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Reading the Transformation of Interior Space Perception through Technology

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Abstract

The act of perception, which we can define as the process of understanding, making sense of and interpreting the events around us and the patterns existing in the natural and artificial environment takes place as a result of the maturation of a certain mental process. Man, who is in a mutual and intense interaction with his environment, adds new social and physical phenomena to his life by being affected by this new environment he has created as well as changing his environment. Technological developments cause transformations in the parameters of environment, time and space, which are determinants of behavior patterns.

The 21st Century has especially contained developments in which communication technologies have changed their appearance significantly. Software and hardware developments in computer and internet technologies have revealed new concepts of space such as virtual space, cyberspace, hybrid space, and new space concepts have brought new definitions and approaches such as virtual reality, network society, simulator and simulation. The stage where all vital relationships and practices of individuals take place is the spatial plane. Therefore, technological developments that reshape spatial boundaries, organizations and distances determine the perceptions and spatial practices of individuals.

Today, at the point where communication technologies arrive, space continues to gain new meanings as one of the main elements of change, new layers of cyber technologies are added to its physical structure or it comes across as a living organism that virtually exists, changes and transforms itself. In this direction, the research examines the changing space and perception of space within the framework of interior architecture and the influence of technology. It is aimed to reveal the predictions about technology, space and human interaction in the near future with the results of the study based on the literature review, and to lay the groundwork for the studies to be done in order to examine the new interactions that new technologies will bring.

1. INTRODUCTION

Every new technology contributing to human life transforms the daily practices of life, the characteristic features of the built environment; also individual and social culture. Man's understanding and making sense of his environment is achieved by getting information from the environment. The concepts of environment and space, which surround human beings, change their appearance with the changing technology, and continue its transformation and historical adventure as a living organism with the new meanings and definitions it has gained.

Production methods, with developing technologies, change the perception, memory and behavior patterns of individuals, individual and social culture, thoughts and habits, as well as changing the physical environment and objects. Technological developments from the past to the present reshape physical and social spaces and space practices at the point where they reach the present day.
The aim of the study is to investigate the interaction of spaces redefined by the technological developments based on computer and internet technologies, with human beings that are the subjects of perception.

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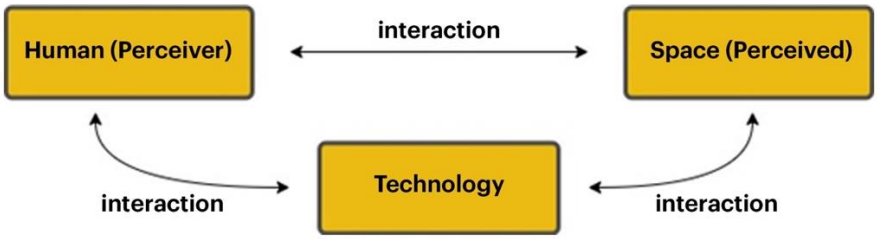

Figure 1.1. *Conceptual Relationship Diagram* [1]

The research examines the change of space in the historical process together with technological developments; how the dimensions of human and the parameters of perception are defined; also the scope of the study contains the relationship between the concepts of culture, civilization, human and technology. In order to determine the boundaries of the study, the concepts of technology and space, which are examined by many different disciplines, are handled within the boundaries of architecture, interior architecture, physical and social environment relations, and interaction with the human who is the user of the space.

The concept of technology is discussed with its role on the concepts of human, space, culture and civilization from pre-industrial times to the present. The concept of culture, on the other hand, is examined within the framework of the boundaries that it relates to technology as an impressive parameter in the process of social accumulation and perception. The research respectively covers a study that touches on human to perception, perception to space, and space to technology, and it contains a multi-faceted reading due to the mutual interaction of the parties. With this study, it is aimed to lay the groundwork for the studies to be done in order to make inferences about how the interaction of human and space has transformed with the historical process; how the perception parameters are affected at the point where it reaches today; to obtain predictions about technology, space and human interaction in the near future with the emerging inferences and to examine the new interactions that new technologies will bring.

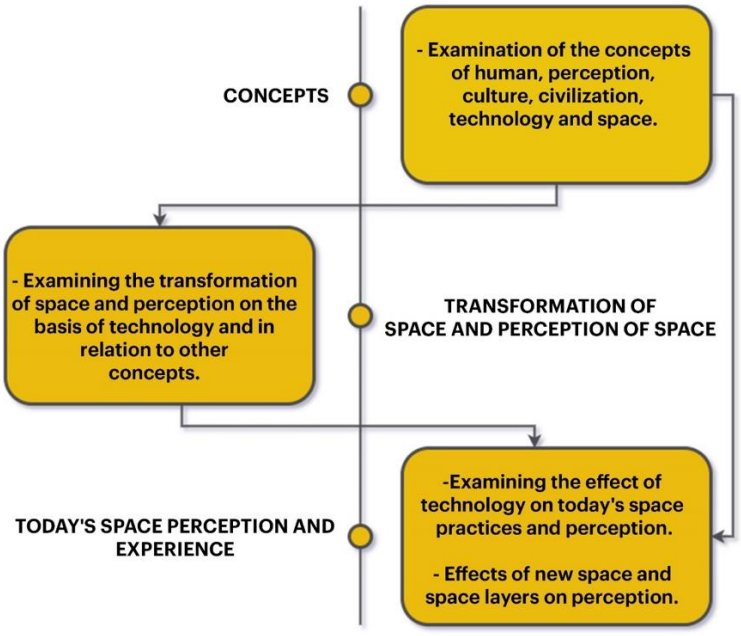

Figure 1.2. *Conceptual Process Diagram* [2]

2. CONCEPTS

Being in constant interaction with the physical and social environment surrounding him, human is defined as an organism that perceives, makes sense of and reacts to its environment. Making sense of one's environment is realized through the act of perception. The act of perception, is a process of understanding, making sense of and interpreting the events around us and the patterns existing in the natural and artificial environment, although it is a short-term action, takes place as a result of the maturation of a certain mental process. Perception is defined as the process of giving meaning to objects and events around us by organizing and interpreting sensory data [3].This process of making sense consists of two stages as sensation and perception. Sensation, which is the first stage and the process of obtaining information from the environment through the sense organs, is defined as an impression that a person obtains through the senses and a physiological action in the dictionary of the Turkish Language Association (sozluk.gov.tr). Perception, on the other hand, is the name given to the more complex process in which the information obtained and realized after the sensation is interpreted.

Although the shortness of the time difference between sensation and perception suggests that the two processes occur together, perception is the process that takes place after sensation. While the sensory process is in a simpler structure that includes the signals transmitted by the sense organs to the brain, the perception process creates a more complex structure in which past experiences and learnings are included in the process. In the perception process, the brain takes into account the experiences of the individual's past life, cultural and social factors, and signals coming from all sense organs [4]. From this point of view, perception emerges as an extremely subjective process since it takes place within the framework of personal experiences. In the process of understanding and making sense of the environment; physical, sensory and perceptual parameters, which are called human dimensions, are effective as well as experiences and cultural phenomena are among the determining factors. Human dimensions are examined under three headings as anthropometric dimension depending on body size, sensory dimension based on sense organs, and perceptual-mental dimensions related to reaction times.

Antopometric dimensions are dimensions that consist of human anatomical structure, musculoskeletal systems and body measurements. Static anthropometric dimensions constitute static anthropometric dimensions, while measurements that occur while in action constitute dynamic anthropometric dimensions. The sensory dimensions are associated with our five basic senses of sight, smell, taste, hearing, and touch. In addition to the five basic senses, scientists talk about the existence of the kinesthetic sense in relation to the position of our joints, the tension and movement of our muscles, and the vestibular sense in the inner ear, which gives information about the movement of our head and the position of the body relative to gravity.

Since people use vision and hearing senses more frequently, these senses are considered as primary senses, while the senses of smell, taste, touch, balance and movement are classified as secondary senses [3]. In this direction, in the samples examined within the scope of the study, evaluations can be found mainly on the primary senses of vision and visual perception, even if there is no purpose of ignoring the sense of hearing and secondary senses.

While every technique, knowledge and method produced in line with the interaction of man with his environment is related to civilization, how it is made sense and gains value is associated with culture [5]. There are different definitions that separate culture and civilization from each other or unite them or base them on a cause and effect relationship. According to Thurnwald, civilization is the accumulation of knowledge and technique. Culture, on the other hand, is a harmonious whole consisting of attitudes, behaviors, customs and traditions, thoughts, and the fusion of all these factors over time. Culture is an attitude, and civilization is knowing and doing [6]. In this direction, while civilization is about doing with the accumulation of knowledge and technique, culture is the whole of attitudes and behaviors.

The tools that man has produced in order to facilitate his actions and to control his environment develop in parallel with his experiences and mental process. The cognitive structure of people and the forms of their

social relations are also directly related to the forms and systems of communication that are dominant in the times they live. Technology is defined as all the techniques that people have and use to change their environment, and society's knowledge and experience of production [7]. The tools that man has produced in order to facilitate his actions and to control his environment develop in parallel with the experience and mental process.

The technological revolution at the end of the 19th century began to compress and condense time and space with innovations such as submarine telegraph lines, steamships, cars, airplanes and radio. Connecting distant places has offered new possibilities to reduce the transportation time between spaces. The 21st century, on the other hand, is defined as a new century in which industrialization has been completed and is called the electronic age, the information age, the space age, the information age. Developments in communication technologies open up the concepts of time, space and speed to discussion again, and cause changes in social and cultural accumulations and social life. Innovations that emerged with the development of information and communication technologies are becoming a part of daily life. The development of digital technologies based on digital data units, which we can call the Internet, new media, and information technologies; changes the ways of seeing, perceiving, interacting with the environment, cultural values, and brings new definitions to the concepts of time and space.

The change in communication technologies is in direct interaction with the concept of space as well as the cognitive structure and social relations of individuals. The concept of space, which is the subject of discussion by many disciplines and comes up with different definitions, is related to technological developments, culture and civilization concepts that contain the meanings of knowledge, accumulation, interpretation, knowing and doing. In the encyclopedic dictionary of architecture, Doğan Hasol defines space as “the space that separates people from the environment to a certain extent and is suitable for continuing their actions in it” [8]. According to Ching, space, a concept that accompanies man since its existence, creates itself as an architectural space with physical and perceptual boundaries at the point where it intersects with man [9].

Henri Lefebvre argues that space is evolving, alive and dynamic as a critique of the approaches that see space as empty and contentless; and treat it only as an object. Lefebvre emphasizes the body and states that if the space is reduced to a geometric space or a space outside of its rational existence, an unbridgeable gap will open between our perception of space and our design of space. He underlines that the starting point of the perception of space is the body.

Physical space refers to an absolute space with perceptible boundaries and a geometric structure. Physical space gains meaning with its measurable distances and the elements it contains, and is expressed by abstracting from its three-dimensional, volumetric and geometric features, as in Newton's absolute space approach [10]. The perceptual space, which is handled through perceiving and experiencing the environment, is meaningful with experiential qualities, not with coordinates and measurements, where the subject is in the foreground. Perceptual space emerges as abstract and subjective as it is the whole of the relationship and meanings that people establish with space more dominantly than physical elements. With the developing technologies, the experience of space by abstracting from physical elements has brought about overcoming the definitions of space with strict boundaries, and new space definitions such as virtual space, cybernetic space, hybrid space have emerged. The perception and experience of the virtual space differs according to the physical space. Space is no longer experienced physically, but in the mind with short-term visual and auditory sensations. Simulations created based on numerical data are presented to the experience of the mind, independent of the body. Cybertectonic space, unlike virtual space, does not ignore physical space and the body. Cybernetic elements are added to the layers of the space, interacting with the human, the subject of space and perception, and presenting a new space experience [11].

The concept of space, which we encounter with different definitions, is related to technological developments and the concepts of culture and civilization, which include the concepts of knowledge, accumulation, meaning and making. The concept of space is an important component of the interaction of culture, civilization and technology, and it has a lively and dynamic structure that evolves with this interaction.

3. HISTORICAL OVERVIEW OF THE TRANSFORMATION OF SPACE AND PERCEPTION

While the first humans used tree hollows and caves to protect themselves from external factors in the Paleolithic period, they settled on flat areas in the Neolithic period and developed new solutions to meet their shelter and protection needs. With the transition to settled life, the establishment of village and city units and the emergence of social classes have created the need for spatial and social organization.

The spatial elements, which were first shaped by materials found in nature and easily brought together, have been transformed in line with the new techniques and information obtained. In Çatalhöyük, one of the first settlements, the houses that meet the need for protection and shelter were shaped as a single room. The entrances to the windowless and doorless structures were made through a gap in the ceiling that also functioned as a chimney. These features were shaped in parallel with the needs of the period and the mental development of human beings. It is thought that the function and structural features of the space remained unchanged until the ancient period.

The increasing crowding of societies, the formation of the concepts of belief, tradition, culture, and the advances in production techniques have changed spaces and space practices. Ancient Greek society built temples, theaters, stadiums, commercial buildings as well as residential units in line with its values and techniques. The Romans, on the other hand, carried the construction techniques further and revealed different spatial values.

The phenomenon of religion, which was dominant in the Middle Ages, was influential in the shaping and meaning of the space as well as the social structure, as the shaping and meaning of spaces were directly related to beliefs and values as well as the technologies owned. Gothic period buildings grew vertically under the influence of religion, and magnificent religious buildings were built with the use of pointed arches reaching to the sky and stained glass. Spaces and furniture have been shaped to contribute to the understanding of the period, causing people to feel weaker and powerless. In the Renaissance period, where the ancient teachings were taken as an example and the phenomenon of religion weakened, the space and equipment went through a change that approached people with the elements of proportion and geometry.

Figure 3.1. *Sainte Chapel, Paris,1248* [12]

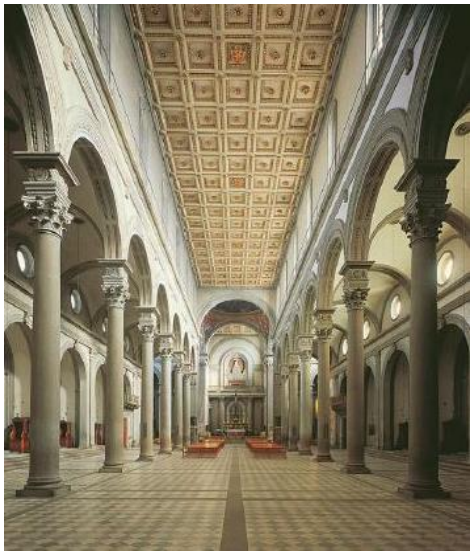

Figure 3.2. *Basilica S. Lorenzo* [13]

With the industrial revolution based on the invention of the steam engine, the forms of production and the social structure began to change significantly. While industrialization provided convenience in production methods, it left handicrafts and craftsmen in the background. In the tape system, which is based on simplifying the work by dividing it into small parts, people have become able to carry out simple, repetitive and unskilled work. The social, economic and social structure shaped by the concepts of city, metropolitan,

space and new production systems have been reconsidered and discussed by many disciplines. Georg Simmel associates the inner insecurity, tension and restlessness that occur in individuals with the urban life brought by industrialization and the complexity of this modern life, and states that this situation is one of the most important elements that shape the perception and behavior processes of the individual [14].

As one of the most important branches of art reflecting the changing technology and social structure throughout history, spaces and spatial equipment have been shaped by new materials and production forms. The use of glass and iron is associated with the industrial period, and the use of iron in buildings is considered the second biggest revolution in architecture after the arch [15]. With the use of materials such as iron, steel, concrete and glass, impressive structures with wide openings were constructed. One of the first examples of the period is the Crystal Palace, which was produced for the world exhibition to be held in 1851. Crystal Palace was built to showcase the technological developments that emerged after the industrial revolution. The structure of the building, which was produced with the prefabricated method based on the pre-preparation of the parts and the production of the parts assembled on site, was ordered to be completed within six months and the structure was built in a short period of nine months. The structure produced with prefabricated iron load bearers and glass facades has an important place in the industry period with its production method and details. In addition to being a great technical achievement; its transparent and light walls, wide openings and its visual impact proved that architecture and iron material can be compatible with each other and by this way Crystal Palace contributed to a new understanding of architectural aesthetics. Glass and iron were not really new as materials, they were used in the 18th century, but covering such a large space with such light materials and creating such transparency between indoor and outdoor was a brand new situation.

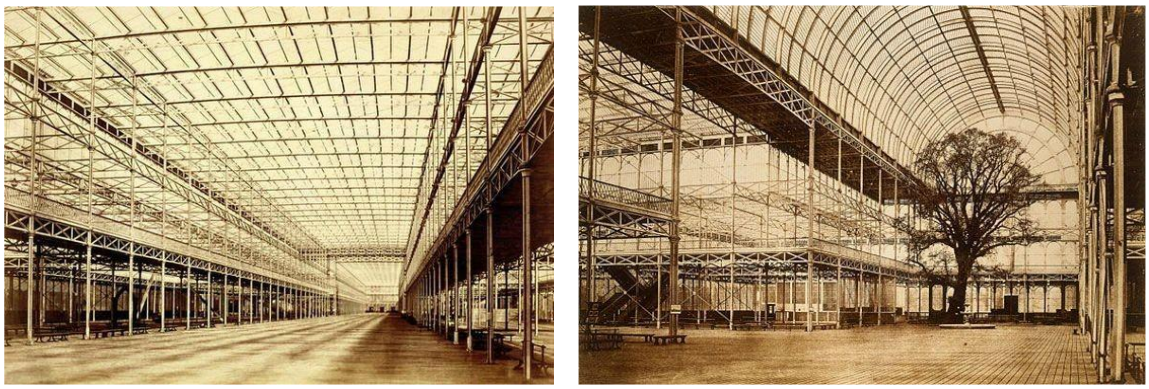

Figure 3.3. *Joseph Paxton, Crystal Palace, London, 1851* [16]

Although space and spatial elements are shaped by technological possibilities, the social, economic conditions and ideologies of societies also greatly affect this formation. While increasing urbanization with industrialization led to the emergence of the working class and spatial segregation, the need for shelter that emerged after the world wars brought concepts such as "mass housing" and became determinant for spatial organizations.

Housing, commercial buildings, cultural structures were built according to the needs of the period, together with the state of being civilized, which is related to the technology, technique and knowledge of the societies, and the culture, which is the meaning of this accumulation. In relation to all these concepts, different architectural styles emerged in different periods. In this direction, the spaces are evaluated as a reflection of the technical possibilities and thoughts of the period. Spaces that emerged as an interaction of the concepts of technology, culture and civilization, from ancient societies to industrial societies, become the parties of this interaction today.

When we look at the historical process, it is seen that the physical and perceptual structure of the spaces produced with different needs, cultural values, beliefs and technologies developed in parallel with the time that are dominant at different times. The space, which was planned to be close to the human body in line with the physical actions and needs at the beginning of the ancient period, has transformed at different times

with the civilization, cultural needs and beliefs of the societies. The spaces that were shaped by the dominance of beliefs and produced in inaccessible sizes in some periods made it difficult to be perceived by kinesthetic and other senses, and weakened the dominance of people over space. With the concepts and technology it interacts with, it continues to transform space from past to present.

4. THE EFFECT OF TECHNOLOGY ON TODAY'S SPACE AND PERCEPTION

The printing techniques developed as a result of the developments in communication technologies, the effect of books, newspapers and periodicals on the information circulation revealed a phenomenon that can be called the information society since the end of the 18th century. With the development of telegraph, telephone and radio technologies, the spread of economic and social relations to different geographies changed the perception of the concepts of border and time in the minds. At the point where communication technologies have reached today, the circulation and accessibility of information has reached different dimensions, but the concepts of border and time have been redefined and the phenomenon of information society has left its place to the phenomenon of network society.

In today's world, communication takes place on a global scale thanks to technological developments. Network systems based on internet technology enable communication and access to information between people over long distances. Practices that emerged with the development of communication technologies began to take shape in the 19th century. The electronic production and transmission of sound and image with radio and television technologies, the use of personal computers changed the relationship between space and time, but the globalization of communication took place in the last thirty years of the 20th century. Global communication networks operating in all areas of social life have brought the society to be called "information" or "network" society.

McLuhan, who discusses the changing world with Gutenberg's invention of printing technology in his book Gutenberg Galaxy, states that the world has evolved from oral culture to written culture, and the social and cultural structure has changed. The transition from oral culture to written culture seems to be one of the first steps of globalization, but McLuhan states that written culture individualizes people and distances them from each other. It is thought that collective speech, discussion and information exchange have disappeared with the written culture. McLuhan, who states that the printing age has come to an end with electronic communication technologies, argues that people will be more conscious than written culture in the electronic age. He thinks that electronic culture and the concept of "global village" and the individuality of printed culture are now left behind. McLuhan, together with the term “village”, refers to the phenomenon of a small space where people can access and react to events and information at the same time. The “global village” also represents a place where mutual familiarity is at a high level [17].

Today, with the use of the internet as a form of communication and organization, it is thought that we have entered a new world defined as the "Internet Galaxy", borders have disappeared and distance has been redefined [18]. As a parallel thought to Castells, Paul Virilio states that thanks to communication technologies, the geographical basis of continents has disappeared and replaced by tele-continents, and cities have become a district of an invisible world-commodity city whose center is everywhere and its surroundings are nowhere, so we are witnessing the end of geography. Virilio states that the immediacy of time eliminates the reality of distances, and the image of space expands as temporal distances disappear [19].

Although the concept of boundary can be handled in different ways, it is defined in the most inclusive sense as "the last line, the end where something can spread or expand" and "the lowest and highest place where something can descend or ascend in terms of quantity". Boundaries not only define geographical areas, but also express existence in a philosophical sense and important thresholds with features such as separation, transition and positioning in spatial terms. Boundaries define ending and differentiation depending on the existence of inhomogeneous situations or things [20].

In addition to the three geometric dimensions that determine the perception of the surface of the real space before the spread of digital technologies, an additional information dimension is added today. The

immaterial electronic volume of information replaces the material and geometric volume of the object. Since these types of information are mostly audio and visual, they interact intensely with the senses of hearing and vision. However, with the developing technologies, a glove connected to a computer allows interaction with the sense of touch, and chemical receptors allow interaction with the sense of smell.

Man has to understand and make sense of his environment in order to adapt to the environment he lives in, which is transformed in line with developing technologies, and to make it suitable for himself. In order to understand and make sense of the physical and social patterns of his environment, he should receive information from his environment by performing the processes of sensation and perception. Virilio states that with digitalization, reality is polluted in the processes of sensation and perception. [19]. The fact that every existing reality is spreading through the information created by electromagnetic waves changes the historical understanding of time and the cultures of nations. After the transportation networks developed in the 19th and 20th centuries, the internet today constitutes the networks that enable the transmission of information. And it goes beyond the meanings of the time and speed phenomena brought to the agenda by the transportation networks in the past, and redefines these phenomena today.

In every period when data traffic between places accelerated, intercultural sharing also accelerated. At the end of the 20th century, at the point where communication technologies have developed and reached, the physical reality of the space has begun to be abstracted and the perception of space based on borders has started to leave its place to a virtual space perception [21].

4.1 Hybrid Spaces

The coexistence of digital technologies and physical space appears as cybertectonic space, augmented space, and hybrid space. When we consider the concept of cybertectonic etymologically, we see that it consists of the words cyber, which means belonging to computer networks, belonging to the internet, and tectonic, which brings an object together and expresses their harmony. The word hybrid, on the other hand, has mixed meanings consisting of different species coming together. In this direction, hybrid space is defined as the combination of technologies that we can call cyber or digital with spatial equipment, adding new layers and dimensions to the space, increasing the layers and dimensions of the space.

Hybrid spaces, unlike virtual spaces, do not ignore physical space and the body. Cybernetic elements are added to the layers of the space and offer a new space experience by interacting with the human, who is the subject of space and perception. The works that create new layers by articulating the space with software and hardware elements contribute to overcoming the current perception of the space by combining the virtual and the physical. Performance and installation works that offer new perceptions and experiences shed light on the future space setup and experiences of digital technologies.

Figure 4.1. *Durham Cathedral, England* [22]

The Complex Meshes installation, prepared by Miguel Chevalier for the Lumiere Durham festival in England in 2015, was designed for the 11th-century Durham Cathedral. Added as a new layer to the roof covering, the cyber layer both reflects the ceiling as a moving element and changes the current perception of the ceiling boundary of the space. The density of people in the space affects the change of the cybernetic elements in the space. Therefore, man and his movement are directly effective in shaping the new element of the space. With the new cyber layer added to the space interacting with human movements, the sense of movement, which is effective in the perception of space, supports the visual sense. The ceiling element, which was in a static structure, has turned into a dynamic and self-renewing structure.

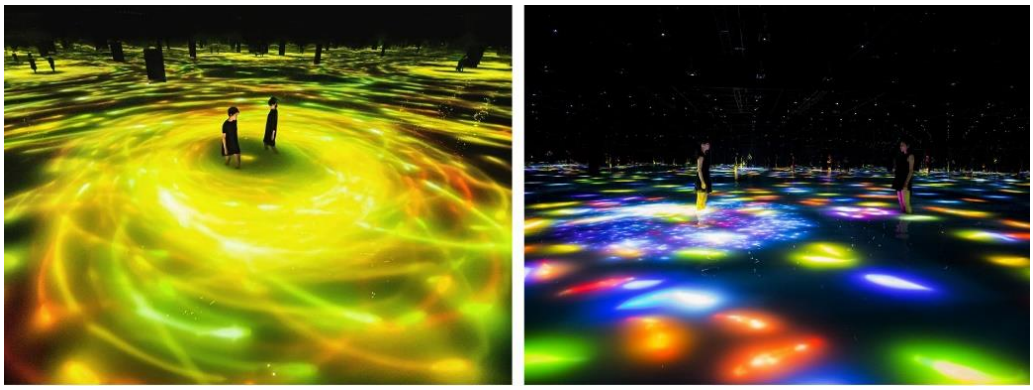

Figure 4.2. *Drawing on the Water Surface Created by the Dance of Koi and People – Infinity, Tokyo 2016-2018* [23]

The interactive digital design called Drawing on the Water Surface Created by the Dance of Koi and People – Infinity, prepared by TeamLab, is processed instantly thanks to computer and artificial intelligence technologies. Technological layers are added to the space, and the space is reshaped according to the movements of each user. The design, which has not been recorded before and does not contain a loop, changes instantly in line with the interaction of the visitors with the space and the new cyber layer that is added to the space. In this direction, each user experiences a subjective experience visually, tactilely and kinesthetically. Visually perceived surface designs are reshaped by reactions such as movement, being still, and touching. Cyber layers, which enable the space to be reshaped together with the senses of movement and touch, have strengthened the human-space interaction by adding new layers to the perception parameters of the static physical space.

Figure 4.3. *Universe of water Particles on Bunkanomori Park, 2017* [24]

The Bunkanomori Park building has been redesigned in a virtual 3D space with the movement of water. The movement of the simulated water, like a waterfall flowing over the building, is reflected in the real building. When people stand on a digital waterfall, they block the flow of water like a rock and change the flow of water. The flow of water, which changes with human interaction, is designed not to repeat as it is in nature. In this direction, the new cybernetic layer added to the space surface establishes a subjective communication with the human and transforms the perception of surfaces into an individual experience. A new space and experience has emerged with physical and cyber elements.

Figure 4.4. *Le Grand Musee du Parfum, Paris* [25]

Designed as a perfume museum, Le Grand Musee du Parfum is supported by digital technologies in addition to physical elements. Technological equipment that provides different language support to listen to the stories of fragrances, flower forms that allow you to experience fragrances are among the prominent experience fictions. Smells that are not normally found in a closed physical space and that do not belong to the space are felt by the visitors with mechanical systems in which technological layers are articulated. The olfactory experience goes beyond the ordinary and integrates with the physical elements that make up the space. At this point, the visitor's experience based on his sense of smell requires interaction with the place.

4.2. Virtual Space

Another reflection of the concept of digital technology, which is explained on the basis of digital data, on the space is the internet and virtual reality space that takes place in virtual space. Virtual reality space or virtual space is a space that the subject experiences independently of physical space and body. In this space experience, the body remains in the background and the mind experience is given priority.

Reality today is produced by miniaturized cells, matrices, memories, and instruction models. Thus, an infinite number of reproductions of reality is possible. Reality no longer needs to have a rational appearance, because the "truth" is not in a position to cope with ideal or negative processes. Reality now has a transactional appearance. In fact, it cannot even be called real, because there is no imaginary surrounding it. It is the synthetically produced real, the hyperreal, which emits combinatorial patterns in a hyperspace devoid of atmosphere. When we pass to such a space that has no relation with reality or truth, we encounter an era of simulation in which all sending systems are eliminated. [26]. Baudrillard describes the appearance that is intended to be perceived as a reality as "simulacrum", trying to make something unreal seem real, "simulation", the artificial reproduction of a phenomenon by means of a computer program.

The invention and use of a technology that will make one of the senses important and dominant transforms the relations of the senses with each other. As a result of this situation, the human being is transformed with all his senses. The emergence of internet technology and its use in personal computers is the first break in

the transformation process that McLuhan foresees [17]. This rupture brings about the transformation in the processes of sensation and perception by creating the opportunity to interact independently of physical space and distance. According to Virilio, cinema has shown that the boundaries and distances of the space can also be intervened, creating a new phenomenon that can create the perception of movement even if the individual does not move [19].

Clubhouse, a digital application developed in 2020, contains virtual spaces called rooms. The rooms are separated from each other according to the subject content. It provides the opportunity to communicate with different people via voice by navigating the virtual rooms. Clubhouse has become one of the virtual places where people, who have to stay at home in line with the emergence of the Covid-19 global epidemic and the measures taken at the end of 2019, meet their social environment needs despite their limited physical environment. people came together in virtual rooms. Virtual rooms created independently of physical elements are experienced through the sense of hearing, as in radio technology. Thanks to the internet technology, the people in the room have the right to speak. Meeting and chatting of people from different distances in a virtual room contributes to overcoming spatial boundaries. However, users cannot experience the virtual space with their senses such as touch, kinesthesia, and sight.

The Twitter website, which started its operations in 2006, has 340 million active users. The website is built on the publication of messages called “tweets”. Every user in different parts of the world has the opportunity to publish and access messages, photos, videos. Twitter defines it as a virtual space independent of physical elements. It eliminates spatial boundaries as users can access information and people at different points. The disappearance of borders redefines the relationship between time and space and offers an experience that contributes to accessibility. Although many senses are not associated with the Twitter cyberspace, the sense of sight, which is actively used, is limited to two dimensions, and the sense of hearing is generally felt from a single point according to the hardware features of the electronic device used to provide access.

Zoom serves as a video communication technology company. With the video communication technology it provides, it is actively used for training, meetings, conferences and socialization activities. In recent years, as the concepts of remote work and distance education have become a part of daily life, Zoom and many similar applications have been actively used for education and working activities. The application, which is actively used for meeting, training and conference activities and provides a virtual space, has contributed to overcoming spatial boundaries. Education is among the areas where the Zoom application is frequently used. Virtual classrooms have large boundaries or infinity compared to a physical classroom, allowing them to bring together more people than a physical space can accommodate at the same time.

The concept of metaverse was first used in 1992 to describe a fictional world in Neal Stephenson's science fiction novel Snow Crash. The concept, which was exaggerated when it was first introduced, has come to the fore today with the interest of Facebook company in the concept of metaverse. The concept of metaverse is seen as the future of the internet and promises a virtual world order. With the developing technologies in Metaverse fiction, people will be able to perform activities such as shopping, going to concerts, movies, holding meetings, using their virtual reality devices, without making any physical effort to change places.

The concept of space, which changes with technology, continues its transformation by adding virtual phenomena to its structure as well as its physical metamorphosis. This transformation changes the interaction between people and space, the way people perceive space, spatial boundaries and spatial practices. It is thought that the space will gain new meanings from the housing scale to the city scale, from educational buildings to commercial buildings, as it has been from the past to the present.

5. CONCLUSION

Looking at the historical process of the transformation of space and perception; every technological break reshapes the concepts of culture and civilization, the physical and semantic structure of spaces, and therefore the perception and behavior of people, as well as the periodically dominant culture, belief and social phenomena and the necessity of new problem solutions trigger technological developments. It is seen that the concepts almost form a multi-headed scale and that different concepts dominate periodically and

affect the transformation of the concepts in the opposite side. This situation shows that the concepts of culture, civilization, technology and space are in mutual interaction.

It is seen that space has different forms and meanings in different periods in relation to the technology, belief, culture and life practices of the societies. In some periods, the space has reached dimensions that cannot be grasped by the perception parameters of people such as vision, hearing, touch, and movement, and in other periods, it has become more comprehensible by approaching human dimensions. All these transformations have occurred in relation to the cultures, beliefs and lifestyles of societies as well as physical actions and needs.

It is clear that the developments in communication technologies as well as the technologies used in production techniques contribute to the transformation of the space. The change in the speed of information exchange between distant spaces has redefined the distance between spaces and opened space boundaries to discussion. With the spread of cyber technologies and their addition to physical space, new space definitions have emerged. Therefore, new technologies have brought new space experiences. When we look at the historical process, it is seen that there is a perception and experience of space in which the body is at the forefront in physical space. In hybrid spaces where cyber layers are added to the physical space, it is seen that the technologies used have enriched the body experience by contributing to the parameters of perception. It is thought that supporting the spatial elements that form the perceptual boundaries with technological data contributes to the transfer of information in the perceptual processes of the senses of sight, hearing, smell, touch, movement and balance. In virtual spaces based entirely on cyber technologies, it is seen that the mental experience, where the body remains in the background, is at the forefront. It turns out that in virtual spaces where mental experience is at the forefront, most of the multi-sensory parameters we use to perceive the space are not used, and predominantly visual and auditory senses are used. It is thought that this situation leads to weakening of sensory experiences and perception of reality.

The concepts that the study deals with and the findings about the transformation process of space and space perception within the framework of the boundaries in which the concepts are examined are stated above. In line with these findings, it is thought that cyber layers will be encountered more in the physical spaces that will be constructed in the future, and the interaction of body and technology will be more in the processes of experiencing the spaces. In virtual spaces, as a space that we will experience more frequently in the future, the fact that the body is in the background and the mind experience is at the forefront brings along various concerns about the perception of reality and atrophy of the senses. In this direction, how future technologies will interact with spatial elements, whether the senses can be substituted with cyber technologies, and how integrated human beings, as a social creature, into virtual spaces will be the subject of future studies.

REFERENCES

[1] Authors Archive.

[2] Authors Archive.

[3] Cüceloğlu, D. *İnsan Ve Davranışı.* Remzi Publications, (2006).

[4] Varol, E. B., *İnsan-Çevre Etkileşimi Açısından Kamusal Mekanda Sanatın Rolü*, Master Thesis. Istanbul Technical University, Institute of Science, İstanbul, (2004).

[5] Çelik, M., Aslan, Ş., Koçkan, P., *Teknoloji ve Uygarlık İlişkisinde Mekânların Kimlik Problemi.* 2nd National Interior Architecture Symposium. İstanbul: MSGSU Faculty of Architecture, Department of Interior Architecture, (2013).

[6] Özer, B., *Kültür Sanat Mimarlık.* YEM Publications, İstanbul, (2021).

[7] Demir, A., *Çağdaş Teknolojik Gelişmeler,* Ankara University Faculty of Political Sciences Publications. No:472, (1981).

[8] Hasol, D., *Ansiklopedik Mimarlık Sözlüğü*, YEM Publications, İstanbul, (1990).

[9] Ching, F. D., Architecture: From, Space And Order, *United States Of America. Penerbit Willey,* (1996).

[10] Usta, G., "*Mekan Ve Yer Kavramlarının Anlamsal Açıdan İrdelenmesi",* The Turkish Online Journal Of Design Art And Communication, 10(1), 25-30, (2020).

[11] Kut, S., Aydınlı, S., Erdem, A., "*Sibertektonik Mekân",* Tasarım+ Kuram Dergisi, 9(15), 21-34, (2013).

[12] https://www.howarthdesigns.com/inspirations/articles/16_sainte/images/sainte2.jpg

[13] http://www.florencia.es/arquitectura-y-arte/los-monumentos/las-iglesias/san-lorenzo

[14] Simmel, G., *Modern Kültürde Çatışma*, İletişim Publication, İstanbul, (2019).

[15] Mutlu, B., Mimarlık Tarihi Ders Notları 1, 1st Edition, Mengitan Printing, (1996).

[16] https://www.archdaily.com/397949/ad-classic-the-crystal-palace-joseph-paxton/51d57c57b3fc4b5834000232-ad-classic-the-crystal-palace-joseph-paxton-image?next_project=no

[17] Mcluhan, M., *Gutenberg Galaksisi Tipografik İnsanın Oluşumu*, Yapı Kredi Publications, İstanbul, (2014).

[18] Castells, M., *İnternet Galaksisi.* Phoenix Publications, Ankara, (2021).

[19] Virilio, P., *Enformasyon Bombası*. Metis Publications, İstanbul, (2003).

[20] Serin, A. P., Akkoy, M., "*Bilgi Ve İletişim Teknolojilerindeki Dönüşümün Zaman-Mekânda Sınır Algısına Yansımaları",* Tasarım+ Kuram, 16(30), 1-20, (2020).

[21] Gezgin, S., İralı, A. E., *Gelişen Teknoloji Değişen Mekân*. Eğitim Publications. İstanbul, (2017).

[22] https://www.arch2o.com/jewel-crown-miguel-chevaliers-complex-meshes-light-durham-cathedral/

[23] https://www.teamlab.art/w/koi_and_people/

[24] https://www.teamlab.art/w/waterparticles_bunkanomori/

[25] https://trendland.com/olfactory-experience-le-grand-musee-du-parfum-paris/

[26] Baudrillard, J., *Simülakrlar Ve Simülasyon*. Doğu Batı Publications, Ankara, (2020).