopian projections have been introduced. While social utopias offer a future by means of the changing social structure and organizations, physical utopias present an ideal future by providing new

configuration of space (Bottorff, 1971).

2.2.1 Classical Period

Classical period connotes to the era between 480 B.C. and 323 B.C. This time period is described mainly in the context of Ancient Greeks along with their influential philosophy, art and thought.

Classical period starts when the Persian Empire was defeated by the Greeks with the rising imperial power of Athens. In this period, Greek civilization made remarkable progresses not only in the military issues, but also in the politics, philosophy, art and architecture. (Bulliet et al., 2008). During this period, serious intellectual developments took place in Greece. Prosperity, political and social developments led a series of scholars such as Hippodamus, Plato and Aristoteles develop their own notion of future and imagination of ideal living. In addition, Greek scholars started to think about the meaning of life and the nature of universe. Thus, systematic philosophy emerged in the face of the intellectual efforts of Greeks (Mckay, 2006). They had great influences over the following civilizations, including the Romans, through the rest of intellectual history.

In the following section, after introducing the general condition of economy, society and politics within the era will be introduced. Afterwards, three impressive imaginations which are the *'Greek Ideal Cities'* by Hippodamus (5th Century B.C.), *'The Republic'* by Plato (4th Century B.C.) and *'Ideal State'* by Aristoteles (3rd Century B.C.) will be discussed, accordingly.

2.2.1.1 Economy and Technology

Improvements in naval technology made Greeks more powerful against their enemies. Their technological achievements brought political power and wealth to them (Bulliet et al., 2008). In this context, the port of Piraeus became an important hub for

commercial activities in Athens. Economic developments led to increase in the quality of built environment and development of city center as well. Although Athens was the most urbanized area in the Aegean region, agriculture was still the main economic resource for the half of the population. Most of the farmers were living in the town center. While some people were working on their own agricultural fields, some of the them who are wealthy were hiring overseers to work their agricultural lands (Millett, 2000). In addition, great majority of the production force of classical era was pursued by slavery. Most of the slaves were working in the craft industries and other businesses owned by few man (Pomeroy et al., 2004).

Due to the fact that agriculture was the main factor of economy during the classic era, the economical distinction between rural and urban areas was not clear (Millett, 2000). There was a great interaction between urban center and the Attica that was the rural hinterland of Athens. Some of the public buildings such as gymnasium were found in the rural areas as well. Commuting time was short and the most common transportation mode was walking or horse riding. So, there was a close connection between Attica and the center of Athens in economic activities.

2.2.1.2 Society and Politics

The Greek society in the classical era was composed of three main groups: citizens, metics and slaves. The people who were born in the Attica and Athens can be classified as the citizens of the Greece. Although citizens consisted of varied classes that were defined according to people's political and economic roles in the society, all classes had the democratic rights. It was not necessary to have a land or a political statue to acquire the civil rights as a citizen (Thomas, 2000). In that era, Aristotle in the 'Politics' made profound discussion on definition of the citizenship. He argued that *"He who has the power to take part in the deliberative or judicial administration of any state is said by us to be a citizen of that state…"* (Aristotle, 1999, p.53). What Aristotle argued for being a citizen in his ideal state will be discussed in the relevant part, but in those times, it is possible to say that, even though it is the first known

democracy in the world, it has some deficiencies mostly due to the gender apartheid. In the Antic Greece only males who are eligible to become a citizen of Athens were the active members of the society.

Apart from the citizens, the population was composed of metics (foreigners) and slaves. Metics were the rich foreign residents of Athens. Although, they were not allowed to become a landowner or voter, they had a key role in the economy (Pomeroy et al., 2004). They were able to live in rented houses and allowed to participate social life. On the other hand, slaves were the 'muted group' as Poperoy mentioned. There is almost nothing about their names and thoughts in historical records (Ibid, 2004). They were exploited by the masters who were the owner of them. The profits that they gained were directly acquired by the masters or the person who rent them. Under such circumstances, the notion of democracy was developed to some extent, during the period of Pericles in the Classical era. The political attitude of him led up to the born of free speech. When people felt free within the new legislative conditions, they started to be in the quest for truth about the nature (Gallion & Eisner, 1986). So, when the such socio political conditions of the societies grew mature, philosophy started to emerge. In that era, Socrates, Plato, Aristotle and many other great thinkers got a chance to think and investigate many subjects freely. Scholar activities were taking place in the agora that is the most important spatial component of the Greek polis.

Antic Greek was composed of different city-states in other words 'poleis'. Due to the defensive reasons, polies were settled on hills or the place that has a geographical advantageous. When the city is developed on the high lands, it is called as 'the acropolis'. The acropolis consisted of temples, markets, administrative buildings. In addition, all area was fortified with walls. It has a powerful and magnificent typology with all its components. Thus, it can be claimed that acropolis had a spiritual influence on citizens (Pomeroy et al., 2004).

One of the most important place in acropolis was the agora where the intensive human interactions and activities take place. Most generally, the agora locates in the center of the city and it provides an enclosure that is defined by public buildings (Gallion & Eisner, 1986). Most of the economic activities were placed in the agora. They were the

main building blocks of the Greek cities and societies. In this regard, agora was the central place for social, political, economic and judicial activities (Pomeroy et al., 2004). They were the ideal places for Greeks. It provided not only exchange of goods but also that of thoughts.

Importance of the agora was mentioned both in the Plato's and Aristotle's discussions. It is thought that a polis has to provide places where people gather, meet and share their ideas as an expression of the inherent nature of human beings. In this context, acropolis presents an opportunity to for human to express and share their ideas among themselves. Rosalind Thomas (2000) argues that literature that are related with the classical era were created by the people living in the acropolises. Thus, all of the literature that Hippodamus, Plato and Aristoteles provide were developed in the context of the socio-political conditions that the agora presented.

In the following part, there will be retrospective review of how the city and the ideal social life were imagined by Hippodamus, Plato and Aristoteles in the context of socio-economic and political structure of that era.

2.2.1.3 Imagination of the City

The Greek Ideal City, Hippodamus (5th Century B.C.)

We know Hippodamus of Miletus from the passages of the Politics written by Aristotle. Hippodamus was the first known 'Politics', he is described as follows: *"Hippodamus son of Euryphon, a Milesian (who invented the division of cities into blocks and cut up Piraeus…) was the first man not engaged in politics who attempted to speak on the subject of the best form of constitution."* (Aristotle, Politics, 1267b 22-38 cited in Mazza, 2009). Because of the fact that Hippodamus was in search for the best form of political constitution in space, Aristotle introduced him a political philosopher and planner. It is believed that most of the classical Greek cities were influenced by his work while they were being constructed (Bottorff, 1971).

In his text, Aristotle presents Hippodamus as the person who invented the division of

the cities. The phrase 'division the cities' that Aristotle expressed led to different interpretations. While some of the scholars think that it was the social division of the city, others offer that it is related with physical division of the city. The first group of the scholars argue that the geometric ordering of the cities is the main concern for planning. They thought that planning is aimed only for spatial ordering and it does not have any relation with politics (Mazza, 2009). In this regard, they argue that Hippodamus theorized orthogonal layout of the streets and applied the physical grid division of some Greek towns such as Miletus (Mazza, 2009) (See: Figure 2.1.). Nevertheless, although most of the scholars think that gridiron system was invented by Hippodamus, it is known that earliest settlements in the Near East, and also some Greek colonies were built on such an orthogonal plan. Therefore, Aristotle's argument about Hippodamus as the inventor of the rectangular city-plan is disputable (Burns, 1976).
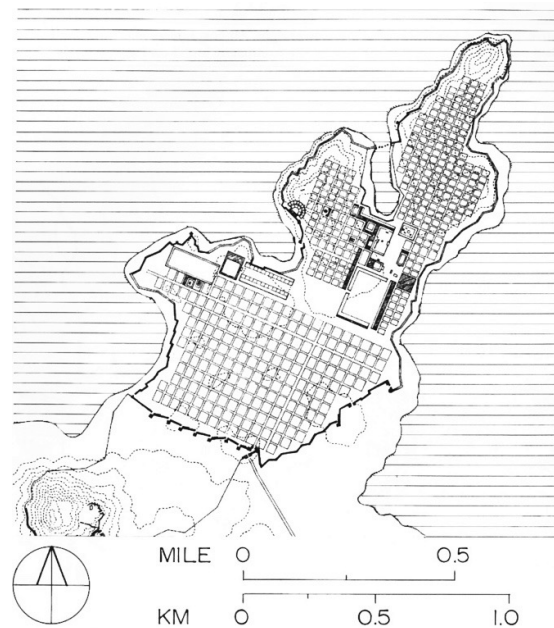
Figure 2.1: Plan of Miletus around 470 B.C. (Source: web.1)

On the other hand, some other scholars interpreted the division of cities as the spatial division of social classes. They suggest that Hippodamus divided the land into the three part for three different social classes. In the Aristotle's text, it is written that:

13

"His system was for a city with a population of ten thousand, divided into three classes; for he made one class of artisans, one of farmers, and the third the class that fought for the state in war and was the armed class. He divided the land into three parts, one sacred, one public and one private: sacred land to supply the customary offerings to the gods, common land to provide the warrior class with food, and private land to be owned by the farmers." (Aristotle, Politics, 1267b 22-38 as cited in Mazza, 2009).

In this context, his invention might be understood as the proposal for a constitution which determines the distribution of profits acquired from the functional land uses to the different social classes. Within such a zoning system, there was a new spatial arrangement of the social groups according to certain political concerns. As we know from the Aristotle's text, Hippodamus realized that, in the classical era, society was composed of three different classes which are the warriors, artisans and farmers. So, he divided the land into the three zones: sacred for the spiritual activities, public land for administrators and warriors, and private one for farmers (Mazza, 2009). He proposed a zoning plan to control socio-political organization. The spatial layout that he offered in his plan was based on the grid layout. Mazza (2009) states that, in the proposal of Hippodamus, *"different social classes are interwoven with an isonomic grid in a pattern that is anything but linear."* (p.114). As we already mentioned, Hippodamus was not the first person who proposed the gridiron system for a settlement but, he was the first person to realize the association between space and politics. As Mazza (2009) argues, *"Hippodamus did not invent the orthogonal grid, but he codified it."* (p.120). In this context, he theorized a connection between socio-political conditions and spatial order in the city. While doing so, Hippodamus evaluated the grid as a geometric form that provides a basis to make zoning more economic, adaptable, socially coherent as well as aesthetic. In addition, grid layout presents the principle of equality. Geometric equality and homogeneous spaces are the symbolic representation of democracy (Ibid, 2009). Therefore, it would not be wrong to claim that overall purpose of Hippodamus was controlling the social structure by means of gridiron plan. By integrating the basic geometric form of the orthogonal grid into the city, he became the first person who spatially systematized the creation of an ideal

14

community with complete social and political changes.

Callipolis, Plato (4th Century B.C.)

Callipolis is the ideal city that Plato mentioned in his treatise, *the Republic*. The word 'Calli' means beautiful, best and highest, and 'polis' refers to the city-state as we already mentioned. Therefore 'Callipolis' implies the desired future of the city.

Plato's intention while developing his ideal city was exploring and promoting the notion of justice above all other concerns. Wright (2012) argues that, in 'the Republic', Plato aimed to develop the concept of 'just state'. In his dialogue, Plato provides an analogy between the city and the soul. In his writings, he proposed the division of the state which is composed of three different groups as the soul is divided into reason, spirit and appetite (Hendrik, 2009). Each class of the society is composed of one of these components, accordingly.

The guardians were constituting the first part of the state. They were the philosophers who have the full control of the government. In other words, philosophers were acting as the rulers. They were thought as the most suitable people to guide the community due to the fact that they have have balanced soul. The second social class was *the auxiliaries* who are the soldiers and government officials. They were responsible for the military services and their soul was composed of spirit. Finally, *the producers*, the group composed of farmers and artisans (C. Wright, 2012). They have the soul of appetite so that they can produce goods for public interest. People were allowed to choose one of these classes if they are able to meet the requirements for chosen occupation.

Most aspects of public life were strictly under control by the philosopher kings. Ruling classes were trying to ensure the intellectual consensus and harmony between people (Ober, 2000). Philosophers were trained to reach the absolute knowledge. During this process, obligations were very hard. First of all, there was no private ownership of the property. Neither a marriage, nor a family life were allowed for them. Every children of the community were raised without having parents. They were instilled to accept the whole community as a family. By this way, ideal state was trying to achieve a

social unification of people just the intellectual harmony of them.

The conditions that Plato described for his ideal society were criticized by most of the other scholars. Aristotle evaluated the conditions in Callipolis as impossible and undesirable because of the fact that they were not correspond is to the human nature (Morrison, 2007). On the other hand, although Aristo understood that it is difficult to rule whole society with philosophers and to achieve an ideal coherence among the people in that period, he argued that proposed conditions of Callipolis are ideal and realizable. Thus, he thinks that the conditions in Callipolis is ironic (Idib, 2007). Similar to these criticisms, Plato acknowledges that the ideal state could not be actualized in real life. Morrison (2007) argues that Plato's intention was to make his readers understand that the proposed conditions were impossible and undesirable. He had a critical view on the conditions of the city states of his time. Therefore, he developed such an ideal holistic perspective and proposed an alternative future.

What are actual the factors that made Plato think on the issue of ideal society? The main motivations behind proposing such a utopia may be considered in two aspects. The first argument is that the actual political conditions in that period affected Plato and he proposed a new program that might be helpful to reform the existing polis or create a new Greek colony. On the other hand, some of the scholars think that there was an ethical motivation behind the idea. Rather than defining a better society, main aim was revealing the notion of justice in individuals (Morrison, 2007). As a new political program or a new ethical understanding, Plato's Callipolis drew a new framework for that period to developed a futurist notion. As Morrison (2007) emphasizes, we need to consider utopia as a paradigm to better understand the Plato's ideas and *"A paradigm can be useful without being realized."* (p.234).

Ideal State, Aristoteles (3rd Century B.C.)

In his writing *'the Politics, Book I'* Aristotle defines the ideal state by describing the polis, the Greek city. According to him, main purpose of the city is maintaining the beneficial cooperation among the people which can be called political partnership. By

this way, it is aimed to provide happiness of the society (Ethics et al., 2018). In this regard, Aristotle puts the household at the center of discussion. Partnership between the two persons creates family. Then, families start to expand and by contacting with other families, they form communities (Ibid, 2018). Aristotle thought that for establishing an ideal state and community, the most important thing is being composed of good individuals. Also, population of the community was a critical issue in Aristotle's' thought. He argues that rather than physical size of the community, quality is much more important. Ideal state needs to inhabit people who have right skills for the community (Bottorff, 1971). When all the individuals fulfill their responsibilities against each other, state will be self-sufficient and ideal.

On the contrary to the previous utopian proposals, Aristotle gives importance to the private ownership and he was against the common sharing of all goods. In addition, he thought that when the all things belong to public ownership, most people would not value for the things that are not belong them. On the other hand, he argued that private ownership gives pleasure for people and develop the sense of belonging (Ethics et al., 2018). Apart from the common properties, there were slaves seen as property owned by the masters. Aristotle accepted that some people are inherently responsible for serving to others who have the power.

In the ideal state, people who are responsible for daily routines such as farming, laboring etc. were not considered as citizens. Because they did not have enough time for leisure activities and also their intellectual levels were low to govern the city (Ibid, 2018). Then, people who have property were eligible for becoming an actor in the political system, and therefore being able to act as a citizen.

Aristotle aimed to present an ideal place where the liberty and peace among all people exist. Aristotle determined the location of the ideal state by considering two reasons that are about some comfort and strategic conditions. According to him, climate of the ideal city was an important factor to shape the characteristics of the people. On the other hand, although it is expected that there will be no war at all, he proposed that a place where the settlement locates should be tackled considering the defensive strategies, in case of a war (Ethics et al., 2018). In this regard, ideal state needs to has

a water access at least in one direction. And also the layout of the city should be arranged accordingly. Irregularity of the street and houses provides defensive advantages against the strangers because it will not be easy for enemies to find their way to the city. In the Book VII, Aristotle declares that while some part of the ideal city is to be designed intentionally with irregular pattern, inner parts are to be generated with the Hippodamus' modern fashion (Aristotle, 1999). Thus, in the layout of the ideal state, it is aimed to create a balance between regularity and irregularity, in other words, between security and the aesthetic.

2.2.2 Pre Industrial Era

Following the Classical Antiquity (5th-4th B.C.) in the Medieval Period the notion of future in the context of the imagining the ideal city was not valid due to the enduring world view of the era (Bottorff, 1971). It is the Pre-industrial era in which the futurist ideas were revealed especially under the very influence of the Renaissance Period. The period comprises the time span between 15th Century and 17th Century. According to the Bottorff (1971), this period is considered as the second era of utopian thinking.

After introducing the general economic structure and technological development in the period, socio-politic life will be introduced. Then, four influential proposals, '*Sforzinda*' by Antonio Filarete (1460), '*Utopia*' by Sir Thomas More (1518), '*City of Sun*' by Tomaso Campanella (1623), and '*New Atlantis*' by Francis Bacon (1650) will be discussed, accordingly.

2.2.2.1 Economy and Technology

The most important aspect of the pre-industrial period was that development and spreading of the mercantilist economy throughout the world. This is resulted from the geographical discoveries in the 15th and 16th centuries that provided whole range of new resources for production and trade. As the trade activities between different cities of the countries had tended to develop, mass of people started to concentrate in the

settlements that are located on the major trade routes (Gallion & Eisner, 1986). New economic structure affected feudal lords negatively because mercantile economy started to create new commercial partnerships and organizations among the people, governments and countries even from overseas. Therefore, a new global economy emerged through increasing demand of the growing population. Tanilli (2013) argues that capitalism emerged in such a condition that feudal relations started to dissolve. While in feudalism, producers have their own production forces[2] in capitalism there is a separation between producers and production forces. The role of the workers was redefined in the context of capitalist mode of production. Producers were deprived of production tools and forces. They became the persons who need to offer their labor to the capitalists in order to gain profits. With emergence of capitalism, scale of the production started to change. Individual small production facilities gave place to the new complex production organizations (Tanilli, 2013). It is thought that spreading of mercantile economy throughout the world increased the speed of consumption and became the first step of globalization.

While people were discovering the new natural resources around the world, at the same time there was a great effort to understand the nature itself. Mathematics and physics became the important research area with the leading scholars revolutionized the perception of the world, such as Nicolaus Copernicus, Johannes Kepler, Isaac Newton. They thought that mathematical systems are the basic determinant of the God's creation (O'Brien, 2005). The emerging ideas on mathematics and geometry influenced the architects and painters in the Renaissance, as well. Developments on science and technology brought about the invention of gunpowder. Improvements in military engineering affected the form of human settlements. Cities rearranged their defensive borderlines according to the new requirements. For instance, due to the fact that new low range artillery, effective use of city walls decreased. The need for improving the fortification walls with new heavy bastions, moats etc. emerged (Gallion & Eisner, 1986). In this context, Gallion (1986) emphasized that obligatory improvements on city walls due to defensive reasons make the separation between

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[2] In Feudalism peasantry were at the same time landowners and artisans have their own means.

town and the country more apparent.

In addition, textile industry that had huge emphasis on the economy was affected with the new inventions. While manpower was still dominant factor of production, people find some solution from the nature itself (Tanilli, 2013). Some basic machines that are working with hydropower were developed to make production processes faster and easier. Other developments were in the field of mining. New inventions make the extracting and also to processing mine easier.

2.2.2.2 Society and Politics

Mercantile economy created a new urban centers with increased populations. Within this urbanization process, existing infrastructure of the cities could not meet the demand. Due to the lack of investment for new infrastructure, development of cities was unable to go beyond the fortifications and tried to maintain itself with poor services on sanitation and water supply (Gallion & Eisner, 1986). When the population grew the built environment was to be developed in new fashions. New public spaces were built up. Since wheeled traffic increased new arterial roads were developed. Nevertheless, insufficient infrastructure caused some diseases (Ibid,1986). In this era, class structure was to be transformed radically. Serfdom started to disappear.

Intellectually, the most important phenomenon in this era was the emergence of the Renaissance. When mercantilism became dominant factor of the economy, merchants got wealthier and they preferred to use their increased resources in the field of science and art. In this new economic context, there was a great competition between the cities. According to Gallion and Eisner (1986), rulers of the cities tried to show their power by improving their built environment. Bottorff (1971) argues that there were not major transformations in the physical form of the cities, yet specifically open spaces were the main focus. In that era, a lot of design interventions were made to create new public open spaces by opening strong central axes. Geometric centerlines were symbolizing the concentration of political power in the city (Gallion & Eisner, 1986). Although it seems that there were some developments on physical space, science and art for the

benefit of people, there were also a lot of criticism about these improvements. It is thought that resources were used only for upper classes. Built environment were improved not for public interest but only for prestige and reflection of affluences. In the book 'Urban Pattern' Gallion and Eisner (1986) emphasizes the poor condition of the cities as follows: *"Behind the fine facades of the plazas and wide avenues dwelt the congested urban population. The city lacked sanitation, sewers, water distribution, and drainage."* At the same time, another urbanization process took place in America. A lot of new settlements were emerged by colonization of the new lands. While, geographic discoveries were increased all over the world. They seriously affected the form and quality of the production forces and techniques, which would consequently lead the emergence of capitalism (Tanilli, 2013).

During the history, while most of the scholars considered the socio-political problems of community from bourgeoisie's point of view with the aim of keeping the control on society. Some scholars developed their ideas to highlight the rights of peasants, artisans and laborers. Tanilli (2013) emphasizes that, these scholars expressed their ideal proposals for the people who have been exploited not only by feudal lords but also by the emerging class, modern bourgeoisies. While in the Classical Antiquity, utopian thinking has been developed as with a powerful emphasis on the society, as philosophical discourses, with the emergence of Renaissance, for the first time, futuristic images were generated by having strong spatial connotations. The ideal city of *'Sforzinda'* which is developed by Antonio Filarete can be evaluated as one of the most important idealistic proposal of the Renaissance in 1460. After that Sir Thomas More wrote his famous work *'Utopia',* which coined the term the first time in 1516. The book is considered the ancestor of the utopian literature. After that period, both social and physical utopian ideas have been generated more frequently. In the next section, how the ideal futuristic proposals were developed in relation to socio-economic and political structure of the pre-industrial era will be discussed.

2.2.2.3 Imagination of the City

Sforzinda, Antonio Filarete (1460)

The writings of ancient Roman architect Vitruvius, *'De Architectura'* was discovered in 1416 in the monastery library. His works was providing the very first discussion of the relation between perfect proportion of the human body and architecture. As Morrison (2016) claims that *"What makes the 'rediscovery' of Vitruvius significant is that it was no longer a work of linguistic interest or a manual on practical building methods but was being considered as a work of classical importance and was being interpreted in humanist terms."* He defined three elements that an architect needs to give importance while designing a building or a city. These are *firmitas* (durability), *utilitas* (utility), and *venustas* (beauty). In addition, Vitruvius argued that the ideal city should be designed in an octagonal shape (Slodczyk, 2016). In the 15th century, most of the theorists developing ideal city models were influenced by his ideas. Among them, Antonio Averulino who is known as Filarete was one of the most significant scholars who developed the image of the ideal city under the influence of the ideas of Vitruvius.

Filarete developed a plan which was named as 'Sforzinda' between 1457 to 1464. It is prepared in the honor of Prince Francesco Sforza (Slodczyk, 2016). Filarete presents the general characteristics of his ideal city in his book '*Libro Architettonico'*, by providing some solutions on both for urbanism and architecture, he tried to overcome social and political problems of the period. What he proposed had not only philosophical ideals but also some daily life solutions. For the first time, philosophical discourse intersected with the spatial discussion and futurist notion appeared through the diagrams and plans. Sforzinda has a star shaped city that is composed of two square rotated by 45 degrees in a circle (Valley & Palestini, 2017).
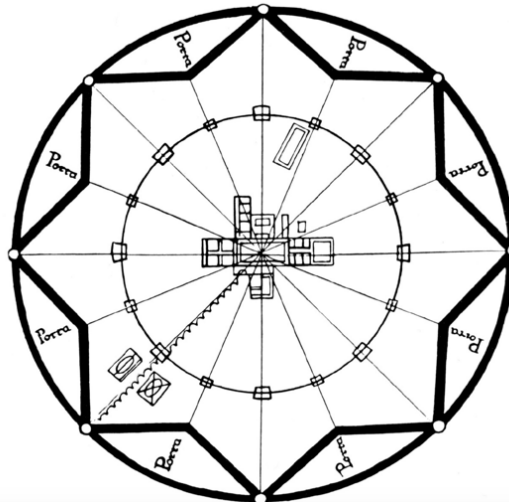
Figure 2.2: Sforzinda (Source: Valley & Palestini, 2017)

In his design, there are 16 avenues starting from the center of the circle where the main square is located. It was proposed that administrative and religious functions were located around that square and all roads were connected with this center. There was also a circular road that is located outside of the city center. On each intersection point of avenues and ring road, there are specialized markets. Freight transportation between markets was ensured by using the water canals that follow through the avenues (Valley & Palestini, 2017). On each corner of inner squares there are eight towers, and at the other eight points in the intersection of two squares there are gates.

Moreover, Filarete presented a new concept in addition to those of Vitruvius *qualiti* (type). He thought that just like the human, buildings have different types. It is composed of three different categories which are religious, public and private. They were classified according to their functions and the status of their owners (Morrison, 2016). In the plan, existence of the public areas such as cathedrals, and schools etc. were considered as an important factor to maintain the social system. Filarete thought that there needs to be one person who has an administrative power to sustain order and peace in the society.

Beside all spatial characteristics of this ideal city of 'Sforzinda', the main tendency was to provide set of aesthetic principles in urban context. In this regard, sometimes

aesthetic values became dominant and prevent some functional utilities and this can be evaluated as the general characteristics of most of the Renaissance city models (Slodczyk, 2016). Filarete's proposal stands between the representation of an ideal society and the existing life of the Renaissance era. While it proposes a completely new layout for the physical space of the city to overcome the actual social problems. It still promotes the duke as central power over the community and allows private ownerships unlike the other utopian proposals which will be discussed below.

Utopia, Sir Thomas More (1518)

In 1516, Sir Thomas More combined the two Greek word roots which are *'ou'* and *'topos'* when he proposed his famous work. While Greek word ou means 'not' and topos means 'place', More generated the term 'utopia' that has a meaning beyond these roots. He proposed an ideal city where the society lives in perfect conditions. Sir Thomas More is the first utopian of the Modern era (Tanilli, 2013). Some of the scholars argue that the idea behind More's Utopia derived from the Plato's Republic. This argument can be considered true to some extent but the political organization and socio-economic structure of More's ideal city are different from Plato's ideal city.

As it is mentioned before, with the emergence of mercantile economy, workers were deprived of production resources and means. Capitalist class has taken the control over the workers and started to use their labor to gain individual profits. In that era, peasants were dismissed from their agricultural lands and their life standards started to get worse. Sir Thomas More witnessed this era and he wrote his influential work by criticizing the current social conditions and political structure. According to him, main reason behind the all the problems was private property. Justice and equality among the people can only be maintained when the private property was terminated (Tanilli, 2013).

In 'Utopia', there are 54 cities in an island. They have same settlement plan with identical dwellings and each city has maximum 6000 people in it. Due to the fact that there is not private property at all, citizens may able to access each and every dwellings

freely (Bottorff, 1971). In addition, there is a unification of the society in which everyone wears same dresses, lives in three-storey identical buildings, eats same foods, has equal time for working and sleeping. To avoid the development of the sense of private property, there is a lottery that determines the families having houses for each and every ten years (Slodczyk, 2016). By making property temporary and creating egalitarian community, it is aimed to prevent most of the problems.

Figure 2.3: Illustration of the Utopia, 1516. (Source: web.2)

People in the utopia could able to produce what they needed. They have an ideal economy based on agricultural production and handicraft. There are huge fertile lands around the cities and all people are responsible to work in these agricultural fields. There are not any families living in these lands permanently. There is a rotation of labors who are working on these lands in every two years. After working on agricultural production for a while, families go back to their cities. According to More, most of the problems that emerged due to the distinction of urban and rural areas might be solved by this way (More, 2006). People were working without being paid for what they produced. Moreover, they were supposed to store all the products in public

storages. They were allowed to take anything that they need in these storages without paying.

In Utopia, there is kind of a democracy. Citizens of each city elect their headman and then, they determine the mayor of each city. Also, the council which is composed of these presidents make some important decisions about future of the country (More, 2006). Moreover, instant referendums are held for major problems. The number of law is low because society is educated well and they have high moral values. As opposed to Plato's ideal city, in More's (1516) proposal, there is a society without classes. The only exceptional group was the slaves. They were composed of people who are criminals or captive of war, and also the people who are sentenced with capital punishment on other countries (Abicht, 2016).

Although Lewis Mumford (2007) criticizes the Utopia by defining that it is kind of a manifesto including a standardized, monotonous and totalitarian way of life, Sir Thomas More revealed the need for visionary ideas and proposals to realize the truth with different perspectives. His work has triggered the development of the notion of ideal future to motivate the real politics.

City of Sun, Tommaso Campanella (1623)

In addition to Thomas More, Tommaso Campanella is a utopian thinker who has a huge influence on both futurist thinking and socialist thought. He published his book, 'City of Sun', in the 17[th]Century and most of the ideas in his book share similarities to the More's Utopia. Although the ideas in the book have been interpreted in many different perspectives, it is clear that there are some visions responding to the actual problems of social life in that era.

According to the Tanilli (2013), just like the ideas of Thomas More, the social utopia of Campanella was influenced by the narrow-mindedness arising from the historical context too. Tommaso Campanella argued that the reason behind the all problems were related with individualism and ignorance (Tanilli, 2013).

In 'City of Sun', similar to 'Utopia' all people have equal rights against the law and there is no private property at all. Citizens of this city have a duty of work but besides working there is a time to socialize (Slodczyk, 2016). People are willing to share what they produce with all the other citizens. There is a communal life in 'the City of Sun'. City is governed by a wise person. In addition, there is a great council that is composed of the people who are older than twenty years. They were responsible to solve problems the social life (Tanilli, 2013). 'The City of Sun' is considered the first utopia that has not slaves. People who are doing their jobs and duties are considered the honorable persons of the community.
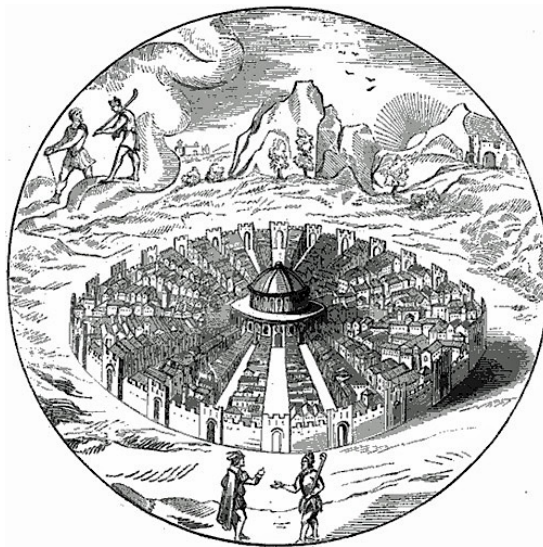
Figure 2.4: Illustration of the City of Sun. (Source: web.3)

Physical form of 'the City of Sun' was influenced by the astrology. The walls of the city are formed with seven circular concentric rings named after the seven planets (Bottorff, 1971). Among the walls, there are four main streets that coming from the central temple to the edge of the city. Relation and communication between each segment is provided by these roads. In addition, there are some defensive reasons behind this form. The city is located on the slope of a hillside that has a good micro climate not only for comfort and but also the defensive reasons. General characteristics of the spatial formation of the city present a clear symmetry and strong relation with the geometrical rules and ratios that is the general features of the ideal Renaissance

cities. The ideas and general features of the Campanella's proposal influenced some other scholars in many fields. For example, as Slodczyk (2016) mentioned, communists got the ideas on social rules that are presented in the book, and used in their concepts regarding the city planning.

New Atlantis, Francis Bacon (1627)

The name of F. Bacon's (1627) book is originated from the famous sanked island called 'Atlantis'. It is written that God sanked the Atlantis, because their purpose was to gain only material benefits but on the other hand, people in the New Atlantis work to provide public welfare and knowledge by understanding the nature (Bacon, 1627). The story of Bacon begins with accidental discovery of the island of Bensalem by travellers. The described people in the story devote themselves to the innovations and exploration of knowledge.

In the center of this island, there is an institution called 'Salomon's House' as the core of the ideal city. Salomon's House is the foundation that searches for truth and knowledge (Mumford, 1922). Their main purpose is making use of the power of knowledge to create welfare. According the faith of citizens of the city, knowledge represents the light and considered as the most valuable thing that they have. So, knowledge that they generate is considered for the honour of God.

In his article, Deveci (2006) discuss whether Bacon proposed a utopia for scientific communion or for all humantity. In this regard, Deveci (2006) argues that *"Bacon's imaginary society relies on a remarkable tension between revolutionary scientific activity and the traditional and conservative community."*(p.7). In Bacon's proposals, there is a class society. Member of the Salamon's House had higher social status than the other people. Unlike the More's Utopia, there was a less integrated community in depicted New Atlantis (Dragomir, 2011).

Most of the scholars evaluated the Bacon's work as less utopian than More's Utopia. Unlike the previous utopian examples, New Atlantis does not include any discussion

about socio-political structure of the society. There is not any proposal about how the community is governed. The only idea about the socio-political structure is that science and the knowledge will become the main force for wealth. In addition, there is not any clue for the details of spatial layout of the city. Despite there is an image of new human settlement within the novel, most of the aspects about the spatial characteristies of his ideal city remain vauge. According to the Bottorff (1971), instead of providing a radical change for the society, he found it more valuable to promote the positive effects of science and knowledge on the collective future.

2.2.3 Industrial Age

After some ideal futurist proposals in the Pre-industrial era, idealistic trend had continued in the 19th and 20th centuries, too. While Industrial Revolution brought economic growth and significant developments beyond this era, it also caused some crucial socio-spatial problems that became the main focus of the most of the utopian works.

In this regard, after explaining the economic and technological improvements and socio-political structure of that era, some of the ideal proposals will be introduced. After the Renaissance period, most of the scholar felt themselves more comfortable to generate physical utopias. Their works including maps, illustrations and sketches made their work more legible and influential than the works of previous eras. Although there are quite number of works during this period, six of them will be introduced chronologically in the context of this study. Those are *'Industrial City of Chaux'* by Claude-Nicholas Ledoux (1804), *'New Harmony'* by Robert Owen (1824), *'Victoria'* by James Buckingham (1848), *'Phalanxes'* by Charles Fourier (1876), *'Linear City'* by Soria Y. Mata (1882), *'Ideal Industrial City'* by Tony Garnier (1904).

2.2.3.1 Economy and Technology

In 1769 James Watt invented the steam engine without knowing that it would change the socio-economic context of the world. This invention allowed people to control most of the production operations by the mechanical power without using extra labor force. Steam power was not used only for generating energy for manufacturing facilities but also for transportation (i.e. ships, railways) in addition to the communication infrastructure like telegraph, telephone etc. (O'Brien, 2005). Advancement on the technology changed the operation of manufacturing. These radical improvements were held first in Britain and it spread over the Europe. Due to the fact that new developments had extensive and complex impacts for most of the aspects of life, it is evaluated as a breaking point called 'First Industrial Revolution'.

According to the Gallion (1986), before the industrial revolution, production facilities and shops were modest, and located mostly at home with small number of employee. Industrial revolution led to increase in the capacity of production and trade activities. As a result of this, production facilities moved from small parcels to the separate and larger urban areas. During this era, not only the manufacturing infrastructure has changed but also the scale of production increased. These changes resulted in the developments on both transportation and communication technologies. Industrial production system that the first industrial revolution presents was based on the movement of raw materials to the factories and also finished products to the markets and buyers (Gallion & Eisner, 1986). Therefore, transportation had crucial role in the Industrial Revolution. In the beginning of the 1800s, steam engine railroads and ships started to be operated in England for logistic uses. Then in 1829, it has started to be operated for public transport, too. It directly affected the increase in industrial production and also it had some spatial effects as well.

In addition to the transportation technology, improvements of communication infrastructure were one of the critical developments of that era. Increasing technology on communication thanks to the developed technologies such as telephone and telegraph led the exchange of ideas and knowledge all around the world. It changed the relation and effect of time and space considerably (Bottorff, 1971). Moreover,

developments on communication facilities caused the emergence of finance and banking sectors.

2.2.3.2 Society and Politics

The revolution that occurred in Britain triggered similar changes both in Europe and the United States. When the other countries experienced the industrial revolution too, and improved their production infrastructures, trade activities among them significantly increased (O'Brien, 2005). In addition, it needs to be clarify that industrialization were concentrated in some regions rather than the spreading towards the all parts of a country (Ibid, 2005). So, it was observed unprecedented increase on the population in the center of some cities where industrialization intensively took place.

In this regard, London as the center of the world economy in that era, experienced rapid urbanization with increased population. During that time, majority of the population were living in the urban area, on the other hand, rural population was very low (O'Brien, 2005). Factories were acted as a magnet as Gallion said (1986). They were attractive points for residential, commercial and public uses. Cities were developing around the manufacturing facilities. Waterfront area with its port, transportation network and residential developments were oriented through the production centers. While factories were constructing and capital was investing the industrial production economy grew. On the other hand, this new industrial economy caused the exploitation of the low poor people (Gallion & Eisner, 1986). Although, it is seemed that new economic system brought welfare and increased the quality of life, actually it increased the class segregation and created unhealthy built environment especially for workers. First industrial revolution produced a new urban environment that consist of row and tenement houses serviced by railways on the edge of the cities near the factories. They were mostly very crowded and high density residential areas and in insanitary conditions.

During the first industrialization process, people left the rural areas and migrated to the urban areas because of the increasing working opportunities. Unlike the agricultural production, new production methods of industry were less sensitive to the environment. Thus, inevitably, it created unhealthy and problematic conditions in the industrialized cities. In this regard, idealistic tendency towards the natural environment and rural areas emerged and accordingly some futurist proposals that are considering the relation of working areas, living spaces and nature itself were generated. In the following section, how the utopian futures were suggested in relation to socio-economic and political structure of industrial era will be discussed.

2.2.3.3 Imagination of the City

Industrial City of Chaux, Claude-Nicholas Ledoux (1804)

Towards the end of the 18th century, the French architect Claude-Nicholas Ledoux realized some problems on process of salt manufacturing and he was appointed by the king to design a new industrial area. In 1775, he developed a plan that has semi-circle form and built the salt works by considering the all deficiencies of the existing production facilities.

According to his plan, the new industrial city was not located on next to a salt waters, but next to the forest. Because timbers were obtained from the forests in order to fuel furnaces which were necessary for the subtraction of pure salt from the brine. He thought that it would be easier to transfer brine to the industrial site with canals than moving the required timbers to the furnaces. With his design approach, Ledoux influenced most of the following industrial developments. Even in today, locating the production site close to the main production factor became the fundamental principle for industry (Gruson, 2009).
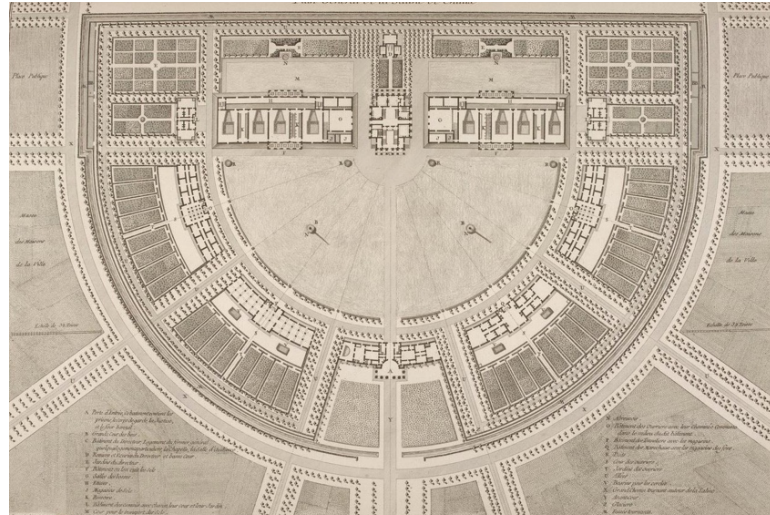
Figure 2.5: Plan of the Royal Salt works at Arc-et-Senans (Source: web.4)

During the following twenty years, Ledoux had focused on this site and developed his ideas to propose an ideal city. He is the first person who presented the design image of an ideal city in the context of industrial production (Slodczyk, 2016). The ideal city that Ledoux proposed had a regular circular form which center the salt work. He designed all details of each building in it. In the center, there is the director's house which represents power and by providing a symmetrical form, it was aimed to ensure that all people see the central place and realized the structure of the social organization. There is a communitarian life in the ideal city (Gruson, 2009). Each family is allowed to live in a single room in a house. They share kitchens and people have common spaces in front of their houses to live together. There are three different groups in the city which are army officers who are responsible for governmental issues, clerks and common workers. (Slodczyk, 2016). In the industrial city of Chaux, there are two main circular roads that connects other roads coming from the center of the city and a gate that connects the nature and industrial city. He was against the uncontrolled nature. According to Ledoux, everything in the nature (natural or artificial) has its own place in a harmony with its surroundings. Just like the previous utopian example, Ledoux searched this harmony and order in the air and sun (Gruson, 2009). Another characteristic feature of this ideal city is the functional approach. During the industrial era, separation and allocation of different functions became important. Ledoux also

33

considered organization of all the different functions with details. His main motivation was creating wealth and harmony within a new socio-spatial order. By doing so, he prioritized hygiene and safety in production (Gruson, 2009). He imagined a community living in a good condition. In all respect, his proposal is evaluated as the first complete work for an ideal industrial city and influenced most of the following utopian projections.
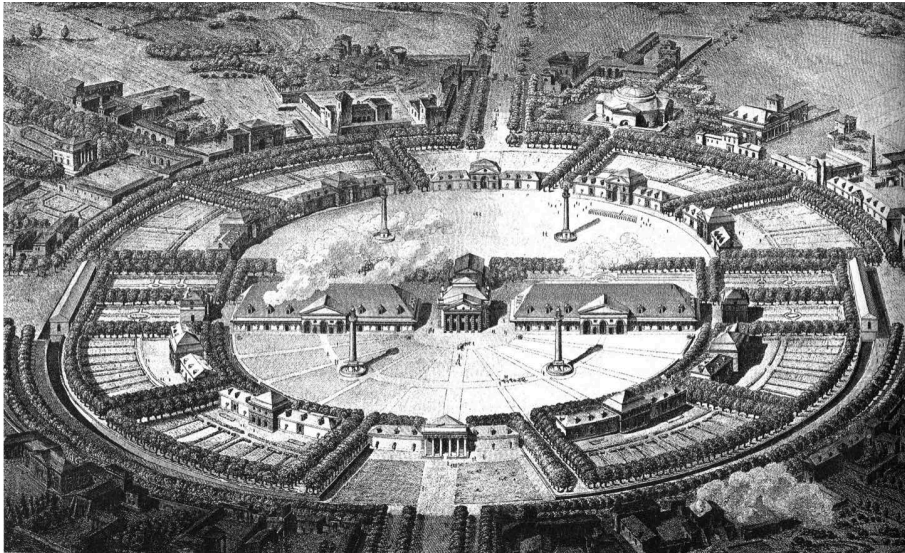
Figure 2.6: Perspective view of the 'Ideal Industrial City of Chaux' (Source: web.4)

Figure 2.7: Plan of the 'Ideal Industrial City of Chaux' (Source: web.3)

New Harmony, Robert Owen (1824)

Robert Owen, an English utopian socialist, suggests an idea that responds to the poor working and living conditions of the industrial era. According to him, most of the problems that occurred due to the lack of any industrial development model for people in the capitalist system. In the very beginning of the 19th century, he became a manager of the New Lanark Cotton Mills. He tried to create a sustainable production area together with residential, commercial and education facilities. There was three principles of this project: increasing the life standards of workers, providing efficiency in production, and creating industrial community with welfare (Akkoyunlu, 2004). To do so, Owen (1858) offered some regulations such as increasing wages, promoting education and imposing restriction on child labor. According to him, if industry is designed and organized accurately, with little labor, more abundance can be obtained (Bottorff, 1971). In 1813, he wrote 'A New View of Society' that describes his reforms for production facilities.

In 1825, Owen took his ideas one step forward by purchasing Harmonie, an Indiana religious community. He aimed to provide his ideal cooperative community. He aimed for the constitution of the society revealing the type of government and socio-economic organization which was looking for. The economic structure of the ideal community was based on a cooperative system both on manufacturing and farming (Owen, 1858). The settlement was designed for 1200 people. Properties were owned by the whole community. To obtain the necessary goods for life, everyone was responsible for work according to his or her ability. They were sharing what they produced.

Owen's architect Stendman Whitewell made a drawing for the proposed society to represent how it would look like. Spatial layout of the city was in square form. Three side of the square, there are family houses, and dormitories on the other side. Inside the square, there was a central building where public kitchen locates. On each side of the central building, there were communal functions such as education, library, elderly school, infant school, lecture rooms etc. Open spaces were designed for recreation and exercise and located around the dwelling units (Owen, 1858). While the inner side of

the Owen's proposal contained factories and public services, outer side was composed of agricultural lands. In addition, there was a ring road around the area that separated these two part. According to Gallion and Eisner (1986), Owen developed his plan especially for the unemployed people. His aim was creating a self-supporting industrial town that would be able to provide industrial employment for all.
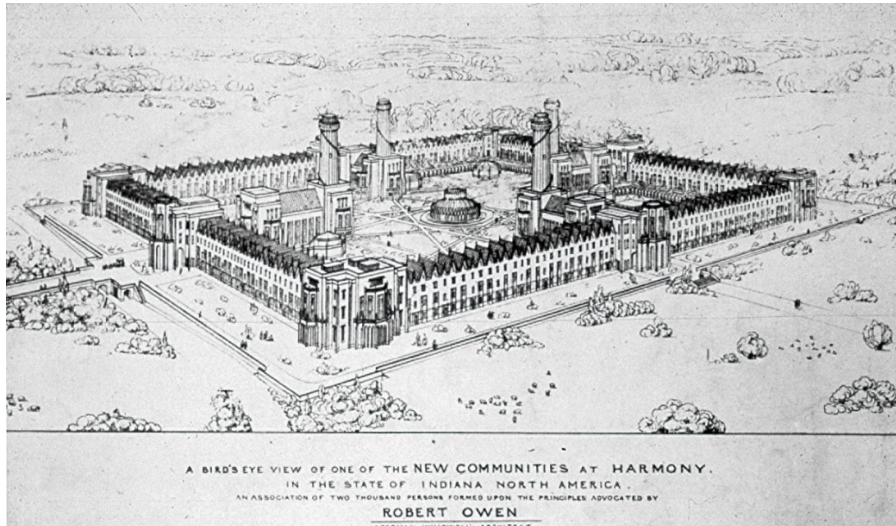
Figure 2.8: Illustration of the Owen's ideal community (Source: web.5)

Phalanxes, Charles Fourier (1876)

Fourier was influenced by the work of Ledoux. He was also disturbed by the conditions of social life that the new industrial capitalism brought about. According to him, poverty was the main reason behind all inequalities in socio-economic structure. He presented a new ideal community that is composed of phalansteries. When people started to work together and shared opportunities in an equal way, most of the problems would be disappeared. In his proposal, each phalanstere is settled on 5000-hectare land with 1600 inhabitants living in equal conditions. These settlements are self-sufficient and their economy depends on agriculture and industry. Generally, it was aimed to overcome the emerging sharp distinction between the rural and the urban areas.
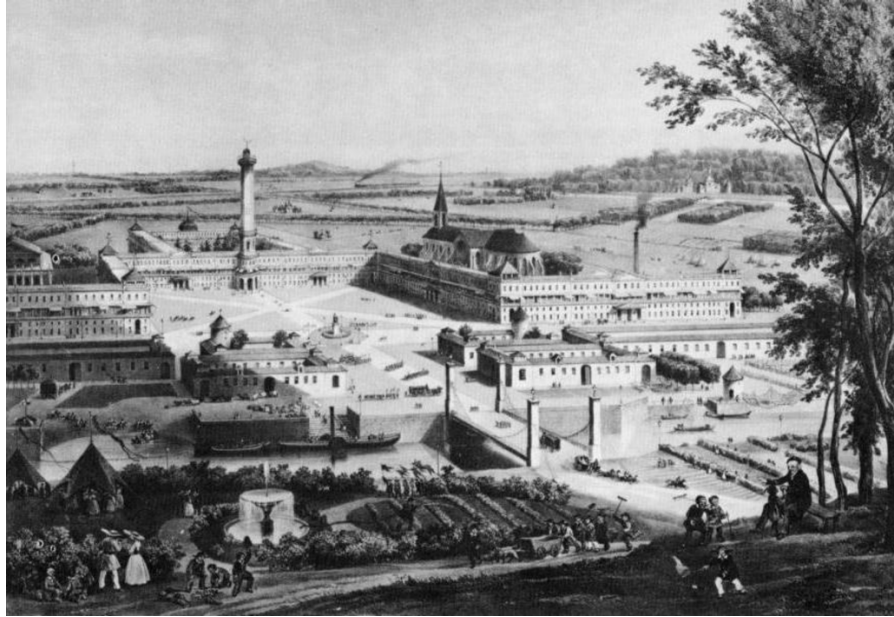
Figure 2.9: Illustration of Phalanstere by Charles Fourier (1772-1832)

In the phalansteries, each person was responsible to work in an area that he or she interested in. Society is composed of several groups. Seven-eighths of the society are producers (farmers and mechanics). Others are capitalists, scientists, and artists (Bottorff, 1971). People were free to work that they are satisfied. Citizens were able to benefit from the all resources by considering to what extent that they work for all society. After using the resources to provide the basic subsistence level of the society, five-twelfth of surplus production was to be transferred to the labor, four-twelfth to capital and rest for the skill and talent (Akkoyunlu, 2004). This system aiming for equal distribution of wealth was to be, later on, called Fourierism.

His ideal settlement composed of three parts which are the central are and two complementary wings. While there are public facilities in the center, wings contain some private uses and leisure activities. In addition, society is governed with socialist law in which there is not any restrictive rules, courts and polices.
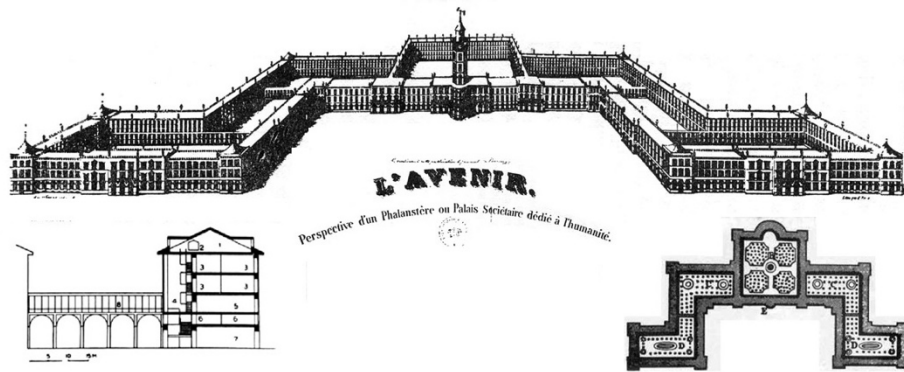
Figure 2.10: Plan and perspective view of the Phalanstere (Source: web.6)

Linear City, Soria Y. Mata (1882)

In 1882, Arturo Soria y Matta, a Spanish civil engineer, presented his concept design called 'Linear City' in his published writings. He proposed completely different urban form than crowded gridiron cities of his time (Bottorff, 1971). He thought that city developments on an expanding linear line with transport infrastructure would be the solution of all urban problems.

His ideal city which is called 'Ciudad Lineal' form consists of ribbons of building on two side of a single street of 500 meters wide that connects secondary perpendicular roads. All functions of the city were located on that road with 500 meters wide in indefinite length. Soria y Matta emphasizes that *"The growth of linear cities is simple because the line itself can go on to infinity and at any point a new community can shoot off like the branch of a tree, the tributaries of a river, the veins of the body"* (Collins, 1965, p.205 cited in Gmbh & Belgrade, 2012).

In the Linear City, Mata offered residential and industrial uses throughout this road. The proposed linear scheme was linking the two existing cities with a spine. By this way, future settlement would be developed between the already existing cities. This main road was not only serving as a transportation service, but also contains all public supply systems such as electricity, gas, water canals, municipal services etc. (Boileau, 1959). At the intersection points of the main road and secondary streets, there were large blocks composed of residential, commercial and public uses. There was not any

central area along this corridor and the distinction between rural and urban life would be disappeared. It would be possible to connect natural area with built environment. Soria y Mata argued that, problems that are occurred due to the increased urban population might be solved with this spatial organization.

In 1982, Soria Mata established the 'Madrid Company of Urbanization' to make his proposal real. He developed his idea of Ciudad Lineal with 55km around the Madrid. He achieved to complete only 5 km of his project. Although only a small part of his futuristic project was actualized, his proposal moved beyond remaining as an utopia (Gmbh & Belgrade, 2012).
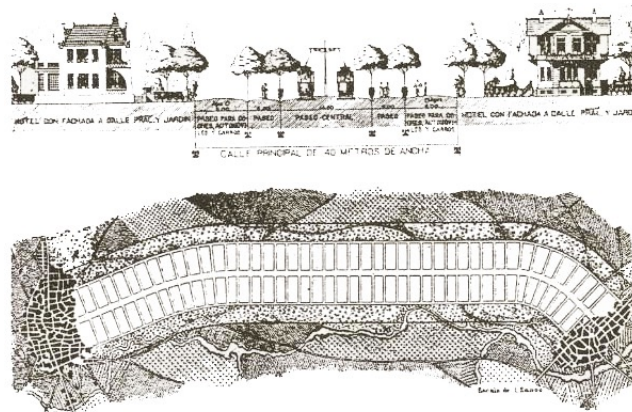
Figure 2.11: Linear City plan (below) and typical section (above) by Soria y Mata (Source: Tufek-Memisevic & Stachura, 2015)

In this context, Boileau (1959) identified Mata's ten basic principles for city planning. The prominent ones are as follows: railway is the most advantageous transportation infrastructure because it is fast and affordable; rectangular layout of the roads and city blocks is more radical because it is orderly than irregular forms; spatial configuration of a town should be formed based on a central spine that contains necessary infrastructures; any building is not allowed to settle on one-fifth of its land; each family has one detached house that has minimum 15 feet set back from the street; each family has agricultural land near their houses; the width of the spine could be decreased in order to overcome some topographical obstacles; due to the fact that linear city provide a nature friendly life, people would not do any anarchic behavior.

39

Ideal Industrial City, Tony Garnier (1904)

In 1899, when Tony Garnier was a student in Paris, he made a project for the industrial city. In time, his idea of the industrial city has been developed more and it was published by the name of *'Une Cite Industrielle'* (1917). According to Gallion and Eisner (1986), Grainer's proposal contains some insights from Soria y Mata's Linear City presenting a new way of urbanization growing along the the highway and Ebenezer Howard's Garden City that contains basically a balanced development between urban and rural areas. His idea was based on a clear separation of different urban functions (i.e. working, housing, transportation and leisure). While separating residential area from the industrial manufacturing areas, he proposed buffer zones such as green belt, highway and rail road (Gallion & Eisner, 1986). Tony Garnier organized all functions in very detailed way and considered the functional relations between them. In this respect, most of the scholars has evaluated Garnier's work as one of the first contemporary urban vision of modern industrialization.

Figure 2.12: Perspective view of La Cite' Industrielle (Source: web.7)

Although Garnier's proposal has an ideal view in the context of utopian thought, it also contains some real aspects of the city. Wiebenson (1960, p.17) argues that *"the realism of the Cite Industrielle is an ideal realism, falling within the pattern of Utopian*

schemes previously existing in France." According to her, when one compares Cite Industrielle with Ledoux' industrial city and Fourier's Phalanstere, it is possible to find similar utopian motivation behind. For instance, Garnier emphasizes the virtue of the people in his ideal society just like Fourier's proposal. Society was supposed to live in a harmony. In addition, religion was not necessary in the Garnier's proposal, instead, there was a worship of nature.

35.000 people were to be accommodated in the ideal industrial city. Public buildings were categorized into three: administrative facilities and assembly rooms; the collections; sport facilities and spectacles (Wiebenson, 1960). There was a transportation infrastructure that connects different land uses. Civic center is located next to the hospital where the main arteries connect. There were residential districts on the both side of the civic center. Housing blocks were in rectangular and horizontal forms. On the south part of the area, there was a port where industrial products are exported abroad. Main energy resource for the industrial area and other functions was obtained from the dam where hydroelectric power station was located. Garnier was very interested in technological improvements that second industrial revolution presents. In the project, he considered one of the most important innovations of his era which is electricity. Electric was evaluated as a new great production force in all respects. In this regard, just like Garnier, most of the scholars in industrial age has integrated the technological advancements in their future proposals.

2.2.4 Modern Period

World history has continued to experience some breaking points after the first and second industrial revolutions. What waited for the people this time were the World Wars and great depression in the early twentieth century. Despite the great depression in economy and politics, in that era, there were great advancements on the art and thoughts. In this section, after explaining the economic and technological developments and socio-political structure of that era, three most known ideal proposals which are Garden City by Ebenezer Howard (1898), Contemporary City and

Radiant City by Le Corbusier (1922), and Broadacre City by Frank Lloyd Wright (1932) will be examined.

2.2.4.1 Economy and Technology

In the beginning of the 20th century, European countries still had power in the world economy. On the other hand, industrial productivity of United States was remarkable. In time, economic power has shifted toward the US to be the wealthiest country in the world. Economic decline in Europe was mainly resulted from the First World War. It changed the socio-political context in all respects and this caused the profound problems in economy. Employment rate and trade activities declined. As a result of this, economic crisis occurred. In other words, great depression emerged (O'Brien, 2005). While Europe started to lose its superiority against the United State, the world has experienced the movements of thought that would bring great achievements on scientific knowledge and philosophical discourse. These changes were mainly resulted from industrial revolution and other political revolutions of that era. Duiker (2009) argues that, before the World War, new industrial improvements, new resources and technologies coming with the Second Industrial Revolution changed our cities and constituted an understanding that these material developments would be the solution of problems. As Tanilli (2005) states, it is possible to argue that, the World War accelerated the advancement of some technical discoveries before the 1914. Second Industrial Revolution presented the production of machineries. Human labor was started to substitute with machines. Especially with the invention of internal combustion engine, productivity of production process has changed and economic structures of countries were redefined. New methods and techniques were introduced and large scale production became possible which is defined as mass production. It has decreased the production costs, and the duration of one-unit production. On the other hand, it caused standardization of products. (Tanilli, 2005). In addition, crucial improvements occurred in science too, especially in the field of physics, genetics and math. Also, some developments revealed in human sciences such as psychology and sociology. For instance, Gestalt psychology, perceptional theory of form, was

developed at this period. During the 20th century, improvements on communication and movement infrastructure make people access information or any good more easily than before. Those structural transformations would eventually lead to the phenomenon of globalization.

2.2.4.2 Society and Politics

In the 20th Century, advancements were not limited only with economic context. Some significant changes on socio-political structure happened as well. Cities started to became more crowded and experienced unprecedented demographic transformations. This rapid changes resulted in social instability, inequality and conflicts. As a distinct class formation, proletariat was emerged (Tanilli, 2005). During the industrial modernity, civilization witnessed rapid and expansive urbanization through the capitalist mode of production and individualism in the society. Consequently, the era witnessed very serious social conflicts, revolutions and reformations throughout the world.

While Second Industrial Revolution increased the efficiency and capacity of production, a huge mass of people was unemployed or working in low salaries. This condition created a contradiction in the society. Bourgeoisie emerged with the rise of capitalism consolidated its political and economic position. In this regard, people felt suspicious about the legitimacy of capitalism (Tanilli, 2005). Tanilli (2005) emphasizes that in this era, people believed that, inevitable results of the rising capacity of manufacturing especially with mass production are the problems of organization and controlling the economy. Individualism had great influence on political order. Although liberalism revealed itself as a new political idea thanks to the previous phenomena such as the Enlightenment Period and French Revolution, socialist ideology tended to increase its political influence especially in the capitalistic centers at the end of the 19th century. Some new rules for vote rights were legislated. Parties and unions representing the working class interest got more political power in political context.

Despite some revisionist improvements on socio-political context, some radical thinkers in urbanism in that new ways of living in order to overcome the intrinsic problems of this era. As the protagonists of the era, Ebenezer Howard, Le Corbusier, and Frank Lloyd Wright have argued that radical reconstruction of the cities would provide solution not only for urban environment but also for the social problems (Fishman, 1997). In the next section, how these three ideal proposals were generated as response to the socio-economic and political structure of modern era will be discussed.

2.2.4.3 Imagination of the City

Garden City, Ebenezer Howard (1898)

In the late 19th century, Ebenezer Howard developed a proposal of Garden City as a respond to the conditions of capitalism. His main aim was creating a society living in cooperation. Ebenezer Howard was not a planner nor an architect or a philosopher, but he was an ordinary citizen working as a clerk who is in the search of a solution for the problems of the era. While he has generated his ideas on Garden Cities, he influenced some other ideas in urbanism such as decentralization of the cities, balanced development of town and country.

After working as a junior clerk for a while, Ebenezer Howard established his own office. Although he had remarkable achievements on his work, he had never satisfied with his work. He was impressed by the inventions of his time and wanted to contribute this rapid progression of the civilization. During this time, he developed some basic tools with new technology of electricity which did not satisfy him. After that, he started to be interested in social issues. He joined the discussions and meetings of a group which called as 'the Radicals'. Their idea was the concentration of power in the hand of a minority of people. In addition, due to the fact that, agricultural workers had no hope to obtain the land that they work, they were migrating to the slums (Fishman, 1997). The Radicals responded this situation by offering the two concepts: democracy and cooperation. They were proposing land reform that would reduce the power of

landowners on the real politics. Cooperatives would be substituted with large scale factories and profit would be shared among the citizens. Moreover, by creating a new social class composed of small landowners and laborers, it was aimed to present a welfare country without any social conflict (Ibid, 1997). In this regards, there was a significant goal of this group but they did not have any strategy or action plan to make these ideas real. By participating the most of these discussion, Ebenezer Howard had evolved his futurist notion. In addition, he was impressed with the writings of Edward Bellamy, an American author and socialist, which is published as 'Looking Backward' in 1888. In his book, Bellamy has a critique of industrial capitalism. He presents an ideal alternative of the society in which nationalization takes place. Although he thought that radical changes could be done only with centralization of power, radicals and were not in the same belief. According to Fishman (1997), on the contrary to the totalitarian ideas of Bellamy's proposal, Howard set up his ideal society based on the balance between personal interest and social order. In this regard, he put forward one of the policies of Garden City that is about the economic structure of the society. According to him, community should include private and collectively owned enterprise and people free to choose any work that they wish. Howard criticized the idea of centralization and questioned whether it is necessary or not. While he was struggling with this question, he came across with Peter Kropotkin's seminal book, 'Fields, Factories and Workshops' in 1899. Fishman (1997) expresses the main perspective of Kropotkin who influence the emerging thoughts of E. Howard as follows: *"While steam energy and the railroads had brought large factories and great cities, the dawning age of electricity would make possible a rapid decentralization. He saw the future in what he called industrial villages."* (p.36). Howard believed that decentralization could be the solution of what he seeking for. After a while he developed one of the motivation of Garden City that is, *"cooperative civilization that could be fulfilled only in small communities embedded in a decentralized society."* (Ibid, 1997, p.37).

In this regard, Howard thought that advantageous aspects of urban and rural areas should be considered to build a new society. The question of how it might be done was answered by E. Howard with 'Three Magnets' diagram. While town and country have their own particular advantageous aspects, a planner must need to present a Town-Country concept that includes the advantageous sides of both. This new idea presented a strategic perspective for action to the Radicals movement (Fishman, 1997).
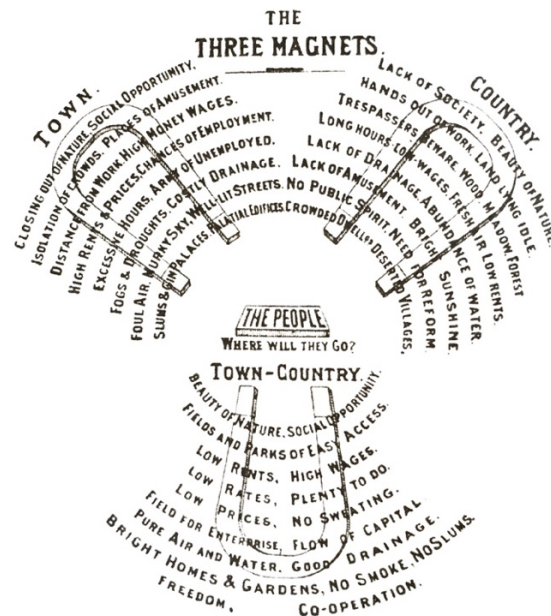
Figure 2.13: Three Magnet Diagram from Garden Cities of Tomorrow (1902)

Howard introduced his ideal city with 30.000 inhabitants. It was a new way of life in a decentralized society. According to his idea, single metropolis would not act as a central power in the whole nation. Symmetry in his diagram has symbolizes cooperation and harmony in the society (Fishman, 1997). His spatial diagrams include both residential and working area that located in close distances. He designed manufacturing areas at the periphery of the city and connected to the railway that surrounded the city. In his ideal proposal there were two centers: neighborhood center and civic center. Each neighborhood center composed of 5000 people and they were self-sufficient. Some important public uses of a neighborhood were grand avenue, a park, promenade, and a school in the middle.
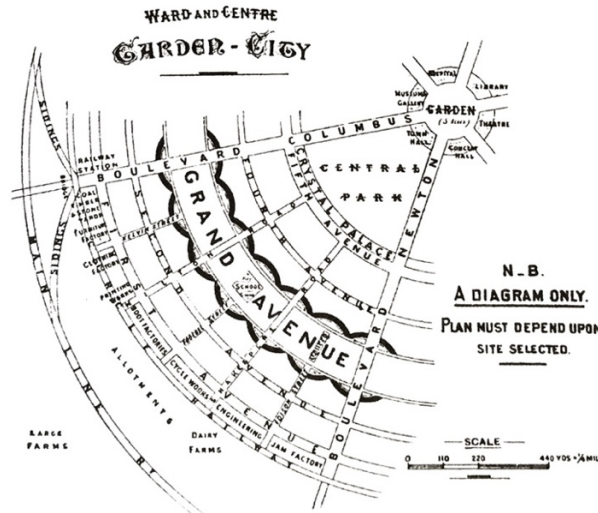
Figure 2.14: A typological section of the Garden City proposed by E. Howard (1902)

According to Fishman (1997) sense of leisure and civic sprit were the attractive forces a city that make people use the public spaces. Leisure activities include land uses such as recreation areas, central park, main commercial area (Crystal Palace). On the other hand, civic sprit was related with the cultural and cooperative issues. People has gained the civic pride in the large public areas such as library, town hall, museums etc. In the Garden City, there was an agricultural belt in which 2000 people could work on fertile lands to supply necessary foods for the domestic use. This agricultural belt also provides a buffer zone between town and countryside. Howard's proposal consists of a central city and its surrounding there are six garden cities connected with each other via railroads. When one of the cities exceeds its capacity, another city would be built in order to inhabit increased population.

During the late 19th century and following era, importance of his ideas were realized by many others. Impact of his ideas can be found in the article of the economist Alfred Marshall. Marshall (1884) argued that railroad network covering the whole Britain makes it meaningless for businesses to agglomerate in certain areas. He suggested that some committees should be established in the areas that land is cheaper in order to coordinate the production (Marshall, 1884 cited in Fishman, 1997).

Moreover, Howard has always tried to make his ideas real. With the supports of many people, First Garden City Ltd. was established to actualize the Garden City idea. Letchworth and Welwyn Garden City were built in the beginning of 20th century. Although it was aimed to adapt the principles of Howard's Garden City, cooperative community that Ebenezer Howard imagined was never developed against to the capitalist mode of production. As Fishman (1997) argues, social change was never achieved and Garden City movement has lost its novelty. Then it was to be considered only as a city planning movement.
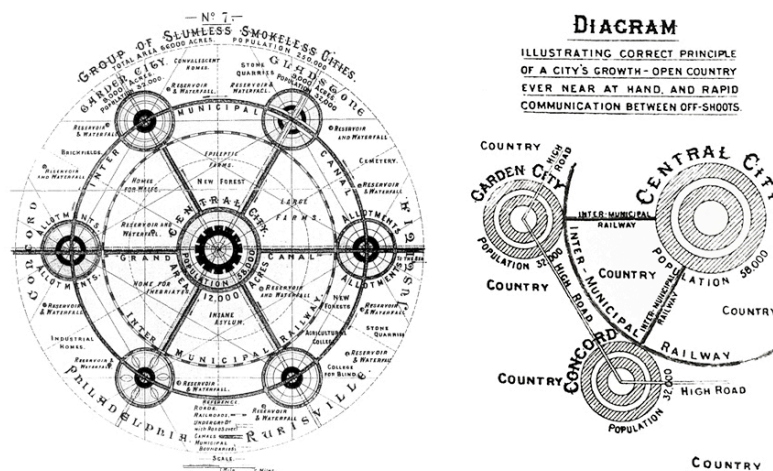
Figure 2.15: Central City and six Garden City from Garden Cities (1902)

Contemporary City and Radiant City, Le Corbusier - 1922

Le Corbusier considered the city a source of the progress and wealth. For this reason, he promoted cities as dense centers.

When he was an architect, Le Corbusier had vision that technology would become a crucial factor for architecture and society. Le Corbusier was trained himself with technological rationalism in architecture. Accordingly, architecture needs to be evaluated as science based on mathematical precision and technical rationality. (Fishman, 1997). In this view, Le Corbusier tended to create a synthesis that combines the ideal image of future with the material knowledge of the past. In the context that handicraft dissolves the industrialization, *"Le Corbusier had concluded that the*

48

machine, if properly used, could create a society of order, abundance, harmony, and beauty." (Fishman, 1997, p.183). Le Corbusier, in 1922 wrote a manifestation that introduced the problems of cities in his era by arguing that industry and commerce will not able to develop due to bad conditions of the cities. In addition, he addressed traditionalism as the main obstacle against to the new ideas on the modern city. Then, he identified physical and mental illness as the result of of the decaying old cities. Consequently, he concluded that our cities did not meet the needs of the modern world. Therefore, they had to transform themselves according to the new conditions. (Corbusier, 1981) In this regard, Le Corbusier imagined a new city that correspond the needs of the new era.

In 1922, Le Corbusier proposed his ideal city accommodating of three million people. He called his ideal settlement as 'Contemporary City'. His main purpose was presenting an ideal type of an industrial settlement. While developing his proposal, he was influenced by Tony Garnier. His city is well ordered with grid system of streets. There is a strong symmetry in the layout of Contemporary City. Fishman (1997, p.190) argues that *"symmetry of the Contemporary City symbolized the victory of reason over change, of planning over anarchic individualism, of social order over discord."* In the Contemporary City, two super highways intersecting at the city center were forming the central axes. City center was composed of the intersections of different transportation infrastructures such as railroads, subway, airway, highways, pedestrian roads and bicycle roads. Le Corbusier gave importance to speed and rapid transportation in his city. According to him, welfare, health, freedom and many other aspects of his ideal city was related with speed. Transportation was not only to transfer people and goods but also the ideas, knowledge and talents. He declares that *"The city that has speed has success."* (Corbusier, 2014, p.169). In this regard, city center undertook the role transportation hub in every sense. In addition, functional distribution of land uses was another aspect of his ideal city. In the image of his futuristic city, location of industrial areas, housing units, offices, terminals, recreational areas etc. were designated in a machine like ordered system. (See: Figure 2.17)
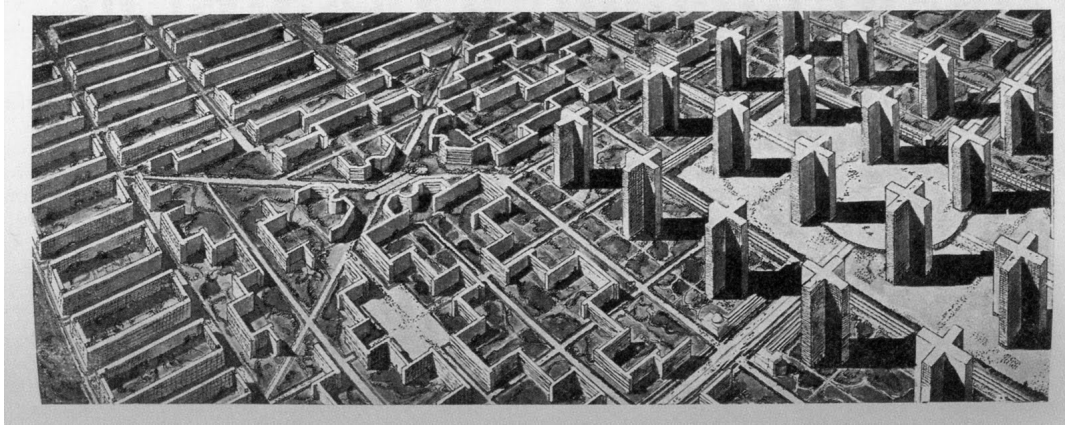
Figure 2.16: Plan of Contemporary City for three million people (Ville Contemporaine) (Source: web.8)

There are twenty-four skyscrapers around the main center where main terminal exists. These skyscrapers were composed of glass and steel, and having sixty stories. Due to the minimum footprint of the built-up area with super high rise buildings, ratio of open spaces was very high.
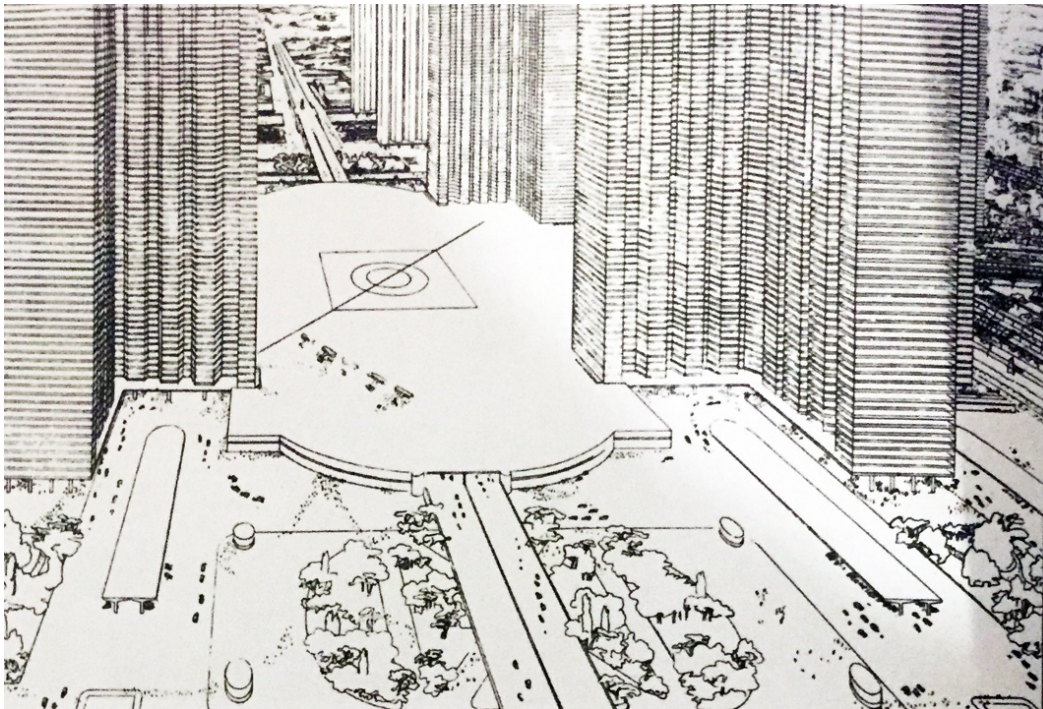
Figure 2.17: Illustration of City Center - Transportation hub where all transport modes and main highways intersect. (Source: Fishman,1997)

Robert Fishman (1997, p.193) expresses Le Corbusier's feelings on the socio-political structure of his ideal city as follows: *"Any industrial society must be hierarchically organized, administered from above, with the best qualified people in the most responsible positions."* According to him, location and category of dwelling of one person was based on his/her professional position. While elites who are industrialist, scientist, and artisans were living on the city center, other workers were living on the periphery of the city. So there was a clear class segmentation in his ideal city.

After joining the syndicalist movement, Le Corbusier has changed some his ideas about the ideal future. Especially great depression had a big impact on his thoughts. In the Contemporary City, there was not any central power that regulates the economic activities. Free competition was the determinant factor of economic organization. After the economic decline and crisis, belief for natural economic order has ended (Fishman, 1997). In Radiant City, the following ideal model of the modern city designed by the Le Corbusier in 1930, he proposed a more authoritarian system. Every aspects of the socio-economic life were under the control. He was influenced by Soria Y. Mata while developing his ideas on the new model of futuristic city. He suggested a linear plan that was similar to the abstract shape of human body. Separation of different functions, characteristic of city center, transportation infrastructure, and density of the city were the very close to his previous model. In accordance with the differences in the economic context, there was an association of social life in which elites and other classes were equally sharing the spaces in the city. He believed that Radiant City would bring essential pleasures to the machine age (Corbusier, 1981).
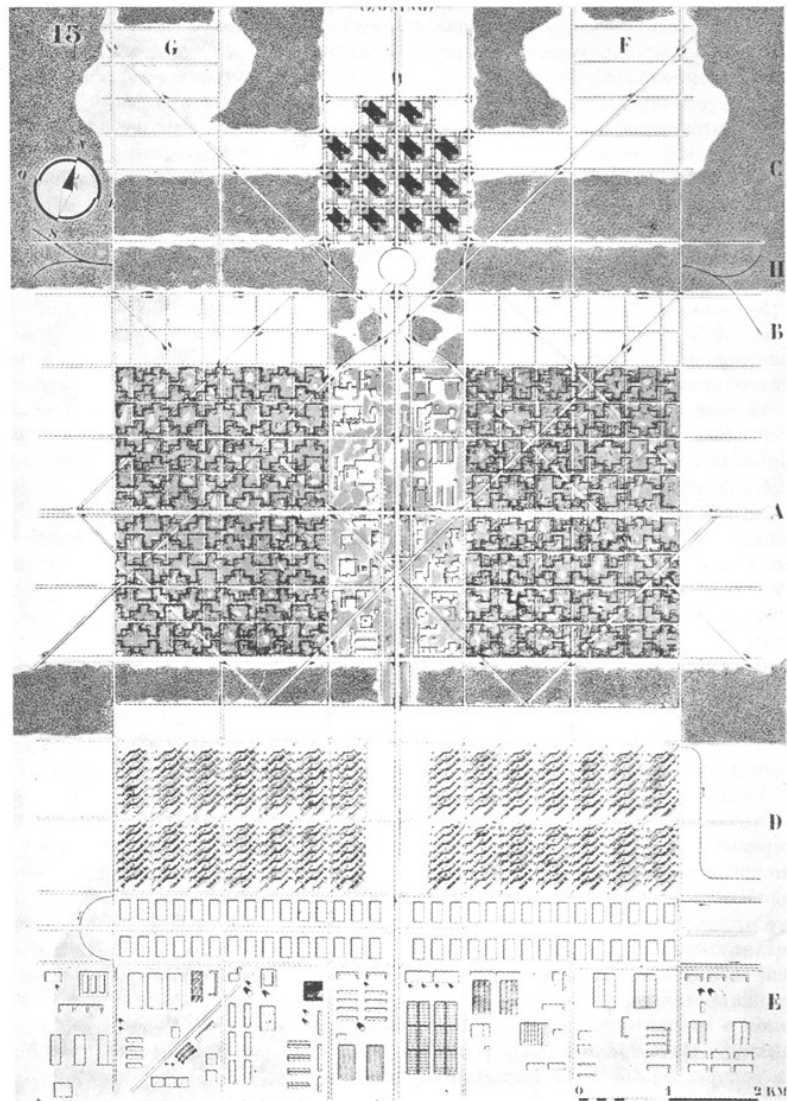
La planimetria della Ville Radieuse (Le Corbusier).

A, abitazioni; B, alberghi e ambasciate; C, città degli affari; D, industrie; E, industrie pesanti (fra le due i depositi generali e i docks); F, G, nuclei satelliti con caratteri speciali (per es., città degli studi, centro del governo, ecc.); H, stazione ferroviaria e aeroporto.

Figure 2.18: Plan of Radiant City (Ville Radieuse, 1930) (Source: Fishman,1997)

Broadacre City, Frank Lloyd Wright (1932)

Broadacre City was presented in 1935 at an industrial expo. Frank Lloyd Wright has imagined his ideal city for decentralized society. In this proposal, there were not any center at all. All areas were developed within the same hierarchy and density. Although Ebenezer Howard tried to introduce a layout in which town and country intertwine each other, his diagram has some characteristics that defines town and country

52

different from each other. On the other hand, in the Wright's ideal city, it is not possible to discriminate the urban areas from the rural lands. In addition, difference between the places that belong to the nature or built environment was not defined intentionally. In Broadacre city his ideal city, built environment dissolves through nature.

Figure 2.19: Broadacre City model by Frank Lloyd Wright (Source: Wright, 1958)

Wright's proposal was presenting a vision for machine era. There are three great inventions in the Broadacre City. Automobile that provide accelerated mobility of citizens, communication system which are radio, telephone, and telegraph. Finally, machinery in the production processes. (Wright, 1935).

According to Fishman (1997), civilization could benefit from the development of the machine age only if they come back to the nature. To do so, Broadacre city covers more than 250 km^2 of lands and composed of thousands of farms that diffuse into the nature. In the Broadacre City, all functions and different land uses such as factories, schools exist. All institutions were in small scale and located in some specific areas to avoid creating a centrality.

Wright was influenced with the invention of automobiles. He argued that private car would provide a new understanding an time and space (Wright, 1958). Machine era would provide high mobility and accessibility of people. For this reason, this new condition led people to spread around. He legitimated the idea of decentralization with this technology in some respect. In the new decentralized plan, big factories are divided into smaller parts and they spread throughout the country (Ibid, 1958). In consideration of the idea of decentralization, his main principle was individualism. He considered individuality as the main factor that would produce a real culture of the future, civilization (Wright, 2008). Therefore, at least one acre was assigned for each citizen to maintain his vital activities.

Figure 2.20: Illustration of aerial view of Broadacre City (Source: Fishman, 1997)

After the Great Depression in 1929, he thought that society needs a complete change to overcome the all the problems. This change should not only be in the economic structure but also the physical configuration of the cities. He argued that, after the developments on communication and movement infrastructure, big cities came to an end. Distances would no longer determinant factor of the cities while they are planned.

Public functions do not need to be located in the center with close distances. In this regard, he came to the conclusion on that decentralization would be the answer of the question on the form of the cities.

According to Wright, when population is diffused over the land, universal ownership of land would be achieved. By this way, inequalities in the unfair distribution of wealth would be overcome and all citizens could be the same production force. Then, Wright argued that, a community that is composed of people having equal property would provide the true democracy (Fishman, 1997). Frank Lloyd Wright tried to present an ideal city where town and country intertwine each other and fragmented structure of the modern city disappears. Decentralization was achieved by providing integration of diverse functions in a uniform urban fabric. Wright believed that this model would ultimately cause to disappearance of ultra-capitalist centers (Wright, 1935).

2.2.5 Post Modern Era

While humanity has experienced some revolutions in time, socio-economic and political structure of the world has evolved accordingly. Apart from the devastating effects of most of the breaking points in this history, people have succeeded to move one step forward in most of the aspects of life. After overcoming the destructive results of the great depression in the 1930s, the Second World War occurred between 1939-1945.

In the second half of twentieth century, the world has experienced with new advancements on socio-economic and political context. These changes led directly to changes in thoughts and ideas in many ways. After the World War 2, the so-called 'post-modern' period has been characterized with a comprehensive critique of the settled principles and institutions of industrial modernity. After explaining economic and technological conditions of this era briefly, Avant-Garde movement which is as an important phenomenon in the socio-political life of this period will be discussed. In this regard, some influenced ideas on the future in the context of urbanism will be investigated.

2.2.5.1 Economy and Technology

After the Second World War, humanity faced with a tragedy in which more than 40 million people died. Most of the cities were destroyed with the destructive effects of the war. Production facilities, transportation and communication infrastructures, dwellings were demolished. To overcome the problems of these results, governments developed some recovery programs to reconstruct the industries and to create welfare.

While the World economy was trying to recover itself after the total destruction of war, ground breaking revolutionary developments have continued to occur. Discoveries on the information technologies revealed the Third Industrial Revolution in the 1970s. With this industrial revolution labor would no longer become the primary component of the industrial production. Production started to be controlled by new technologies enabling it possible for people to drive production without physically participating in the production line. Profound impacts of information technologies on production processes have felt in many other aspects of life too. In addition, it caused the changes on economic geography of production that would result of the emergence of Post Fordism. Although Fordism gained power in the economic system after the Second World War, it had sustained itself until the emergence of Post-Fordism in the 1970s. Post-Fordism that presented a flexible accumulation mode of capital caused an effective decentralization and specialization of production facilities (Harvey, 1989).

2.2.5.2 Society and Politics

One of the most important reactionary approach of political and artistic movement was suggested by a group of people called 'avant-garde[3]'. It was used as a metaphor to described the people who have original ideas and works. Heynen (2004, p.97) described avant-garde as *"a progressive political and artistic movements that considered themselves to be ahead of their time."* In his book 'The Theory of the Avant-Garde', Poggioli (1968) categorizes the four distinct characteristics of avant-

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[3] Literally, avant-garde means that advance guard of a military force.

garde movement. These are activism, antagonism, nihilism and agonism. While activism refers to the action and dynamism, the antagonism represents a struggling against the tradition. In addition, avant-garde movement is defined itself in a nihilistic search. Lastly, it has an agonistic character in consideration of the political conflicts. In the avant-garde movement, the main motivation is creating a new life praxis as an alternative for the present. Heynen (2004) expresses this new trend as follows: *"The alternative would no longer organize social life on the basis of economic rationality and bourgeois conventions. It would rather found itself on aesthetic sensibilities and on the creative potentials of each individuals."* (p.97).

Historian S. Giedion offered that architecture should need to be evaluated as a discipline that is not restricted in some precise limits. He thought that architecture has to affect much more extensive domain to exceed its boundaries. Architects should not design just a building but they need to developed comprehensive projects including social, spatial, political and economic aspects of life (Giedion, 1995 cited in Heynen, 2004). This idea has taken into consideration by many of the avant-garde architects and they started to design all these aspect of life. W. Benjamin emphasized that to achieve this purpose avant-garde movement should be destructive. In this context, Avant-garde movement defines a new utopian path having critical character for architecture (Heynen, 2004).

After the Second World War, idealized social and political concerns started to be ignored in modern architecture because it was thought that destructive effects of war could be overcome only with an institutionalized architecture. This was resulted in the abandonment of the avant-garde desires behind (Ibid, 2004). The gap between modern architecture and the avant-garde movement has opened. After that, great number of critics against the modern architecture emerged by neo avant-garde groups such as Situationists, Archizoom, Archigram, Superstudio.

2.2.5.3 Imagination of the City

The Situationist International and The New Babylon by Constant (1961)

Having found in 1957, The Situationist International (SI) criticized modern urbanism and tried to develop radical alternative approaches. Pinder (2005) declares that, the Situationists had an ambiguous approach for the cities just like the many other avant-garde movements. On the one hand, they argued that the cities are in alienation under control. On the other hand, they thought that there is a real possibility in which people could feel free in the cities. The Situationists developed their approach according to the idea of unitary urbanism. Unitary urbanism is defined as a dynamic and evolving concept in the face of different situations. It is formed by the actions and preferences of people (Pinder, 2005). In addition, most common feature of modern planning approach which is functional distribution of land uses is not valid for this time. Unitary urbanism provides an urban environment in which work and leisure, public and private intertwine to each other. There was not clear separation between them. Moreover, it presents a collective and participatory way of living.

Pinder (2005) argues that, the situationists are evaluated themselves different from the other utopian planners. On the contrary to other scholars who develop a blueprint for their ideals, situationists did not produce spatial proposals. Yet, still they developed a totalitarian futurist notion in which radical changes would occur in our lives. The Situationists were not in favor of fixed forms and permanent solution for the spatial organization of the city. They described the city as the big playground where people participate the game (Sadler, 1999).

Nieuwenhuys who is a Dutch artist and advocator of unitary urbanism, was the member of the Situationists. Although he was mainly a sculptor and painter, he interested in urbanism and architecture as well. In this regard, he developed his famous work which is named as 'New Babylon' in 1960s. He argued that his work should not be considered as neither a planning project and architectural concept nor a work of art. Rather, what emphasized was a new understanding for urban space and way of living (Pinder, 2005). In his proposal, urban land is owned by all people and they equally

shared whole environment. Working is done with automatic systems. So, people are not responsible to participate the production processes. In the spatial organization of the city, there is a functional flexibility and mixed uses that people play.

Constant expressed his idea not only with essays or blueprints but also by models, drawings, paintings, photographs and films. Pinder (2005) described the New Babylon as a *"massive, interconnected urban space."* (p.200). It is composed of a space-frame locating not on the ground but suspended on the upper level of it. By making the ground level free, it is aimed to leave the ground level only for traffic and public meeting. Constant described main component of the city as the sectors that align on that space-frame. In the New Babylon, each sector is fifteen to twenty meters high and composed of different functions such as social spaces, residential units and technical units. In this sectors, transportation is provided with stairs and elevators. Between these sectors, another rapid mode of transportation is proposed (Pinder, 2005). Constant designed a flexible environment in which it would change its volume by transforming its structure with technical advancements. Citizens of the New Babylon might be able to reconfigure their spaces according to the instant needs. So, there was a great structural flexibility of the city.
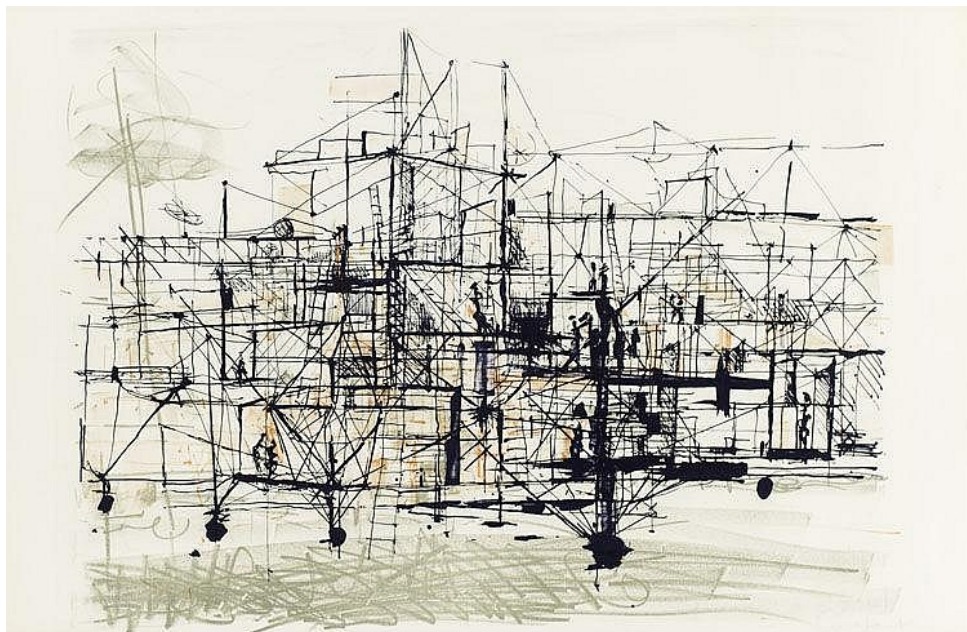
Figure 2.21: Illustration of the New Babylon by Constant (1961) (Source: web.9)

In time, he had continued to improve his project by making new illustrations, models and drawings. Although Constant was aware that standard forms of cartography is not sufficient to described the multi layered form and flexible structure of his city, he developed a bird's eye view to make it clear that how different sectors connect and relate with each other. (See: Figure 22.) According to Pinder (2005), for pragmatic scholars Constant's New Babylon does not have adequate details. The gap between his images and texts is caused due to the fact that Constant's main purpose was to discuss the future by focusing on context rather than the content.

S. Sadler (1999) described the New Babylon as the product of experimental design of that era. He argues that, *"Experimental designers of the period were trying to drive beyond rationalism by advocating free forms, mixed use, and functional flexibility. They expected to create new senses of meaning and place in the city, sympathetic to human ludic and social need."* (p.127).
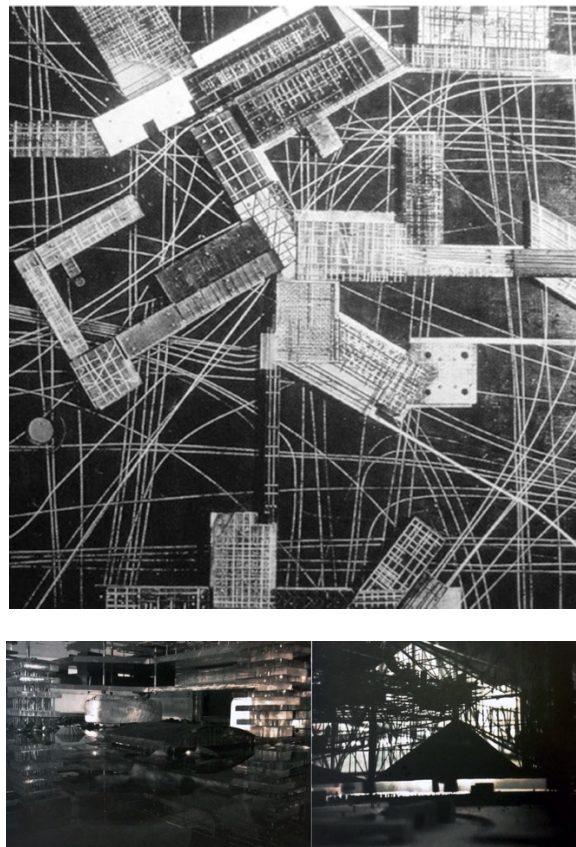
Figure 2.22: Plan view of the New Babylon (above), and the details of the sectors of the model (below) by Constant (Source: Pinder, 2005)

Plug-In City and Walking City by Archigram (1969-70)

A group of architects that consist of Warren Chalk, Peter Cook, Dennis Crompton, David Greene, Ron Herron and Michael Webb started to publish a newsletter which is called *Archigram* between 1961 and 1970. Their radical ideas and proposals became remarkable works in architecture of that period. Just like the many other neo avant-gardes, main purpose of the Archigram was to re-evaluate architectural praxis and rediscover the nature of it (Sadler, 2005). They developed some radical approaches that might be considered fantastic. Sadler (2005) declares that, *"Any architectural rendering is otherworldly, presenting a design more romantically or structurally perceptible than it will ever be if actually built, but something especially oneiric was happening in Archigram's blueprints."* (p.5). The group believed that technological sense in architecture has lost in modernism. Then, they generated their designs based on a prerequisite that acknowledges the numerous merits of technologies on architecture.

Many of the mainstream modernist architects were disturbed by the Archigram's ideas because they were not used to such radical influences of technology on the built environment. Even though radical thoughts of Archigram was not adopted by many of the people, they achieved to generate a radical style by producing creative collages.

Plug-In City developed by Peter Cook is one of the first well-known work of the Archigram. Main components of the Plug-In City were collectiveness, interchangeable units and rapid transportation connections in the formation of the city. Sadler (2005) claims that *"Plug-In City was devised to prompt circulation and accelerate the city-in-flux."* (p.16). Just like the previous avant-garde model proposed by Constant, Plug-In City also allow its citizens to transform their environment. In other words, each unit in the city is adaptable to any needs. City was to change its spatial arrangement by a crane. (See: Figure 28.) Thanks to the flexible structure of the city, it might adapt any changes. When the technology change or population increase, Plug-In City can easily respond and reconfigure itself to the new conditions.
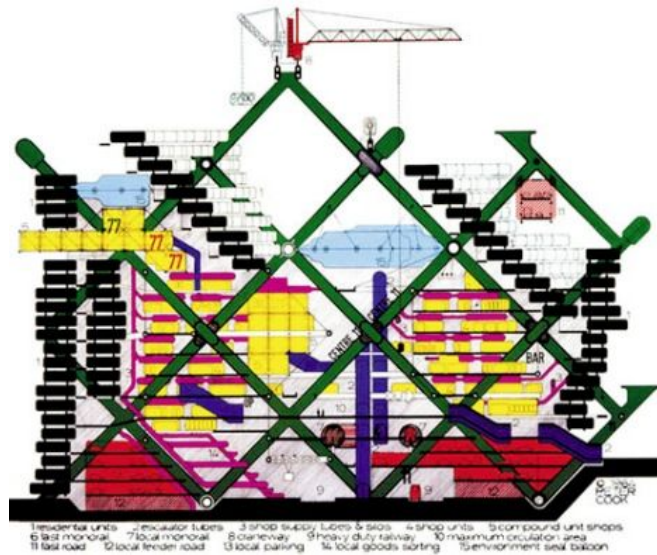
Figure 2.23: Illustration of Plug-In City (Source: web.10)

Peter Cook was influenced by the increased impacts of standardized mass production. On the one hand, Plug-In City was inspired by rapid mass production techniques of the era while providing the technical features of the city. On the other hand, it criticizes the present socio-economic structure that force people to live in a standardized way. In this regard, Plug-In City aims to create a society that would feel free on designing their life according to the personal preferences. Moreover, citizens in the city was white collar employees.
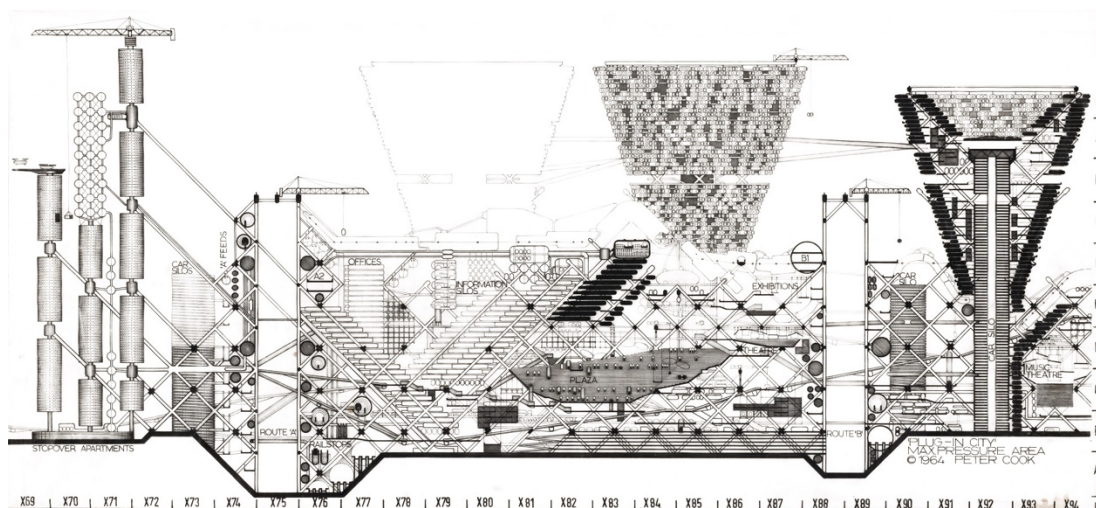
Figure 2.24: Illustration of Plug-In City by Peter Cook (Source: Sadler, 2005)

62

In the Plug-In City, it is impossible to see a factory that has a smoke on its chimney. All works were done by automation. P. Cook also thought that the proposed a modular system would solve most of the problems of the era such as population growth, increased traffic, uncontrolled extensive growth of the city (Sadler, 2005).

Another influential examples of Archigram are 'Walking City' and 'Instant City'. In the Walking City, R. Herron, imagined a nomadic life for the whole city. City as a huge movable machine contains all the city functions and citizens in it.
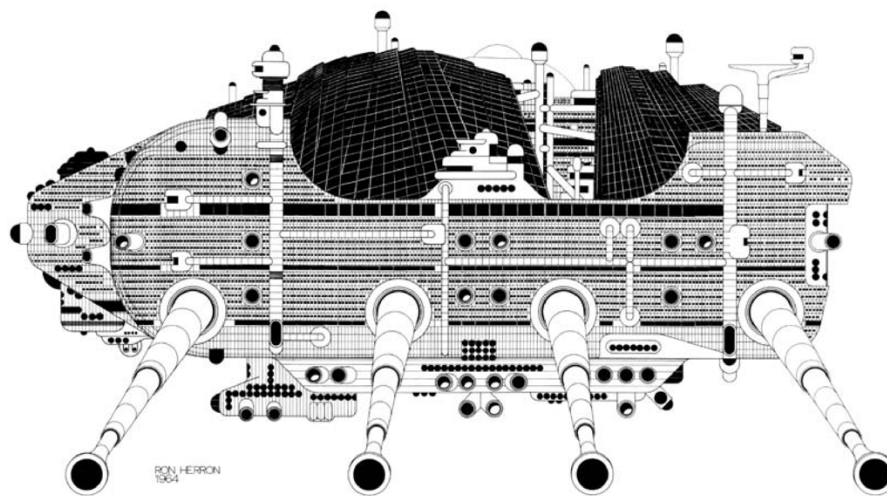
Figure 2.25: Walking City by Ron Herron (Source: Sadler, 2005)

Continuous Monument by Superstudio (1969)

Superstudio was an another influential avant-garde group in the late 1960s and 1970s. The Italian architects A. Natalini, C. T. di Francia, R. Magris, P. Franssinelli and A. Magris are the members of the group. In that time, there was a dominance of consumerism in which economic decline occurred in Italy. During that time, architectural environment had been experienced an important transformation. Members of Superstudio realized that *"architecture served to indoctrinate society into an irrelevant culture of consumption, and therefore sought to extract out of architecture all that encumbered on man's ability to live a free life."* (Lang & Menking, 2003, p.13). Their architectural style was considered contradictory with any

other architectural theory. They developed their approach as response to the most of the aspects of modernist movement of the era. Francia (2003) describes the limitations of the architecture and also some avant-garde groups of his era by arguing that before understanding the useful structure of the society, cities are considered as the formal compositions of the whole community. For this reason, they evaluate that organic model of society should be designed in an organic way or the technological society should need to be expressed with technological aspects. In this regard, members of Superstudio brought criticism over the reforms of neo-capitalists who use the architecture on institutional base (Francia, 2003). They started to respond the present conditions by making structural analysis of the relationship between society and culture. In this way, they tried to distinguish the discipline of architecture from being an institution.

Superstudio expressed their ideas by using different ways of representation techniques such as drawings, photo-montages, collages, installations, exhibitions, manifestations etc. Quesada (2011). says that Superstudio offered *"a new form of material culture in the oxymoron of information society: a techno-utopia emptied of objects."* (p.25). In the end of the 1960s, they developed an architectural approach. According to their model, environment would exist without architects. They believed that designing all the aspects of the community generated injustice and inequality throughout the time. They ignored the all design activities until the time when it provides desired future. Therefore, members of the Superstudio were known as anti-designers who were in favor of the minimum design interventions over life. Accordingly, they proposed the image of 'Continuous Monument' in 1969. With that, they imagined an anomalous structure against the existing sociocultural context. In their model, a pure continuous crystal grid was designed on the top of the ground throughout the world. As Francia (2003) argues, *"...the world was rendered uniform by technology, culture and all the other inevitable forms of imperialism."* (p.69). Instead, they imagined an artificial surface in which there would not be any traces of capitalism. The rest would be reserved for natural landscape.

64
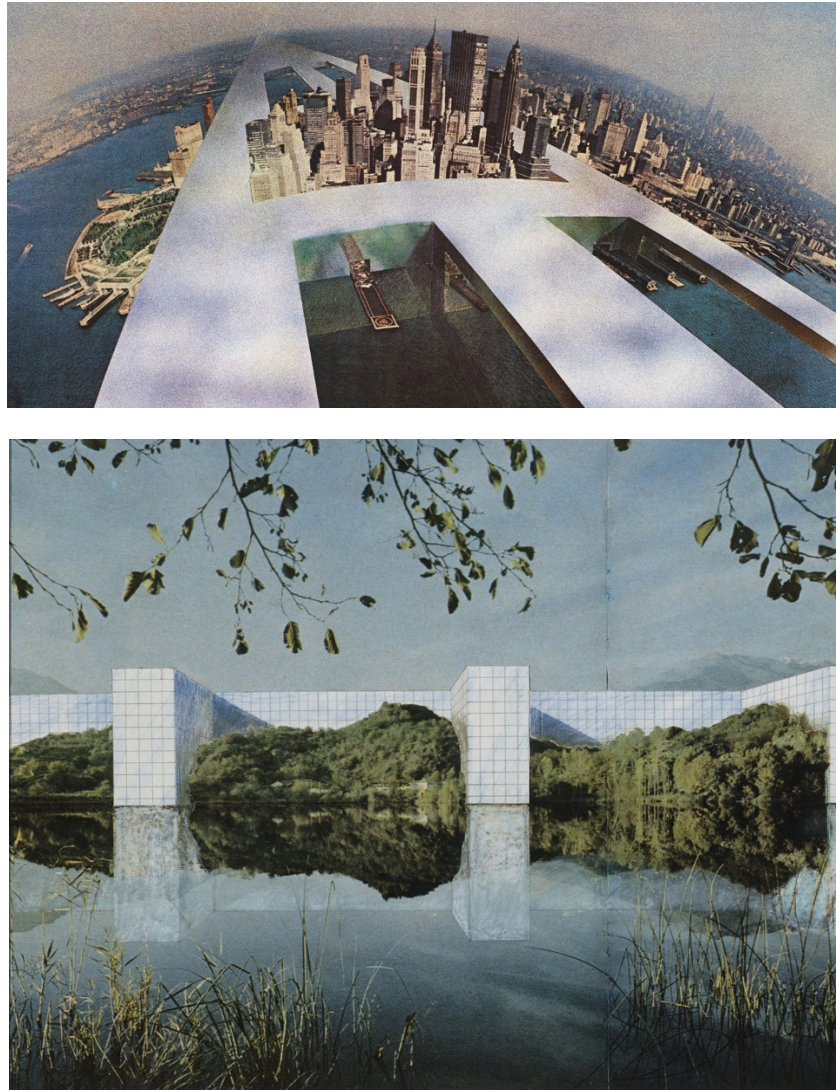
Figure 2.26: Illustration of Continuous Monument over Manhattan, NY (above), and that in the natural context (below) (Source: Lang & Menking, 2003)

Later on with the conceptual proposal called Supersurface, Superstudio suggested a new environment that is composed of virtual network of energy and information without any designed objects and architecture (Francia, 2003). They developed their Supersurface proposal based on the query that what the Internet would present us for the future. They claimed an unusual consciousness in which architecture could be philosophically developed (Wallis, 2016).
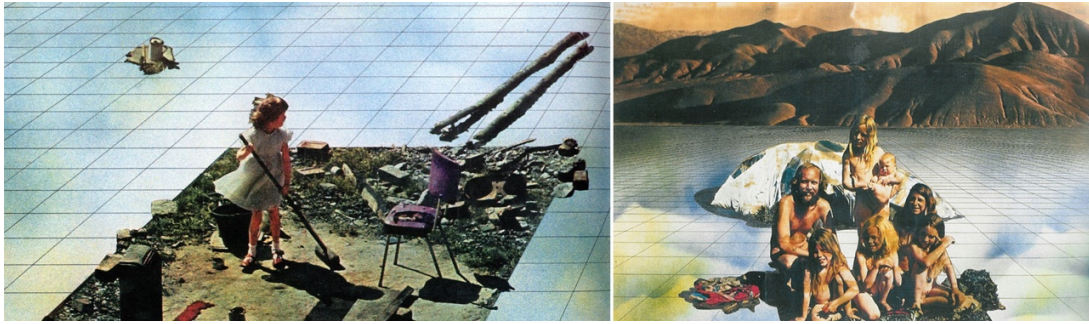
Figure 2.27: Illustration of 'Supersurface' by Superstudio (Source: Lang & Menking, 2003)

No-Stop City by Archizoom (1970)

A. Branzi, G. Corretti, P. Deganello and M. Morozzi who are the founder of Archizoom had influential criticisms for the modernist architecture in the 1970s. They shared same concerns with the members of Superstudio. They were also influenced by the impacts of social, economic and political structure of that era. In 1966, both groups participated an exhibition entitled as 'the Superarchitecture'. They manifested that, *"Superarchitecture is the architecture of superproduction, of superconsumption, of superinduction to superconsumption, of the supermarket, of the superman, of the super gasoline."* (Quesada, 2011, p.23). They were inspired by the ideas of Pop Art that responds to the abstract expressionists. According to them, media that are symbolic or literal meanings have revolutionary potentials for the society.

In 1970, their concerns turned towards to the field of urbanism. Then, Archizoom generated their most influential work which is called 'No-Stop City'. They proposed this project by considering the fact that thanks to the advanced technology, there would not be needed any central modern city rather urban place would extend with identical and uniform surfaces. (See: Figure 2.28).

Just like the 'Continuous Monument', there would no need for architecture and citizens were able construct their own environment. 'No-Stop City', as it can be inferred from its name is built on an infinite grid. Archizoom represents their future city as an indoor space having few architectural elements such as columns and walls. All activities of

daily life are done on the ground with artificial lighting and air conditioning. 'No-Stop City' presents complete equality among the its inhabitants. The anonymous structure of the city was formed based upon the two components of that era which are the mass production and mass consumption. While the former was represented by a factory that provide equal services for all citizens, the latter is symbolized with supermarket that presents a system of mass consumption.
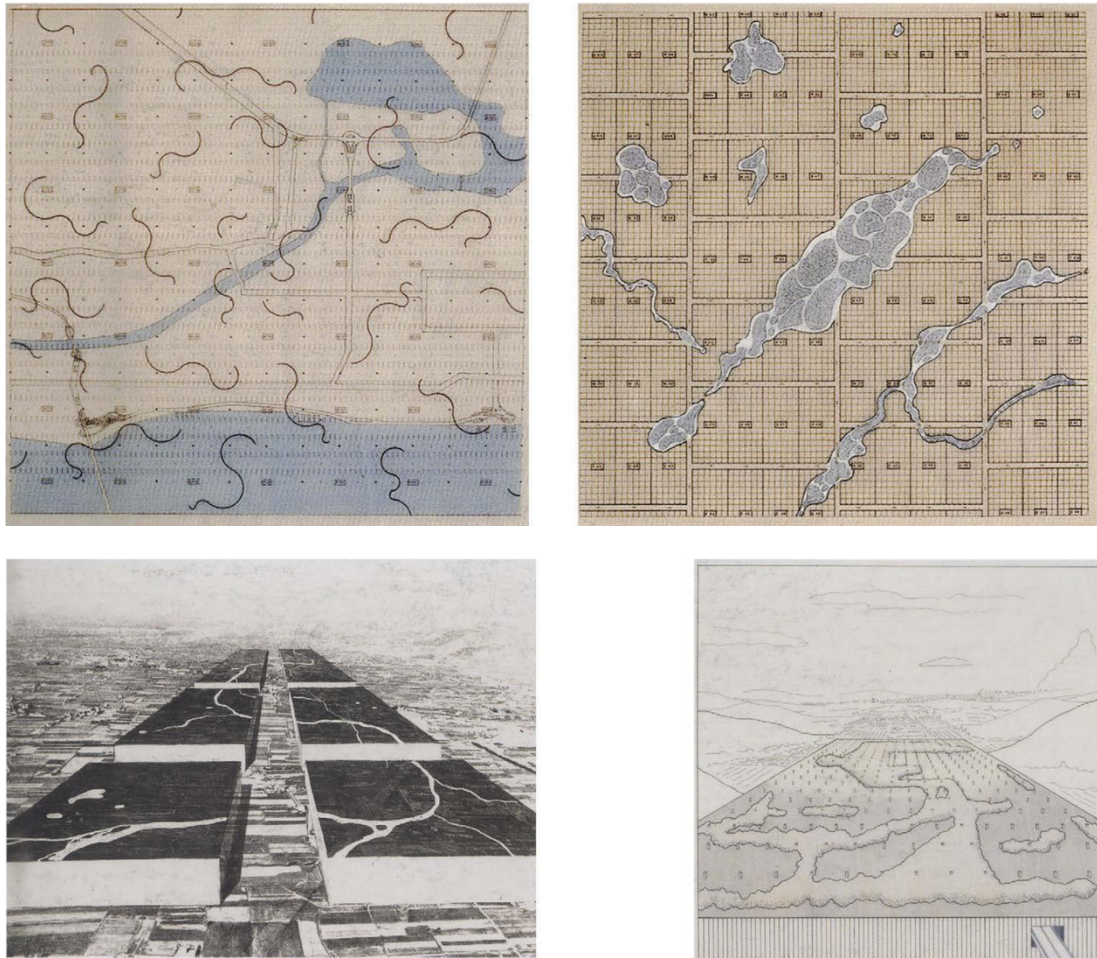
Figure 2.28: Homogeneous city layout of No-Stop City (Source: Gomez, 2018)

Exodus by Rem Koolhaas (1972)

The Project 'Exodus: Voluntary Prison of Architecture' was another influential image of the city of future suggested in the 1970s. The group led by R. Koolhass was also affected by the very socio-political context of that era particularly, in the case of Berlin

Wall dividing the city into two parts. They aimed to invert and criticize the consequence of the Berlin Wall by envisioning an enclosed area within the two parallel walls. Koolhass and his colleagues described the city that is divided into two: *The Bad* and *the Good*. In their thesis, they started to present their city by describing the relation of the two groups:

> *"The inhabitants of the Bad Half began to flock to the good part of the divided city, rapidly swelling into an urban exodus. If this situation had been allowed to continue forever, the population of the Good Half would have doubled, while the Bad Half would have turned into a ghost town. After all attempts to interrupt this undesirable migration had failed, the authorities of the bad part made desperate and savage use of architecture: they built a wall around the good part of the city, making it completely inaccessible to their subjects."* *(Koolhaas et al., 1972, p.1)*

They provided a huge rectangular strip that expands over the city of London. In addition to the main strip, there are five other secondary lines that run through the old fabric.
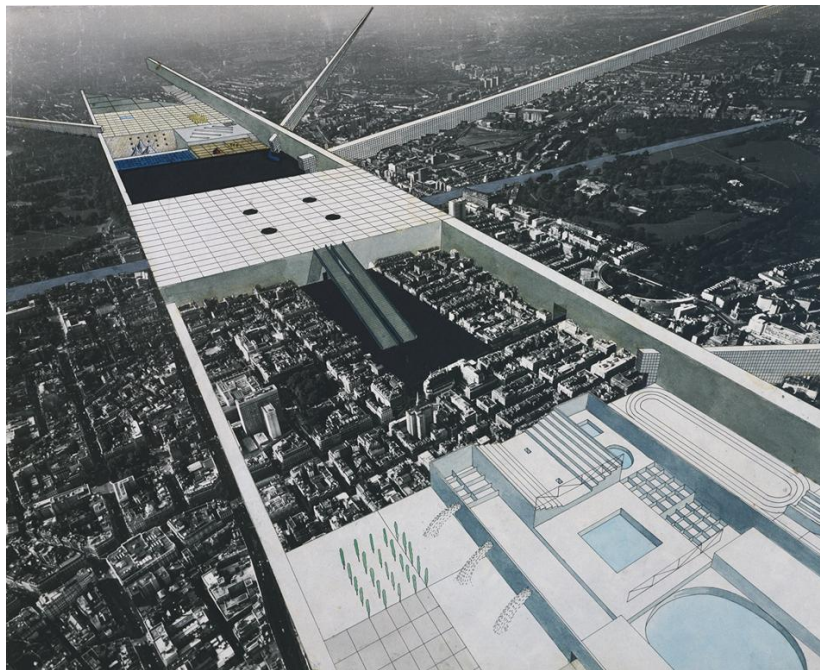
Figure 2.29: Perspective illustration of Exodus by R. Koolhaas, E. Zenghelis, M. Vreisendorp, and Zoe Zenghelis (1972)

This gigantic mass promoted great separation between old town and the new. People were willing to migrate from the post-industrial city of London to the Exodus. They declared this phenomenon with following expression:

> *"The inhabitants of this architecture, those strong enough to love it, would become its Voluntary Prisoners, ecstatic in the freedom of their architectural confines. Contrary to modern architecture and its desperate afterbirths, this new architecture is neither authoritarian nor hysterical: it is the hedonistic science of designing collective facilities that fully accommodate individual desires."* (Koolhaas et al., 1972, p.2)

Social, economic and political aspect of the new metropolitan city were better than London. It was against to the disorder in urban life, fragmentation of private spaces, consumerist society. Enclosed area of it was providing variety of activities for the citizens, as well.
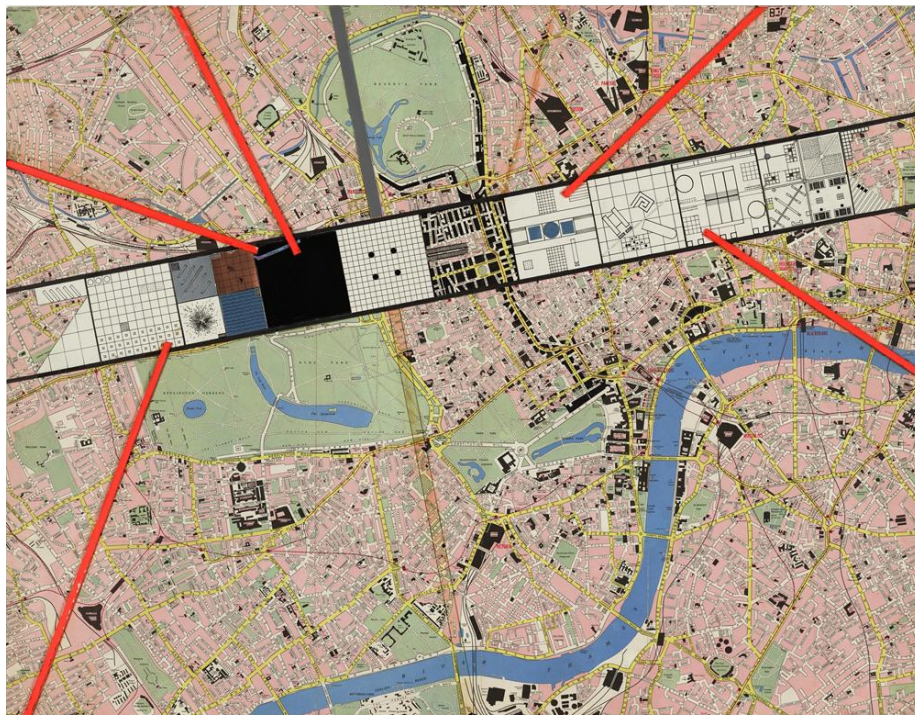
Figure 2.30: Plan of the Exodus by R. Koolhaas, E. Zenghelis, M. Vreisendorp, and Zoe Zenghelis (1972)

2.3 General Characteristics of the Futuristic Thinking from Classical Era to the Post Modern Period

In this section, there will be general evaluation of the idea of future for each period. Although, there are ideal proposals more than what this study have presented so far, it is aimed to understand the futurist notion in the light of those most influential examples. Therefore, the scope of this research tries to generate broad comprehension about the general characteristic features of the futuristic thinking during the history.

Classical Era: As we already discussed in the beginning, there were three major social groups in the Classical era who are metics, citizens and slaves. Each had different roles in the society related with the some political, economic duties. Although sense of democracy was emerged in the age of Pericles, they could not overcome some deficiencies and weaknesses. People who have money increased their power against the poor. The distinction between upper class and the grassroots grew up and started to cause socio political problems. In that era, Plato and Aristotle realized the decay in the sense of democracy that Pericles introduced. Accordingly, they emphasized the problems on the misuse of personal liberty (Gallion & Eisner, 1986).

While Hippodamus tried to create a political order and to offer a new social division of the state by using the space itself, he became the first person who realized the relation between space and politics. On the other hand, as response to the existing problems, Plato thought that the notion of 'just state' should need to be developed. Although his idea was criticized in the context of the adaptation of new social structure with existing human nature, it was aimed to develop a notion for a desired future to solve the existing political and ethical problems.

In addition, Aristotle developed his ideal future on a political collaboration. While Plato defined the ideal state on a social structure that is composed of three classes having different socio-political roles in the society, Aristotle gave importance to the integrity of people in the socio-political context. Only classification that he proposed for social life was based on the ages groups. Although each age groups have different

roles in the society, they constitute a uniform community.

Consequently, Hippodamus, Plato and Aristotle responded to the problems that were occurred due to the conflict between democracy and the oligarchy. Although there are some differences in the structure of each proposal on the ideal future of the society, their main consideration was basically the socio-political problems existing in that era. Each of the scholar responded to critical problems by providing new way of perception on socio-political structure.

Pre-Industrial Era: With the emergence of mercantile economy, capitalim started to reveal its impacts both on economical and socio-political context in the pre-industrial era. Under these circumstances, each of these utopian thinkers put forward their ideas as response to the real conditions of the era. They privileged the people who have been exploited by the new emerging class.

When the scale of the economy was changed with the end of Feudalism, production activities were started to appear even in the individual level. Serfom disappeared and people were taken the active roles in the socio-economic life even in individual. It caused an increase in private property and individuality in society. In this context, Sir Thomas More believes that private property is the main reason behind all problems. Although there were some strict rules over the utopians, democracy had a crucial role in governance. These conditions are also valid for the Campanella's ideal city. In the City of Sun, it is thought that most of the problems occurred due to indivudalism and ignorance (Tanilli, 2013). In addition, one of the most distinctive features of these two ideal proposals is communal life. As response to the new production mode that mercantile economy brought, they suggested a communitarian economy.

As it is mentioned before, most of the scholars that developed utopian schemes in the Classical Era discussed the ideal city philosophically. On the other hand, in the pre-industrial era, discussions on the ideal state started to be pursued on within the spatial context. Each of the utopian narratives includes some ideas relating with the spatial configuration of the ideal city. Although, there was a great influence of the

Renaissance era on the formal design of the ideal cities, only the 'City of Sun' includes strong geometric layout. But with the improvements of the technology espacially in the military fields such as gunpowder, the location of the ideal state and relation of it with other countries became an important issue. While some of them created a community that have not any contant with other world, some others keeps this relation in at minimum level. But distinctive feature of the utopian thinkers was that most of them prefered to locate their ideal states on an island. The reason behind this can be promoted sense of protection as well as the idea that discovering a land that is unknown would bring prosperity and a new life radically beyond the actual conditions. In addition, Slodczyk (2016) mentions that, one of the main features of these Renaissance ideal cities was the functional organization in which some economic and social activities were located in specific spots of the city.

In this regard, while More and Campanella proposed a society without any social class, Bacon designed his ideal state on a hierarchical basis. Although the work of Bacon is evaluated less utopian than the More's and Campanella's work, his proposal is remarkable in a way that the put forward the importance of the knowledge in prosperity a society.

In consequence, each of the utopian projection includes new way of life to be realized in an unknown future. The ideal states that are described in the early utopian literature present a desired way of life that did not exist in the pre-industrial era. Even if they were criticized in a way that they proposed a totalitarian system for ideal communities, they influenced most of the scholars in the following periods.

Industrial Era: Beginning with the first industrial revolution in the late 18th century and then continuing with second revolution after a century, significant developments has occurred in most of the aspects of the city. Not only the city itself, but also the people were influenced by each paradigmatic shift in the modes of production. As the response to the negative consequences of industrial revolution, most of the utopian thinkers develop some influential proposals. Their main aim was to get rid of these

negative impacts by imagining completely a new society.

According to Wiebenson (1960), there are two major approaches in utopian thinking in the context of industrial era. One is the imagining the new society by ignoring the actual problems of the existing one; another is envisioning the ideal condition by considering the real one. During the industrial era, ideal cities has involved the both realistic and idealistic interventions. Scholars were in the search for practical achievements of these utopian notions, as well. Yet, few of them could have a chance to see the level partial realization of their utopian programs.

Main purpose of futurist thinkers in this era was to create an ideal industrial society. By doing so, they tried to sustain the organic interrelations between urban and rural areas as well as between the nature. They mostly imagined a collectivist government in their ideal cities. Collective life was in the center of their proposals just like classical utopias in the previous era. As response to the social and economic disorder of that era, they emphasized the new social, political, and administrative organizations. Although the ideal proposals in industrial age have lost their impacts in time, they produced remarkable solutions for real life and contributed a new way of futurist thinking. They presented their ideas via some blue prints. In the previous eras, utopians were mostly focusing on socio-political issues. Early utopians have tried to alter social order by developing some macro images on it. Ideas on spatial organization of the ideal city were limited and had similarities in the context of that era. On the other hand, starting from the industrial age, scholars have enhanced their notion of future by providing some macro socio-spatial interventions. While socio-political organization was dominant factor of the ideal societies before, with increasing negative impacts of industrial revolutions on cities, socio-spatial concerns got prominence, too. Moreover, technology have begun to take a determinant role in shaping the optimist view on the future. It allowed people to imagine free from the very limitations of the actual life. Economic components, social structure and human values, and spatial configuration of the city have been reconsidered with the innovation on technology.

Modern Period: Ebenezer Howard, Frank Lloyd Wright and Le Corbusier evaluated the most of the aspects of cites as problematic and unhealthy. They believed that due to the fact that modern technology has a contradictory character against the social order of that period would bring chaos, conflict and injustice among the people. They proposed a new order to overcome this issues. Howard, Wright and Le Corbusier developed their ideas on a vision that proper technologies that are compatible with social values of the community would provide the common good. In this regard, they developed their proposals based on some technological improvements in communication and movement infrastructure.

While Howard believed that, railway infrastructure would provide a decentralization that might be the solution to most of the socio-economic problems, Wright thought that cities need to be decentralized greater than Howard's proposal. According to his belief, private ownership of the car and highly developed road infrastructure would bring prosperity. Although both of them tried to create a coherent life between urban and rural area, Howard's proposal was presenting a segregated spatial scheme of town and country. On the other hand, Wright's Broadacre city was introducing an alternative that presents a spatial layout in which urban and rural areas completely intertwine each other. On the other hand, Le Corbusier did not advocate the decentralization for his ideal city instead he developed an ideal city by providing centralization with high densities. He also put the highly advanced transportation infrastructure into the center of his city and suggested living in huge skyscrapers. According to Le Corbusier, Modern Period destroyed the social life on the public streets. As response to this situation, he offered elevators as the new streets in the vertical dimension.

All of them aimed to create an industrial society that would live in a harmony. Fishman (1997) described the components of this harmony with three aspects. Firstly, it appears itself in the physical context by providing an efficient and radical urban plan. Secondly, by providing highly accessible functions, it is aimed to ensure social harmony. Lastly, harmony in the aesthetic realization expressed itself in the beauty of the ideal city. Howard, Wright and Le Corbusier tried to provide a new socio-politics and socio-economic way of life. Howard was in favor of cooperation in the society. On the other

hand, Wright promoted individualism in his ideal city. Le Corbusier describes the individuals as a part of the collective order. As response to the economic decline of that era, each of them emphasized that role of human rationality in the economic decision making process. In addition, when they are compared with the social utopians of the previous periods, it is obvious that they realized the possible impacts of the advanced technologies on the form of the cities. They tried to use this point of view while developing their schemes but also they were aware of that not only physical interventions would bring the solution but also social, political and economic aspects are needed to be considered in a comprehensive way.

Post Modern Era: Second half of the twentieth century has experienced with some avant-garde movements as discussed in the second chapter of this study. Social, political, and economic conditions of that the era led some groups called avant-garde, to produce imaginative thoughts and projects about the future. Before the Second World War, the effects of Fordism were observed only in the manufacturing processes. Yet after the war, social impacts of Fordism started to be realized too. In this context, avant-garde groups generally respond to emergence of the new structure of the consumerist society that was resulted from the widespread mass production and first impulse of the globalization which would be resulted from the Post-Fordism later on. Avant-gardes basically criticized the institutional aspects of architecture. In addition, due to the fact that some of them witnessed the emergence of the third industrial revolution and they expressed their suspicions and fears against to the automatization of the labor.

Although each of the Avant-garde groups suggests different ways to express their beliefs and proposals, they had almost same interpretation and criticism against to the modern culture and consumerist society of the era. In general, their works presents highly speculative approaches against the present conditions.

Most of the avant-garde groups accepted the benefits of technology on built environment. By creating a modular and dynamic environment, it is aimed to

overcome the intrinsic problems of that era. Moreover, the ideas of Superstudio and Archizoom represents a completely uniform surfaces that people are allowed to produce their own environments freely. Social structure of the cities is considered as collective units. Equality among the citizens is determined as an important aspect of their imagined cities.

There was an emphasis on the automation and information technologies on their projects because most of them were generated in the period of the third industrial revolution. While New Babylon does not refer to the conditions of working, Plug-In City provides total automation in works in which citizens do not participate the production facilities. Superstudio imagined a society who has an ability to live freely. Accordingly, Supersurface that represent the internet of future provides necessary sources such as energy, information etc. to its inhabitants equally. In the No-Stop City, it is envisioned that, advanced technology will connect each and every piece of land with an infinite network. So, the modern central city will not be needed as it is now. Cities will be formed through the infinite uniform surfaces.

As we already mentioned, they developed their futurist notions as response to the modern conditions of the era. While doing that they did not make make contextual discussion instead they mostly focus on the content. With the avant-garde movement, the impacts of the technology on production mode and on the socio-economic structure of the society was examined in a speculative way. Although their proposals are evaluated as extremely imaginative, their ideas on the role of the technology, impacts of the globalization on the society and effects of present economic system on urban environment are now considered as remarkable discussions among the most of the scholars. In this regard, it can be argued that, the futurist notion in the postmodern period are giving some clues for the late modern era characterized by Industry 4.0. Although the new era will present us a new radical transformation related with the production mode, human behavior and social organization, the capacity in which the emerging trends generate a strong a futurist thinking in urbanism is yet to be discussed.

In this chapter, the idea of the future from the classical era to the post-modern period was discussed with respect to the socio-economic conditions of each era. It was aimed to investigate how the notion of future has been developed as response to the presents conditions of historical periods. It is possible to argue that the emerging economic and political circumstances have become the main determinant factor generating the idea of future. In this regard, industrial revolutions have caused significant constructive and destructive impacts for the whole socio-economic and political structures in the global context. With respect to the constructive impacts of industrial revolutions, the idea of the future has been mostly used as a political power to envision the better living conditions for the society. On the other hand, destructive impacts that have effects on social, economic, political and spatial context have led people to envision the ideal future to overcome undesirable situations. Before the industrial period, the idea of future was first expressed in the philosophical discourses. Most of the ideal images were shaped around the socio-political context. After that, expression of the ideal future as response to the destructive impacts has revealed itself in the socio-spatial discussions as well.

With respect to the overall discussions in this chapter, one can infer that the notion of future has always been on people's agenda in the forms of societal, spatial and political structure. Understanding the general motivation of people while generating the sense of future in the previous periods might be helpful to envision the idea of future that would be generated as response to the incoming conditions. It is possible to claim that without the thousands of years of knowledge about the futuristic thinking that previous generations have produced, we might not envision what the forthcoming era will provide. Therefore, it will be meaningful to evaluate the discussions in the following chapter in the context of the impacts of the industrial revolution on social relations, economic activities and spatial formations.

CHAPTER 3

INDUSTRY 4.0

In the previous chapter, the research questioned how the futurist thinking have evolved and responded to changing the socio-economic and political conditions and challenges from the classical era to the post-modern period. In this chapter, the main purpose is to present the new socio-economic trends and tendencies in our current age and present the possible changes in economic factors, space and the society.

A better understanding of the evolving dynamics of production modes throughout the history from a materialistic perspective will help to evaluate the transition from the late capitalist era to post-capitalism. Then, the factors of production that have evolved continuously will be redefined in accordance with the new dynamics of industry 4.0.

3.1 Changing Modes of Production in History

The idea and phenomenon of production have always been in the center of the human life. People have always been in the search of new production methods and techniques to meet the needs of human beings. This search has always resulted in productive solutions in the context of certain time period. So, throughout the history, the way we produce things has changed and all the different modes of production have affected not only the way we live but also where we live in relation to the relationship between man and environment.

K. Marx, the German social thinker, coined the term, 'modes of production', in Das Capital (1867) to describe different organizational models for producing goods. For

human, the main motivation behind developing different production modes is survival and at the same time satisfying the basic necessities of social being.

Each production modes have evolved in the context of socio-economic structure of the given period. Marx (1859) described this evolution by identifying the interrelation of society and economy in the preface of his another seminal book, 'A Contribution to the Critique of Political Economy'. According to him, society emerges out of an economic relations and socio-economic conditions develop in relation with each other. While they are mutually growing in time, some production relations emerge in the community. Relations of production arise from the interactions between people who have the production force and the people who do not have. Mainly, it consists of property and power relations among the society (Hume, 2007). All the production relations establish the economic structure of society and also legal and political superstructure (Karl Marx, 1859). While the economic structure of each society is developing around different production modes, social structures of the communities are defined with the production relations. In addition, production relations determine the capacity of production which is also defined by the forces of production (Lichtblau et al., 2015).

Basically, 'forces of production' refers to the all kind of components of the production processes. Any facilities or instruments that are part of the production processes could be one of the components. Production forces can be also described with three main factors of production; land, human capital, and physical capital. In the the article 'On the Mechanics of Economic Development', the city is considered as the collection of these three factors of production (Lucas, 1988, p.38). Accordingly, we can define 'land' as a space where the production activities take place and also it refers to the natural resources of the production. Another term, 'human capital' refers to the labor who manages and controls the production process. Education and developed personal skills can be the instruments of the human capital to become a part of the production processes. Finally, 'physical capital' implies the man-made materials and instruments (e.g. machineries) that are used to produce goods for people. In this context, relations of production and forces of production constitute the mode of production.

While production forces are developing in time, some conflict takes place between these forces and production relations. During the history, when the production forces have been redefined and improved according to the humans needs, it was for the benefit of the lower class because they will increase their control on production process and resources with new developments. On the other hand, ruling class is in the position that they have control on production and distribution of goods. Due to the fact that they have full control of superstructure of the society, they do not want to change this situation with new improvements. Conflict between production forces and relations starts at this point. Then, this conflict causes some contradictions between social classes in the society. When production forces are evolving, lower class prevails against the ruling class and production relations are redefined with the new production forces that they have. After that, such an antagonistic process ends up with a social revolution (Shimp, 2009). Marx explained how social revolution begins when production modes evolves in accordance with the changes in production forces and relations as follows:

> *"At a certain stage of development, the material productive forces of society come into conflict with the existing relations of production or with the property relations within the framework of which they have operated hitherto. From forms of development of the productive forces these relations turn into their fetters. Then begins an era of social revolution. The changes in the economic foundation lead sooner or later to the transformation of the whole immense superstructure"* (Karl Marx, 1859).

This evolution has happened constantly throughout the human history. While one social class wins the conflict and determines the production relations with improved productions forces, another lower class will emerge from this new social structure and start to struggle again. This process will repeat all the times (Shimp, 2009).

New social classes and production modes have emerged from this dialectical relationship[4] between production forces and relations (See: Figure 3.1). Theory of historical materialism developed by Marx provides an understanding of history by describing evolving dynamics of forces and relations. In his work human history is described with four different periods. Each era has its own mode of production and social structure. The four main modes of production that determine socio economic life of the human kind are Asiatic, ancient, feudal and modern bourgeois (capitalism) (Karl Marx, 1859).
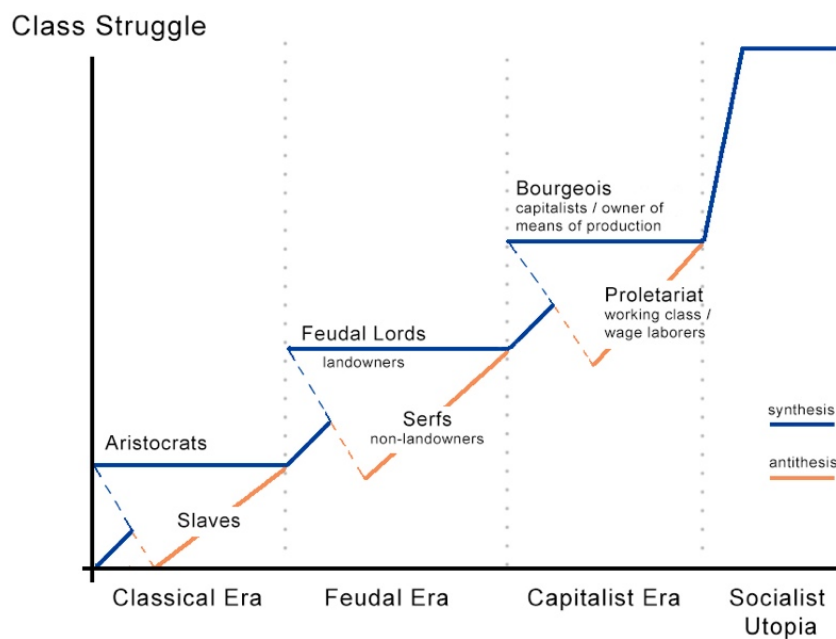
Figure 3.1: Marxian Graph of History (Source: web.11)

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[4] Dialectical relationship developed by Georg Wilhelm Friedrich Hegel is an important component of historical materialism. Thesis, antithesis and synthesis are the elements of dialectic. The idea is that mankind is separated from the absolute reality and all the time, main purpose is to understand this reality. So dialectical process tries to close the gap between mankind and the absolute reality. Existing reality described as thesis and it always has some antithesis inside. They started the struggle and this contradictory relationship creates synthesis that is closer to absolute than previous one. Then this synthesis becomes a new thesis and process to reach the reality starts again. Once there is no antithesis against the thesis, dialectical process over (Freedman, 1990).

3.1.1 Asiatic Mode of Production

The very first production mode in history is the Asiatic mode. In this mode, production depends on hunting and gathering. Communities lived and produced together to increase the chance of survival. Common ownership and equality determined the social structure of the society. They were sharing that what they gathered and hunted. At this epoch of human history as Hume says *"kinship relations are the basis of labor, which is categorized by marriage and/or other kinship relationships between individuals."* (Hume, 2007, p.1154) . Apart from the gathering and hunting, people started to understand how transform the raw material such as metal and iron into the useful objects. By using new tools and instruments they started to engaged in agriculture and animal husbandry.

Development of production forces provoked people to leave their commune (Shimp, 2009). While production forces have been started to develop, production relations emerged within the community. Some people obtained these new production forces and started to define production relation accordingly. This leaded to division of society into the different social classes: people who have a control of the production forces and people who do not. Then the former begins to exploit the latter for their advantages. In other words, slavery began to emerge. So these new conditions resulted in the end of the collective living and Asiatic mode of production.

3.1.2 Ancient Mode of Production

The concept of Ancient mode of production is coined by Marx but the term was not developed well enough. Production is made with primitive standards on the small scale lands and it is used to meet the basic needs of the people (Avcıoğlu, 2001).

Laibman (2006) describes historical sequence of each production modes with preconditions, contradictions and contributions of their developments. (See: Figure 3.2). Author (2006) notes that *"Preconditions describes the inheritance of a given mode of production from the previous modes, 'contradiction' the dynamic that drives*

it forward, and 'contribution' its legacy to subsequent modes." (p.187). In this context, Laibman (2006) indicates that class exploitation is the precondition for the next stage of human history which is called as Ancient mode of production. It appeared after the dissolution of previous one due to the emergence of slavery.

In this era, the notion of private property was developed in the context of new socio-economic structure. Aristocrats are the owners of the property and slaves were exploited to provide benefit for them. Working capacity and physical power of labors determined the limits of production forces. So, in this era, development of production force meant that increased number of slaves. Due to this reason, ruling class began to search for new sources for slavery outside of their territories. Thereby production forces grew extensively. Extensive development refers to labor-intensive production. More labor meant more work or product. When the slave population grew, need for surplus production increased directly. But extensive growth of production forces declined the rate of surplus production (Ibid, 2006). Contradiction occurred at this stage. Struggle between aristocrats and slaves bring to an end of the ancient mode of production.
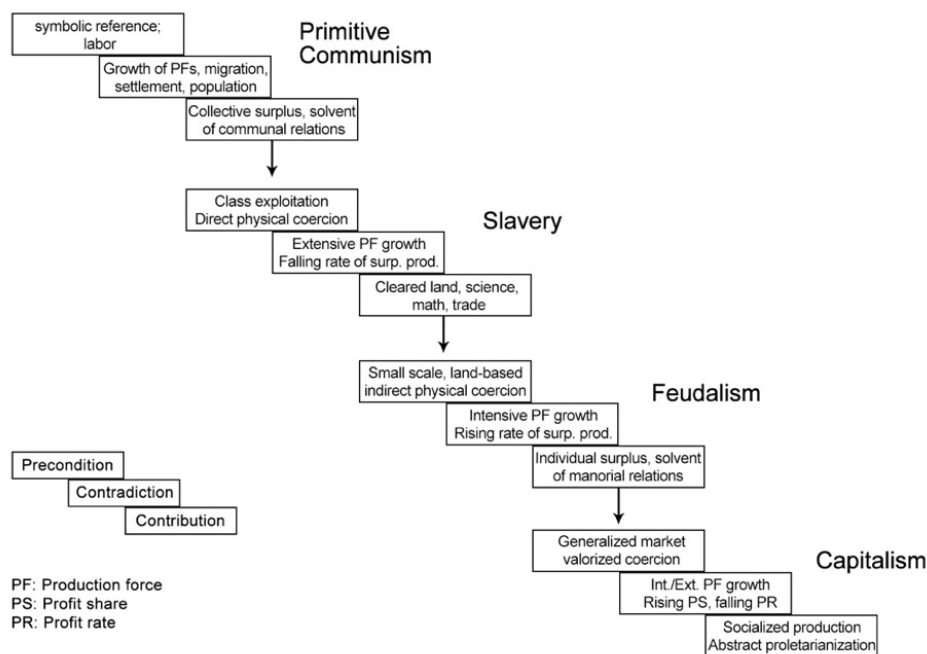
Figure 3.2: Preconditions, contradictions and contributions of production modes. (Source: Laibman, 2006, p.188)

3.1.3 Feudalism

Societal formation and order in the middle age, especially in western Europe, is called as feudalism. It is a political, economic and social regime. There is not governmental formation (Tanilli, 1996). At this stage, production relations were formed around the two main social classes: feudal lords and serfs. In addition to these two groups, Tanilli (1996) mentions another social class that is priests. Rather than being a citizens of a country, people were the citizens of the landlords. Social classes had different socio-political rights and they are separated each other with strict rules. Although serfs were working for land lords, unlike the slaves they had rights and they were not seen as only a production force. They were not bought and sold as in the past (Laibman, 2006). Therefore, they found a chance to work for their own benefits by paying rent to land owners. Serfs had got a few numbers of forces of production own their own. On the other hand, even though they are responsible to make the whole production for the society, their social status was lower than others.

At this stage of history, there were still exploited and exploiter, but status of lower class increased. Guilds that are composed of groups of craftsmen in town were established. By this way they achieved to support each other and redefine the production relations. In time, serfs tried to find new methods and ways to increase their productivity. So, production forces started to grow intensively rather than extensively (Ibid, 2006). Intensive development of production refers to increasing productivity with the technology.

Improvements in the forces of production and increased status of serfs caused some conflict between production relations and forces as happened in the previous stages. Laibman (2006) describes the reasons of contradictions as the intensive growth of production forces and rising rate of the surplus production. Serfs positioned themselves in a different point that they have never been before with their improvements on the production forces. They produced more than they need. After that, serfs needed markets to earn benefits form the surplus (Shimp, 2009). So, market relations and capitalism started to emerge and also contradiction between ruling class and lower class has emerged. Market relations weakened the feudal lords against the serfs.

Feudalism dissolved when lower class won the struggle against the ruling class and market relations were formed (Ibid, 2009).

In the beginning, cities were considered as the administrative and religious centers. After that, with improved production capabilities of cities for the market, their roles were started to be change and as a new social class: 'bourgeois' has emerged in the end of the middle ages. The wealth of the bourgeois is not depending on the ownership of land but it depends on a production of commodity and trade. In the next stage, the bourgeoisie would gain the power of production through advanced production techniques (Tanilli, 1996).

3.1.4 Capitalism

Next stage in the human history is 'capitalism'. World's production system takes shape around the capitalist mode of production today. Throughout the history, capitalism constantly changes its form but basic mechanism behind it always remains the same.

Laibman (2006) describes the precondition of capitalism with the idea that feudalism had lack of ability to generate a market system. After degree of surplus production increased, production forces and relations that were defined in feudal mode of production evolved. Lower class that are able to produce commodity for their own benefits used market to gain profits. Capital which is earned from this process became the important force of production of the new era. It became the main value to control the labor power or production materials. Role of the producers were defined accordingly. Separated and isolated individual producers combined with each other thanks to the intense specialized production (Laibman, 2006). Rather than the way of individualistic production pattern, producing a single product is divided into different steps which is collaboratively carried out by waged workers. This is called as social production of capitalism. In this production mode individual workers started to develop their skills in the field that they want to work and choose their employee freely.

Social classes in capitalist mode composed of two: the capitalists and workers. Although workers or proletariat can be evaluated as much more free than serfs and slaves, still they need to exchange their labor power with wages to sustain their life. Ruling class which is capitalists have a power to increase the productivity by rising the wages or offering some incentives to workers. Although it seems that there is a win-win situation for the members of those two classes, actually there is another kind of coercion and class struggle which is more than previous modes of production (Shimp, 2009). While production is social, what is produced is private appropriation. Engels (2006) says that *"...the owner of the instruments of production continued to appropriate the product, although it was no longer his product, but exclusively the product of others' labor. Thus, therefore, the products, now socially produced, were not appropriated by those who had really set the means of production in motion and really produced the products, but by the capitalists."* So, main contradiction in the capitalism reveals itself between socialized labor and private appropriation (Cornforth, 2015, p.87).

Marx emphasizes that historical epochs will not end with the emergence of capitalism. Capitalism will be overthrown as it was happened to the previous stages. According to him, capitalism will be replaced with communism. This continues until people reach the absolute true where there will be no contradiction to change the present thesis (Shimp, 2009). In this mode of production freedom will be important aspect and there will not be any kind of exploitation.

There are a lot of deeper discussions on the issue that how communism follow the capitalism and what will be the prerequisites of this process in the context of socio-economic point of views. This discussion is out of the scope for this study, rather main focus is the bringing the upcoming stage of capitalism into question. Before manifesting the next stage of capitalism we should consider how capitalism came until today and how it evolved.

After Second World War capitalism gained power. This period was called as 'Golden Age of Capitalism' due to unprecedented economic growth in the industrialized capitalist countries (Kotz, 2001). With the industrial revolution, the world was

introduced with the new mode of production forces and new economic development models. These changes in the economic context made capitalism widespread and stronger than never have been before. In the Marxist tradition, there is stadial thinking to identify the different periods of socio economic life. Each stage overthrown the previous one and process continues in linear succession. Also in the development of capitalism, there are several phases that evolve successively through the time.

3.2 Periodizations of Capitalism

There are rich variety of periodizations of capitalism in the literature. All of studies aim to clarify the socio economic structures in the related time period. For instance, Robert Albritton (2001) argues that *"capitalism should be periodized according to four basic stages: mercantilism, liberalism, imperialism and consumerism."* (p.128). He identifies each phases in accordance with the most decisive mode of capital accumulation in that era. Mercantilism is a stage when the golden age of the capital accumulation emerged between 1700 and 1750 in England. After that liberalism took place between 1840 and 1870 in England. Next, imperialism appeared in Germany and the US between 1890 and 1914. Lastly, consumerism occurred in the US between 1950 and 1970. And today as author says *"we are in a phase of transition away from consumerism, which may of course have interesting sub-phases. The big question is whether this transition will lead to yet a new golden stage or away from capitalism."* (Ibid, 2001).

On the other hand, M. Aglietta (1976) defines the different phases of capitalism as 'extensive stage', 'intensive stage' and 'late capitalism' which is also called as 'monopoly capital'. The extensive stage can also be explained by primitive accumulation. In this stage, capitalist production presupposes some primitive accumulation. Extensive stage can be defined as the accumulation process occurring with the including of pre-accumulated capital into the production phases (Angelis, 2001). In the process of extensive accumulation regime, capitalism spread into the new areas. In time, the extensive stage reached its limits and productivity decreased. In the

19th century with the first industrial revolution, a shift from extensive to the intensive accumulation happened and next stage of capitalism appeared: the intensive stage. In this stage, increasing rate of relative surplus-value was the main concern. To achieve this purpose existing capitalist activity areas were reorganized. For this reason, capital accumulation was observed (Jessop, n.d.). Then, in the 20th century capital accumulation reached a point to enter a new stage which is called as monopoly capital. Nature of the capital shifted from competitive to monopolistic (Laibman, 2005).

In addition, in the Western Marxist view, there are some other models that are helpful to identify the capital accumulation processes. While regulation theory is defining the different phases of capitalism with the regimes of accumulation, the social structure of accumulation theory provides an explanation *"based on creation and then collapse of successive sets of the institutions that are favorable for capital accumulation."* (Kotz, 2001). For both of them, Fordism and Post-Fordism became the important regimes of accumulation.

Fordism and Post-Fordism are discussed as a capital accumulation regime, but they may also be evaluated as a phases of capitalist development. In the article written by Alnasseri, Brand, Sablowski and Winter (2001), periodization of industrial capitalism is conceptualized according to three phases: extensive accumulation, Fordist mode of development and the period coming with the crisis of Fordism.

Capitalism has survived itself by experiencing different accumulation regimes in response to the different socio economic conditions. As we mentioned before, capitalism has powered itself with the first industrial revolution in the 18th century and then, with second industrial revolution in the late 19th century. In that period to overcome the economic crisis that caused decreasing the productivity, production relations and organization were redefined thanks to some new regimes of accumulations. With regards to the periodization of capitalism, Fordism and Post-Fordism, and also the Taylorism, that was emerged first, needs to be figured out.

Although different periods of capitalism offered new ways of production, and affected the socio economic structure of the communities, it is impossible to say that these

changes transformed the whole superstructure. As we discussed, evolution of particular production mode requires rational changes both in the production relations and the production forces. What our socio-economic structure has experienced so far has been limited in the framework of the capitalist mode of production. As Laibman (2006) says *"transition beyond capitalism cannot be theorized; it exists inherently in a utopian, speculative mode."*

In this context, following part will present us that what is next for the capitalist mode of production. We are going to examine the coming stage of capitalism in terms of evolving production relations and forces. After explaining the general ideas about post-capitalist society, how the main factors of production is to be affected by the new dynamics of post-capitalism will be discussed.

3.3 Towards a Post-Capitalist Society

3.3.1 Main Ideas on Post-Capitalism

The discussion on post-capitalist society is not a new phenomenon. There are several writings on this issue. One of the most important one is 'Grundrisse'. It consists of notes written by Karl Marx in 19th century and it could not be read in Western Europe until the late 1960s. In the book 'Post Capitalism: A Guide to Our Future', P. Mason (2015a) quotes that *"When they finally get to see what Marx is writing on this cold night in 1858, scholars will admit that it 'challenges every serious interpretation of Marx yet conceived'. It is called the Fragment on Machines."* (p.133).

Karl Marx emphasizes that when the scale of the industrial production become larger, relations between workers and machines evolve. In the production process, the role of the workers with hand-tools started to change. Workers positioned themselves in the side of the production process rather than being its chief actor (Marx, 1993 cited in Mason, 2015a). Marx proposed a new model of production that is defining the role of the machines as a main producers and on the other hand, people's duty is just supervise them. In this context, productive force is considered as the 'information'. Therefore,

knowledge and organization is determined as the main productive factors instead of the conventional labor force (Mason, 2015a).

In such an economy, if people will participate the production process just as the developers of algorithms and leave the rest to the machines main question becomes who takes the control on the power of knowledge. Mason (2015a) mentioned that *"the nature of the knowledge locked inside the machines must be social."* (p.133). In this context, to understand the relation between machines, knowledge and people, we can reconsider Wikipedia. It is an open sources encyclopedia that everyone can contribute. It maintains itself with collaborate work of the millions of people. After, a developer provides the basic algorithms for the software, whole structure is starting the formed socially. Knowledge and self-organization produce a dynamic platform. Likewise, Airbnb provides an opportunity for people to rent accommodation throughout the world. It is the biggest real estate cooperation in the world but it does not have any properties at all. Similarly, Uber which provides transportation facilities for people is the biggest transport organization in the world but it does not have any car fleet. These kind of developments provide just a digital platform for people to produce and organize the shared social knowledge. By this way, everyone benefits from what is socially generated. Thus, knowledge and organization can be considered the new dynamics of the post capitalist era.

In the 'Fragment on Machines', the idea that 'knowledge is a production force' and the 'knowledge stored in machines is social' made Marx to reach two conclusions (Mason, 2015a). First, increasing productivity with the knowledge is a better option than extending working hours. Secondly, according to Marx, 'the knowledge' as a driver force of economy could not provide a price mechanism. Unlike the current capitalist mode which determine the value of produced entities with the input values, in the new structure, inputs are formed with a form of social knowledge and it is impossible to define the proper value of them (Ibid, 2015a).

The conclusion of Marx demonstrates that he was trying to describe a new production force: 'the knowledge' that is in the search of a new route beyond the capitalism. Although the ideas in the 'Grundrisse' was evaluated as rough draft, it still provides a

91

basic perspective for the post capitalist society. Mason (2015a) answers the question about why this idea disappears as a concept and could not be internalized completely with the argument that in the time Marx lived, *"the socialization of knowledge inherent in the telegraph and the steam locomotive were not sufficient to blow the foundations of capitalism sky-high."* (p.137).

But he concludes that the idea in the writings of Marx still has a route towards a post capitalism. Mason (2015a) explains what Marx imagine in this context with the following expression:

> *"He imagined socially produced information becoming embodied in machines. He imagined this producing a new dynamic, which destroys the old mechanism for creating prices and profits. He imagined capitalism being forced to develop the intellectual capacities of the workers. And he imagined information coming to be stored and shared in something called a 'general intellect' which was the mind of everybody on earth connected by social knowledge..."* (p.138).

So, the notes in the 'Grundrisse' was the first attempt to define the production relations and forces in the context of new production mode. Marx foresaw that the knowledge would become the main component of the new system. He was clear about that we will live in a different period beyond the capitalism in light of the shared knowledge and information technologies.

The idea that knowledge become a crucial factor of the new capitalist structure is also argued by Peter Drucker who is a famous management consultant. What he mentioned is that knowledge should need to be understood as *the* resource instead of *a* resource. In this regard, with comprehension of this notion, we might take a step forward to the post capitalist society (Mason, 2015a). In the article 'Will capitalism survive the robot revolution?' futurist Zoltan Istvan (2016) claims that 'money' as a tradable value could not survive against the knowledge. Knowledge will become the most valuable resource to create machines, software etc. In this regard, the magazine 'Think Act' defines the data as ne the raw material of the 21st century and it is claimed that the amount of data is expected to double every year (Dujin et al., 2014).

In the book 'Post-Capitalist Society', Drucker (1993) points out that factors of production (land, human and capital) have started to change with the developments on information technologies. In this context, he provides two questions to better understand the knowledge as the resource of the economy. First question is about if we consider the knowledge as the resource of the production than how we might increase the productivity of it.

Increasing productivity has been the major challenge through the all phases of capitalism. Each industrial revolution has emerged when the productivity goes into the period of regression. Kondratieff wave[5] explains process of each capitalist economic phases with the increased values of economic indicators (e.g. prices, interest rates, foreign trade etc.) followed by decline (Kondratieff, 1922 as cited in Korotayev & Tsirel, 2010). There has been always a cyclic fluctuation on productivity. Each new phase is coming with the first declining of the value of economic indicators resulting from the decreased productivity and then thanks to the increasing productivity with some new developments, following phases emerges. (See: Figure 3.3) At this point, Drucker's asks that how it will become possible to increase the productivity of *the resource* which is *knowledge*.
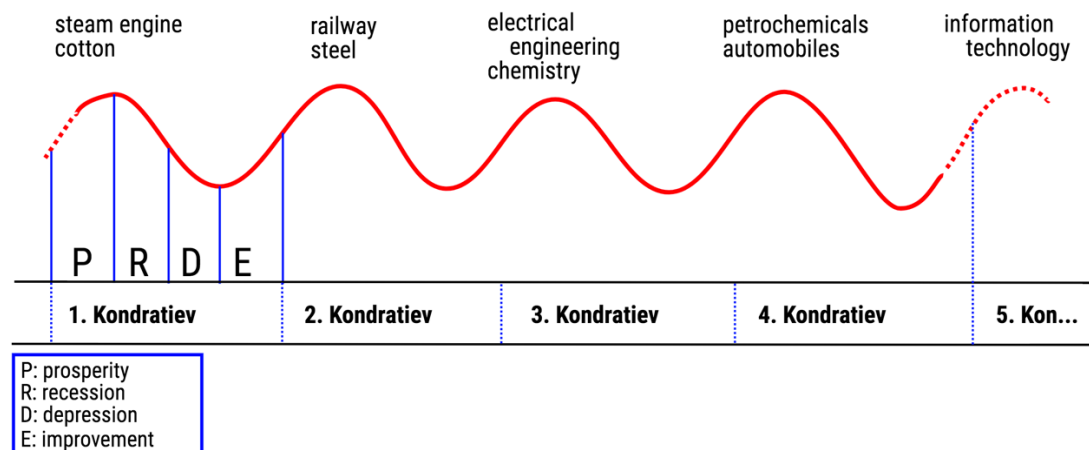
Figure 3.3: Kondratiev Waves (Sources: web.12)

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[5] A Kondratieff Wave is a long-term economic cycle resulted from technological developments. After the innovation period (improvement), period of prosperity, recession, depression emerges respectively.

Mason (2015a) says that *"if previous eras of capitalism had been based on the increased productivity of machines and labor, then the next must be based on the increased productivity of knowledge."* (p.113). In this regard, Drucker (1993) argued that integration of different disciplines into each other might be the solution. Moreover, knowledge should not be monopolized. On the contrary, it should be shared to increase the productivity. Also, we as a producers have to compete against the intelligence to make production process valuable. Indeed, fourth industrial revolution will give an opportunity for these. This characteristic feature of industry 4.0 will be discussed later but it is important to know that connection, integration and modularity are the key components of the new forthcoming era.

Secondly, Drucker (1993) asks the questions who would be the social archetype of post capitalism? While in the Feudal era, there were lords, bourgeoisies take over the stage in the capitalism. In the new epoch, who will be the main actor is the focus of the question that he asked. As the answer he proposed is that there will be 'the universal educated person' who has the manager's ability to apply knowledge and intellectual's ability to deal with pure concepts (Mason, 2015a). Basically, what he thinks is that due to the high developments in information technologies, in the post capitalist society, our behaviors from production to consumption and also to socialization will evolve inevitably. Not only the life of people but also roles of them in the life will be redefined with new circumstances. Even today, our life has been affected with the new improvements on information and communication technologies quite a lot. Ratti (2017) contributes the discussion on the question of who will be the main actor in future by introducing the competition between owing the data and the intelligence itself. He defines the data as the consequence of the new production mode just like the knowledge. The main problem of today that he proposes is that *"who will access the data?"*. The answer tends to present what Drucker asked for. Ratti (2017) answers the question of *"will the data be more accessed, controlled and edited by big companies or states than by individuals?"* by redefining the competition between individuals and big companies or states. According to him, important thing in this competition is not the owning the data. On the contrary, competition beyond having the data lies behind the intelligence. He says that we should compete for the intelligence not for the

ownership of the data. If we achieve this, we might evolve towards the fairer society. So, making discussion on these two question will be beneficial to analyze the transition to post-capitalism.

Another most known study on the new form of capitalism is presented in the book 'Cognitive Capitalism' that is written by Y. M. Boutang in 2008. It is defined as the third phase of capitalism after the mercantile and industrial capitalism. Boutang (2008) emphasizes that cognitive capitalism is appearing just like the previous phases of capitalism. It will reorganize and rearrange the essential features of the industrial capitalism (Boutang, 2008). Cognitive capitalism provides a new dimension for working. Within the new information age, people will become 'co-producers' with the companies (Boutang, 2008 as cited in Mason, 2015a). Both production and consumption patterns of people will evolve. Some other scholars use the term 'prosumers' to define the new role of the individual with this evolution. We will able to produce what we consume thanks to the advanced technologies.

The debate on forthcoming stage of the capitalism has become the focus of many scholars. From K. Marx to Drucker (1993) and Boutang (2008), all have the similar concerns for the future of capitalism. Most recent discussion about post capitalism is conducted by P. Mason in 2015. In the article titled as 'The End of Capitalism Has Begun', Mason (2015b) argues that capitalism might be abolished with something more dynamic. According to him, the only thing that will overthrow the capitalism would be the post-capitalism. It will reshape the economy around the new values and behaviors he says. He declares that post capitalism is possible because information technology has caused three major changes. First thing is that information technologies lead to reducing the need for work. People start to reorganize their time for the new conditions of work. Secondly, he emphasizes that due to the fact that there is no limit to produce information, it provides decline in the ability of market to form the prices. Because he argues that *"markets are based on scarcity while information is abundant."* The other critical aspect is the emergence of collaborative production (Ibid, 2015b). Wikipedia is a great example for the result of this change as we have discussed before. Mason (2015b) argues that transition towards a post-capitalist era is not all about

economics. It also consists of human transition. Even today, our generation is almost completely different than our grandparents. Our behaviors, abilities and perceptions are changing and adopting with the new conditions. While these changes happen, we start to live in more integrated and networked society. In this regard, Mason (2015a) claims that *"with the rise of networks, the capacity for meaningful action is no longer confined to states, corporations and political parties; individuals and temporary swarms of individuals can be just as powerful agents of change."* (p. 267). This new kind of person is called as 'networked individuals'.

Discussions on the post capitalist society has begun in the late 19th century especially after the emergence of first industrial revolution. Automatization and mechanization were involved in the production process for the first time and this made people think on the issue that how the production forces and relation will evolve with the rapidly developing technology. Due to the economic effects of first three industrial revolutions, capitalism gained an unprecedented increase. Although capitalism became powerful and widespread around the world thanks to the previous revolutions, the fourth one will present us something different and more dynamic beyond the capitalism itself. It is possible to argue that, all proposals on how the post capitalist society will be structured and the ideas on new production relations and forces will find opportunity to be realized (or not) with the fourth industrial revolution, Industry 4.0. In the next part, the main features of the fourth industrial revolution will be discussed to make the argumentation on post-capitalist society more clear.

3.3.2 The Fourth Industrial Revolution (Industry 4.0)

Our world has experienced three different industrial revolutions from the late 18th century to the 21st century. First industrial revolution occurred when steam engine was introduced to the mechanical production. After that, the second one emerged with the invention of electricity and assembly line in the late 19th century. The third industrial revolution appeared when the information technologies dominated the industry after the mid-20th century. While the time flows by, how we perceive and experience the

idea of production has been always affected by these consequent revolutions. While first industrial revolution was occurring, most people were not aware of the forthcoming changes that were going to affect their life significantly, just like happened in the second and the third industrial revolutions. Developments of each industrial revolution provides the basis for the next one. This can be explained with 'the law of accelerating returns' as discussed in the book, 'The Age of Spiritual Machines', by Ray Kurzweil in 1999. According to the law, evolution inherits the knowledge and methods acquired from previous evolution to create the next one. What he wants to explain is that evolutionary systems have cumulative growth patterns and they are exponential progresses. In the essay entitled as 'The Law of Accelerating Returns' Kurzweil (2001) analyzes the technological developments which are the triggering forces of industrial revolutions in this perspective. *Kurzweil (2001)* argues that:

> *"An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense intuitive 'linear view'. So we won't experience 100 years of progress in the 21st century — it will be more like 20,000 years of progress (at today's rate) …There's even exponential growth in the rate of exponential growth."* (p.1)
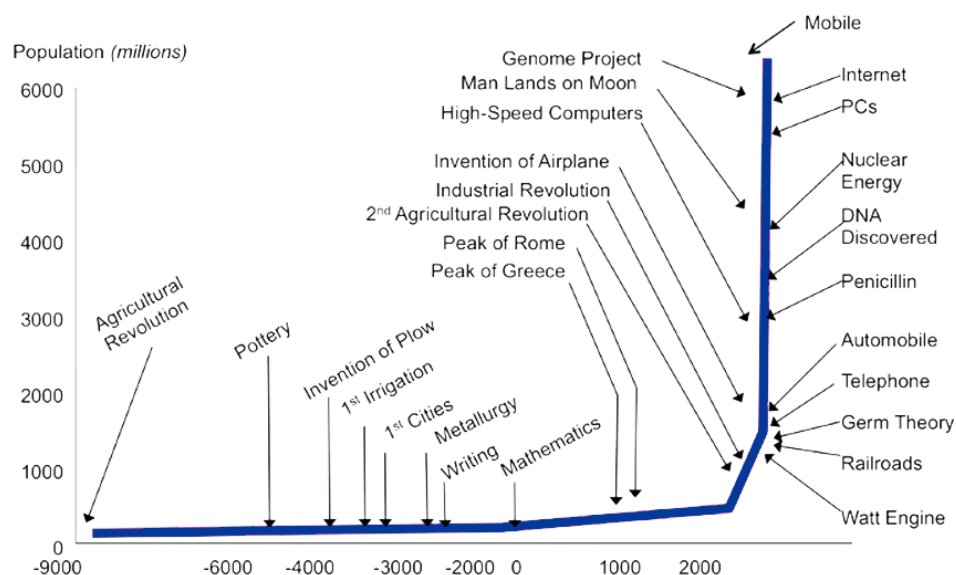
Figure 3.4: History of technological developments (Source: Milken Institute)

97

Since the early ages of history, each invention can be considered a technological development step. From the wheel to the internet, all new critical discoveries have led to paradigm shifts. (See: Figure 3.4) In the beginning, these paradigm shifts occurred less frequently. In time, the numbers of these paradigms increased exponentially. Kurzweil (2001) emphasizes that *"a paradigm shift occurs when previous approach or method exhausts its potential."* (p.3). When the number of these shifts increased, emergence of industrial revolutions become unavoidable.

From the late-20th century till today, it is possible to claims that these paradigm shifts have occurred very frequently than ever before. Each new paradigm constantly gives rise to another one in short term and it is quite obvious that these increased paradigms will lead to a new revolution. Likewise, Smit and his colleagues (2016) proposed that according to this logic fourth industrial revolution will emerge with the high developments on information technologies and will connect every part of the production chain and human beings with advanced automated technologies.
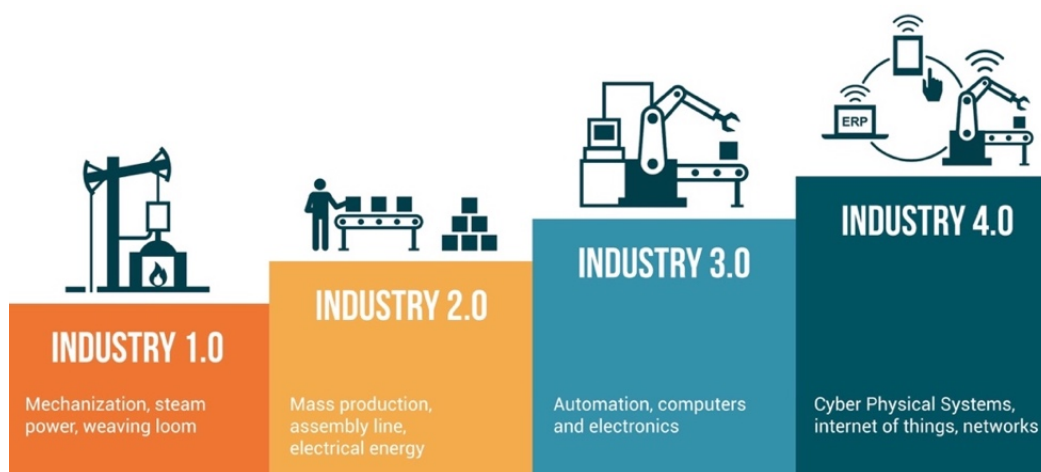
Figure 3.5: Industrial revolutions (Source: web.13)

When we consider the current developments, it is possible to argue fourth industrial revolution is just starting to appear. The concept of 'Industry 4.0' called as 'Project of the Future: Industry 4.0' is developed by a German Federal Ministry of Education and Research. Industry 4.0 is described as *"the organization of production processes based on technology and devices autonomously communicating with each other along the*

value chain: a model of the 'smart' factory of the future where computer-driven systems monitor physical processes, create a virtual copy of the physical world and make decentralized decisions based on self-organization mechanisms." (Smit et al., 2016). Klaus Schwab (2016) who is the founder of the World Economic Forum argues that, in the transition period between agricultural revolution and industrial revolution, muscular force was transformed into the mechanical power. Now, this mechanical force is combining with developed cognitive power thanks to the advanced technologies and knowledge explosion. Physical and unphysical production systems come together to make cooperation through the value chain.

Previous industrial revolutions made radical changes in the production forces and the relations. When we look at the historical progress, it can be seen that changes on these two components have caused new modes of production and eventually revolutions. In the same way, the fourth industrial revolution will modify and change the production forces and reformed the relations but it will cause something more comprehensive. This is explained by K. Schwab (2016) as *"Fourth industrial revolution does not change what we are doing but it changes us."*

What makes the fourth industrial revolution different from the third one is explained by Mark Barrenechea with three concepts: *extreme connectivity*, *extreme computing power* and *extreme automation* (Barrenechea, 2017). Extreme connectivity can be explained with the concept of 'internet of things'. It can be defined as the network infrastructure in which all devices connect with each other. All components of the network that we use, produce data and exchange among themselves. This infrastructure provides a highly connected network between humans and machines and also among the machines. Next, extreme computing power means the increased capabilities of devices on every part of the production processes. Lastly, these two concepts cause extreme automation. Due to the extreme automation, the role of the workers in production process will change. Some futurists argue that, in future whole production will be conducted by machines and this condition will provide an industry called as 'lights out production'.

3.3.2.1 Characteristic features of Industry 4.0

The fourth industrial revolution is appearing with rapid developments in technology. These developments involve variety of fields that will affect our lives. Industry 4.0 has a distinctive character by integrating physical, biological and digital fields into each other. It provides comprehensive, profound and systematic advancements on production processes (Schwab, 2016). The main characteristic features of the fourth industrial revolution can be summarized by decreasing production scale, decentralization, virtualization, modularity, integration and flexibility.

- **Decreasing production scale:** *Industrial production will be localized in smaller and more specialized units.*

Decrease in production scale means that redefining range of the actors who participate the production process and decreasing size and scale of the necessary infrastructure for manufacturing. It results from the decreasing importance of scale economies. Economies of scale refers to the production efficiency and economic advantages that is gaining in the production processes. In traditional production, efficiency is obtained by increasing number of output and size or scale of a production activity. Mass production processes have been done in large scale and producers try to decrease the cost per unit of output by producing more. Now, advanced technologies coming with the new industrial revolution allow human to produce efficiently not only with mass production (assembly line) but also in a separate way and independently. These separation and independence arises from the changes in production force. When the knowledge becomes the resource (force) of the new production mode, we do not have to consider the level of unit costs to get efficiency in production. Because, essential thing to make production efficient and valuable is that creative and innovative knowledge. This necessary knowledge or intellect can be generated, controlled and operated by individuals in production processes.

As we already discussed, with the fourth industrial revolution mechanical power is combining with cognitive force. Cognitive power in other words intellect has started to leave mechanical one in the background throughout the production processes. Every individual who has the production force could be the part of the manufacturing industry. When a product is generated, he/she reaches a new knowledge and this knowledge becomes the resource of the next production process. It continues in a cyclic way. So, intellect becomes not only the producer itself but also the product of the process (Shananhan, 2015). Production will start to be conducted efficiently even in personal level with advanced technologies. For example, in software technology market, there were only some big manufacturers such as IBM, Microsoft etc. Then, number of freelance software developers increased unprecedentedly with technological developments and they have started to develop technology and creative ideas even at their home. Each individual produces knowledge and innovative solutions by using his/her intellect and contribute the global production line. Thus conventional assembly line might be reconsidered as a more flexible and also in virtual form in the global context.

With advanced technological developments, marginal costs in production is reduced to almost zero and this condition will encourage individuals and small entrepreneurships to become a part of the production processes. Also, it will lead large manufacturers re-shore their production facilities to near the markets and consumers. While in Fordism, production was concentrated in nation states and being conducted within the large scale operations in a standardized way, production became fragmented and dispersed beyond the nations with Post-Fordism. Production was moved from huge factories to more flexible and specialized production organization based on small manufacturing facilities. Therefore, scale economies have started to lose their importance after Post Fordism, and with new era they will probably disappear. Thanks to the new revolution, industrial production will be localized in smaller and more specialized units. In production process, role of every person who produce knowledge will be redefined according to new circumstances.

- **Decentralization:** *Production activity no longer needs to agglomerate in an area not only because of the the new scale economies but also due to the new developed cyber physical systems.*

New conditions in the economy will offer new possibilities in the organization of production. Decentralization is the another characteristic features of the Industry 4.0. While the scale of production is changing, production starts to reveal itself in a spatially dispersed way. At the same time, new era will improve the ability of interoperability. Production activity no longer needs to agglomerate in an area not only because of the the new scale economies but also due to the new developed cyber-physical systems. These systems allow humans and production facilities to connect and communicate with each other in anywhere (Smit et al., 2016).

- **Integration:** *Spatially dispersed but vertically and horizontally integrated systems.*

Industry 4.0 provides spatially dispersed but vertically and horizontally integrated system[6]. These condition causes strong integration between digital and physical systems which is the another characteristic features of Industry 4.0. Beyond this kind of integration, it also gives chance to small and medium sized firms, entrepreneurs and even in individual level producers to be integrated into the production chain by increasing their power of productivity.

- **Virtualization:** *Combining the digital world with physical.*

Next characteristic feature of Industry 4.0 is virtualization. It is the process of

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[6] Vertical integration refers to the communication between people, machinery and resources that are digitally modelled in the smart factory. On the other hand, adaptation to new circumstances and constantly optimization of production according to the needs correspond to the horizontal integration. These two are considered as the objectives of industry 4.0 (Lichtblau et al., 2015)

transforming the production phases that exist in real form into the virtual context. Virtualization is an important factor to combine the digital world with physical. Some technological developments such as advanced simulation and augmented reality provide real time information to the producers and this gives an opportunity to improve their decision in production chain. Brain Roberts (2015) argue that virtual reality and simulation will reduce the need for building large scale facilities.

- **Modularity:** *Smaller and more specialized manufacturing units.*

The third feature of Industry 4.0 is modularity. Production facilities will be organized with high modularity. This characteristic feature is defined by Smit and his colleagues (2016) as *"flexible adaptation of smart factories to changing requirements by replacing or expanding individual modules."* Modularity of production facilities will lead to smaller and more specialized manufacturing units.

- **Flexibility:** *Displacement of technological facilities and organizations according to the instant needs and desires.*

Lastly, new production mode coming with Industry 4.0 provides flexible production patterns. Hackenesch (2011) claims that rigid value chains will be replaced with flexible value patterns. Value chain is the process of creating a product from the raw material to an end product. In this context, rigidity of the production line will be replaced with more flexible pattern. Producers in all scales will able to get involved in any related production lines. Making contribution to manufacturing processes will become possible even in personal level. Industry 4.0 brings freedom and flexibility into the production process. Displacement of technological facilities and organizations according to the needs will be possible throughout the production. By this way production activities will be set up in much more decentralized ways. In addition, it will be easier to produce and customize products according to the instant needs and desires (Dujin et al., 2014).

3.3.2.2 Main Indicators of Industry 4.0

Fourth industrial revolution has already begun to show its effects on our life. The most obvious changes that we can observe are the reduced need for work, collaborative production and knowledge as a new production force and the resource of new production mode. These changes are observed because of the two main indicators of fourth industrial revolution: *Emergence of Post-Capitalist Society* and *Technological developments.*

Emergence of the Post-Capitalist Society

As we already discussed, there is a tendency towards a transition to post capitalist society. This transition can be evaluated as one of the indicator of Industry 4.0. As Marx (1993) mentioned in his writings, when production changes, the roles and the relations between workers and machines evolve. Recent mode of production defines the role of the machines as a main producers and on the other hand, people are responsible to develop their intellects to compete with new production dynamics. Even in today, developing knowledge should be considered as a better option to reach the desired achievements in production activities than extending working hours. Advanced technologies are making production activities easier, faster and productive than ever before by offering smart solutions. While doing this, they exclude individuals from most of the physical production processes. Automatization appearing with the third industrial revolution is becoming more dominant and it is invading all aspects of our lives with the emergence of fourth industrial revolution. Mason (2015a) argues that transition towards a post-capitalist era is not only about economics but also consists of human transition. Futurist Zoltan Istvan (2016) mentioned that economists are facing with a serious question that was seen as ridiculous two decades ago. Their main concern is that '*if 90 percent of human jobs are replaced by robots in next 50 years, then what will be the consequences both for economy and for human? Will the capitalism survive with the revolution?*' According to author, no one knows the answer and this question is making everyone nervous.

Due to the automation of production processes which is the inherent nature of the fourth industrial revolution, Industry 4.0 seems to be a job killer rather than job creator (Müller et al., 2014). Technological innovations have always caused some transformations on businesses. While some jobs are being disappeared with innovations, new working areas are emerged and replaced the old ones. For example, in the 19th century, people working on agricultural sector were constituting %90 of the work force in the USA. Then, thanks to the industrial revolutions, this ratio becomes lower than two percent today (US Census Bureau, n.d.). People started to get involved in industrial production processes. New production modes have always provided new employment opportunities for people up to now. On the other hand, some scholars, who have pessimistic views on this issue, think that new revolution will not offer a significant increase in employment this time. On the contrary, it will destroy most of the jobs and make them unnecessary.

In the essay entitled as 'Economic possibilities for our Grandchildren' (1930), J. M. Keynes argues that *"We are being afflicted with a new disease of which some readers may not yet have heard the name, but of which they will hear a great deal in the years to come namely, technological unemployment. This means unemployment due to our discovery of means of economizing the use of labor outrunning the pace at which we can find new uses for labor."* (p.359). What he tried to emphasize is that new production modes emerging with industrial revolutions reduces the need for workforce and we might not find a way to substitute the unemployed labor force. But this idea has not been true for during the previous industrial revolutions. In the article entitled as 'The Onrushing Wave' (2014), Reay states that technological unemployment is inevitable. *"Every great period of innovation has produced its share of labor-market doomsayers, but technological progress has never previously failed to generate new employment opportunities."* (p.9). However, what happens if Keynes's idea becomes true with new dynamics of the Industry 4.0 and technological progress fails to generate new employment opportunities? The discussion on whether the fourth industrial revolution brings prosperity or not is still unclear. But whatever happens, it will be important to adapt and develop our abilities for future.

K. Schwab (2016) introduces two different approaches about the impact of technology on employment: 'destructive effect' and 'constructive effect'. The former results from the automation which causes complete substitution of labor force with mechanical and cognitive power makes people unemployed and forces them to adapt their skills into different fields. In other words, destructive effect refers to the dislocation of jobs. Even in today, there are some examples of this effect. Istvan (2016) presents a possible consequence of the atomization in freight transportation sector. There are 3.5 million truck drivers in the USA. When we consider the recent innovations on the driving technology, the question of *what will those people do in the future?* becomes remarkable. There has not any relevant answer for this question yet. But this is certain that not only truck drivers but also many jobs will no longer exist in the future. Although this condition should be considered as the nature of the competitive economy, actually it provides an unusual situation. Capitalism expects that new employment opportunities emerge because of the inherent characteristic of competitive economy but this time, many people who will lost their jobs will not be able to find new jobs and this will make situation completely different. According to Z. Istvan (2016), everyone's job including even the U.S president will be at risk of being outperformed by machines.

Throughout the history, there have been exploited and exploiter in each production modes. What makes exploiter powerful against the exploited has always been the production forces and 'money' which always become the most important value to gain the force. In the new context, knowledge will become the new tradeable value as we already discussed and high skilled people will have advantages against the others. But the others will still have the possibility to develop their own knowledge against them. The only thing that will make difference is having the innovative intelligence, knowledge and creative thinking.

On the other hand, some economists think that automation in production process raises the productivity. Then, high productivity will cause increase in income ratios. This condition provides constructive effect of technology by generating demand for new products and services.

Increased demand for the new services causes the emergence of new jobs for displaced workers and even new sectors. This situation is explained by Jevons Paradox. According to his idea, with technological developments, necessary amount of the resource for production decreases. It results from the increased the efficiency of the resource usage thanks to the technological innovations. But on the other hand, consumption rate of resources increases due to high demand. As a result of higher demand, new employment opportunities would appear.

Rotman (2013) argues that job loses that will result from the new industrial revolution may just be part of the initial shock. According to him, job loses will be seen in the very first stage of the transition period and it will be temporary. Only thing that people will need to increase the job opportunities is the adaptation and adjustment of their skills to the new circumstances. With new developments, a lot of entrepreneurs will appear and they will create new employment opportunities based on new technologies, then number of jobs will increase. He thinks that just like the previous industrial revolutions, the fourth one also provides new employment opportunities.

In the report of World Economic Forum, dated in 2016 there is an estimation of the changing trend of employment. According to the report, it is claimed that: *"%65 of children entering primary school today will ultimately end up working in completely new job types that do not yet exist."* (*The Future of Jobs*, 2016). It is obvious that new era will bring fundamental changes on the way we work and live. According to a research which is presented in the same report, participants who are the managers of department of human capitals are asked to define the changes in demand for work skills. As it is seen on the Table 3.1, cognitive abilities, system skills and complex problem solving will be more demanded than physical abilities and technical skills in 2020. Results show that while people who are working on more productive, creative and innovative will be able to sustain their jobs, people working in the areas that require only physical abilities and technical knowledge will need to be adapt their skills. Otherwise they will be unemployed.

Table 3.1: Change in demand for working skills between 2015-2020 (Source: *The Future of Jobs*, 2016)

	Scale of skills demand in 2020	growing skills demand	stable skills demand	declining skills demand
Cognitive Abilities	15%	52%		
Systems Skills	17%	42%		
Complex Problem Solving	36%	40%		
Content Skills	10%	40%		
Process Skills	18%	39%		
Social Skills	19%	37%		
Resource Management Skills	13%	36%		
Technical Skills	12%	33%		
Physical Abilities	4%	31%		
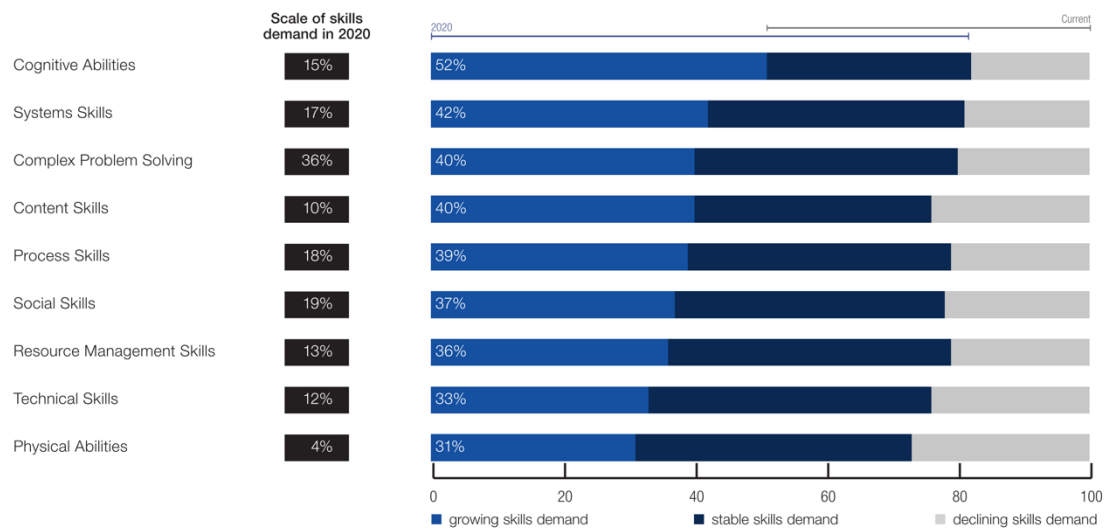
Economist Carl Benedict Frey and engineer Michael Osborne (2013) presented a study which shows the probability of computerization in 702 different jobs. They defined a range between 0 and 1. Accordingly, the most sensitive job against the computerization/automatization is label with '1' and job that has the least tolerance for computerization is labeled with '0'. (See: Table 3.2 and 3.3) According to the results %47 of jobs are in the high risk group for automation in the USA. It is possible to say that jobs associated with high levels of education will survive. On the other hand, low-skill workers will be confined due the computerization. They will have to adapt their skills and acquire creative and social skills (Frey & Osborne, 2013).

Table 3.2: Occupations which have the least tendency to automation
(Source: Frey & Osborne, 2013)

Probability	Occupation
0.0030	Emergency Management Directors
0.0042	Doctors
0.0043	Psychologists
0.0065	Computer System Analysts
0.0068	Curators
0.0077	Anthropologists
0.0100	Theatrical and Performance
0.0110	Mechanical Engineers
0.0150	Chief Executives
0.0180	Architects

Table 3.3: Occupations which have the most tendency to automation
(Source: Frey & Osborne, 2013)

Probability	Occupation
0.99	Telemarketers
0.99	Mathematical Technicians
0.98	Shipping, Receiving and Traffic Clerks
0.97	Real Estate Brokers
0.97	Agricultural and Food Science Technicians
0.96	Locomotive Engineers
0.93	Truck and Tractor Operators
0.92	Production Workers, All Other
0.92	Machine Operators
0.89	Bakers
0.86	Plant and System Operators

Technological Developments

All these changes are mainly resulted from the technological developments. Some impacts of the new technologies of production have already observed. (See: Table 3.4.) There are a lot of reports and articles on the new technological developments that is coming with industry 4.0. In this regard, with reference to H. Wial's (2015), research it will be meaningful to consider the technologies that are probably have spatial

impacts. Wial includes only the technologies that have effects on production processes. He introduces seven different technological developments which are;

- *advanced sensing and process control*

- *cloud computing*

- *industrial robotics*

- *modular pharmaceutical manufacturing*

- *advanced materials*

- *digital manufacturing*

- *additive manufacturing*

Table 3.4: Drivers of change, time to impact on business models (Source: *The Future of Jobs*, 2016)
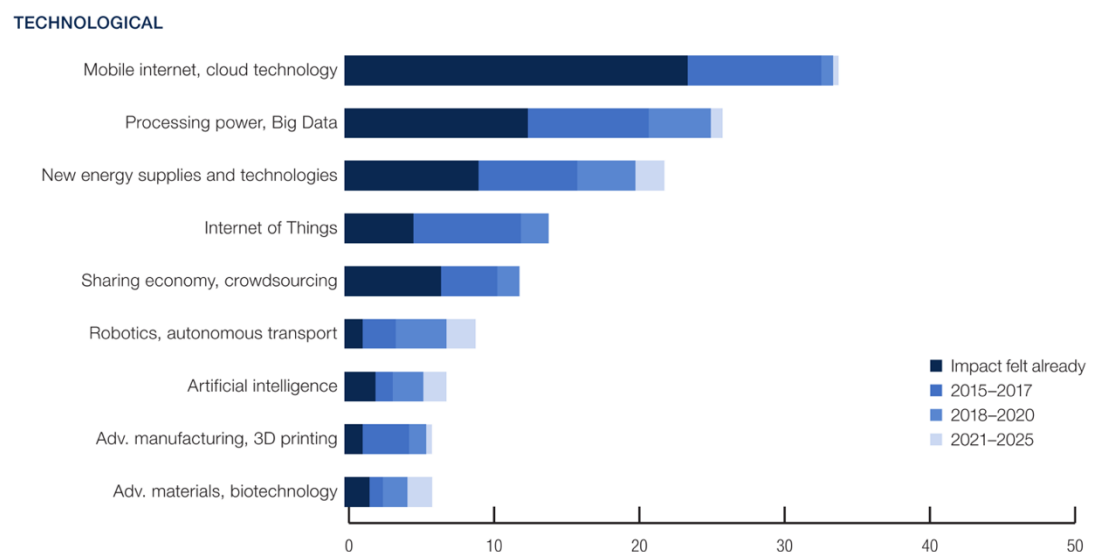
Advanced sensing and process control: This technology allow people to track every stage of the production. By attaching sensors to the objects, it becomes possible to collect data about the object's location and related information about the object from the production stage to the shipment and even after the delivery. It has already used by

many firms on their products. Howard (2015) gives the example of GPS: thanks to the global positioning systems, producers of our mobile phones collect information about how and when the phone is used. This kind of information technologies today are being used by many producers. Actually, they have been used since third industrial revolution; however, with Industry 4.0, it is expected that advanced sensing technologies will improve the production systems by connecting all sub-systems, the producer, the consumer and the internal and external objects with each other not only during the production process but also after that as well (Dujin et al., 2014). This system also tracks constant changes in demand. It allows producers to adjust their production schedules accordingly and produce sufficiently. It will increase the efficiency in all aspects. Jan Smit and his colleagues (2016) says that these systems which is called as cyber-physical systems allow humans and production facilities to connect and communicate with each other in anywhere. Thus, the boundary between physical world and virtual world becomes blurred.

Cloud computing: Cloud computing refers to a collective platform in which data is shared. In cloud computing data is stored on the remote servers rather than on the on-site hardware (Wial, 2015). It provides lower costs to store huge amount of data and also gives an opportunity to interchange the generated data among the people and also machines as well. As we already mentioned, data will become the new raw material of the 21st century (Dujin et al., 2014). The amount of data is increasing in unprecedented dimensions. Thanks to the cloud computing, collection, storage and evaluation of data from many sources become possible. In this regard, the term 'big data' was generated. Big data refers to the huge amount of dataset including structured or unstructured data, from different sources in different sizes (IBM, n.d.). IBM defines three different features of the big data (3V): high volume, high velocity and wide variety. High volume refers to the massive amount of the data and wide variety correspond to the different kind of data types. The last one, high velocity means that processing and analyzing the data in high a speed thanks to the advanced processing technologies. So analyzing big data allows people generate new knowledge faster than ever before.

Thus, cloud computing system decreases the decision making time and causes better choices throughout the production chain.

Industrial Robotics: Robots have been already become a part of our life since the last revolution (Dujin et al., 2014). They have been used by the most of the manufacturers in the production processes to perform difficult tasks. With Industry 4.0, robots will become intelligent. They will be able to adapt every circumstances by communicating, interacting and cooperating with each other and also with humans. Wial (2015) thinks that next generation of industrial robotics will overcome the most of the problems because they will have mobile, flexible and adaptable features. In the March issue of 'Think Act', it is written that: *"In Industry 4.0, robots and humans will work hand in hand, so to speak, on interlinking tasks and using smart censored human-machine interfaces. The use of robots is widening to include various functions: production, logistics, office management. These can be controlled remotely. If a problem occurs, the worker will receive a message on his mobile phone, with link to a web cam, so he can see the problems and give instructions to let the production continue until he comes back the next day. Thus, the plant is operating 24 hours/day while workers are only there during the day. No more night shifts, and productivity skyrockets."* (Dujin et al., 2014). In addition to this, it is possible to say that with advanced industrial robotics there may be 'lights out production' as we mentioned before. So, it will give rise to reduction of labor intensity. Again, this situation may cause the decrease in unit costs and reduces the importance of scale economies.

Modular pharmaceutical manufacturing: Pharmaceutical refers to the products that are related to the medicines such as drugs. Modular manufacturing in pharmaceutical provides a new production approach with small and programmable factories. Manufacturing units are flexible enough to adapt and reconfigure itself according to different production activities. Thanks to the new modular factories, producers will be able to recompose the sets of standardized parts of production to research and produce

drugs based on their specific requirements (Wial, 2015). He (2015) offers that these production units could be reusable and modular permanent facilities or they could be in the size of shipping container that could be transported anywhere as well. Thus, it offers mobile and flexible structure. Although modular factories have started to use in medicines today, it is believed that, they will have a significant impact on other production industries as well. In addition, the integration of different disciplines along the production processes which is the main feature of industry 4.0 may be possible with new modular characteristic of production. Because, modularization will allow producers replace, expand and bring the different individual production units together. So, it will present more collective and productive environment.

Advanced materials: Although data is considered as the new raw material, we will still need some physical materials to produce tangible products. When the second industrial revolution appeared, it brought with advancements in steel manufacturing technologies that caused lighter, stronger and versatile materials. New materials allowed people to construct new bridges, skyscrapers, transportation infrastructures that were impossible to think before. Our built environment was generated within the limits that materials and the technology of that period offered.

Nowadays, with the emergence of the industry 4.0, scientists have started to explore new smart materials that we have never used before. They are lightweight, self-repairing, strong and even in the nanoscales (Manyika et al., 2013). Just like the previous industrial revolution did, fourth industrial revolution will generate new products which will be beyond the current era. Advanced material will give us opportunities to create new products that human have never become capable of doing. Especially, developments on nanomaterials have critique roles to shape the products of the future.

Digital manufacturing: Wial (2015) defines the digital manufacturing as *"the increased use of information technology, including software and the Internet, to reduce costs and increase throughput in the entire manufacturing process."* Digital manufacturing techniques offers a comprehensive control and efficiency advantages during the production process by offering three phases: design, prototyping and testing the products. Accordingly, first, a product is designed, then prototype is produced according to the design. In the end, it is tested. If the result of the test does not satisfy the producer or correspond to the what it has been intended, operation will start anew (Ibid, 2015). Thanks to the digital manufacturing systems, producers can be able to design, control and monitor every stage of the production process and also by simulating the final products, they will make preview of what they propose, before creating the final product. This will also create some benefits for customers. Products can be presented in digital environment with all details and they can be customized and tests according to needs of each customer thanks to the digital manufacturing.

Additive manufacturing: Additive manufacturing is kind of a production technique also known as 3D printing. Products are generated layer by layer rather than using conventional methods techniques such as cutting, bending, molding etc. (Manyika et al., 2013). It uses the digital manufacturing process. Product is designed in a virtual world. After that, a software program simulates the design process and send it to the 3D printer to drive the production. It will be possible to generate products that are difficult or impossible to produce with conventional production techniques (Ibid, 2013). Although, it is thought that only one material can be used in whole production process, recent advancements in 3D printing technology allow producers to use multiple materials such as plastic, metal, ceramic, glass, paper and even living cells. Thanks to the additive manufacturing, it will possible to create any object that is imagined in our mind in any time. In this manner, it will provide flexibility and instantaneity in production. In addition, there is no waste material in 3D printing, the difference between the amount of the input and the output material is equal.

3D printing has already become the part of our life. Households and businesses started

to use this technology to produce what they need (Wial, 2015). We can claim that it gives people a freedom of production. On the other hand, 3D printing has some limitations on it, such as; the relatively slow speed of building, high material cost and limited object size and level of detail in manufacturing. Nevertheless, when it overcomes these kind of limitations, additive manufacturing will probably be the heart of the production activities in the future.

3.3.2.3 Spatial Impacts of the Industry 4.0

Just like the previous industrial revolutions, recent manufacturing technologies and the new products emerging with the fourth industrial revolution will influence the spatial developments of cities. Wial (2015) conceptualizes the relation between technological advancements and spatial developments by identifying economic impacts of those technological innovations. According to him, each innovation in production processes and new technological products create different costs and benefits for manufacturers and residents. Different costs and benefits are associated with different locations and they lead people to make different decisions about the land uses. Thus, location choices of people are reshaped according to new economic circumstances and they affect the spatial pattern of the cities.

Wial (2014) explains the general nature of the connection between new technologies and spatial pattern of the cities by using his economic perspective. He considers this discussion speculative because the impacts of these new technologies on spatial development have not been investigated enough. This is because the fourth industrial revolution is just in the beginning and it is too early for an empirical evaluation. Rather, he presents a theoretical discussion on this issue. In his study, after explaining the economic concepts that have influences on land use decisions, he investigates the spatial impacts of those seven technological developments. Although, the subject is handled with totally in an economical perspective, it will provide a fundamental knowledge for us to shape our futurist notions in urbanism in the context of Industry 4.0.

SPATIAL IMPACT OF INDUSTRY 4.0

Technologies that are propably have spatial impacts;

• Advanced sensing and process control
• Cloud computing
• Industrial robotics
• Modular pharmaceutical manufacturing
• Advanced materials
• Digital manufacturing
• Additive manufacturing

············redefine············►

Economic Factors;

• Agglomeration economies
• Amenity values
• Transportation costs
• Plant-level scale economies
• Input requirements

⋮generate
▼

New neccessities for spatial configuration of the cities.

Figure 3.6: Diagram of the connection between new technologies and spatial development of the cities

Emerging Factors in Contemporary Economy

Wial (2015) defines five different factors that will the spatial impacts of those technologies. These are *agglomeration economies, amenity values, transportation costs, plant-level scale economies and input requirements.*

Agglomeration economies*:* It is the term referring to some costs and productivity advantages that firms acquire when they cluster in specific locations. Wial (2015) defines the agglomeration economies as a significant determinant of the location choices of economic activities. He thinks that new technologies may increase the advantage of being in the same place or they may also decrease. If the technology provides costs and productivity advantage without the need to agglomeration of production activities, producers will no longer co-locate and spread out geographically. In addition, the contribution of new technologies on productivity may be lower than the agglomeration economies itself. Then, manufacturers will continue to locate near each other to gain economic advantageous.

There are three major sources of agglomeration economies which are the common skill needs, proximity to suppliers and customers, informal face-to-face communication of ideas (Marshall, 2006 as cited in Wial, 2015). Firstly, there has been always a co-location tendency of manufacturers that have common skill needs. Florida (2003) argues that the tendency of being in a cluster is derived from the need of acquiring the work force of people who have an innovative production power. Unlike the conventional view which explains the efficiency in production by being in a location where transportation routes or natural resources exists, human capital theory argues that productivity advantages can be acquired only by including highly educated and productive people in the production processes within the new era (Florida, 2003).

Wial (2015) emphasizes that a technology which increase demand for a specific ability of people make manufacturers locate in the places where those skills intensively exist. On the other hand, if the technology reduces need for skilled workers or increases their need for workers whose skills are widespread will make geographic agglomeration unnecessary for producers (Wial, 2015). Whether the new technology generate agglomeration depends on the impacts of technological developments on skill needs.

Secondly, manufacturers prefer to locate in the same place because they have shared needs such as similar suppliers, transportation facilities, R&D centers and also the customers as well. For example, while emerging technologies allow us to do just in time production that minimizes the storage volumes, they force manufacturers to be in a close proximity to transportation facilities (Ibid, 2015). Due to the fact that specialized production will replace the standardized products, producers will no longer need warehouses to store huge amounts of products. It will become clear that when and for whom the products will produced. It's called 'on-demand' production. After customized production is done, products will be delivered immediately to the customers with high speed transportation facilities. Moreover, in the future, manufacturers need to keep up with the rapid developments on technology. Thus, it will be important to become closer with R&D centers. So, while each technology is presenting new ways of production, they will redefine the necessity of proximity. Lastly, face-to-face communication is considered as an important aspects of

118

production because people working on the same kind of production processes can improve the production or generate new ideas by exchanging their opinions. It is thought that even in such an era of electronic communication, ideas can be generated and improved through in personal communication that requires geographic proximity (Storper, Michael & Venables 2004 cited in Wial, 2012).

Amenity values: It is related with the willingness of the household to settle in a location. Just like the parameters that causes manufacturers to select specific areas for their own benefits, there are some amenities that influence the location choices of residents as well (Wial, 2015). Amenities can be exemplified with clean and pleasant environment. For instance, if a manufacturing facility causes heavy traffic, air pollution and noise, households may be willing to pay more to move away from that unpleasant location. During the previous industrial revolutions, factories have become the unpleasant areas and it led to some zoning requirements between residential areas and manufacturing facilities.

Most of the researches describe the new production mode coming with Industry 4.0 as a more environmental friendly system. In this regard, it is possible to claim that new production technologies will provide more pleasant environments and the separation between working and residential areas may disappear. In the future, probably, there will be opposite impacts of manufacturing facilities. They will be attraction points for residential land uses and having a pleasant factory as a neighbor may become most preferred situation for residents.

Transportation costs: Transportation costs of goods influences the producers' decision while they are choosing the location for manufacturing facilities. When transportation costs high, manufacturers try to locate near the resources or markets to increase their productivity. It causes the dispersion of manufacturers. On the other hand, when the transportation costs decrease, manufacturers will prefer to cluster together rather than locating near the customers or markets. Therefore, agglomeration

economies will outweigh the dispersive force of transportation costs (Wial, 2015). Yet eventually, with the advanced developments on communication and transportation infrastructures will encourage producers to spread out geographically without considering any costs advantages. In the book 'The World is Flat', Thomas L. Friedman (2005) uses the metaphor of the flat Earth to describe the new dynamics of the socio-economic structure of the world in future. According to him, new movement and communication technologies will provide a flattening effect by freeing people in such a way that they will be able to work, communicate from anywhere to anywhere with anything (Ibid, 2005).

Plant-level scale economies: After Fordism, production conducted on assembly lines have been considered more economical way to sustain manufacturing. According to the logic, if the fixed costs are high, only way to make production cheaper is conducting the production on large scale. Thus, this situation makes large plants more economical and productive than smaller ones (Wial, 2015). In those era, existing technological developments determined the level of scale economies that provoke the emergence of large scale factories. After World War II, when the land was accessible by cheap highways and rail roads, manufacturers started to build their facilities on large parcels away from the central parts of metropolitan areas to the edges where the land is cheap. If the new technologies reduce the scale economies, manufacturers will no longer need any assembly lines or large scale operations to optimize the costs and profits. Thus, production activities may be located on smaller parcels of land in denser portions of the large metropolitan areas (Ibid, 2015).

Input requirements: Land, human, and physical capital which are the main factors of production have always involved in manufacturing processes in different levels due to the different impacts of emerging technologies. Each industrial revolution has presented different concerns about these inputs. In this era, Wial (2015) argues that most of the recent concerns have focused on the impacts of automation on the

employment. Whether the automation will disappear the jobs or not is the trend topic of the current discussions. As we already discussed, there are different ideas that presents the constructive and destructive effects of new technologies on employment. In this regard, Wial (2015) says that: *"Mechanization reduces the amount of labor required to make each unit of a product but, at the same time, reduces the cost of producing each unit, thereby expanding the market for the product and, with it, the total number of workers needed. Whether the net impact of mechanization is to reduce or expand employment depends on which of these two effects is larger."* (p.68). So, in both cases, people will need to adapt new circumstances. Just like the possible impacts of the technology on human resource, new technologies will affect the physical capital and land as well. Physical capital which is the man made materials and instruments will be highly affected with new innovations. The role of machines will be redefined and also the scale and the operation mode will completely change. Moreover, the importance and the scale of the land in production processes will change. In the book 'New Rules for the New Economy' Kelly (1998) emphasizes that new economy emerging with new innovations operates in 'space' rather than place. He claims that *"People will inhabit places, but increasingly the economy inhabits a space."* (Kelly, 1998 as cited in Florida, 2003). Thanks to the new technologies, location free production may be possible. In this regard, whether we need to provide special zones for production infrastructure should need to be discussed. Therefore, to what extent these inputs will be the part of the production processes, and in what degree they will continue to participate the production activities depends on the influence of the technological changes on production.

Spatial Impacts of the New Technologies

 In this part, possible spatial impacts of the seven technological developments that are the main indicators of industry 4.0 will be investigated with respect to these economic concepts.

Advanced sensing and process control: In one of the public lecture series of American

Planning Association about new manufacturing technologies and their spatial effect, Wial (2014) emphasizes that in short term, large firms will be able to adapt advance sensing technologies and in long term, this technology will lead to reduction of plant scales and also in the level of scale economies. While manufacturing will be carried out far away from the head office, an employee in the office or even at home will able to control and follow the production process closer than ever before. In addition, by knowing the updated demand of people, just in time production will be done. Thanks to this system, the need for warehouses and logistic areas will reduce. On the other hand, it will be more important to locate production facilities near the freight transportation facilities. According to Wial (2014), due to the opportunities of this new technology, small scale manufacturers will be more likely to locate on smaller parcels in denser portion of metropolitan areas.

Cloud Computing: It is expected that thanks to the cloud computing, producers will no longer need to build their own information technology infrastructure or hire their own information technology staff (Wial, 2015). Cloud computing leads to the collaborative production which is the one of the main indicator of post capitalist society. In future, most of the decisions will be made by cyber systems by using the big data. The needed amount of workers will reduce due to the increased capability of decision making process. Wial (2014) argues that this will provoke deagglomeration of the manufacturers, because virtual collaborations will be emerged and producers will no longer need to locate their facilities close to each other. Moreover, improved ability to access the data will give a chance to small scale producers and entrepreneurships to enter the competition by decreasing unit costs of production.

Industrial Robotics: Robotics technology will increase the capacity and power of production forces that small manufacturers and even individuals have. They can be the part of the industrial production processes. This technology will weaken the scale economies and provide a tendency of shifting the manufacturing towards a smaller

parcels of lands located in the center metropolitan areas. (Wial, 2015). Industrial robotics will bring mobile and flexible production pattern. This technology can easily facilitate and adapt to the any kind of manufacturing activity because of the inherent nature of the robots. Thus, it will be possible to rearrange and reconfigure the manufacturing operations according to the instant demand thanks to the industrial robotics.

The difference between new generation of robotic devices is that they have greater mobility, dexterity, flexibility, and adaptability than previous ones (Manyika et al., 2013). Thanks to the advanced artificial intelligence, robots will able to handle most of the task that human could not. This will not only affect the production efficiency, or production durations but also it will alter the interaction patterns of people with industrial production. New technology will reduce the frequency of the regular travelling activity between work and home. There will be fully autonomous production clusters in which the intervention of people is low. In the future, we may be agglomerate and rearrange the spatial configurations around the robotic industries, because they will provide us most of the goods and services.

Modular manufacturing: Modular manufacturing units will reduce the fixed costs of production and causes deagglomeration of production facilities and producers. Thanks to the new modular and smaller structure of the production facilities, they can locate in smaller parcels in city centers. According to the demand, size and scale of the operation can be configured. In addition, modular production facilities will be flexible enough to repositioned themselves in accordance with the constantly changing needs. With opportunities of this technology, manufacturing footprint will decrease and it will lead to the mixed use development and even hybrid morphologies.

Advanced materials: Wial (2015) argues that most important impact of advanced material will be on transportation costs. New technologies will generate light and nano materials. Because of that, size and weight of the products will be smaller than the

most of the conventional goods. Thus, these conditions will provide opportunity to increase the costs efficiencies on freight transportation. In addition, transportation infrastructure will be improved by new advanced materials. New developments on transportation infrastructure will increase the mobility of people, goods and services. Increased movement capability and high speed of both people and services will affect the time-distance relation. Thus, it is expected that advanced materials will reduce the transportation costs and changes the movement behaviors. When the transportation costs decrease, manufacturers will feel free to make location decisions. Commuting durations will no longer be a parameter of the people when they choice a location to settle. This impact will lead to less geographic agglomeration of production (Ibid, 2015). In addition, new materials will develop the abilities of architects and engineers to generate new housing typologies and building systems as well.

Digital manufacturing: As we already mentioned, digital manufacturing technologies are about the usage of the information and communication technologies on production processes. They will reduce the economies of scale, because it will decrease the fixed costs and increase the throughput by integrating the physical production with digital world. It will increase the chances of entrepreneurs and small producers to become the part of the manufacturing activities. Although digital manufacturing can offer opportunities for producers to locate away from the customers, Wial (2015) thinks that developments on digital manufacturing may not provide complete geographic dispersion. This is because, customization of production which is one of the feature of digital manufacturing technology is in the need of close interaction and communication between the designers and the customers. That means, digital manufacturing is to allow the production activities to locate in the center of the metropolitan areas. This will result from the reduction of scale economies, and increased customization of production processes.

Additive manufacturing: Additive manufacturing will develop the production forces of small manufacturers, entrepreneurs and also individuals in manufacturing activities. Among the different technologies, additive manufacturing has the greater potential to the idea of 'a factory in every home' (Wial, 2015). New technology will make the production activities possible even in our home because of the two reasons: First one is related with the reduced scale economies arising from the low production costs. It will increase the competitive advantages of small producers and even individuals against the big companies. This competition may cause new collaborations among the people in all scales. Large scale manufacturers will prefer to benefit from the people who have the innovative knowledge in all around the world. Rather than developing their own research and development departments to produce new innovative knowledge, they will collaborate with the any developers and innovators who can able to develop valuable knowledge thanks to the advanced technologies even in their home. Secondly, the size and the scale of the production facilities will decrease and they will require less land than conventional facilities (Ibid, 2015). Moreover, additive manufacturing technology will increase the value and desirability of people to become the neighbors with the factories. Because manufacturing will be conducted in more quiet, cleaner and sustainable ways. According to Wial (2015), zoning demand to separate industrial areas from the residential and commercial uses will decline.

Although most of the discussions about Industry 4.0 is developing around the economic perspectives, it's impact on the of urban development need to be investigated comprehensively. In the discussion paper 'Advanced Manufacturing/Industry 4.0 and Urban Development', it is argued that, Industry 4.0 is slowly entering the discussions about future cities (Müller et al., 2014). In this regard, German Research Institute Fraunhofer developed the concept of 'Morgenstadt' ('City of Tomorrow') to describe the interrelation between the city and the advanced manufacturing. They describe the city of future as follows:

> *"In the future city transportation and handling of goods will happen fluently within intelligent structures of production and distribution. At the same time essentials have to be provided at any time to all citizens… In the city of the*

future, life and work will be characterized by short distances and by the freedom to realize individual life and work styles. At the same time people will have multiple opportunities for participating in decisions on the development of their city. Rigid value chains will be replaced by innovative and flexible value patterns. Regarding consumption and economy, the possession of goods will be less important than the sustainable use of goods and systems. Inhabitants of Morgenstadt won't be exclusively consumers anymore ‑ they become prosumers: producing consumers." (Fraunhofer, 2014).

In the proposal of Fraunhofer, there is an imagination of a future where the production, consumption and the living habits will change. The emphasis of 'short distances' results from the fact that production and living areas are starting to merge into each other. Industry 4.0 will reduce the need for separate land uses by offering the virtual spaces to conduct what we have done in the places.

When we consider the technological developments that have the possible spatial impacts, their common feature is that they will reduce the impact of scale economies. As we already mentioned, it will reduce the barriers for small scale producers, entrepreneurs and individuals to become the part of active production process and also part of the competitive market. Reynolds (2017) claims that

"While manufacturing jobs continue to decline and strong market cities lose more industrial land to conversions to residential and tech office use, greater access to manufacturing tools and technologies are reducing barriers to entry and a new generation of entrepreneurs, artisans and students are engaging in manufacturing and creating a range of 'new maker spaces' in cities." (p.25).

This effect emerges not only due to the decreased fixed costs of production and increased affordability of production infrastructures, but also the emergence of the knowledge as the new source of the production. People who have creative and innovative knowledge will able to actualize their ideas without the necessity of big production infrastructures and they will be integrated the production chain more easily. Thus, collaboration with the maker spaces will be taken into consideration by big

126

manufacturers, because it is expected that they will become the pioneers of the most of the innovative productions.

Increased customization, modularization and flexibility of production will lead to deagglomeration of manufacturers. While small scale producers and entrepreneurs will able contribute the production processes even in the small parcels at the city centers, big manufacturers would tend to reagglomerate around creative and high skilled human capital. Even though, it is expected that most of the innovative production activities will be done on small scale with high efficiency, in the short term, there will be still specialized agglomeration of big production facilities to meet the high demand in some specific standardized goods. They will continue to prefer to agglomerate near each other and transportation facilities. But in the long term, when each technology becomes complete part of the production chain, big manufacturers will be able to maintain their production activities by dividing into the sub production fragments. By this way, future factories will become our new neighborhoods.

With respect to the abovementioned discussions about the spatial impacts of new developments, one can speculate and predict the future spatial relations of Industry 4.0 based on those economic tendencies and emerging concepts as follows:

- *Increased customization, modularization, flexibility of production will lead to deagglomeration of manufacturers.*
- *Decentralization trend of the Post-Fordist era will continue by reformulating itself.*
- *Specialized agglomerations, autonomous production clusters will emerge.*
- *Production activities will be divided into sub-production fragments.*
- *There will be remarkable production facilities in small parcels even in the core of the cities.*
- *Emergence of great unification of diverse functions in the city will be observed. In other words, cities will be formed with different types of hybridities.*
- *There will be re-agglomeration around the creative and high-skilled human capital.*

127

- *New emerging dynamics are to generate local concentrations in a dispersed territorial pattern.*

To conclude, the locational factors (rent, labor and transportation) which caused the agglomeration or deagglomeration will need to be reconsidered with respect to the new production dynamics of the fourth industrial revolution. In this regard, to what extent these three components will affect the location choices of people will be the determinant for the future spatial organization of the urban environments. In addition, the new era requires to reconsider some of the concepts already generated within the contemporary literature such as agglomeration, decentralization and mixed use developments. This issue will be discussed in the conclusion part. Although this subject is a relatively new area of study and the existing researches are few in number, it would be meaningful to speculate future conditions in the light of emerging concepts, trends and tendencies of the incoming era. As Futurist Zoltan Istvan (2016) says: *"Whatever happens, it's probably best to keep an open mind about the future and new economic models."* (p.3).

In this chapter, it was aimed to understand the fourth industrial revolution with respect to the evolving dynamics of production modes that have emerged during the history. After examining each mode from the historical perspective, the incoming period that is called as post-capitalist period was introduced. In this context, Industry 4.0 as a main determinant factor of the new era is discussed with respect to the impacts on society, production, and place.

When one examines the what Industry 4.0 presents for us, it is clear that the recent development trends might able to cause radical changes both in the relations and forces of production. These changes are expected to generate a paradigm shift just like it did in the previous transition periods from one mode to another. Although socio-economic structure of the world has encountered with various periods of capitalism, none of them have succeeded to generate a radical transformation for socio-economic structure of the societies. While previous industrial revolutions have generated power for capitalism so far, the fourth one will able to provide basis to complete change of the

socio-economic, politic and spatial formation of the societies.

The impacts of Industry 4.0 are discussed from a materialist point of view in this chapter. On the other hand, following part will be discussed with more idealistic perspective on futurist thinking in urbanism. In this regard, prospective view about how the notion of the futurist thinking in urbanism under the emerging concepts of the Industry 4.0 will be introduced in consideration of the contemporary discussions and in urbanism.

CHAPTER 4

REVISITING THE NOTION OF FUTURISM: ENVISIONING HYPER-MODERN URBANISM IN THE CONTEXT OF INDUSTRY 4.0

4.1 Prospective View on Industry 4.0: Possibility of a New Futurist Thinking in Urbanism

In this chapter, after identifying the emerging futurist concepts of the new era, we will discuss the question of Industry 4.0 and the possibility of the generation of a new genre of futurist thinking in urbanism within the context of contemporary discussions and emerging concepts. After that, several speculative and innovative projects will be examined to understand the opportunities and limitations of them in the context of new futurist thinking in urbanism.

4.1.1 Emerging Concepts of Industry 4.0 Guiding Futurism

Previous industrial revolutions contained radical changes and presented alternative concepts for society. Most of the scholars developed their futurist ideas by exaggerating the impacts of the new production modes on the socio-economic and political structure of the society and the built environments. New future projections are used to be put forward via thinking beyond the concepts that industrial revolutions have offered. The new visions on future civilization are defined by considering the expected positive and negative consequences of the new production modes.

There have been always certain influences of the industrial revolutions on futuristic thinking through the gradual increase in time. It is possible to argue that none of them

has generated such a great impact as the fourth industrial revolution has generated. This impression is about the future image of the society inspiring from the future conditions of the industrial revolution. In this regard, most of the scholars describe the incoming industrial revolution as a total paradigm shift for the humanity.

Identifying the emerging concept of the Industry 4.0 that have significant power to guide our imagination will help us to develop a rational speculation on the futuristic perspective of urbanism. Therefore, it will be helpful to define the emerging concepts within three fundamental domains: *production mode*, *society* and *space*. When we look at the shift that the new production mode possibly offers, several concepts can be highlighted.

Industry 4.0 provides us a certain image of the future in which **creative and innovative knowledge** is the new forces of production. As we already mentioned efficiency in production will no longer be measured with labor power or productive capability of machinery but with the intellect. Therefore, realizing the cognitive power as the new resource will provide **extreme dynamism** in the production because by using the advanced technologies, and knowledge might allow people to generate necessary conditions for their life quickly. This will lead to constant changes in society. In this regard, Popper (1947) introduces Heraclitus' idea of change in which he argues that *"everything is in flux and nothing is at rest."* (p.10) According to this idea, there is no longer stability in the world. The city will be in a state of flux. Dynamism, that is expected to be introduced by the new era, will generate new coexistences of different layers in the city at all scales. New production mechanism will be able to generate **instantaneous** and **virtual solutions** to meet necessary requirements. By using the power of the knowledge, people will be able to participate in production processes easily. The critical point is that this condition is valid as far as people could be able to acquire operational knowledge on an equal basis. As noted earlier production chain will no longer be defined as a conventional process, instead, new production mode will present a **flexible, modular** and **virtual form** of the assembly line. This will lead to **interoperability** of the production processes. It allows people to operate different production systems or activities in a compatible way to reach common purposes. Apart

from the impact on the economy, the ability to use the shared knowledge/data in any practice will generate an **integration and collaboration in the social and political** structure of the community. These new concepts will bring a complete change in the structure of the production activities and, accordingly, the way in which we live. Therefore, the act of envisioning the future will reveal itself with the encouragement of these new conditions.

Industry 4.0 implies a radical transformation in the structure of the society. As we mentioned before, during the transition process of post-capitalist society, people will experience a radical change in their life. Each individual, apparently, will be able to part of the **collectively generated knowledge** with sufficient intellect. There will be a tendency to work in a collective way because it is believed that **collaborative work** among people will generate more efficient processes of production. It is difficult to speculate whether this collaborative work might exist only in the virtual environment or in physical spatial context. It is possible to claim that such production mechanisms are formed through instantaneous **self-organization** of the people. In this regard, there will be a new form of **collectivity** in the productive organization of the society. Collectivism will bring a new mode of communal life. In this new social formation, it is inevitable to expect that there might be multiple and spontaneous encounters of diverse groups in the urban environment. In this regard, **diversity** in the society might become a main factor to determine the productive capacity of the society. In this context, Bachu (2017) quotes the claim of Sareff which is *"Diversity is an intellect multiplier, especially when the diverse groups can collaborate well."* (p.1). Therefore, it is possible to claim that emerging concepts will provide a basis for diverse groups to form new communalities by **clustering** in metropolitan areas. In the new socio-economic structure of the community, the role of the individual is to be redefined, as well. The human will act as the algorithmic master of the machines rather than the being a labor force in the production chain.

In addition, there is a possibility for the emergence of a dual community in which some social conflicts might take place. Apart from the people who will able to use knowledge/intellect as a production force, there will be another group who cannot

make a contribution to the socially-generated knowledge. If the new technologies create some inequalities for people to access the resources, there may be a social division and this may eventually result in a counter-revolution (Roberts, 2015).

Finally, Industry 4.0 will influence the existing spatial relations at all levels. New production relations and technologies will lead industries to relocate themselves in accordance with their own economic capacities. In this regard, main determinant factors will be the optimum access condition to knowledge, the new raw material of the industries. New conditions on the production pattern will result in more **flexible** and **integrated** physical setting in the urban environment. Basically, flexibility refers to the ability to change as a response to the new conditions or needs. The dynamism that will be presented by new era might increase both functional and operational capabilities of the space. This might result with the **adaptable** design alternatives for the urban environment instead of a rigid layout. Rather than presenting a single specific image, space will be able to evolve and adapt for constant needs, desires and necessary conditions. This will lead to the emergence of more coherent and integrated physical settings.

In short term, Industry 4.0 will continue the **decentralization** trend of the Post-Fordist era. This will result from the extreme conditions of the **fragmented** and **modular structure** of the new production mode. On the other hand, while communication technologies provide an immense opportunity for decentralization of industrial production processes at the regional and national level, there will be still specialized agglomerations near the transportation facilities, high tech manufacturers and research and development facilities (Wheeler, Aoyama, & Warf, 2000). Therefore, they will continue to create **autonomous production clusters**. When production systems will complete their evolutionary progress with technological developments defined in the previous chapter, production facilities will start to be divided into sub-fragments because the conventional logic of the assembly line will completely disappear. Manufacturers will able to do their production efficiently with zero marginal costs even in small production units. Therefore, small parcels even in the core of the cities will able to host remarkable production facilities. Therefore, Industry 4.0 will manifest

itself in the emergence of great **unification** of diverse functions in the city. Production units might diffuse to every part of the urban environment. Thus, Industry 4.0 will probably promote more mixed urban development by bringing each part of manufacturing into the city (Müller, Herzog & Eiermann, 2014). When the power of knowledge is realized by the individuals as the new production factor and innovative people will tend to become a crucial part of the production chain. By the time they adapt their skills according to the necessary conditions, fragmentized production facilities will **re-agglomerate** around this creative human capital in the cities. The concept of 'factory at home' can be actualized. Even at home, people will be able to have sufficient equipment to produce necessary commodities with his or her intelligence.

New production activities will reveal itself in the urban environment by creating new **hybridities** within different land uses. Extreme development of communication and movement infrastructure will challenge the settled perception of time and space. Places will able to meet requirements of people instantly. Roberts (2015) argues that planning will tackle with **the aspatial** and **instantaneous** issues in the future. In addition, the concept of **self-organization**[7] implying the lack of centralized control mechanisms in the organization of space and society might also be reconsidered in the context of spatial relations. Thanks to the advanced production systems people might able to customize or even self-produce their own environment. Discussing the city as a living mechanism, not a static entity made people evaluate city design as a spontaneous self-organized process. It requires bottom-up organization mechanisms and a new understanding on evaluates the act of design as an innate ability of individual. Therefore, it is possible to claim that new forces of production will enable the smart (algorithmic) control of the formation and transformation of human settlements as self-organizing systems unlike master planning the city as 'machine' or 'organism'. This argumentation lets us make further discussion on the possibility of a new futurist thinking in urbanism within the framework of Industry 4.0.

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[7] The idea of the self-organizing city that has appeared with the Metabolists has become an influential idea for the subsequent adaptive and flexible visionary cities such as Plug-In City.

Within the light of this discussion, we can highlight the emerging concepts for each domain as follows:

Production Mode:

- creative and innovative knowledge

- extreme dynamism in production

- instantaneous and virtual solutions

- flexible, modular and virtual form of production chain

Society:

- collectively generated knowledge

- instantaneous self-organization of people

- new form of collectivity - collaborative work

- integration and collaboration in social and political structure

- diversity in the society

- new communalities by clustering

- humans as algorithmic masters

Place:

- more flexible and integrated physical settings

- adaptable design alternatives

- decentralization

- fragmented and modular structure

- autonomous production clusters

- unification of diverse functions

- re-agglomeration around creative human capital

- mixed uses - hybridities

- self-organizing systems

4.1.2 Possibility of a New Futurist Thinking in Urbanism within the framework of Industry 4.0

Even though it is possible to predict the future spatial relations of Industry 4.0 based on the new economic tendencies, to some extent, discussion about the precise spatiality of the new era remains uncertain. As Wial (2012) argues, this results from the lack of comprehensive data to reveal its possible future impacts. But it is possible to claim that this paradigm shift might create opportunities to think beyond the present age. We can argue that Industry 4.0 will generate a future in a significantly different form from now. The spatial characteristics of the new future image, in this context, remain as a fundamental question to the contemporary urbanism. Although we cannot predict the future, we can envision. In this section, how the emerging concepts of the new era discussed with reference to the recent speculations and models on urban future.

After the first wave of the developments in information technologies in the late 20th century, we are on the verge of a new era as introduced in the previous chapter. This new period is expected to reveal itself with great acceleration in the technological innovations and consequently the new ideas about future.

Mason (2015a) defines this period characterized with the Industry 4.0 as a total paradigm shift. In the book 'Cognitive Capitalism', Boutang (2008) argues that although labor and the industry are still continuing to work, their workplace will be transformed. Location of the production areas will not be defined with the specific areas like factories rather whole society is defined as a factory (Mason, 2015a). With new information technologies, not only the new perspective of time and space but also the concept of production, way of life and most importantly image of the urban environment will be radically altered.

Starting from the Third Industrial Revolution, impacts of the information technologies on the urban environment have become the main preoccupation of the many scholars. Castells is the one who redefined the spatiality of cities in the information age in his book 'The Informational City'. Castells (1989a) has investigated how 'information' become the main determinant factor to reshape capitalism, industrial spaces and

structure of the society. Although it was not possible to see the instantaneous impacts of the information and communication technologies on the spatial configuration of the cities during the late 20th Century, he envisioned the potential consequences of it. In this regard, Castells (1989a) has introduced the concept of *'simultaneity of social practices without territorial contiguity.'* (p.19). In other words, he argues that in the new era 'space of flows' would dominate the 'space of place' (Castells, 1989b).

Accordingly, 'space of flow' would be composed of technological infrastructure of information, communication and transportation systems that enable different interaction networks according to the specific activity patterns such as manufacturing, entertainment and art. These networks are composed of hubs and nodes. Nodes are the interaction points in which specific activities take place. For example, Wall Street act as a node specialized in the trade activities, and MIT is another node with computer sciences. On the other hand, hubs are the communication points in which all kind of exchange activities occur. Airports and harbor can be evaluated as hubs. Networks of 'the space of flows' operated by its inhabitants generate the residential spaces around these nodes. Moreover, 'the space of flows' contains electronic spaces that provide a new platform for communication and for most of the other activities (Castells, 1999). According to Castells (1989a), each function in the 'Informational City' is connected with a certain socio-spatial environment but all of them contains a spatial logic of 'the space of flows'. Castells (1989a) argues that logic of the system does not refer to the de-spatialization of the functions, but the emergence of a completely new form of the space (p.202).

As one of the techno-utopian advocate, George Gilder claims that we are at the beginning of the era in which we will see the 'death of the cities'. He based this idea upon the expected consequences of the advanced communication technologies. He also argues that *"cities are leftover baggage from the industrial era."* (Gilder, 1995 as cited in Townsend & Moss, 2000). Due to the fact that the power of the new communication technologies that enable people to reach any needs or facilities even from their home, the role of the cities will be redefined. On the other hand, although the new era is expected to produce a new spatial form that is 'space of flows', Castells

(1999, p.296) argues that space of place will still exist. While 'dominant activities' such as financial issues, management of production facilities, media, entertainment, science etc. are organized around the space of flows, human interaction and casual exchanges will be located around space of places.

It is possible to trace some emerging concepts of Industry 4.0 in the idea of 'Informational City'. In this context, the new era will not produce only spatial dispersal due to the advanced communication and transportation technologies but also generates a concentration tendency towards the nodes. Each node will be formed with specific activity/production patterns and agglomeration of different functionalities. According to the 2018 revision of the World Urbanization Prospects by UN, 68% of the world's population is projected to live in urban areas. The new form of the urban space will pursue this trend by generating creative urban clusters. Castells (1999) states that although cities will have diverse characteristics regarding cultures, institutions and economies, they will share the same spatial logic. Castells (1999) describes this logic by *"the combination of territorial sprawl and locational concentration."* (p.295). While this spatial logic promotes deagglomeration at territorial scale by promoting decentralization, fragmentation and modularity in production mode, it results with re-agglomeration in the urban scale thanks to the clustering tendencies of sub-fragments of production facilities and accordingly of the people.

As in the previous phases of history, productivity will be the greatest challenge for the next phase of capitalism too. As we mentioned in the previous chapter, while the main determinant factors of productivity were capacity and capability of labors and machines for earlier periods, the productivity of knowledge will be the main concern for the incoming era. In this context, urban environment can be the fundamental factor to increase the productivity. Therefore, we need to redefine the role of the cities within the new dynamics of the era.

Geoffrey West, a British physicist, argued some ideas about the nature of the contemporary cities. According to the researches that West and his colleagues conducted in the field of biology, they noticed that larger animals require less energy per kilogram than smaller species. They generated some mathematic equations from

the findings in biology and eventually, they adapted this knowledge for analyzing the cities. They concluded that *"when a city doubles in size, it requires an increase in resources of only 85 percent."* (Lehrer, 2010, p.5). Therefore, they argue that the larger the cities, the more efficiently they operated. In this regard, though West (2010) argues that we need more megalopolises, he also accepts that this equation is not sufficient to reveal the growth of cities completely (Ibid). Because it is not so simple to legitimize this argument by saying that when cities become bigger they consume less energy or need less infrastructure, instead the reason behind this issue should need to be discussed by considering the role of people in it. In this context, West and his colleagues made inferences that *"cities are valuable because they facilitate human interactions, as people crammed into a few square miles exchange ideas and start collaborations."* (Lehrer, 2010, p.6). In her book 'The Death and Life of Great American Cities', Jacobs (1961) declares that small-scale neighborhood units are valuable because they generate the free flow of information between citizens. Lehrer (2010) states that *"the city not as a mass of buildings but rather as a vessel of empty spaces, in which people interacted with other people."* (p.6), which Jacobs (1961) also believes in. West and his colleagues made a statistical analysis and prove the idea that 'when people come together, they become more productive'. Although Jacobs (1961) discussed this issue on a neighborhood scale, West argues that it is also relevant for the whole city. In this context, within the light of the data that West offers, Lehrer (2010) claims that *"as cities get bigger, everything starts accelerating. There is no equivalent for this in nature."* (p.8).

Throughout the history, humanity has always tried to find new resources when the previous one has become exhausted. Starting from the first one to the third, each industrial revolution has defined different resources and operation mechanisms to create wealth and productivity. Citing from West, Lehrer (2010) states that, humanity is on the verge of the present period in which its' resources are running out. In this regard, cities might be the solution (p.9). As Jacobs (1961) claims *"big cities are natural generators of diversity and prolific incubators of new enterprises and ideas of all kinds."* (p.145). Therefore, it is possible to argue that the new resource of the production that is knowledge might be produced effectively in the urban environment.

Collective organizations and knowledge-based society that emerging concepts of Industry 4.0 propose, will reveal itself in the metropolitan areas with communal and diverse clusters.

In addition to Castells' (1989) argumentation, it is possible to notice some indications of the new informational era from the work of some other scholars at the end of the 20th Century. Moss and Townsend (2000) emphasize that the increased number and diversified types of interaction between individuals, manufacturers, in addition to the technologic gadgets promote the complexity in the city. The authors argue that *"Information systems are permitting new combinations of people, equipment, and places; as a result, there is a dramatic change in the spatial organization of activities within cities and large metropolitan regions."* (2000, p.31). They believe that the 21st century will present us a new urban environment without strict zoning regulations. Activities in the city will not be separated into the different zones, rather all functions will be carried out in mixed enclaves.

In his seminal book, 'Urban Design Since 1945: A Global Perspective', D. G. Shane (2011) describes four urban design models generated through the last sixty years. Accordingly, introduces the model of 'metacity/megacity' coming after the 'metropolis', 'megalopolis' and 'fragmented metropolis'. Metacity is characterized by information and communication technologies. According to his idea, there were some constraints that fragmented metropolis possessed because it falls short to respond to the new trends and tendencies So, the new proposal is manifested in consideration of the concerns of the contemporary socio-economical conditions. Therefore, it is offered that designers should focus on the connections between different fragments and the spaces between them. D. G. Shane (2011) introduces this new paradigm by arguing that, *"shift towards city territory as space between fragments containing flows of energy and information between urban actors in a mixed ecology of uses."* (p.256). The space between different fragments of the city and also between different territories will no longer act as a separator but they will be the medium that connects different urban form. Shane (2011) emphasizes that morphology of the cities will be inevitably altered. There will be an emergent system that is regulated with the set of codes and

bottom-up organizations to form the spaces between urban fragments.

Shane (2011) states that according to the future projections in which prospective urban patterns in city territories are pictured, cities will shrink and expand around the globe and people will move towards these places (p.263). New urban territories will emerge as self-built expansions of the megacities. Emerging concept of self-organization can be considered in the evolution of the new urban form. The new territorial pattern will probably be composed of be different enclaves that emerge with bottom-up organizations. Shane (2011) argues that *"widely distributed informational and communication networks enabled the city to spread across the landscape territory while also powering the construction of new dense, layered nodes where mobile individual could meet in person on a new mass scale."* (p.272). Thus, incoming era might provide new socio-economic associations and spatial configurations by proposing new urban scales containing diverse clusters.

Moreover, Gordon and Richard (1997) claim that due to the increased car usage that provides high mobility of people, there is a decentralization trend in the growth of cities. They argued that 'effective radius' specifying the distance that citizens can able to access in a city has gradually increased in time thanks to the innovations on the movement and communication infrastructures. They thought that with the recent innovations of telecommunication technology, geography would become irrelevant and proximity would become redundant concept (Gordon & Richard, 1997). Eventually, the decentralization trend will come to an end at a certain point in time and as Gordon and Richard (1997) say that *"...the city of future will be anything but compact."* (p.100). Satterthwaite (2007 as cited in Shane, 2011) declared that most of the urban population would live in cities with 1 to 2 million than in the megacities. These cities will be formed as emerging compact urban enclaves that are defined spaces with their own contents and perimeters (Shane, 2011). Each and every enclave has its own autonomous system and defines a city within the city. Fragmentation of the city is also discussed in the 'Collage City', a well-known book by Colin Rowe. At local level, these fragmented units that present specialization, diversity and collaboration among the citizens will define new scale of relations in the shrinking

metropolitan areas. In general sense, the new spatial configuration will provide creativity and consequently increase the productivity of the new production mode.

Enclaves will generate its own unique organizational structure and they will have diversity not only in the socio-economic organization but also in the spatial formation. This condition will lead to the formation of the so-called 'hybrid territories'. Shane (2011) argues that *"the metacity allows new hybrid, three dimensional combinations of public space from all other system…"* (p.308). Because of the fact that emergent spatial relations and patterns of the new production, consumption and leisure activities will be completely different from the existing 'time and space relationship, the idea of blurring the bounds of different uses that most of the avant-garde groups have speculated already might become more probable in the new urban typologies. New conditions will also alter the functional distribution of land uses in the most general sense.

The idea of Supersurface imagined by radical architecture Cristiano Toraldo di Francia who is the member of Superstudio had speculated the future conditions of the internet. His idea was presenting a uniform surface that combines all different functions and activities into a directionless plane. Even though it is difficult to make such an extreme speculation with existing trends of Industry 4.0, it is possible to speculate that emerging concepts and present tendencies lead people to imagine new forms of space towards the hybridization of the built environment. At this point, definitions (Cho, Heng & Trivic, 2015) for the modes of hybridization in urban context gains relevance. The authors categorize three modes of hybridization: spatial, functional and operational. Although they develop the idea based on the high-density conditions in the urban context, it is possible to envision the spatial impacts of the incoming era based on these basic categories on the concept. Accordingly, to Cho et al., (2015) defines 'spatial hybridization' as follows:

> *"Spatial hybridization of urban space is reflected through structural complexity and new technological innovations and their relationship to the surrounding context, forming new spatial conditions for mobility, access, connectivity, physical flexibility and innovative public uses."* (p.7).

In this context, one can envision the new the spatial typology on hybridity with direct reference to emerging tendencies of Industry 4.0, such as more dynamic, flexible and modular structure of the new production modes. Spatial hybridization might manifest itself in urban space by generating an environment that diminishes the necessities for permanent uses, functional distributions of land use and the required sizes of space for various activities.

On the other hand, 'programmatic or functional hybrids' can be defined by referring to the interchangeable and modular use of the environment. Cho et al., (2015) argues that *"programmatic or functional hybrids combine various activities that are mutually synergetic and compatible while suggesting unconventional way of space usage."* (p.7). So, it is possible to argue that, new future image, that Industry 4.0 will present us, might allow people to perform various activities simultaneously in the same place. The future idea that new concepts offer will be beyond the classic notion of the mixed uses. The emerging notion of programmatic hybrid will present us a condition of coexistence of different functions and activities in the urban enclaves.

In addition, the role of the individual in producing the environment will change with the new production mode. As in some of the previous utopian examples, people might be allowed to construct and form as a response to instant needs and preferences. This will lead to the emergence of functional hybridity, as well. Emerging concepts of Industry 4.0 such as virtuality, interoperability, instantaneity, customization, modularity and flexibility, in this regard, can be considered the supportive factors of the functional hybridity in future urban space and form.

Lastly, 'operational hybrids' defines the emergent social relations in space. When spatial pattern changes, it provides new conditions for spatial negotiation (Cho et al., 2015, p.7). In this regard, the radical shift in spatial relations in the new era might affect the property ownership, and public and private uses, as well. Industry 4.0 is likely to reformulate the spatial relations just like previous utopian proposals did. Within the context of uniform and hybrid environment, the settled spatial notion of boundaries and territories may be revisited, too. Barriers between different fragments might dissolve and disappear within the new socio-spatial context. Within the new

energy and information flows, hyper dense enclaves will become the new nodes of the territorial setting. In this regard, Shane (2011, p.308) declares that *"these nodes differ from previous urban fragments in their complex urban sections with new, layered public spaces and their openness to surrounding urban networks and energy flows."*

In 1977, O. M. Ungers, R. Koolhaas and their colleagues published a manifesto entitled 'The City in the City: Berlin as a Green Archipelago'. In the manifested work, the problem of depopulation, at the end of the 20th Century, was considered as an important issue. The authors believed that cities needed to be reconsidered against shrinkage tendencies. Therefore, they identified Berlin's urban islands which are still significant and dynamic part of the cities (Walker, 2015). According to Cambridge dictionary (2018), archipelago refers to *"a group of small islands or an area of sea in which there are many small islands."* In this context, Shane states (2011) that Ungers, Koolhaas and their colleagues evaluated Berlin as *"...a similar kind of 'city archipelago' a city made up of large urban fragments that floated in a sea of green spaces."* (p.272). (See: Figure 4.1). The new territorial pattern is formed around the fragmented patches in the city. In the city archipelago, polycentric fragments generate a whole system. The idea of archipelago influenced some contemporary scholars such as F. Oswald, P. Baccini and H. Ohno in the forthcoming years.
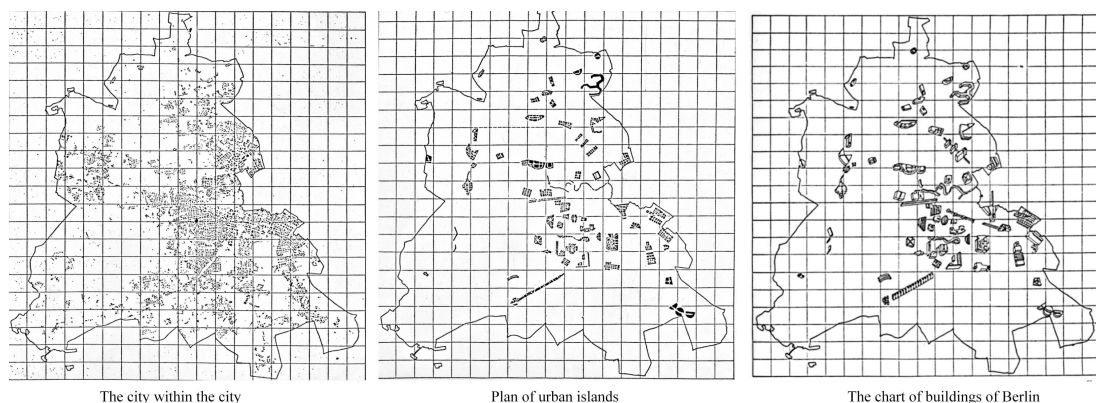

| The city within the city | Plan of urban islands | The chart of buildings of Berlin |

Figure 4.1: Archipelago City by Ungers (1977) (Source: web.14)

Oswald and Baccini a model to envision a new urban system. The model is called 'Netzstadt' (Net-city) describes the main pursuit of Oswald and Baccini as the *"attempt to understand urban territories as an aggregation of islands or nodes, and their connecting infrastructures."* (Hertweck & Marot, 2013, p.69). (See: Figure 4.2).
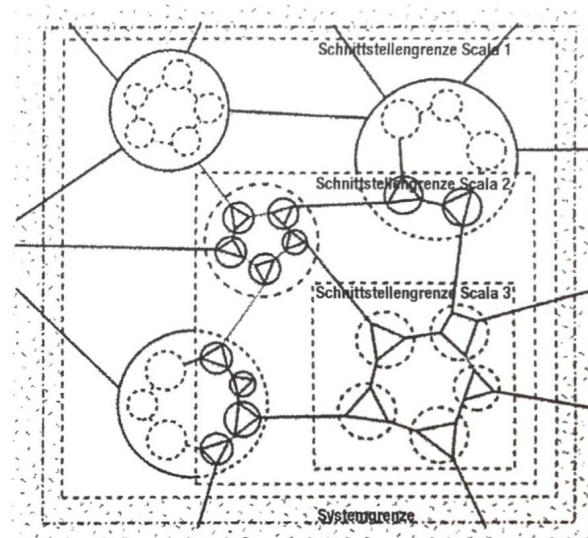
Figure 4.2: Netzstadt Diagram by Oswald and Baccini (1998) (Source: Hertweck & Marot, 2013, p.69)

Within the new urban scale that Netzstadt presents, some dualism regarding the urban environment might become irrelevant (Aravot, 2004). Town and country, local and regional, center and periphery, natural and artificial might be reconsidered in the context of the new urbanity. Aravot (2004, p.97) states that *"new urbanity is characterized by massive flows of people, goods and information, which concentrate at the nodes of the net."* Therefore, nodes and links between these areas become important components of design processes. Nodes are high-density places and they contain social and functional diversity. According to Hertweck and Marot (2003), physical and virtual interaction changes our classic notion of proximity. Within the new context, *"the accessibility of place is started to be perceived as a factor more of time than of space."* (p.21). This eventually might change the activity patterns of people in the urban environment. Hertweck and Marot (2003) emphasize that new conditions will change the center-periphery relation, too. Improvements in

communication and movement infrastructure that make geographic proximity redundant will generate flexibility for most of the activities to happen independently from the place. So, center and periphery relation will no longer be relevant categories to define the new spatial conditions. The connection between nodes will be formed neither from center to center nor from one boundary to another, instead nodes will be linked to each other by the means of information flows without direct spatial relations. In addition, inner structures of the nodes, that contains great diversity, will manifest themselves by creating unification and hybridities in the spatial context.

'Fiber City, Tokyo 2050' proposing by Hidetoshi Ohno is another project that is influenced by the idea of archipelago, as well. Ohno (2006) uses the 'fiber' to describe linearly extending structures. Transportation networks at all levels can be the example of the fibers. They are also places where any kind of circulation exists. These circulations can be defined with commercial uses in which interaction and exchange activities take place. The 'fiber' is also defined as a boundary. It might be the boundaries of a residential district, a university, a park, a river or even of a cliff (Ibid, p.8). (See: Figure 4.3).
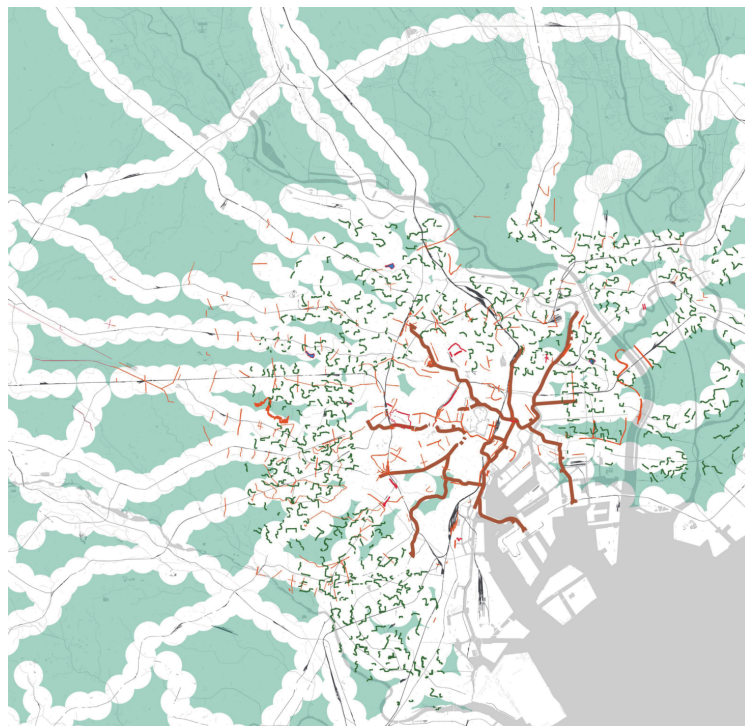
Figure 4.3: Macro formation of Fiber City, Tokyo 2050 (Source: Ohno, 2006, p.12)
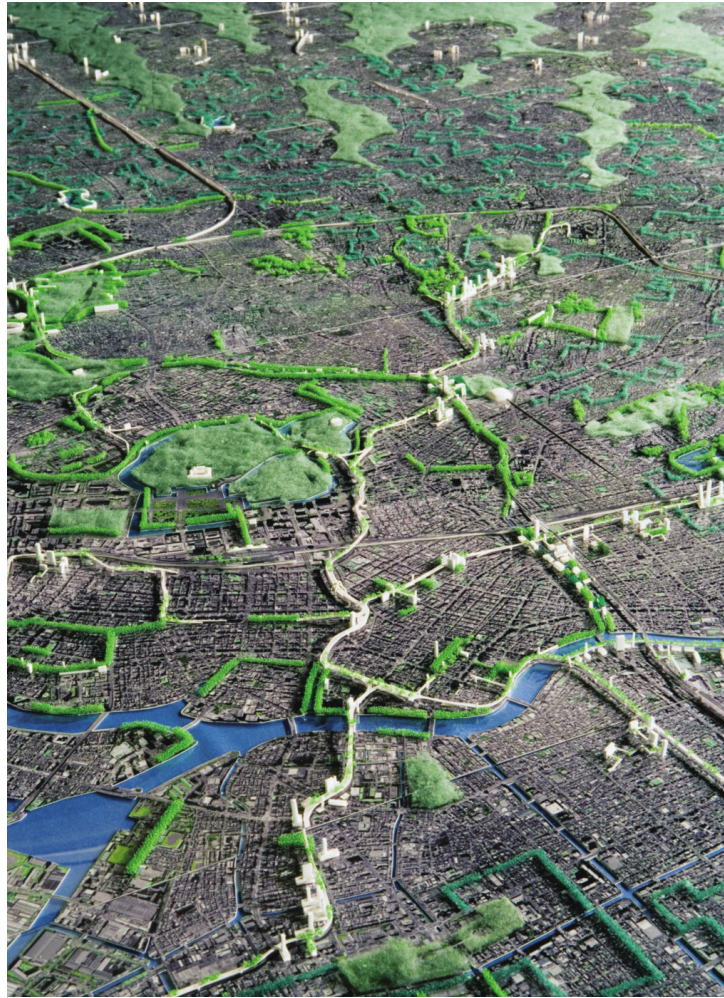
Figure 4.4: The view from its fragment (Source: Ohno, 2006, p.14)

The Fiber City is built according to four design strategies: *Green Finger, Green Partition, Green Web, Urban Wrinkle.* 'Green Fingers' is formed extending through the outer part of the city by creating compact urban enclaves. The connection between them is provided with transportation networks. In each finger, there will several concentrated communal living areas within the walkable distance. 'Green Partition' is generated to decrease the natural disaster risks in the high-density urban environment. Continues wall of greenery is provided to achieve this purpose. 'Green Web' provides a new transport layout to decrease the high traffic of Tokyo. This system is aimed to transport not only people but also goods and energy. In addition, the web will generate diverse functions in its layered structure. (See: Figure 4.5)

Figure 4.5: Urban enclaves in the Green Finger (above) (p.15) and pattern formation in the dense enclave (below) (p.20), (Source: Ohno, 2006)

'Urban Wrinkle' is another strategy that generates linear spots of interest against the monotonous urban spaces. Vacant spaces or undefined areas such as lands around the viaducts, inclined surfaces, old canals, cliffs are described with the metaphor of the wrinkled face of a person. In the future city, fiber will make these spaces attractive and generate various activities in them for people to participate.

Figure 4.6: Layered formation of urban fabric (above), (p.25) and examples of urban wrinkle (below), (p37) (Source: Ohno, 2006)

Fiber City presents an alternative future image for the shrinking metropolises in the post-industrial era. Urban environment extends through the linear directions by generating compact urban enclaves. Ohno's idea is related with the advantageous of linearity in cities. Geometrically, places can be defined by lines instead of points. Ohno (2006) thinks that, even if two urban areas have same surface size, the one that is in a linear form has a bigger influence to its surrounding than nonlinear urban forms. Ohno (2006) defines his approach with the idea of fluidity in urban spaces. In addition, the Fiber City is defined with speed and flow. It is believed that cities are constantly changing organisms. Therefore, classical notion of boundaries will be inadequate for the next era. All areas that exchange and interaction activities take place might be evaluated as the boundary. Due to the fact that, the Fiber City will provide a high level of transactions at all scales, clearly defined zones will no longer exist. In addition, it is proposed that urban fabric will be formed with fibers (Ibid, 2006, p.9).

150

In the light of these contemporary discussion on urbanism, it is possible to argue that, emerging concepts of Industry 4.0 significantly corresponds to the ideas of Castells (1989a), Gilder (1995), West (2011), Shane (2011), Unger (2013), Oswald (2003) and Ohno (2006). New era coming with Industry 4.0 might able to provide a basis for generating a new vision for urbanism. The Fourth Industrial Revolution presents us a fuzzy future image beyond our deterministic imagination. Therefore, emerging perspective on the future of the individual and society provide us a real possibility to realize the necessity to come up with new futurist thinking in urbanism. In the next section, the abovementioned possibility will be tested by reviewing the most recent conceptual projects envisioning the future of the city.

When one examines the each of these contemporary discussions, it is possible to claim that main focuses of those research are related with the form of the future city. On the other hand, the societal formation is also a crucial aspect when one considers the future in the light of emerging concepts of the incoming era.

Levitas (1990) argues that the definition of utopia should need to be discussed with three aspects: content, form and function. While 'content' related to the definition for utopia includes normative and evaluative descriptions of the good society, the term 'form' refers to the description of the 'good society' or 'ideal commonwealth' by analyzing the its' form. Moreover, the concept of 'function' is related to the identifying the overall object of the utopian idea. According to Levitas, in the case that one of these concepts is not defined well, it would not be possible to realize the utopian thinking (Barlas, 1992 cited in Levitas, 1990). In this regard, one needs to discuss the new futurist thinking in urbanism by considering its function and more importantly its content that should identify the societal formation of the future. It is obvious that the function of the incoming era is to abolish the hegemony of the capitalism and to transform the existing forces of production and production relations. On the other hand, it is possible to claim that post-capitalism would present a society that is different from the one that capitalism offers.

Barkin (1978) argues that *"A new productive structure was necessary to support the changing social structure."* (p.335). Industry 4.0 brings people a new productive

structure that is expected to generate revolution in the production mode. In this regard, it is inevitable that there will be a change in the social structure as well. Although there are a few number of discussions on the post-capitalist society, none of them provides broad understanding of the dynamics and structure of the societal formation of the future community. Therefore, the idea of 'post-capitalist society' remains vague. For this stage, one can easily claim that capitalist mode of production will be overthrown with the new production forces and advanced technologies. On the other hand, what this condition would bring us depends upon on how we react against these changes and its' destructive and constructive impacts on our lives.

In addition, Frase (2017) asserts that we are moving through the uncertain future. He rather presents a wide array of the framework in which different future scenarios exist. In this context, he has influenced by the Brin's (2005) argument which claims that the examining the possibilities is more interesting than discussing the specific option. Because, the things that different possibilities offer are more than the realities what present.

In the book, 'Four Futures: Life After Capitalism', Frase (2017) aims to present the possible futures that the world would possibly experience. He develops four different alternatives based on the two important discussions. While first one is related with ecological crisis that the world has faced and automatization trends in the production. Within the scope of this study, examining the future scenarios of the latter might be meaningful. Frase (2017) asserts that in the beginning of the 20th century, famous sociologist Rosa Luxemburg (1915) popularized the argument of Engels that is *"Bourgeois society stands at the crossroads, either transition to socialism or regression into barbarism."* (p.24). In the light of the socio economic context of today, it would be meaningful to reconsider this statement. Therefore, the question of how the society will organize in accordance with the new production dynamics become the main focus of his study.

Frase (2017) accepts that contrary to the ecological crises that would bring scarcity to the world, automatization trends that produce more with less labor force would offers wealth for the society. He (2017) argues that technological changes do not determine

152

the societal transformations, but they provide a context for it. The forerunner of change is social struggles between different groups and therefore new relationships between these groups. In this regard, the *communism* that offers equality and, the *rentism* that promote hierarchy in the society are the two different scenarios that would be emerged with respect to the wealthy conditions which automatization trend presents.

In the first scenario, the author tries to understand that the world in which there would be no longer grand narratives of the capitalism exists. How the social relations might evolve without paid labor force is focused on the first future scenario. In the world where all production activities are done by machines, how the purpose and the meaning of life will be defined are the main questions.

In his seminal book, Capital III, Marx describes the realm of necessity and realm of freedom. In the realm of necessity, individuals, by using his/her manual labor force, have to be in struggle with nature to meet the basic necessities for sustain his/her lives (Marx et al., 1981). In the future thanks to the evolving dynamics of production mode, it might be possible to dispose of these realm of necessities and realize the freedom. When the antithesis between mental and manual labor disappears, labor would become the main purpose of the life rather being just tool for life. Marx (1967) declares that when this condition happens, it would be possible to claim that *"from each according to his abilities, to each according to his needs."* Although most of the scholars criticize this argument by declaring that this condition stays far from the reality, today it needs to be reconsidered again with the emerging concepts of the incoming era.

The new societal formation that is free from the necessities of capitalist mode of production is thought as the community without any social hierarchy and conflict. On the other hand, Frase (2017) argues that even in the communism offering equality, there will be conflict of interest and disagreements in the community. It is argued that on the contrary to the capitalist system in which all hierarchical status is dependent on the capital relation at the top, in the incoming era this hierarchical system will change when the knowledge becomes the new tradable value instead of the money. It is proposed that the incoming era would not offer a complete equal social formation or nonhierarchical society, rather there will be a world of many hierarchies but none of

which is superior to another.

In the second future scenario, the Frase (2017) exaggerates the hierarchical relationships in the future community by arguing that the socially produced knowledge will be in strict control of some social classes. In this regard, it is not possible to claim that there will be equality in the society. Just like the capital in the previous era, intellectual property rights will be the new commodity that generates the rent for people. Therefore, the ruling class would regenerate itself by controlling the production of the knowledge which is the new force of production. In such a condition, one might argue that although production mode will change, the general dynamics of societal formation will remain the same as in the capitalist mode of production.

4.2 Exploring the Futurist Aspects of the Industry 4.0 within the context of Existing Projects

In this section, a series of recent futurist design projects is going to be revived in the light of the emerging concepts of Industry 4.0. In the first part, the projects developed by some design groups will be investigated. Then, the major technological megatrends will be introduced in order to question the capacity of contemporary urban design to respond to the structural dynamics of the emerging trends to be characterized by Industry 4.0.

4.2.1 Speculative Projects on Future Cities: An Overview

Japanese Shimizu Corporation proposed megacity projects which is called as Shimizu TRY 2004 Mega-City Pyramid. In the project, it is aimed to be realized over the sea in Tokyo Bay, Japan. Megacity is composed of great number of smaller pyramids. It is proposed to solve the problem of lack of urban space. In addition, it is aimed to increase the energy efficiency, to reduce the natural disaster risks and to provide solutions for other related issues that are resulted from the increased population in Tokyo. Megacity offers rapid mobility for one million individuals. The proposed

structure contains variety of functions in it and each function is linked with rapid transport facilities on the trusses. In addition, the structure of the pyramid is to be built by ultra-lightweight materials. (See: Figure 4.7)
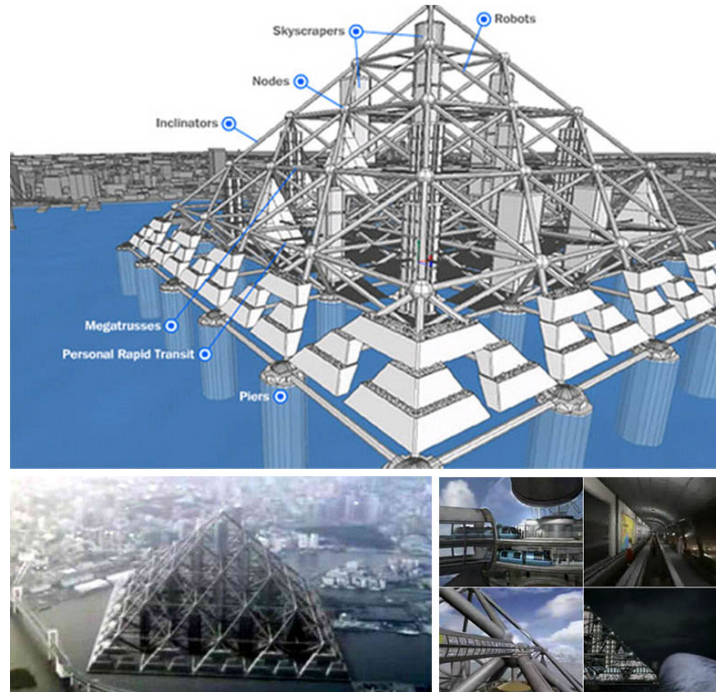
Figure 4.7: Shimizu TRY 2004 Mega-City Pyramid by Shimizu Corporation
(Source: web.15)

The starting date of the construction of the Mega-City Pyramid is expected in the 2030s (Anarchytect, 2012). We can consider this project futuristic only with regards to its hyper-scaled construction of high-tech infrastructure, as an engineering solution, rather than suggesting a new life pattern in itself.

As an architecture and urbanism practice, MVRDV, the Dutch design office, generates visionary solutions for contemporary urban issues. One of the first influential manifestos of MVRDV is the 'MetaCity/Datatown' that is a data cube containing all the information about the urban environment. The group also perform in the studio, 'The Why Factory', within the Delft University of Technology. Their approaches and design researches have profound influence on the recent discussion on contemporary futurist urbanism.

Figure 4.8: Model of China Hills in Beijing Centre for the Arts (Source: web.16)

In 2009, MVRDV made an exhibition which called 'China Hills' in Beijing, China. The proposed design schemes emphasized the unprecedented increase in population leads to significant changes and necessities in the urban environment in China. Although cities get bigger, decrease in diversity, collectivity and dynamism remain as the deficiencies of the urban environment in China. In this regard, MVRDV made an exhibition to examine the future typology of Chinese cities.

They proposed high-rise and dense living units. Future typologies will include mixed uses. Multi-level structures are composed of the great number of terraces. Each layer is able to generate different activities in it. (See: Figure 4.9).

Figure 4.9: Illustration of China Hills by MVRDV (2009) (Source: web.16)

In the project's description, it is claims that *"by inserting these new 'hills' in and around existing cities, a new form of inhabited mountain range appears; where individuality blends with collective responsibilities, and where architecture, urbanism and landscape blend into a continuous spatial experience."*(web.15)

Another project that MVRDV proposed is the 'Skycar City' in 2006. It is related to the idea of car-free settlement and they imagined a future city in which skycars freely move around the buildings, and over the land. (See: Figure 4.10). By this way, development of cities will not be oriented according to the general notion of proximity. In the new context, cities zoning will become the irrelevant concept. There will be three-dimensional clusters in the cities.

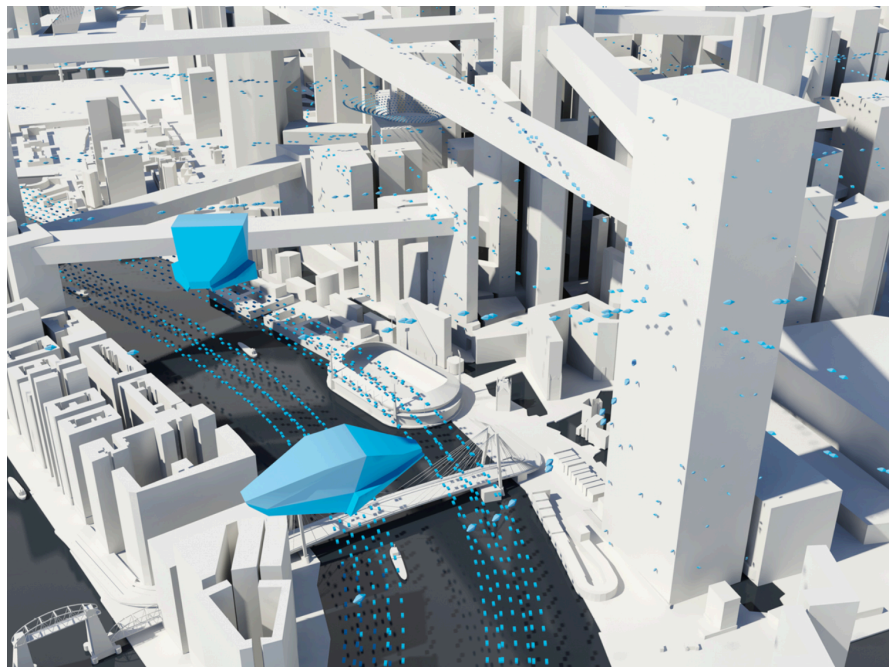**Figure 4.10:** Illustration of Skycar City (Source: web.16)

Through the series of studio works and exhibitions, 'The Why Factory' generates creative ideas on the future settlements through the series of studio projects. They are producing various scenarios to examine the impacts of uncertain future on the urban space. In Spring 2010/2011, they conducted a studio on the future city within the following questions.

- *"Can we develop a city that is entirely devoted to fast transit of people and goods?"*

- *"How can the positioning of program and its architecture contribute to direct accessibility or the desire for a minimum travel time?"*

- *"What would a neighborhood look like if the only means of transport would be a vehicle reaching 500 km/h?"* (The Why Factory, 2011, web.16)
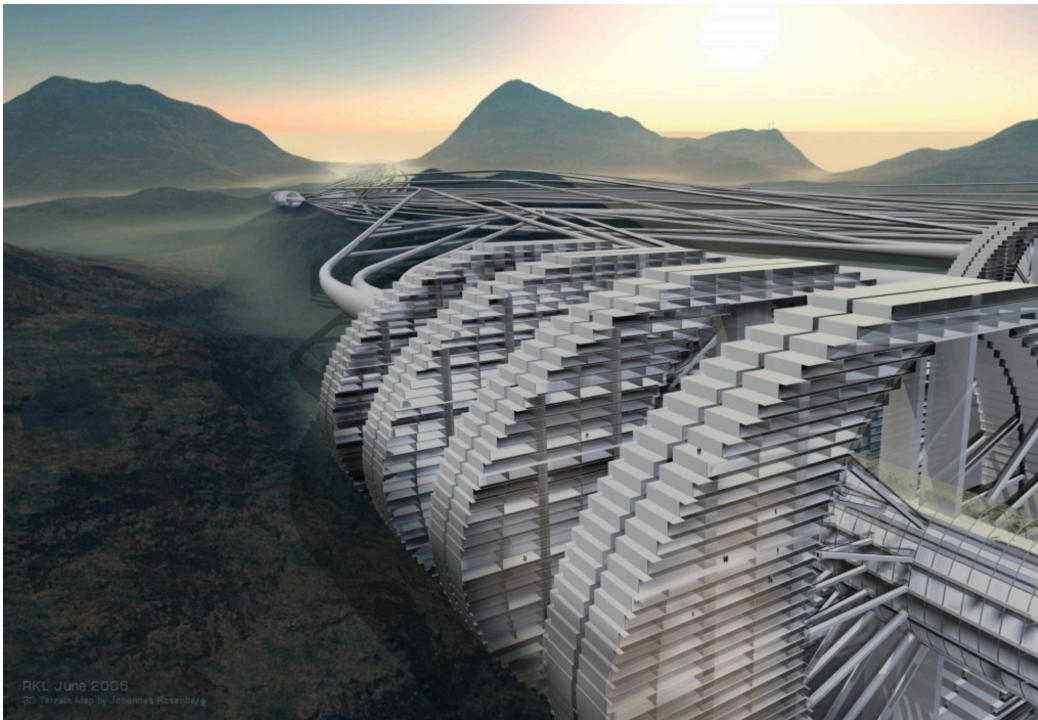
Figure 4.11: The 5 Minutes City by The Why Factory (2011) (Source: web.16)

The studio focused on various mode of transportation facilities and generate speculative ideas on a city that has a spatial form with maximum five-minute travel time. Their main motivation was that envisioning an urban model that minimize the travel durations and create high accessibility between different functions of the settlement. In addition, the performance of the system is aimed to maximize by designing the city with computational techniques.

Later on, during the Fall 2011/2012 Semester the studio imagined a futuristic city

without rules and governance. While generating projects, they focused on the question of 'how social, economic and spatial components of the city can be shaped and controlled in such a condition'. In this regard, self-organizing systems which is also one of the main concepts of Industry 4.0, was the main concern of the proposed projects.

Figure 4.12: Illustration from the project, 'AnarCity Paris' by The Why Factory (2012) (Source: web.16)

In the Anarcity, citizens are opposed to the conditions of capitalism and this leads people to organize their environment by themselves. It is expected that standing

against the existing system generates collectivism among the people. In this regard, knowledge might become a main factor of the new era as argued in the literature of Industry 4.0. Accordingly, cities will be formed by sharing t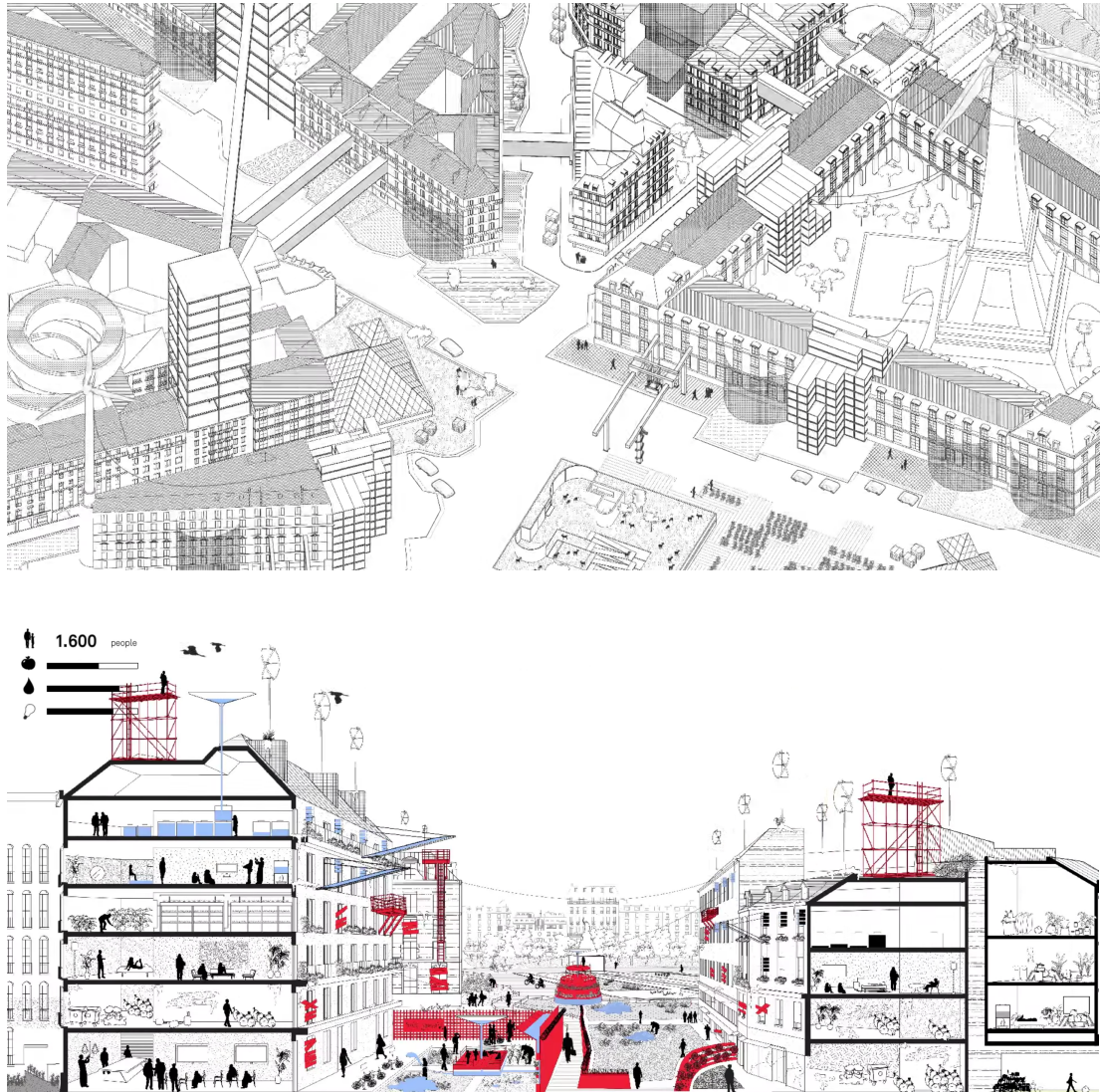he knowledge and making production collectively. (See: Figure 4.12) Designers of the projects consider the 'Anarchy' as a first step to reach advanced civilization that have a self-controlled system. In addition, the city will be of composed by intensified and diverse functions.

From a very similar perspective, MVRDV and The Why Factory proposed for the Venice Architecture Biennale entitled 'Freeland' in 2012.

By the project, the cities are imagined to be formed by the people who will be free to design their own environment by using software called 'the housemaker'. This is essentially very parallel with the idea of small-scale self-production as suggested by Industry 4.0. Via an interactive production system highly diverse fabrics are to be generated (See: Figure 4.13).

Figure 4.13: Self-Organized City: Freeland (Source: web.16)

Examination of these speculative ideas according to the attitudes towards the production mode, society and space might be useful for understanding to what extent they provide comprehensive approaches for the future of the city. When we consider

the recent futurist projections on human settlements, which is developed as mainly response to the communication technologies, it can be argued that they have some deficiencies in their proposals. Moreover, the logic and reasons behind such a new paradigm shift have to be manifested clearly. Even though there are some deficiencies, scholars projected the future as a reaction to the new informational age.

4.2.2 Influential Technologic Megatrends

Schwab (2016) identifies three categories of technological megatrends which would come with the Fourth Industrial Revolution: *physical*, *digital* and *biological*. Within the scope of this study, it will be meaningful to discuss the technological advancements in the physical category, briefly. Physical technological megatrends mainly consist of autonomous vehicles, 3D printing, advanced robotics and new materials (Ibid, 2016). In this regard, autonomous vehicles and 3D printing might be evaluated with respect to their potential to generate futurist thinking in urbanism.

Figure 4.14: Illustration of Driverless Car (Source: MIT Technology Review)

Although autonomous vehicles are considered only driverless cars, there are also some other remarkable vehicles such as autonomous trucks and drones. These autonomous transportation modes are expected to change our lifestyle and urban environments. In

the report of 'One Hundred Year Study on Artificial Intelligence', Stone et al. (2016) argue that "*as cars will become better drivers than people, city-dwellers will own fewer cars, live further from work, and spend time differently, leading to an entirely new urban organization.*"(p.18). However, it is impossible to claim that recent prototypes and speculative ideas on autonomous vehicles present comprehensive futurist visions for urbanism.

However, 3D printing technology presents a new method to generate a variety of objects that are envisioned. By using this technology, it is expected to construct buildings, too (See: Figure 4.15). As we already introduced, flexibility and instantaneity will be the main factor of this production technique. Therefore, it is pretty possible to argue that the emerging construction techniques based on new technology has a real potential to generate a new form of building the human environment in a comprehensive manner.

Figure 4.15: Illustration of Speculative Future of 3D Printer Technique (Source: MIT Technology Review)

In China, the first 3D printed apartment unit was built and the first office building was constructed in Dubai with this technique (See: Figure 4.16). According to Khoshnevis (n.d.) working on 3D printed lunar structure in Nasa claims that in the future, cities will be printed too (Khoshnevis, n.d. as cited in Davison, 2015).

Figure 4.16: 3D-printed Office Units (left), 3D-printed five-story apartment building (right) (Source: web.17)

In addition to these examples of 3D printed structures in the world, it is envisioned that this construction technique will be the solution to establish future settlements even on Mars. In this regard, it is possible to argue that this megatrend leads people to think beyond the present time and space.

To conclude, when one examines the recent speculative projects on future cities, it is possible to realize that most of them are architectural projects. This situation can be interpreted within the light of the post-modern criticisms on urbanism and architecture. Especially after the 1970s, neoliberal thinking which reduces the intervention of governments on the socio-economic structure of the society have gained power. Among the many other fields that this ideology has influenced, urbanism can be evaluated as one of the important domain that affected from this shift. In this regard, the role of the urban planning was redefined and its comprehensive and regulatory power have reduced. In such a system, in order to consolidate and maintain the neo-capitalist economy, the architectural discipline has become the main tool of this neoliberal urbanism. Therefore, architectural projects become the crucial part of this process. It is possible to investigate the traces of this ideology on the envisioned future cities. Although many of the projects include the emphasis of 'city', they generally emerge based on the certain architectural and engineering solutions. On the contrary, there needs to be the concept of community in the focus of those discussions. That is the only way to go beyond the just generating impressive images for the future.

Most of the examples that were presented in this chapter were produced by MVRDV. This group is one of the leading architectural organization that generates futuristic perspectives for future. Members of the group were in search of smart solutions to overcome the possible problems that cities would meet in the future. In this regard, they aim to develop new typologies with innovative infrastructures that reduce the impacts of the expected problems. Although their works provide quite influential impacts on the idea of the future, they have some deficiencies too. When one evaluates the projects that are composed of varied themes and scenarios for the city of the future, it is possible to argue that there is nothing more than fuzzy images that presents the functional organization of the system. Without considering how the space and society would be formed in accordance with the new production relations, it is not possible to generate complete future scenarios. Although the project of 'AnarCity' includes some clues about the societal formation and new production relations, simulation that the project offers does not offer an inclusive notion for the future. On the other hand, presented technological megatrends and many others do not have a power to construct the future that offer complete changes in the socio-economic structure of the society. Actually, each of the megatrends has a potential to change existing dynamics of the related functions of the socio-economic structure of the society, but rather than the examining the impacts of each project separately, their impacts need to be considered and developed in an integrated approach by examining the all other emerging concepts of Industry 4.0 and the socio-economic dynamics of the society.

CHAPTER 5

CONCLUSION

Industry 4.0 suggests a broad influence on most of the aspects of life. It connotes to radical complete changes on the present conditions, and also widened our perspective on the future possibilities. According to Polak (1973), developments in modern technology provides an unusual way of thinking about the future. Because of the exponential growth of the technology, it constantly offers infinite numbers of discoveries and changes. With the Industry 4.0, influence of the technology on our ideas about future will apparently become more dominant than never have.

In his book 'The Image of the Future', Polak (1973) claims that *"the formulation and description of images of the future may influence the future itself."* (p.22). In this regard, it is possible to argue that new technological developments will make possible to realize some idealistic approaches that have been envisioned since the recent periods. At the same time, they can provide a real basis for the possibilities of projecting new utopias. In this regard, emerging dynamics of Industry 4.0 would operate as the ingredients of the imagined environment to guide our prospective ideas for possible future.

The incoming era includes remarkable technological influences on projecting the future. The role of technology, starting from the Industrial Era, in the notion of futurism, has always become the main component of directing the image of the future. Constructive effects of the technology have always been considered as the primary factor to envision an ideal future compared to the destructive effects of it. Yet, this fact presents a tricky duality. As discussed before, the ideas developed by the avant-garde

groups display critical futurist images against the automatization and advanced technology of that era. While possible consequences of the new technologies over the society are generally accepted as unfavorable situations, ideal conditions for a society have always been envisioned through the technological solutions. Thus, it is inevitable that the new technologies that Industry 4.0 presents may cause some disturbing effects on the society (in terms of social equality and spatial justice) yet at the same time, they might be the inspirations to the futurist ideas, as well.

In addition, it would make sense to examine the emerging concepts of Industry 4.0 within the scope of recent discussions on utopianism. According to Picon (2000 as cited in Ganjavie, 2012), utopian activities started to disappear towards to end of the 20th Century. Ganjavie (2012) rationalizes the reason behind the so-called 'end of the utopia' with the evolution of time. Harvey (2000) discusses the validity of Marx's perspective on the capitalist society. Marx interpreted the conditions that capitalism has generated as the most intelligent utopia ever, because it limits the emergence of alternative futures by creating places and means that would provide enormous opportunities for people to enjoy. As a result of this, people do not suppose the possibility of alternative utopias (Ganjavie, 2012). Harvey (2000) mentioned that this situation is resulted from *"the supreme rationality of the market versus the silly irrationality of anything else."* (p.154). He believes that the reason behind the disappearance of alternatives is not lack of imagination, but the suppressed mind to produce alternative futures due to the present control capacity of capitalism. In this context, Harvey (2000) argues that;

> *"To be sure, the ideology and practices of competitive neoliberalism do their quietly effective and insidious work within the major institutions -the media and the universities - that shape the imaginative context in which we live. They do so with hardly anyone noticing."* (p.155).

In his book, 'Spaces of Hopes', Harvey (2000) focuses on the discussion about alternative imaginations for the world. In this regard, he presents a key concept called 'dialectical utopianism'. In his critical study, Harvey (2000) mentions two different categories of utopia which are '*utopianism of temporal process*' and '*utopianism of*

166

spatial form'. 'Utopianism of temporal process' describes an endless vision for the ideal community to achieve. There is not anything fixed or predesigned and it emerges from the social processes. 'Utopianism of spatial form' introduces a future that controls the time by designing the space completely. The former basically includes a full of social imagination. The latter on the other hand includes stability and fixed final images. It is possible to say that within the conditions of the capitalist mode of production, totalitarian utopian thinking that merely privileged spatial forms or social processes could not maintain its existence. At this point, Harvey (2000) asks whether the revival of the utopian tradition might lead us to reconsider the possibility of real future alternatives (p.156). In this regard, Harvey (2000) presents his view as follows:

> *"The task is then to define an alternative, not in terms of some static spatial form or even of some perfected emancipatory process. The task is to pull together a spatiotemporal utopianism - a dialectical utopianism - that is rooted in our present possibilities at the same time as it points towards different trajectories…"* (p.196).

Presenting the 'spatiotemporal utopianism', Harvey (2000) basically tries to combine those two utopian categories. He believes that by articulating the dimensions of time and space in utopian thinking, we could generate stronger utopianism than before. Levitas (2003) argues that *"spatiality and temporality in utopian thought need to be reconnected in a revitalization of the utopian tradition that will give us ways to imagine and pursue the possibility of real alternatives to our current condition."* (p.137). In this regard, his key concept 'dialectical utopianism' or 'spatiotemporal utopianism' might be the new way to realize the utopianism within the context of concrete possibilities of the present era as well as those of future.

When we consider the so-called post-capitalist era, the main question is how the utopian movement will form new social and spatial structures of the cities in the light of Industry 4.0. Actually, it is possible to argue that Industry 4.0 is to create a powerful evolution both in the production mode in addition to the other aspects of social life. As we mentioned before, Industry 4.0 will change not only the production mode but also 'us'. The new era, in this sense, has the power to change both social and spatial

structure of the cities. Therefore, one could claim that future image of Industry 4.0 would help us to generate a more dialectical form of the utopian thinking by proposing a future beyond the present notion of social space and time. Such a new perspective liberating the critical mind might demolish the hegemony of the capitalism over the intellectual production of utopian thinking. Then, it could be claimed that evolution towards to the post-capitalist society might break the limits of people to envision new utopias. By introducing new perspectives on social and individual life patterns, the incoming era has a real potential to lead people to start thinking about alternative futures. Besides just providing a new future environment for us, the new era coming with Industry 4.0 will also be able to reconstruct the idea of futurism in the context of utopian thinking again.

When one looks at the intellectual history of traditional utopianism, it can be argued that most of the examples have provided static systems regarding the social and spatial contexts. While Plato, Aristoteles and some other scholars in early periods formulated their ideas in accordance with the form of temporal processes, they did not engage in generating concrete spatial forms in their proposals. Generally, they concentrated on the ontology and rational-being of individual and society. More, Bacon, Howard, Wright and many other scholars, however, have generated spatial forms rather than promoting the process in the following periods. In this context, the concept of spatiotemporal utopianism generates a new understanding for contemporary utopianism discourse. While it rejects the ultimate image of the future, it defines a new utopian approach that considers the process (socio-spatial formation) as a crucial aspect for the content of utopia (Levitas, 2003). The new futurist approach is described by Unger (2004) within the context of a visionary thinking rather than as a utopian future projection. In this regard, Unger (2004) claims that:

> *"Notice that visionary thought is not inherently millenarian, perfectionist, or utopian (in the vulgar sense of the term). It need not and does not ordinarily present the picture of a perfected society. But it does require that we be conscious of redrawing the map of possible and desirable forms of human association, of inventing new models of human association and designing new*

168

practical arrangements to embody them." (p.360).

Therefore, it is possible to argue that contemporary utopian thinking presents us a different way to envision the future. According to Levitas (2003), utopian discourse has changed. The new context is defined as *"less didactic, more open, more dynamic, as well as more ecologically concerned and thus more spatially and geographically aware"* (p.148). In addition, it is expected that the new perspective generates a future that is fuzzy, less monolithic and less connected with grand narrative than previous utopian examples (Ibid, 2003).

In his book, 'The Postmodern Condition: A Report on Knowledge', Lyotard (1984) made an analysis on the epistemology of post-industrial society and postmodern culture regarded as the end of the grand narratives. According to the Lytoard, when the importance of grand narrative decreased at the end of the modernity, the post-modern era has revealed itself. Lytoard (1984) argues that technological developments in the post-industrial period have changed the nature of the knowledge. As mentioned before, knowledge will be the driving force of the industry and it will become the major factor of production in the incoming era. It might not only change the production process itself but also affect social organizations and individual behaviors. While Industry 4.0 privileges knowledge as the new force of production and focusing on the role of each individual in production processes, it will provide the concepts of 'socially generated knowledge' for the economic structure. In this regard, it can be expected that the epistemology of the hypermodern era will be different from that of the postmodern era.

Advancements in the communication technologies have made totalitarian grand narratives become invalid. In this context, Lytoard (1984) claims that:

> *"We no longer have recourse to the grand narratives-we can resort neither to the dialectic of Spirit nor even to the emancipation of humanity as a validation for postmodern scientific discourse. But as we have just seen, the little narrative remains the quintessential form of imaginative invention, most particularly in science."* (p.60).

As a counter-argument to the big totalitarian narratives of the previous periods, Lytoard (1984) introduces the little narratives (*petite narratives*). These 'petite narratives' will no longer contain uniformity and dominance of authoritarian thinking in it. Instead, they will create local narratives that have diverse and flexible characters in them. In his book, 'Utopia for Realists', Bregman (2016) mentions the destruction of the grand narrative. He indicates we should consider another way of utopian thinking. Bregman (2016) claims that *"If the blueprint is a high-resolution photo, then this utopia is just a vague outline. It offers not solutions, but guideposts. Instead of forcing us into a straitjacket, it inspires us to change."* (p.27). Within the transition period from postmodernism to 'hypermodernism'[8], it can be argued that emerging concepts of Industry 4.0 will be able to define new local narratives in the domain of production mode, society and space. It is possible to argue that creative and productive power of Industry 4.0 is able to envision different approaches for each of the domain. One could claim that emerging futurist notions presents a vague and uncertain image. Rather than generating an all-encompassing ultimate model for future, Industry 4.0 allow us to achieve more open and dynamic visionary thought. Therefore, it is possible to infer that futurist aspects of Industry 4.0 are very consistent with the recent discussions on contemporary utopianism.

Bergman (2016) argues that there is a general opinion that we are on the verge of the end of the grand narratives in the context of very pragmatic world. Contrary to the undesirable image of the city that previous industrial revolutions generate, it is possible to claim that the world has a real potential to be a comfortable, secure and healthy place now. Bergman (2016) believes that *"it's high time that we, the inhabitants of the Land of Plenty, stake out a new utopia."* (p.207). In this regard, the emerging conception of Fourth Industrial Revolution could be considered a real basis for the intellectual construction of 'new utopianism'.

Each and every domain of the new period will generate remarkably different aspects for people. Though it is an argumentative point that to what extent Industry 4.0 will

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[8] See: Armitage, J. (1999). From modernism to hypermodernism and beyond: an interview with Paul Virilio. *Theory, Culture & Society*, *16*(5-6), 25-55.

generate a completely different class structure and individual identity than capitalism presents, it is obvious that new era under the influence of the new paradigm will open a new window to challenge present societal conditions of capitalism. For this reason, one can claim that the emerging dynamism of Industry 4.0 to generate a new kind of society is likely to lead people to think beyond their time and revive futurist senses that the intellectual hegemony of capitalism has blurred.

Visionary thoughts of the contemporary speculations and future urban models and the futurist perspective that emerging concepts of Industry 4.0 offers are quite consistent. It can be argued that futurist thinking in urbanism is quite relevant to the contemporary discussions on urbanism, yet hypermodern era requires to reconsider some of the concepts already generated within the contemporary literature such as *decentralization, agglomeration, dualism between urban and rural and self-organization.*

The incoming era is expected to result with territorial fragmentations of urban planning and design, and local concentrations through dense, diverse and autonomous clusters. In this regard, one can argue that **'decentralization'** which is already discussed in the context of post-fordism will be revisited within the emerging context of Industry 4.0. The notion of decentralization originally signifies the fragmentation of a settlement toward the peripheries of the city by generating dispersed parts. This has been resulted mostly due to changing movement abilities and patterns of the individuals. Technological improvements especially in communication and movement infrastructure, have defined centrifugal urban forces that lead to the emergence of decentralization. On the contrary to the conventional sense of decentralization, emerging factors in the contemporary economy that are mentioned in the third chapter and emerging concepts of Industry 4.0 on the domain of socio-spatial context will allow us to redefine the concept of decentralization, as well. New emerging dynamics are to generate local concentrations in a dispersed territorial pattern. Each sub-fragments will not only be generated by its centrifugal force, but also centripetal forces as well. Each and every fragments might be defined with dense, self-sufficient and autonomous clusters. Rather than being a part splitting from a whole, each fragments

are to emerge as an independent and autonomous entity. In this context, hubs which are conceptualized as exchange points and nodes as the interaction points will be intertwined with each other and create new local spots that establish creative interactions within locally flexible production patterns.

In addition, the vision that each and every fragment will be formed by local concentration through territorial decentralism requires revisiting the old term: '**agglomeration**'. In conventional sense, agglomeration refers to the condition of clustering of a homogeneous community sharing the same economic basis and cultural identity. In the new context, re-agglomeration towards the emerging sub fragments will not provide a homogeneous or uniform activity patterns instead there will be diversified but also integrated model. In this regard, one could also argue that the notion of mixed-use should need to be re-conceptualized regarding emerging 'hybridities' that results from new spatial formation.

Additionally, this new circumstances will lead to reconceptualization of the **urban-rural division**. Keskinok (2018) declares that according to Marx and Engels, division of urban and rural areas is the source of the opposition between mental and physical labor of individuals. The urban-rural division is considered as one of the contradictory condition that generate and develop the capitalism. The question is that how this dualism will evolve against the new forces of production and new production relations of post-capitalist era. According to Engels (1977 cited in Keskinok, 2018), this division both reduces the mental development of peasants and physical improvement of city-dwellers. It is inevitable that when the new forces of production eventually evolve towards the new condition in which people are free and able to join any production process with their advanced intellectual capacity, the opposition between mental and physical labor will dissolve. People would be able to produce labor mostly with the mental one. Accordingly, in the new circumstances of the post-capitalism, the division between urban and rural areas will start to lose their meaning.

In addition, Pchelintsev (1966) argues socio-spatial formation of the cities will be redefined. He claims that:

"The new, higher social-spatial form, based on unconstrained layout of extensive areas and upon specialization and spatial separation of functional zones, contrasts with the old urban form and constitutes a means of overcoming it and of resolving its contradictions." (as cited in Sawers, 1978, p342).

According to him, the whole country will be composed of one specific suburbanized industrial region. Therefore, contradiction between urban and rural areas will be disappeared by proposing an extended suburban region instead of a country (Sawers, 1978, p.343).

Capitalism always generates an unequal development trends in the urban environment. As a general nature of capitalism, big cities are developing more and this condition generates uneven geographical developments. This characteristic feature of capitalism might be in contradiction with the emerging conditions of post-capitalist development. Although it is thought that as cities get bigger, they become more economically productive and creative, the new era will present us a different perspective. Post-capitalism will generate territorial fragmentations and local concentrations by creating dense and diverse clusters. Each enclave will have its own productive capacity and generate a new scale both for production and societal formation.

Moreover, the idea of **'self-organization'** provides a new broad understanding not only for industrial production processes but also the construction of all aspects of the society. Rather than just proposing a bottom-up design process in the way of participation of the people in the production processes of space, the new conception of self-organization implies an active involvement of the individuals and community to actively provide its/their own living environment in a collective manner. At this point, it would be meaningful to reveal the difference between the post-modernist approach and hypermodern attitude in the bottom-up design processes.

Post-modern criticisms on planning assert that planning as an institutional organization prevents the flow of economic activities and its creative capacity and accordingly it

causes social stagnation (Keskinok, 2014). Therefore, post-modern approaches redefine the scope of the planning by reducing the role of governments to interfere and regulate the most of the aspects of life. This ideology considers the planning as a repressive mechanism and reject the top-down planning approaches to determine the future of the societies and cities. This approach denies the idea of constructing the future (Keskinok, 2009, p.24). Post-modernism generates an opposite ideology against the general nature of the planning. Keskinok (2014) claims that this new attitude eliminates the critical relation between scientific thought, strategic thinking and also utopian thinking. Post-modern ideology does not only abolish the idea of planning the future in real context, it also blurs the futurist sense of people by using the hegemony of capitalism as it is mentioned before. On the contrary, the hypermodern era would not refuse the idea of imagining and planning the future. The new era presents a new understanding for bottom-up organization mechanisms. Instead of unintentional, uncertain or irregular development processes, it would be regulated with the set of codes. There will be a smart way design and control the future of the cities. Thanks to the new forces of production, rather than the merchant mechanisms, humans will be able to control the formation of their environment.

Lastly, it is possible to claim that recent futurist projects and technologic megatrends that are designed and produced prospectively include some drawbacks. When one evaluates the capacity of the contemporary discussions on futurist thinking in urbanism, it is obvious that speculative projects do not generate comprehensive discussion which would cover the societal and economical dimensions from the constructive and futuristic view of urbanism. Although the projects have influenced the circle with powerful images, the socio-spatial suppositions behind those spatial imaginations need to be elaborated more with reference to the fundamental arguments on the new society of future. In this regard, the ultimate images of the conceptual projects fall insufficient to develop a strong and effective futurist notion in urbanism. In addition, when one looks at the influential technologic megatrends it is possible to argue that innovative and creative capacities of each technologic megatrend, apparently, fail to generate profound discussion for futurist thinking in urbanism with regards to the social, political, economic and spatial dynamics. Therefore, the

technologic megatrends are yet to be included in the possible futuristic utopias on cities with further and more systematic design researches in near future. One can assert that without any ideas for changing the social structure and order of the society, conducted discussions on futurist thinking in urbanism would not be influential and remarkable.

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