THE FUTURE OF ARCHITECTURAL DESIGN

THE INTEGRATION BETWEEN HUMAN AND TECHNOLOGIES IN SCI-FI MOVING PICTURES

By

MISS Sasina NAKMONTANAKUM

A Thesis Submitted in Partial Fulfillment of the Requirements

for Master of Architecture (Architecture)

Department of Architecture

Graduate School, Silpakorn University

Academic Year 2021

มหาวิทยาลัยศิลปากร

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The following text portrays the future of architectural design focused on the relationship between humans, technology, and architectural designs within the science-fiction genre. Moving pictures are an apparatus that connects both the physical world and the imaginative world—visuals on films, television series, animations, documentaries, and games reflect societal changes via architectural languages, human behaviour, and technological advancement. The research investigates the definition and pattern of the future that changed over time between the 1920s to 2020s. Through the process of literature review, the study covers an evolution of habitation, transportation, communication, identification, automation, and consumption. The third chapter is an advanced segment of research identifying the distinct features and representations of the architectural buildings and the arts of moving pictures. Hence, the collection of tools is established to evaluate the architectural influences between real-world architectural designs and architecture in moving pictures. The adopted series of tools also utilize visual, formal, and physical components in those cases to indicate tendencies for technological advancement and its overarching visions. The fourth chapter crystalizes the key points within the tools together with the specificity of further in-depth knowledge. As a result, the comparative-binary analysis summarizes the ultimate relationship between architecture and moving pictures. In conclusion, the study shows that the evolving time, the societal changes, and the technological advancements all affect and determine the future of architecture. Furthermore, the patterns of notable resonances between architecture and moving images have been proven to represent an interconnected interaction that cannot be isolated as independent variables.

มหาวิทยาลัยศิลปากร

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Lastly, I would like to state my most profound respect and appreciation for having included the names of all the moving-picture directors, creators, designers, architects, and design practitioners who created amazing workpieces that continue to inspire the next generations regarding the better futures of our world.

วิทยานิพนธ์ฉบับนี้จะประสบความสำเร็จมิได้หากปราศจากความความเอื้ออาทอน ความปรารถนาดี ความเข้าใจ และความช่วยเหลือจากผู้มีพระคุณที่กรุณาสนับสนุนไม่ว่าทางใดก็ทางหนึ่งดังชื่อที่ปรากฏในกิตติกรรมประกาศนี้ระหว่างการพัฒนาวิทยานิพนธ์ฉบับนี้ ผู้เขียนได้มีโอกาสไปศึกษาปริญญาโทสาขาการจัดการออกแบบทีกรุงลอนดอน ประเทศอังกฤษ ทำให้ผู้เขียนมีโอกาสเข้าถึงความรู้และประสบการณ์ที่ไม่เคยคาดคิด

ซึ่งจะเป็นไปไม่ได้เลยหากปราศจากความกรุณาของศาสตร์จารย์ ดร. ต้นข้าว ปาณินท์ ซึ่งอนุญาติให้ผู้เขียนสามารถเรียนปริญญาโททั้งสองสาขาวิชานี้ไปพร้อมๆ กันได้ ขอขอบคุณอาจารย์ทุกท่าน พี่ๆ และเพื่อนๆ ในสาขาแนวความคิดทุกคน ที่เข้าใจความแตกต่างของเวลาและมักให้ผู้เขียนได้ตรวจแบบเป็นคนแรกเสมอ เพื่อที่ผู้เขียนจะสามารถไปเรียนต่อในตอนเช้าได้ ขอขอบคุณพี่นกและมิ้งที่เป็นทั้งพี่สาวและเพื่อนที่คอยให้กำลังใจและอยู่เคียงข้างผู้เขียนมาเสมอ รวมถึงไมนอสและเจนนี่เพื่อนจากแดนไกลที่คอยให้กำลังใจด้วยช็อกโกแลตที่แสนอร่อยอย่างสม่ำเสมอ

อย่างไรก็ตามผู้เขียนไม่สามารถบรรยายคำขอบคุณทั้งหมดที่มีต่อ ดร. ลิขิต กิตติศักดิ์นันท์ ผู้เป็นที่ปรึกษาที่ยอดเยี่ยมโดยให้คำปรึกษาทางวิชาการและคำแนะนำต่อการใช้ชีวิตในโลกอันแสนกว้างใหญ่แห่งนี้ ทั้งหมดนี้จะเกิดขึ้นไม่ได้เลยหากปราศจากการสนับสนุนและกำลังใจจากครอบครัว น้องสาวสุดที่รัก และกู่วัฒน์ ผู้ล้วนเป็นผู้สนับสนุนให้ผู้เขียนได้ไล่ตามความฝันอย่างไม่มีเงื่อนไข

สุดท้ายนี้ ผู้เขียนขอขอบคุณผู้กำกับ นักออกแบบ สถาปนิก และผู้สรรค์สร้างการออกแบบทุกท่าน ที่ได้อุทิศตนเพื่อสร้างสรรค์ผลงานที่น่าทึ่งและเป็นแรงบันดาลใจให้แก่คนรุ่นถัดไปได้รังสรรค์สิ่งที่ดีขึ้นเพื่ออนาคตของโลกใบนี้

MISS Sasina NAKMONTANAKUM

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The Future of Architectural Design

The Integration Between Human and *Technologies in Sci-Fi Moving Pictures*

1.1 Statements and Significance of the Problem

The medium of moving pictures in the science fiction category represents an apparatus connecting the two worlds of imaginative and physical worlds. The visionary works demonstrate how the world transforms through architectural languages, human conduct, and technological innovation, all of which evolve with time.

The science fiction genre exemplifies the blending of historical accounts and projections for the future. Since the late 1920s, when the famous *Metropolis (Lang, 1927)* premiered, the international phenomenon has caused the continuous expression of thoughts about the *"future"*.

This thesis investigates technological science-fiction moving image media (film, television series, and documentary) and associated architectural designs between the 1920s and the 2020s. It also aims to find the definition and pattern of the future, which centres on technological development and people's expectations throughout various periods.

1.2 Objective of Research

1.2.1 To investigate and explore case studies based on particular facts.

1.2.2 To comprehend the research's relationship to historical time.

1.2.3 To elaborate the creative tools range from moving picture media to architectural design.

1.3 Hypothesis

1.3.1 In Sci-Fi moving picture media, the relationship between human and technology evolution depicts via architectural design.

1.3.2 The connection mentioned above yields a collection of creative thinking tools.

1.3.3 The architectural design for human living is inspired and reflected by hypothetical tools.

1.4 Scope and Limitation

From the 1920s until the 2020s, the focus is on a century of global time. The research will identify moving-picture media (Sci-Fi genre), associated architectural designs, historical event influences, and technological progress. The evolutions of habitation, transportation, communication, identification, automation, and consumption are included in the discussions.

1.5 Research Questions

1.5.1 Does the visionary of futures generated by the interaction of time, technology, and architectural discourse?

1.5.2 What is the definition of the future at different points in time?

1.5.3 How do the moving picture media, technological advancement, and architectural designs evolve in response to human living conditions?

1.5.4 Is it possible to forecast trends and patterns of the future ahead of time?

1.5.5 What variables of technology and societal issues affect the formation of a future?

1.6 Benefits of Study

1.6.1 To update the information on technological science-fiction moving picture genre from previous records and findings of predictions and evidence.

1.6.2 To predict the probable “future” of architectural designs based on the study.

1.6.3 To comprehend the intricate link between human and technological integration in science fiction of moving pictures.

1.7 Methodology

Evidence collecting, analysis and summarization are the three components of the study. This thesis consists of three main phases as followings

1.7.1 Phase I – Literature Review

Chapter 2: Architectural Design and Evolution of Sci-Fi Moving Pictures

The primary research approach for this paper is a literature review and categorising analysis. The study's sample consists of three key sources: moving picture media, architectural design, and historical events. This paper will review the broad changes from the 1920s to the 2020s by focusing on the studies parameters, transportation, habitation, consumption, communication, automation, and identification.

1.7.2 Phase II – Analysis of Social Perception Components from Chapter 2

Chapter 3: Resonance Between Moving Pictures and Architecture

The second phase analyses the literature review and categorises it into six criteria. Transportation, habitation, consumption, communication, automation, and identification are factors, and they are the variables that revolve around the social perception in three areas: architecture, human behaviour, and technology advancement. These are the extraction of DNAs in architecture, both in the actual world and in moving pictures.

1.7.3 Phase III – Analysis of Case Studies with The Hypothesis Tools

Chapter 4: Binary Analysis of Future Architecture

The last phase included a more in-depth study of a few case studies using the previously discussed methods and evaluations. It analysed and showed potential future trends to represent and predict the evolution of the concept of the future. The relationship between architectural design and practices in the moving image media and the actual world is assessed.

CHAPTER 2:
ARCHITECTURAL DESIGNS AND EVOLUTION OF SCI-FI MOVING PICTURES

2.1 Logics and Evidence

From the 1920s through the 2020s, the events discussed in this chapter describe what happened each decade. The notable factors affecting society and designs were studied using samples of moving image media and accompanying evidence. Modern chronicles combine the science fiction genre, technological progress, and architectural design. As a result of the resonance of world history and the evolution of social customs across time.

Humans have been utilising words, paintings, and other means of communication to convey their thoughts for thousands of years. According to the timeline chronology, this evidence helps the younger generation study and comprehend the societal condition throughout various eras. Moreover, it is frequently linked to economic, political, social, ecological and technological factors (Islam M Abouhela et al., 2007) that influence human evolution.

While writing such poems or novels, an individual's mind could independently generate visuals of their own. Technology advancement is a vital game-changer for creating a common platform for audiences to perceive messages in the same direction. The invention relates to moving-image media such as sequence drawings, animations, films, television broadcasts, and advertisements from the previous century. The media, as mentioned earlier, are used for a variety of reasons, including entertainment and persuasion.

The science fiction genre depicts either positive or catastrophic societal developments in the extremist potential. It is often discovered that the storyline elaborates on the city's perception and how it shapes future civilisation. Throughout

the films, the audience is commonly attributed to the city's turmoil, fashion trends, historical facts, murder scenes, avant-garde architecture, and nightclub gossip (Neumann, 1999). This genre frequently expresses worldwide anxieties (Sontag, 1965) about the future. The possibility of plots often includes invasion from monsters and corrupted machines. It is also involved with the dire living conditions on Earth, forcing people to seek out a new colony in space.

Architectural design is also a form of language that announces the historical significance of places and describes their sacred state in the context of their location. Consequently, architecture and setting scenes are integral parts of visionary works that depict the story's setting, including time, place, and people. However, there are several restrictions to constructing an actual structure on Earth, including city regulations, financial limitations, climate, and conflicting ideas.

Hence, cinema was the first medium for architects and filmmakers to exhibit pure architecture to the public (Islam M Abouhela et al., 2007). Moreover, with the boundless imagination in cinema, architects could use this medium to express and raise issues of conscience in our world for critics from past to future. Likewise, architects might utilize cinema's boundless creativity to communicate and elevate conscience concerns on our planet for criticism from the past and future (Boake).

Humans have long tried to develop ways to connect and communicate, from body gestures carved symbols in caves through Egypt's Papyrus paper to today's moving-picture media. Technological advancement makes life easier for people throughout the world, but it also serves as a tool for conveying stories. In the moving-image medium, technology helps to lower the expense of putting up a set and allows designers to express themselves on a virtually limitless scale. In addition, the location in moving-picture media is no longer restricted to the physical world because of technological advancements. Instead, everything is possible, whether in ancient times, in cyberspace, or on distant planets.

2.2 The Period Between 1920s and 1930s

2.2.1 Historical Review

In 1895, the *Lumière brothers (Louis and Auguste Lumiere)* premiered the first commercial movie screening at the *Grand Café* in Paris (Editors, 2009). It was a pivotal event for the globe when a crowd could experience a shared viewing experience in a single room. Technology has created new prospects in the fields of building and filmmaking. Theatres or Cinemas became a new typology in the 20th century. Televisions transmitted moving images wirelessly and made mass communication for entertainment and propaganda early. It transformed the cities and interiors where televisions are the new hEarth.

The 1920s and 1930s are the decades between World Wars. During this period, the world reached the highest and lowest points of time. *"Jazz Age"* and *"The Roaring Twenties"* were used to describe the 1920s. After the First World War (in the early 1920s), America's economy was booming until *the stock market crashed* towards the end of the decade, triggering the *Great Depression*. (Silverstein, 2004, Editors, 2017) While in Germany, *the Weimar Republic* (which ruled from 1919 to 1933), the country was beset by financial and social unrest. These situations are expressed through films; *Metropolis* (Lang, 1927) in Germany and *Just Imagine* (Butler, 1930) in the USA. The utopian and dystopian societal aspects acknowledged against the rising of capitalism, political philosophy, technology, and economics. These concerns have been used to form the central storyline for most moving pictures in science fiction to the 2020s

2.2.2 Influences on Moving Pictures from Arts and Architecture Movements

Discussed Materials		
Moving Pictures	**Buildings**	**Movements**
1. Metropolis (Lang, 1927) **2. Just Imagine** (Butler, 1930)	**1. Chicago's Tribune Tower** (Howells and Hood, 1922) **2. The Chrysler Building** (Alen, 1930) **3. Radio City Music Hall** (Stone & Deskey, 1932) **4. Babel Tower**	- Art Deco - Expressionism
3. Der Golem, Wie er in die Welt kam (Wegener & Boese, 1920)	**5. Berlin's Grosses Schauspielhaus** (Great Playhouse, 1919)	- German Expressionism
4. Das Cabinet des Dr Caligari (Wiene, 1920)		- Avant-Garde Impressionism
5. Alita Queen of Mars (Protazanov, 1924)		- Neoclassicism - Surrealism - Futurism
6. Things to Come (Menzies, 1936)		- Futurism

Table 1 Discussed Materials – Art and Architectural Influences in the 1920s – 1930s

As film technology advanced faster than television, it could not overcome electromagnetic transmission and reception issues. Feature films appeal to the middle class by providing a similar format to an actual theatre by adapting novels and plays (Bauer, 2021, 2012). Due to the capabilities of recording devices, most films

from these decades appear to have utilised set design instead of genuine building. As a result, the set design of cinema in the 1920s and 1930s was influenced by various art movements; *Surrealism, Expressionism, Constructivism, Bauhaus, Art and Crafts, Art Nouveau and Art Deco.* The dominant style popular in Europe, America and Western colonial cities was Art Deco. Over the years, the movement has found expression in graphic design, furniture, and the digital realm of video games. The movement's reign of architectural marvels created a succession of monuments to its rule that surround numerous skylines worldwide and continue to make it part of daily life (Johnson, 2019). The style also promotes a *"New World"* idea, which combines traditional craft motifs with *Machine Age* imaginary and material developments. It implies that the epoch in the discussion was a breakthrough in social life conditions, architecture, aesthetics, transportation communication, and aerospace technology in Europe (Berlin and Paris) and the United States. However, *Expressionism* and later *Surrealism* were the preferred styles in the majority of Europe during this period .

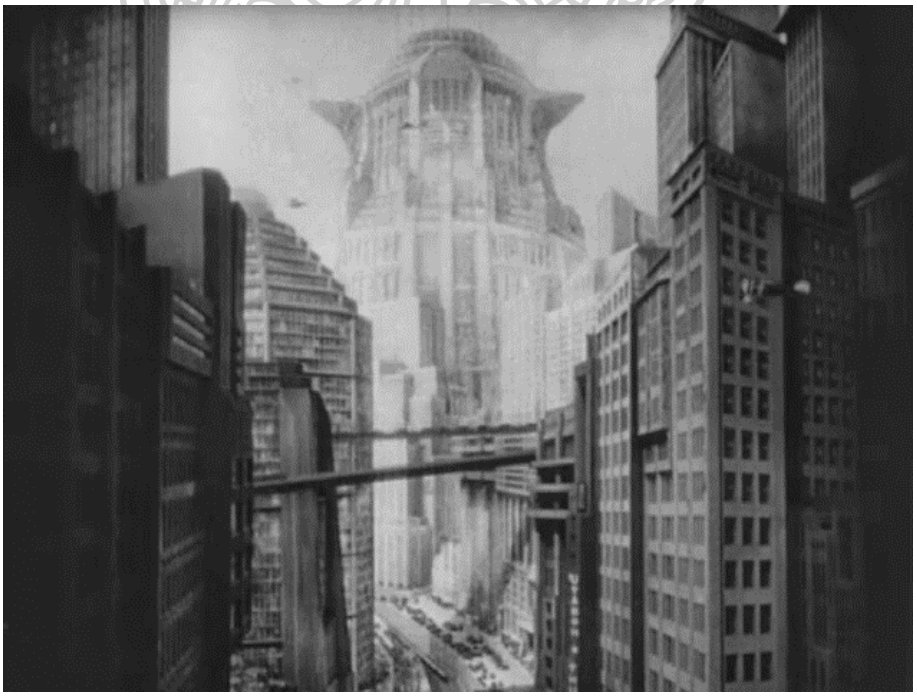


Figure 1 Metropolis (Lang, 1927)

Retrieved from http://www.filmwalrus.com/2014/03/film-atlas-germany-metropolis.html

Figure 2 Just Imagine (Butler, 1930)

Retrieved from http://pre-code.com/just-imagine-1930-review/

Skyscrapers were a symbol of capitalism and a new meaning of cathedrals (Neumann, 1999) in the United States during this period. While *Chicago's Tribune Tower* (Howells and Hood, 1922) has been a focal point of the city's cultural heritage for almost a century (Shaw, 2017). New York has long been known as a commercial and industrial centre. Building's appearance in New York, such *as the Chrysler Building in Manhattan (Alen, 1930) and Radio City Music Hall in New York City (Stone & Deskey, 1932)*, featured and influenced the urban city in cinema. Fritz Lang arrived in Manhattan, New York, in 1924, with the idea of creating an Art Deco metropolis with powerful, streamlined, and symmetrical buildings (DeGraff, 2017). They built the new skyscrapers city with the German definition with the collaboration of three-set designers, Erich Kettelhut, Otto Hunte, and Karl Vollbrecht, on the model of the dystopian Sci-Fi film, *Metropolis* in 1927 *(Lang, 1927, Neumann, 1999).* If the positive

aspects of fast urban expansion were reflected in the States (e.g. *Just Imagine* (Butler, 1930)), the negative parts of capitalism were portrayed in *Metropolis* by uncertainty and worry. The new *Babel Tower* was used to describe the skyscrapers in this Weimar Republic film. The buildings were built like vast continuous mountain rangers. The colossal constructions frequently mentioned in this context have enormous shapes that evoke memories of *German Imperialism (Editors, 2009, Neumann, 1999).* The city's transportation was spread in multi-layers: on the ground, in the tunnel of towers, and the sky allocated the massive population in the urban texture. The dazzling nights that illuminate the city with light from windows and gleaming billboards illustrate just how far technology has brought civilisation to the world. Growth, on the other hand, widens the social divide, with the rich getting wealthier and residing higher in the sky, while the poor become lifeless laborers in the underground. Following that, several science fiction moving-picture media, either dystopian or utopian, incorporate these elements there in *Metropolis*.

Figure 3 Metropolis (Lang, 1927)

Retrieved from https://m.imdb.com/title/tt0017136/mediaviewer/rm4172610048/

Figure 4 Chicago Tribune Headquarters (Howells and Hood, 1922)

Retrieved from https://www.archdaily.com/880899/how-chicagos-tribune-tower-competition-changed-architecture-forever

Figure 5 Chrysler Building, New York (Alen, 1930)

Retrieved from https://www.historybyzim.com/2011/12/the-chrysler-building/

Figure 6 Radio City Music Hall, New York (Stone and Deskey, 1932)

Picture by James Howe Photography

Before publicly using CGI (Computer Generated Imagery), moving media sets were created by handcrafted models, textiles, and other props similar to those used in theatrical set design. In the film *Der Golem, Wie er in die Welt kam (Wegener and Boese, 1920)*, or *The Golem: How He Came into the World* (in English). It served as a prequel to *The Golem* (1915), the most well-known series film. *Hans Poelzig (1869-1936)*, a German architect, was the film set designer of *The Golem*. Berlin's *Grosses Schauspielhaus (Great Playhouse, 1919)* was a theatre with 5,000 seats, reminiscent of an amphitheatre from ancient Greek (Luebering). The Great Playhouse and the Golem set design were exceptional works of art for the German Expressionist experience. Hans Poelzig and Marlene Moeschke designed the exterior and interior elements for the film on site. Living nature's roots and branches forms are shown using expressive language (Clarke, 1974, Augustin, 2016). The depth of the setting in this film convinced the audience that they were watching a real scene with actual objects, not imitations.

Figure 7 Der Golem, wie er in die Welt kam (Wegener and Boese, 1920)

Retrieved from https://www.framerated.co.uk/der-golem-1920/

Figure 8 Das Cabinet des Dr Caligari (Wiene, 1920)

Retrieved from https://walkerart.org/calendar/2012/brute-heart-with-the-cabinet-of-dr-caligari

Figure 9 Das Cabinet des Dr Caligari (Wiene, 1920)

Retrieved https://www.archdaily.com/300945/films-architecture-the-cabinet-of-dr-caligari

Das Cabinet des Dr Caligari (Wiene, 1920) or *The Cabinet of Dr Caligari* was released the same year as *The Golem: How He Came into the World* in 1920. As a result, it influenced Lang's Metropolis in 1927. It was a plotline about economic inequality and the turbulent relationship between humans and machines (Collins, 2019). The images are bold and brilliant in black and white with a chiaroscuro style, as shown in the illustrations below. The lines, forms, shades, and compositions made the movie's character look animated in the paper world. Every object in the scene is meticulously constructed. *L'Inhumaine (*L'Herbier, 1924), a descendant of this type of techno-primitive Sci-Fi pictures, premiered in France four years later. This film is regarded as the first avant-garde of the 'Impressionist' trend in the country. The depth of the scene design was used as the camera's focal length to reveal a more realistic picture and create more modern artworks than in the prior films (2016).

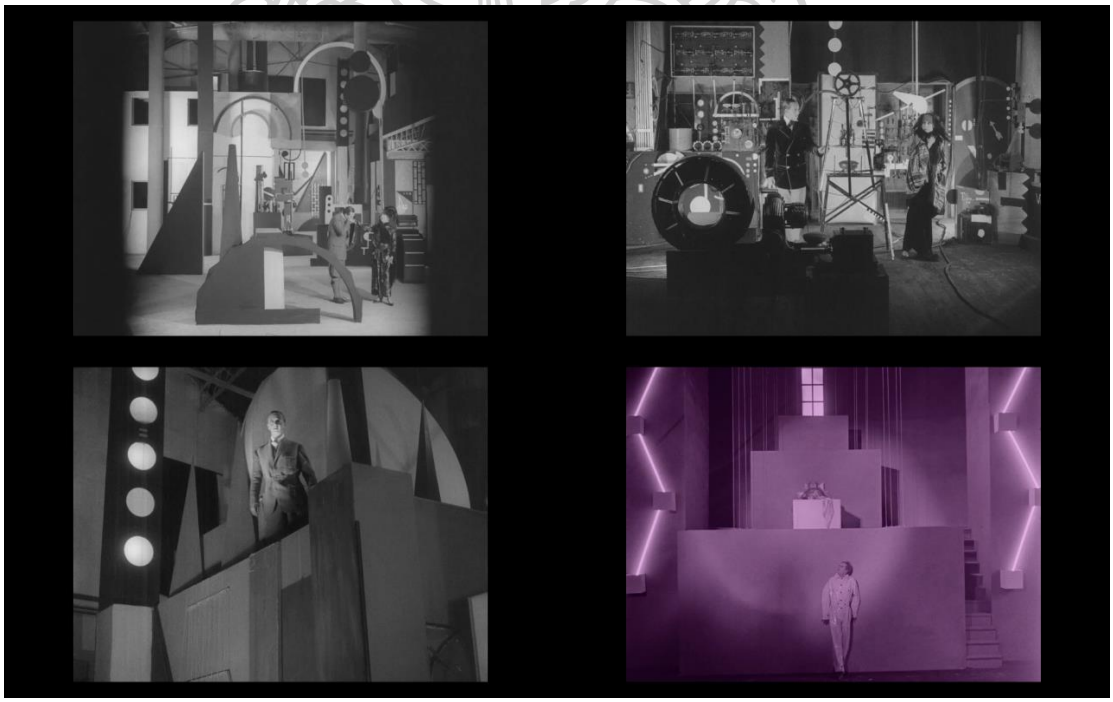
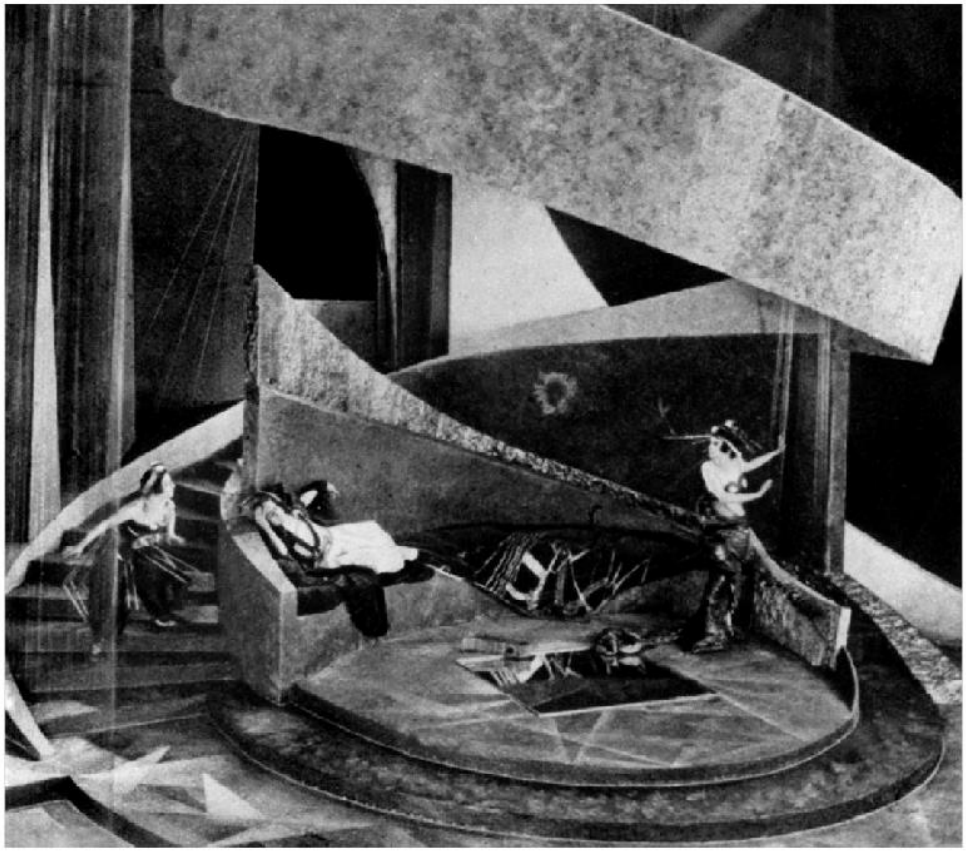


Figure 10 L'Inhumaine (L'Herbier, 1924)

Retrieved https://www.flickeralley.com/inhumaine-and-the-impressionists/

The station on Earth



On Mars

Figure 11 Alita Queen of Mars (Protazanov, 1924)

Retrieved from http://theredlist.com.

Alita Queen of Mars (Protazanov, 1924) was a 1924 film based on Alexi Tolstoy's novel. The show was meant to show Russia's or the Soviet Union's will and innovation to explore the stratosphere. Due to a lack of knowledge, Mars departs from the actual Mars in this film. The architectural concept was separated into Earth station and the Martian habitation since it was based on the technologies available at the time. Life on Mars appears spectacular, with Hellenistic clothing and a style mixing surrealism with classicalism, providing a futuristic and dream world.

Figure 12 Metropolis (Lang, 1927)

Retrieved from https://www.rogerebert.com/reviews/great-movie-metropolis-1927

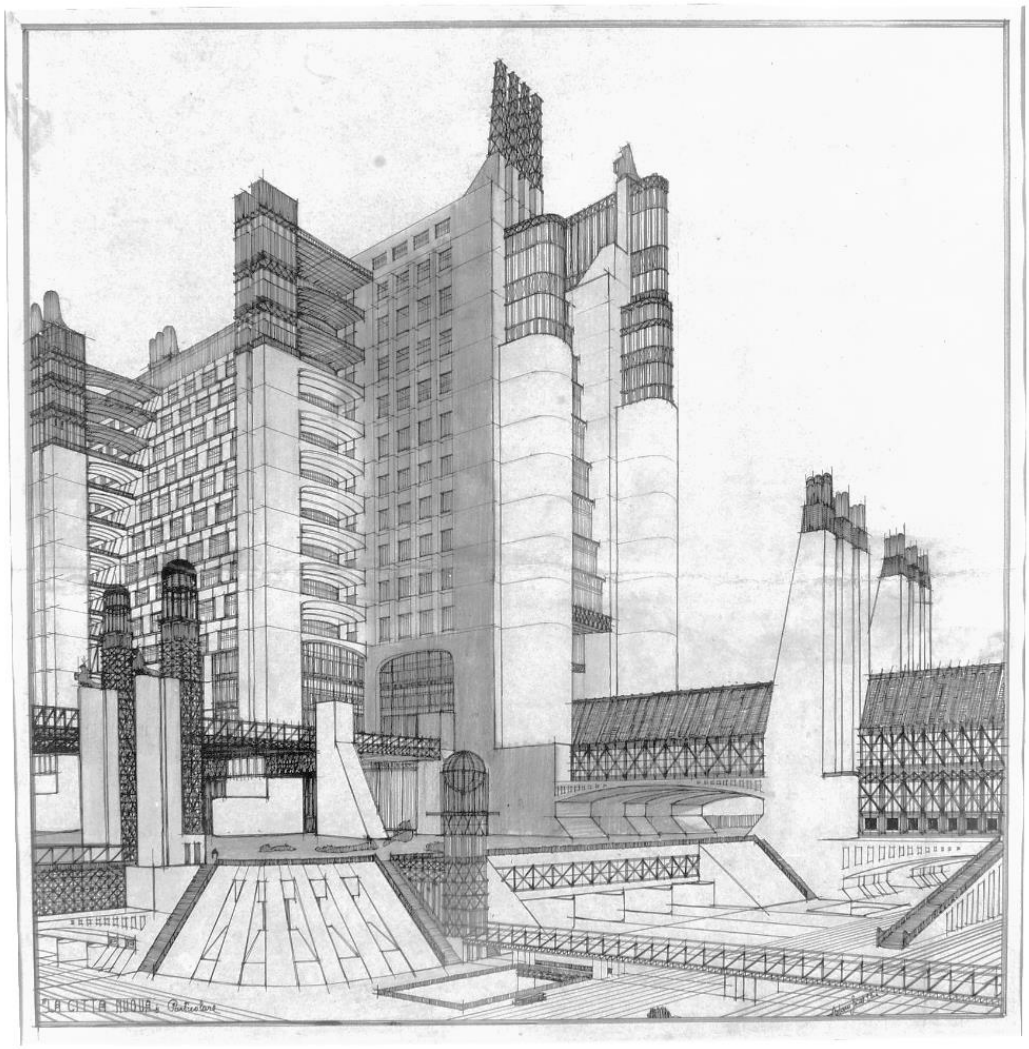


Figure 13 Citta Futurista (Antonio Sant 'Elia, 1916)
Retrieved from TintoMeches via en.wikipedia.org

The architectural clue in *Metropolis* portrays an urban setting where skyscrapers are continuously erected like a mountain and flying birds are replaced with aviation hovering in the sky. The nights are lightened by automobiles and windows, whether on the ground, on platforms, or in the air. Lang's metropolis was influenced by *Antonio Sant' Elia's* architectural drawings and Art Deco structures in Manhattan in 1924 (Edelson, DeGraff, 2017, Neumann, 1999). The interaction between buildings and how architectural components were developed, renovated, and appear more depressing illustrates how the city reacts to humans.

However, the film's prediction that high-rises will fill the sky has been confirmed in many large cities, including Hong Kong. Similarly, *Just Imagine* (Butler, 1930) offers a similar picture of an amused future from the standpoint of the United States. Compared to Metropolis, the show was considerably more energetic with musicals and had a more vivid ambience since it was designed to cheer up the people of the Great Depressing. *Things To Come (Menzies, 1936)* presented the depressing era in 2036's future and opposed Lang's future since Menzies did not believe in robot labour and super skyscraper. He projected that those conflicts would most likely continue in 2036. The globe would require a dictatorship to rule people with army power from aviation equipment such as war machines, flying fortresses, and form-fitting air suits (Colton, 2013).

Figure 14 Hong Kong Sky (Architecture of Density, 2003)

Retrieved from https://www.fastcompany.com/1681772/the-mesmerizing-skyscrapers-of-hong-kong-in-eerily-beautiful-close-up

Figure 15 Metropolis (Lang, 1927)

Retrieved from https://magazine.artland.com/

2.2.3 Technological Influences in Films Making

Discussed Materials		
Moving Pictures	**Technology**	**Impact**
1. Berlin - Die Sinfonie der Großstadt (Ruttmann, 1927) **2. Man with a Movie Camera** (Vertov, 1929)	**Mobile Video Recorder**	- Recording outside studio - Street views - Create a type of *Documentary*
3. High Treason (Elvey, 1929)	***Prediction*** - Commonly use of television - Video call conference (the picturephone)	- Screen-based activities

Table 2 Discussed Materials – Technological Influences in the 1920s – 1930s

In the latter part of the 1920s, cinema was not confined to portraying fiction or entertaining purposes. The story was not just based on a novel or a show but on historical events on the street. The documentary *Berlin - Die Sinfonie der Großstadt or Berlin – Symphony of A Great (Ruttmann, 1927)* portrayed the city on roads and sites. The urban movement from dawn to dark reflects the living conditions in different building typologies such as entertainment venues, industries, stores, and modes of transportation, including trains, trams, horse carriages, and cars. Similarly, *Man with a Movie Camera (Vertov, 1929)* provided similar stories about how people are reacted to urbanization. He also explained the activities of individuals, including how filmmakers behave for shooting scenes. This documentary genre helps the next generations comprehend the past and observe how the world has evolved from a particular historical point.

Figure 16 High Treason (Elvey, 1929)

Picture Phone

At the beginning of the Second World War and the Great Depression, *High Treason (Elvey, 1929)* premiered. The film illustrated conflicts between the 1940s and 1950s between *"The United States of Europe"* and *"Empire of the Atlantic States".* However, the fascinating aspects were the utilization of television, which was not commonly used back and the video call conference, which links people across the courtiers to interact face to face. In the United States, television was usually utilized from the 1950s through the 60s in the family. Thus, it leads to a new type of home entertainment. AT&T established its first video call, *the Picturephone prototype,* in 1956. Since the late 1990s, the widespread consumption of video calls has varied through the development of the Internet and camera-mounted devices (Wolfe, 2019). The device was the starting point of *"Screen-Based Activities"* (*Koeck*, 2013), where screens are based on communication, identification, transportation, consumption, habitation, and automation.

2.2.4 Issues and Theme Mentioned in Moving Pictures

2.2.4 a) Societal Problem Theme

The wealthy of urbanisation and capitalism resides on the cloud floor, while the poor get impoverished and live below. The concept of the social gap has repeatedly been utilised for critique. Regardless of the scenario's backdrop, whether on or beyond Earth, somewhere in the future. Following that, numerous science fiction moving picture media, either dystopian or utopian, incorporate these elements in Metropolis. Before publicly using CGI[1], moving media sets were created by handcrafted models, textiles, and other props like those used in theatrical set design.

[1] CGI = Computer Generated Imagery

Figure 17 Woman in the Moon (Lang, 1929)

Retrieved from https://offscreen.com/view/woman-in-the-moon-fritz-lang-1929

2.2.4 b) Spaceflight Theme

Alita Queen of Mars (Protazanov, 1924) and *Woman on the* Moon (Lang, 1929) are examples of cosmic imagination projection before humans reached the Moon. Woman on the Moon was filmed when the culture of Weimar and the escalating spaceflight tension occurred from 1923 to 1933. The film created imaginative visions for the Moon, the spacecraft, and the station to land on the planet. These are the beginnings of futuristic Sci-Fi. They were described in three main routes in the 1920s and 1930s: the disruption of human beings' machine evolution on Earth and Mars in space. The set design gradually evolves into an architectural project that links people's movement and spatial quality. Though most films continue to use handcrafted components in their productions, the scale and size of the sets are adjusted to fit with recording equipment for a more realistic experience.

2.2.4 c) Machine VS Human Theme

In 1927, Fritz Lang brought the world to *Metropolis*, a dystopian silent cinema classic that influenced several Sci-Fi films in the years afterwards. It was one of the first of its genre, detailing the narrative of a human-machine connection while noting how the robot or android became or lived in the human form. The story was set in the future of the year 2000. With the architecture and other magnificent objects on the set, the film exhibits German Expressionism designs throughout the movie. The story showcases how urbanization and civilization have implications for social classes, economic disparities, and technological development.

2.2.5 Summary of the Decade Between the 1920s and 1930s

Film's prediction that high-rises will fill the sky has been confirmed in many major cities. Similarly, *Just Imagine (Butler, 1930)* offers a similar picture of an amused future from the standpoint of the United States. Compared to Metropolis, the show was considerably more energetic with musical and had a more vivid ambience since it was designed to cheer up the people of the Great Depression. In the latter days of the 1920s, cinema was not confined to portraying fiction or entertaining purposes. The story displayed the city on roads and events on the street. The urban movement from dawn to dark reflects the living conditions in different building typologies (entertainment venues, industries, and stores) and modes of transportation (trains, trams, horse carriages, and cars). For example, the documentary *Berlin - Die Sinfonie der Großstadt or Berlin – Symphony of A Great (Ruttmann, 1927)*

Lastly, the new social status of a person may be determined by their residence. The wealthy protagonist of urbanization and capitalism resides on the cloud floor, while the poor get impoverished and live below. The concept has repeatedly been utilized for critique. Regardless of the scenario’s backdrop, whether on or beyond Earth, somewhere in the future.

Category	Details
a) Period	The 1920s – 1930s
b) World's attention (continent)	Europe and America
c) World's attention (country)	Germany and the USA
d) Major historical event(s)	- Germany, The Weimar Republic (1919 – 1933) - The United States, The Great Depression (1929 – 1939) - Decades between World Wars I and II - Capitalism - Machine has taken people's jobs. - The rapid growth of urban areas is a global phenomenon.
e) Art and architecture movement(s)	- Art movements: Surrealism, Expressionism, Constructivism, Bauhaus, Art and Crafts, Art Nouveau and Art Deco. - Architecture: high-rise, compact residential area and factory
f) Technological advancement(s)	- Machines for mass production - Television transmission - Space-fight technology
g) Result(s) in moving pictures	- The first establishment of the *Dystopian* sub-genre in Sci-Fi; Metropolis (Lang, 1927). - Space-age films have begun to develop a story about the journey to Mars and Moon. - Films act as an apparatus between architects and filmmakers for experiment and expression.

Table 3 Summary of the period between the 1920s and 1930s

Lists of moving picture media in this section.

1. ***Aelita: Queen of Mars,*** 1924. Directed by PROTAZANOV, J. USSR: Walker Art Centre.
2. ***Das Cabinet des Dr Caligari***, 1920. Directed by WIENE, R. Weimar Republic.
3. ***Der Golem, Wie er in die Welt Kam***, 1920. Directed by WEGENER, P. & BOESE, C. Weimar Republic.
4. ***High Treason***, 1929. Directed by ELVEY, M. United Kingdom.
5. ***Just Imagine***, 1930. Directed by BUTLER, D. United States.
6. ***L'Inhumaine***, 1924. Directed by L'HERBIER, M. France.
7. ***Man with a Movie Camera***, 1929. Directed by VERTOV, D. Soviet Union.
8. ***Metropolis***, 1927. Directed by LANG, F. Germany.
9. ***Woman in the Moon***, 1929. Directed by LANG, F. Weimar Republic.

2.3 The Period Between 1940s and 1950s

2.3.1 Historical Review

The period between these two decades was tumultuous, reshaping the world in several ways. It was the period between *World War II* and the early years of *the Cold War.* Most vintage Hollywood films are created to promote propaganda and stories about fighting wars. The social and cultural developments compel the architectural design to accommodate the new activities in the city, for instance, the theatre, festivals, airports, hotels, offices and art houses (Danks, 2017). It produced an enormous quantity of demand that served to regenerate the wartime industries to make people spend money on objects of mass production. Towns such as *Los Angeles* were designed to provide the convenience of driving (Marshall, 2020).

2.3.2 Wars' Influences in Space Age Science Fiction Genre

The Cold War and the Atomic age's anxiety raised extraterritorial and mutant creators themes in Sci-Fi pictures (O'Donnell). The consequences of nuclear destruction and space travel caused many Sci-Fi films to include monsters or creatures from unknown places in this period. For example, *The Day Earth Stood Still (Wise, 1951)*, *The War of the Worlds (Haskin, 1953)* and *The Forbidden Planet (Wilcox, 1956)* are exceptional Sci-Fi works of the 1950s. The films depicted the responses of the military, technology, and humankind to robots and creatures. Architectural settings in the movies include a military facility or spacecraft and an archaeological environment. It represented society's order through architecture and expressed concern about the impending disaster from wars. *Star Trek (Roddenberry, 1966)* and *Star Wars (Lucas, 1977)* have similar elements to the prior mentioned films. It has continuously influenced and developed the space-age genre afterwards.

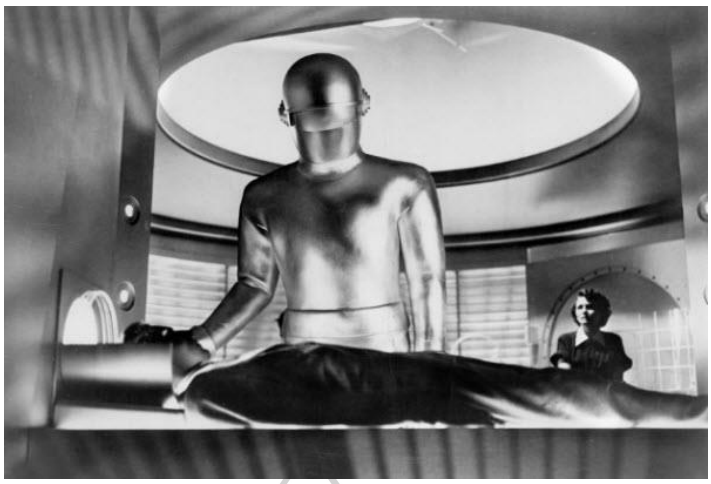


Figure 18 The Day Earth Stood Still (Wise, 1951)

Retrieved from http://www.lovedesigner.net/the-day-the-Earth-stood-still-1951/

2.3.3 Architectural Influences in Moving Picture Media

Modernism influenced many cities, particularly in less developed areas. The economic expansion brings contemporary structures worldwide, reflecting foreign institutes or political domination. Leading to *Internationalism*; buildings are constructed without regard for local customs, values, and climates. Many architects collaborate with filmmakers to show how three-dimensional architectural design (length, breadth, and height) reacts to camera viewpoints and time dimensions. Films in this period demonstrated the city's vital background to depict society at that time.

The Fountainhead (Vidor, 1949) discussed an architect's life and his challenges in the design ideas. The film depicts the background of the drawing of a high-rise city on the wall. The movie compared older buildings with ceiling heights, materials and windows sizing against modern architecture. It also demonstrates how the architectural style has moved from bulky, heavy, and robust to lightweight, airy, and serene. In the same year, *Carling House* (Lautner, 1949) utilized the same architectural language and design components, including window glass with an aluminium frame, horizontal grooved, and internal panelling surfaced as revolutionary design in that time.

Figure 19 The Fountainhead (Vidor, 1949)

Enright Building Party

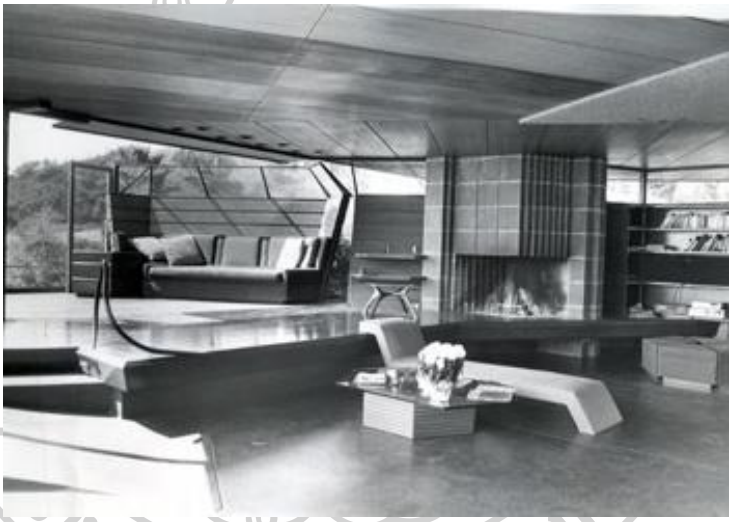


Figure 20 Carling House (Lautner, 1949) Photo by Frank Cooper

Retrieved from https://www.laconservancy.org

Other American films such as *The Naked City (Dassin, 1948)*, On the *Waterfront (Kazan, 1954)*, and *Sweet Smell of Success (Mackendrick, 1957)* were classed as Film Noir in which individuals in the plot participated with morality, crime and dramatic occurrences. Although Hollywood pictures in the ‘40s and early ‘50s were still in monochrome because of the high cost of colouring production, the movie’s perspective (camera’s angle and position) became acquainted with the films nowadays. These films are one of the numerous historical proofs that economic wealth has been transferred from Europe to America (New York).

2.3.4 Roles of Hyperreality Landmarks

On July 17, 1955, *Disneyland* opened its doors for the first time. The park is designed to be a place where people may forget about the world outside while enjoying the moments. Nonetheless, it is not just a typical landmark with several branches worldwide. This theme park is distinguished because it also produces films and stories to complement walks and tours. For business and psychology, these are many elements of making people spend more time in the park. Disneyland continues to expand its business with new rides and stories. It is also where people may have a peek at the *"future"* in films in the later years, such as *Star Trek (Roddenberry, 1966)*, *Back to the Future (Zemeckis, 1985)*, *Iron Man (Favreau, 2008)*, and *Tron* (Kosinski, 2010).

Figure 21 Disneyland in 1955

Retrieved from https://www.scholarship.in.th/disneyland-opening-day-in-1955-sounds-like-it-was-a-dystopian-hell/

2.3.5 Summary of the Decade Between the 1940s and 1950s

In short, the world's political, military, and economic crises were addressed by the 1940s through the 1950s. There must be a psychological design behind everything from everyday items to movies. According to the flourishing of domestic TV as dominating channel of transmission, it supplanted radio. Promote propaganda and encourage people to consume as mass communication more efficiently. Films in this period are generally about daily life, making the connection with films easier, whereas the Sci-Fi genre often refers to creatures' arrival. Disneyland has become a landmark of hyper-reality where visitors may enjoy simulacra in the parks.

Category	Details
a) Period	The 1940s – 1950s
b) World's attention (continent)	Europe and America
c) World's attention (country)	Germany, France, and the USA
d) Major historical event(s)	- World War II - The Cold War - Growth of industrial and mass production - Recruit people to join armies
e) Art and architecture movement(s)	- Art movements: Internationalism, Brutalism, Pop-Art, and Retro Art - Architecture: high-rise, compact residential area factory, theatre, festivals, airports, hotels, offices, and art houses
f) Technological advancement(s)	- Television was widely used in households.
g) Result(s) in moving pictures	- Propaganda materials were published to citizens for military and economic reasons.

Table 4 Summary of the period between the 1940s and 1950s

Lists of moving picture media in this section

1. ***Back to the Future***, 1985. Directed by ZEMECKIS, R. United States.
2. ***Iron Man***, 2008. Directed by FAVREAU, J. United States.
3. ***My Uncle***, 1958. Directed by TATI, J. France.
4. ***On the Waterfront,*** 1954. Directed by KAZAN, E. United States.
5. ***Star Trek: The Original Series***, 1966. Directed by RODDENBERRY, G. United States.
6. ***Star Wars,*** 1977. Directed by LUCAS, G. United States.
7. ***Sweet Smell of Success***, 1957. Directed by MACKENDRICK, A. United States.
8. ***The Day Earth Stood Still,*** 1951. Directed by WISE, R. United State.
9. ***The Forbidden Planet,*** 1956. Directed by WILCOX, F. M. United States.
10. ***The Fountainhead***, 1949. Directed by VIDOR, K. United States.
11. ***The Naked*** City, 1948. Directed by DASSIN, J. United States.
12. ***The War of the Worlds,*** 1953. Directed by HASKIN, B. United States.
13. ***Tron: Legacy***, 2010. Directed by KOSINSKI, J. United States.

2.4 The Period Between 1960s and 1970s

2.4.1 Historical Review

The invasion of the monsters, harsh climate and pollution, and machine malfunction are all threats to the world continually developed from the previous days. These are the issues often discussed over the two decades from the 1960s to the 1970s. The apocalyptic and post-apocalyptic films portray how society is rebuilt and governed in various ways to respond to transformations (Jackson and Staff, 2021). As a result, a broad segment of cinema regards science fiction films that gaze to the far future as warning stories about the recognizable world of the human present and past. People may envisage and fantasise about their lives on Earth, in space, and in virtual reality. Due to the potential of computer graphics, the stories of the altered universes have begun.

2.4.2 Relation Between the Spatial Quality and Architecture

2.4.2 a) Context: Earth

Architectural typologies must be included in the film, such as a secret laboratory, a secret agent's office, a space station, and the potential of future societies, either utopian or dystopian (Jackson and Staff, 2021, Benson, 2020, Plim et al., 2021). Between the late 1950s and early 1960s, many mainstream publications reflected science fiction's formative significance in architecture, film, art, and literature. From the periphery to the most popular franchises, science fiction has been delivered fantastic settings, advocates, and high-profile productions. Film series such as *Mad Max (Miller, 1979)* have taken severe threats about civil liberties, the environment and the oil crises. Special effects in the film were made more realistic for apocalyptic circumstances (Miller, 2017). As with the movie *Soylent Green (Fleischer, 1973),* the audience was aware of the contaminated environment and worried about poverty, insufficient resources, and overcrowding.

An endless vertical and horizontal space, the quality of lighting, the shape and forms of the place, and a spacious area with the capacity to manage crowds are the quality of architecture in futuristic moving pictures in this era—the vast space intended to accommodate automation devices for its functioning. White, for example, appears to represent a clean and intelligent feeling, but it is also employed as a captive mental area in the future environment. Furthermore, they propose the concept of communication projection in a hologram or on a screen.

Logan's Run (Anderson, 1976) depicted a virtual society of the future in which transportation, consumption, and housing are all automated by computer programming. As well as in *Demon Seed (Cammell, 1977),* intelligent house controls by artificial intelligence (AI) suggested the notion of the Internet of things gadgets where individuals may control housewares with automation commands. Anderson's and Cammell's films expressed the anxiety of how these machines take control over human life. Moreover, the *Demon Seed* also points out that robots might live in a flesh body like humans in the future.

Figure 22 Logan's Run (Anderson, 1976)

Retrieved from https://autos.yahoo.com/news/cars-breaking-bad-guy-found-them-130039954.html

2.4.2 a.1) Civic Architecture in Science Fiction Moving Pictures

THX-1138 (Lucas, 1971) dropped the changing of futuristic perspective by merging the current structures, which refreshed the particular definition of technical Sci-Fi moving pictures. The large scale of civic architecture makes humans feel smaller in society. The actual places used in this movie mainly appeared in San Francisco, including *the Bay Area Rapid Transit Subway (1957)*, *The Lawrence Livermore National Laboratory (1952)*, *the Marin County Civic Centre (1967)* in San Rafael by Frank Lloyd Wright, and *The Lawrence Hall of Science (1968)* in Berkeley *and San Francisco Airport in 1927* (Pollock, 1999). The places mentioned above share the spatial quality of controlling the human mind with scales of architecture mentally and physically.

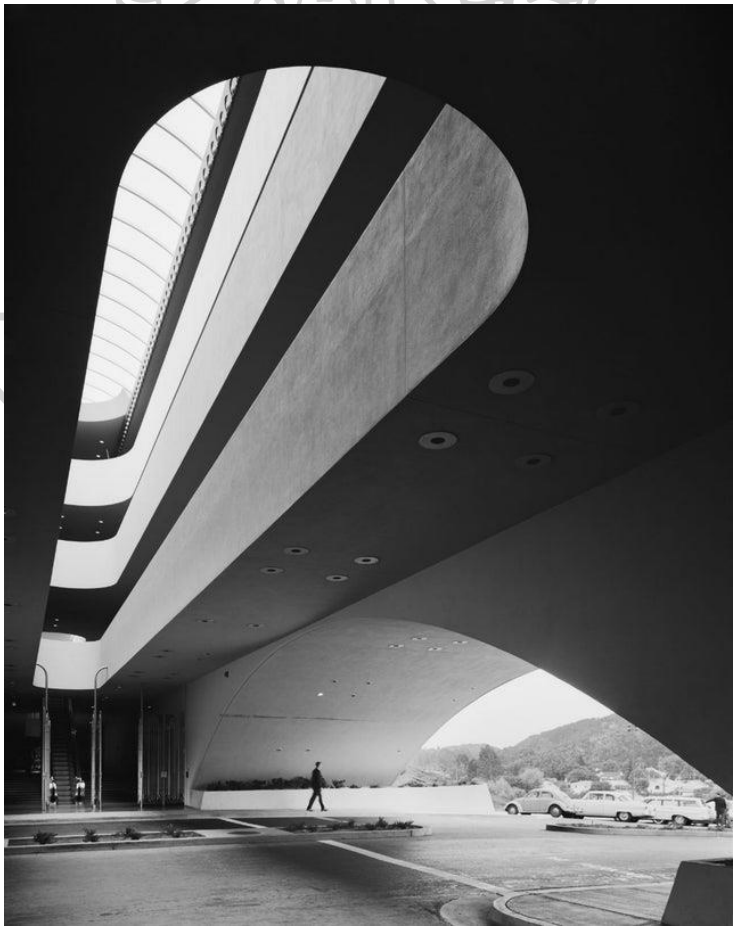


Figure 23 The Marin County Civic Center (1967) in San Rafael by Frank Lloyd Wright,

Retrieved from https://www.reddit.com/r/architecture/comments/72utmr/gattaca_marin_county_civic_center_building_by/

Figure 24 THX-1138 (Lucas, 1971)

Retrieved from https://blog.dwr.com/2007/02/09/people_used_to_/

2.4.2 a.2) Concept of Compacted-Moving Cities

During this period, architects explored the concept of compacted-moving cities, such as Richard Buckminster Fuller and Shoji Sadao's *Tetrahedron City Project (1968).* They suggested a floating city in Japan's Tokyo Bay. *The Tetrahedron City Project* proposed the concept of a 'city' that takes the form of a ship. It gave security, entertainment, and seclusion to individuals who lived in the limited space within the densely populated area.

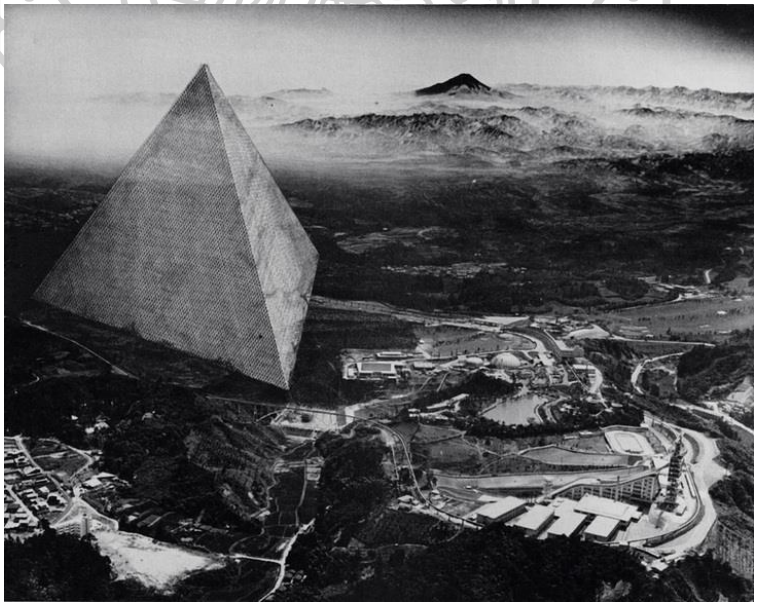


Figure 25 Tetrahedron City Project, Yomiuriland, Japan (Fuller and Sadao, 1968)

Retrieved from http://www.fontecedro.it/blog/category/buckminster%20fuller

Between 1961 and 1974, the Avant-grade group *'Archigram'* proposed conceptual and hypothetical future city designs such as *A Walking City, Living Pod,* and *Instant City (Rowlings, 2018).* These works prompted the subsequent designer to create architecture in the far future with many scenarios seen in Sci-Fi movies. In these decades, this kind of city may also be found in Star Trek (Roddenberry, 1966) and Star Wars (Lucas, 1977), where spacecraft are used for many functions, including defence, warfare, living, transit, and commercial trade.

2.4.2 b) Context: Space

In 1969, *NASA* was successfully sent humans to the Moon. From the space travelling perspective, *2001: A Space Odyssey (Kubrick, 1968)* also predicts how humans can travel in a spacecraft with a spinning motion to maintain health conditions. The physical environmental conditions, such as weightlessness, lack of sound, and delay of transmission from the spaceship to Earth, have been verified as truths decades later (Saavedra, 2020). Consequently, there are plenty of space-age stories in these decades. The famous blockbusters with large budgets, such as *Star Wars (Lucas, 1977)* and *Close Encounters of the Third Kind (Spielberg, 1977),* are the most popular Sci-Fi films of all time (Wallace, 2009). These are examples of movies with a plot in which humans live with the other species in space. Whether humans are on or beyond the planet, there are always stations and armies to battle, protect, or attack different types. It most likely observed the story of the star ship in *Star Wars.* It creates a mobile metropolis within the spaceship, with various functions in the interior. *Close Encounters of the Third Kind* continues to be set on Earth. It also addresses people's difficulties with connection and communication. Music and gestures can be viewed as a universal medium for understanding humans and aliens.

Figure 26 Star Wars (Lucas, 1977)

Figure 27 Close Encounters of the Third Kind (Spielberg, 1977)

2.4.2 c) Context: Virtual Reality and Prelude of Cyberspace

Virtual reality was the third alternative for filmmakers in setting backdrops in the Sci-Fi genre. Directors like Stanley Kubrick, Joseph Kosinski, Ridley Scott, Gerry and Sylvia Anderson (Benson, 2020) imagined a location in space where imaginations construct a vision of an inevitable future in *virtual space*. In the technological and machine subgenre of the Sci-Fi genre between the 1960s and 1970s, the notion of robots in human forms, LED and RGB colours (red, blue, and green), and innovative future architecture designs were featured repeatedly. It usually comes with the threatening anxiety of the possibility that the machine will win over humans. These are the introduction period of cyberspace before computers widely have used in the following decades.

2.4.3 Summary of the Decade Between the 1960s and 1970s

The architectural elements of modernism in the period are depicted in *Playtime. (Tati, 1967)* The film portrays a crowded metropolis with typology and space management. It was attempting to make the most use of available space. The cubist design patterns may be found in the architectural plans and façades. The unglamorous town began losing hope in decent humankind, as foretold by Sci-Fi films at this time. The architectural design is being altered to be more futuristic by integrating curves, lines, and deformation while paralleling modern cubic design in mainstream design such as the workplace. The future appears currently loaded with technological advancements in automation, communication, and transportation, allowing people to live more conveniently but not pleasingly. However, directors also showed how these developments could turn against humankind and put civilization at risk. Furthermore, the worry of overpopulation is portrayed in films, either locating a new colony outside the planet or manipulating precise computation for prolonging or maintaining human life expectancy.

Figure 28 THX-1138 (Lucas, 1971)

Retrieved from https://www.britannica.com/topic/THX-1138

Figure 29 Playtime (Tati, 1967)

Retrieved from https://www.archdaily.com/395674/films-and-architecture-play-time/

Category	Details
a) Period	The 1960s – 1970s
b) World's attention (continent)	America
c) World's attention (country)	USA
d) Major historical event(s)	- Vietnam War - Antiwar Protest - Baby boomers - Environmental Awareness Movement (Pollutions and climate changes)
e) Art and architecture movement(s)	- Art movements: Minimalism, Conceptual Art, and Pop-Art - Architecture: high-rise, compact residential area factory, theatre, festivals, airports, hotels, offices, art houses, and civic architecture
f) Technological advancement(s)	- Humans landed on the Moon - Computer development caused the concept of virtual reality
g) Result(s) in moving pictures	- Sub-genre; cyberspace, space travel, alien arrival, and consequences from machines

Table 5 Summary of the period between the 1960s and 1970s

Lists of moving picture media in this section

1. ***2001: A Space Odyssey,*** 1968. Directed by KUBRICK, S. United States
2. ***Close Encounters of the Third Kind***, 1977. Directed by SPIELBERG, S. United States.
3. ***Demon Seed***, 1977. Directed by CAMMELL, D. United States.
4. ***Logan's Run***, 1976. Directed by ANDERSON, M. United States.
5. ***Mad Max***, 1979. Directed by MILLER, G. United States.
6. ***Playtime***, 1967. Directed by TATI, J. France.
7. ***Soylent Green***, 1973. Directed by FLEISCHER, R. United States.
8. ***Star Trek: The Original Series***, 1966. Directed by RODDENBERRY, G. United States.
9. ***Star Wars***, 1977. Directed by LUCAS, G. United States.
10. ***The Creation of the Humanoids***, 1962. Directed by BARRY, W. United States.
11. ***THX-1138***, 1971. Directed by LUCAS, G.

2.5 The Period Between 1980s and 1990ss

2.5.1 Historical Review

The continuation from previous decades of the future idea is still discussed about the future associated with space-age, machine worries, and human apocalypses. It is also the age when eruptions of people, environmental problems and energy crises led to the depression. The rise of the Internet spawned an entirely new subgenre of science fiction, such as cyberspace, cyberpunk, and virtual reality. Scientists and technologists created a paradigm for the city that illustrates how technology changes transportation, communication, habitation, and security.

Figure 30 1980s. Tokyo Street at Night, 35mm (by thekinolibrary)

Retrieved from https://www.youtube.com/watch?v=yy9EP7OFfIM

2.5.2 Computerised Age Influences

To increase the vision of science-fiction images in these decades, the further progress of the computerised visual approaches shows a more vital vision for future possibilities. *Metropolis (Lang, 1927)* was referred to as its city vision in many films such as *Blade Runner (Scott, 1982), Ghost in the Shell (Oshii, 1995), and Akira (Otomo, 1988).* These films depicted the cyberpunk scenario of a dystopian future where nefarious organisations rule society. The film stresses the new relationship between human subjectivity and the environment. It develops character in *Blade Runner* in urban settings of Neo-Tokyo through holographic projections of buildings' facades. The similarity of architectural design by a reimagining of the digitalised future, such as neon lighting in the city, numerous billboards downtown, and a crowded population area. These are the factors that have been developing since this point in history.

Figure 31 Late 80s/ Early 90s Night Hong Kong Street Scene (by thekinolibrary)

Retrieved from https://www.youtube.com/watch?v=ND5HBiWG31A

Figure 32 Ghost in the Shell (Oshii, 1995)

Urbanscape in the Asian city

Figure 33 Akira (Otomo, 1988)

Retrieved from https://www.intjournal.com/thinkpieces/mutations-and-megastructure

2.5.3 The Differences Between Cyberpunk and Cyberspace

2.5.3 a) Cyberpunk

Cyberpunk is a thriving cultural movement that includes cinemas, fashions, and designs from the science fiction subgenre. It has been defined as a high-tech elite society with sophisticated technology populated by individuals unable to afford luxury (Bailey, 2020). It is the design in which the city is filled with illuminated skyscrapers with neon-light hologram projections. These are the early science-fiction genre films set in Asian cities (Hong Kong and Tokyo). The richness of the Hong Kong cityscape at Yau Ma Tei and Kowloon city is filled with the super high-density city overloaded with sensory, digital, and physical information. It resulted from the rise of Asian economies, particularly Japan, in the 1980s (Islam M Abouhela).

Figure 34 Blade Runner (Scott, 1982)

Retrieved from https://planetdystopia.net/blog/history/tower-babylon-urban-dystopias/

Megastructures resembling ziggurats rise hundreds of stories above Manhattan-style streets interlaced with more miniature skyscrapers in *Blade Runner (Scott, 1982)*. The film stresses the new relationship between human subjectivity and the environment. It develops character in this film in urban settings of Neo-Tokyo through holographic projections of buildings' facades. While the audience follows *Blade Runner* in a flying car above the towers of Los Angeles and *Akira* on a futuristic motorcycle, the city has a twisted, dynamic, visceral sense as if it has become real (GARDNER, 2020, Neumann, 1999). *Ghost in the Shell* also had the similarity to architectural design by a reimagining of the digitalized future.

2.5.3 b) Cyberspace and Virtual Reality

Cyberspace is the term written by William Gibson in *Neuromancer* (Gibson, 1984). Cyberspace often occurs in the cyberpunk genre. It is a virtual place (Wallace, 2020) where people can enter by connecting interact with the alter realism. The process necessitates the use of devices and rooms. When people are linked to the system, their bodies can either move or cannot move. People could interact with objects there as physical objects in the actual world. Films frequently depict people entering cyberspace as semi-sleeping. *Three dimensions* refer to the prior definition (depth, width, and height) and the new combination of *focus, locus, and sensus.* These are factors describing virtual experiences (Waterworth and Waterworth, 2001).

Figure 35 TRON (Lisberger, 1982)

Retrieved from https://www.nyfa.edu/student-resources/

Figure 36 Lawnmower Man (Leonard, 1992)

Retrieved from https://clamshellcasefiles.com/episodes/2020/11/30/072-the-lawnmower-man-1992

In *TRON (Lisberger, 1982),* the protagonist is transferred from the physical to the virtual world. This film's iconic design in the virtual world is neon colours and glowing lines. Colours such as red, green, blue, pink, purple, and yellow are used in the illustration. The design pattern is often seen with the repetition of polygon-like shapes and parametric design. Similarly, in the *Lawnmower Man (Leonard, 1992),* the films constantly discuss the physical world and virtual reality by utilizing VR goggles, gloves, and entire body tracking motion devices. Perceiving the 4D experience (a sensory experience) allows people to feel as if they are truly present in the simulated environment. According to *the Franklin Institute's History of Virtual Reality*, the concept of virtual reality began in the 1800s with the invention of the first *stereoscope (1838).* During the heady period in the field between the 1970s and 1980s, optical advancements and haptic devices, among other instruments, allowed people to move in virtual space. The Virtual Interface Environment Workstation (VIEW) system, developed at NASA Ames Research Centre in the mid-1980s, combined a head-mounted device with gloves to enable haptic interaction.

Figure 37 The Virtual Interface Environment Workstation (VIEW), 1990
Retrieved from https://www.nasa.gov/ames/spinoff/new_continent_of_ideas/

2.5.4 Concept of Altered Identities and Mind Transferring

In 1999, *The Matrix* (*Wachowskis, 1999)* and *The Thirteenth Floor (Rusnak, 1999)* films discussed virtual reality and consciousness or brain uploading to other simulated environments via a supercomputer server. They have also doubted the existence of actuality, memory, and individuality. Although people can control and move avatars simultaneously in virtual reality by wearing devices around twenty years later, the concept of brain uploading or transferring is still under investigation. However, On *the Thirteenth Floor* reveals a glimpse of 2024 architecture from a 1999 perspective. The structures are tall and feature large voids with a deformation fluid design. However, before 2024, architects such as Zaha Hadid designed and built futuristic architecture, such as *The Opus Tower* in Dubai (Hadid, 2016).

Figure 38 The Thirteenth Floor (Rusnak, 1999)

2024 Scenario

Figure 39 The Opus Tower in Dubai. (Hadid, 2016)

Retrieved from https://www.buro247.me/lifestyle/design-and-architecture/zaha-hadid-first-dubai-project.html

Figure 40 Art Tower Mito, Japan (Isozaki and Associates, 1990)

*Nonlinear Architecture – Photography by Jun Tazawa, Koral*l

Retrieved from https://www.amazingarchitecture.com/

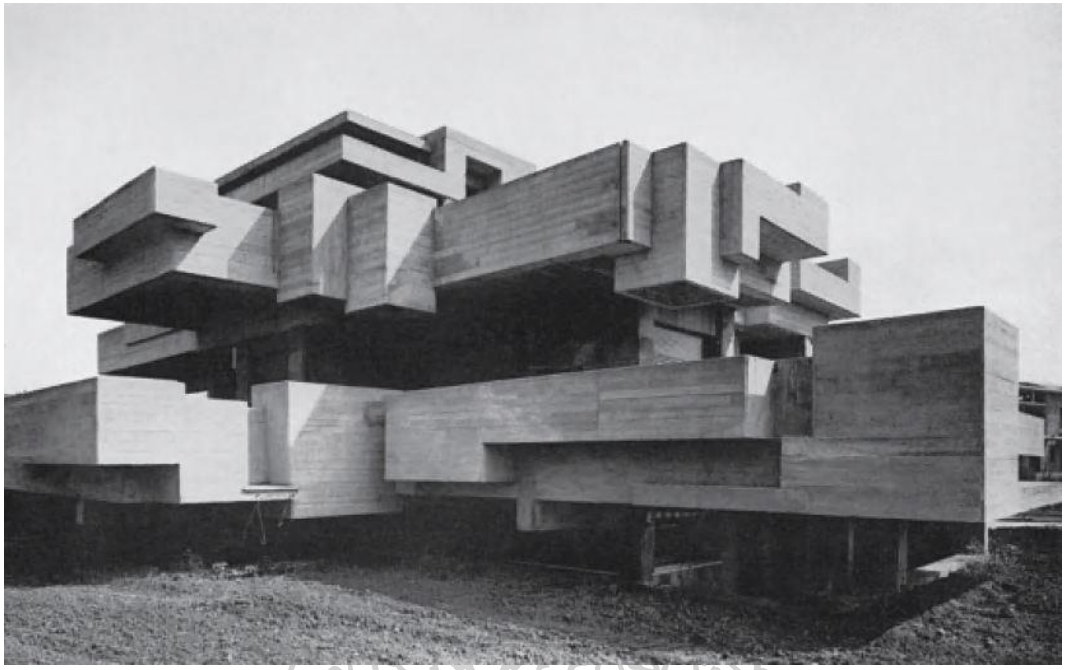


Figure 41 Villa Ronconi (Vici, 1973)

Brutalism Architecture - Retrieved from https://www.phaidon.com/

Figure 42 Southbank Centre (Crompton, 1967-1968)

Brutalism Architecture - Retrieved from https://magazine.artland.com/

2.5.5 Technological Development

Aside from cyberpunk and cyberspace, another aspect of technological development impacts society: the Internet of Things (IoT). These devices are slowly becoming a part of people's lives. It can be helpful for security, military, and surveillance purposes and make life easier. However, these devices connect to the Internet, there is always the risk of hacking and privacy invasion.

Enemy of the State (Scott, 1998) depicts how the government or the organization in charge can spy on people via CCTV or phone. It can also detect the location and address of a person or object. There are two sides to the coin which can provide security to society by identifying criminals. On the other hand, it might be invading one's privacy and endangering one's freedom.

During *Total Recall (Verhoeven, 1990), Bicentennial Man (Columbus, 1999)* and *Back to the Future (Zemeckis, 1985)*, some devices or services predictions in the mentioned movies happened in the 2010s. For instance, personal drones, automobile cars, tablet and mobile payment technology, biometric devices, hands-free gaming consoles, bright clothing and wearable technology, videophone, waste-fuelled vehicles, hoverboards and video glasses (Poppick, 2015).

Nonetheless, the more intelligent the devices, the more people are afraid of technology. The *Terminator (Cameron, 1984)* depicted a future in 2029 in which machines defeat humanity. The machines revolted against the humans' original goal of protecting and defending public safety. In contrast, machines have ruled the world, killed people, and made human beings minorities.

The films predicted that television would no longer be a hEarth of a home, as everyone would have a personal screen in their hands within the next decade. The expansion of equipment that integrates into daily life routines necessitates new design space settings, such as chargers for phones, cars, or other devices.

In the 1980s and 1990s, the *Space Age* ushered in a new brighter aspect of an extraterritorial ally. For example, *ET the Extra-Terrestrial (Spielberg, 1982)* depicted how friendly aliens and humans could interact. T*he Fifth Element(Besson, 1997)* illustrated when Earth has the defending army in space. By that time, the world's architecture and transportation resembled those depicted in *Minority Report (Spielberg, 2002)*. Vehicles float along through the sky to reach the high floors of the super tall skyscrapers. Humans can also use biological technology to reproduce aliens from organ parts to extract genetic codes and create aliens in human forms. Also, in *Gattaca (Niccol, 1997)*, there is a similar aspect of genetic improvement or selecting only the best from parents to achieve the best human version. The film highlights how plastic surgery can alter one's appearance and biometric identity.

2.5.6 Summary of the Decade Between the 1980s and 1990s

Overall, the architectural design in space-age films is not dissimilar to that of other subcategories of the Sci-Fi genre. However, the resemblance elements are the urbanscape design and some hidden scientists or military basement for Earth's research and civil defence from dangers. Narrations, costumes, and immersive digital components are inextricably linked details of filmmaking from these eras. It also impacted not only the United States but also the entire world. However, before Hadid's work shifted to futuristic architecture, Sci-Fi films adopted Brutalist aesthetics in the 1980s and 1990s. This movement expressed a strong, powerful, and emotionless architectural language. The most common building material is hard concrete, representing a lack of place (Leibling, 2018). It was also during the rise of *Postmodernism* and *Deconstructivism.* The *nonlinear geometries* described complexity design from several computer-aided software, which boasts digital-era development. It also aimed to create new forms of social arrangement from technological advancements.

Category	Details
a) Period	The 1980s – 1990s
b) World's attention (continent)	America and Asia
c) World's attention (country)	USA, Japan (Tokyo), Hong Kong SAR
d) Major historical event(s)	- Shifting attention from Western cultures to Eastern cultures - Concerns about overpopulation - Computer's popularity - Internet invention - Concerns about privacy and security from the internet
e) Art and architecture movement(s)	- Art movements: Postmodernism, Deconstructivism, Futurism and Brutalism - Architecture: non-linear geometries, neon lighting, high-rise, compact residential area factory, theatre, festivals, airports, hotels, offices, art houses, and civic architecture
f) Technological advancement(s)	- Computer-aided design (CAD) - Internet of things (IoT) gadgets - Equipment for accessing virtual reality
g) Result(s) in moving pictures	- Sub-genre; cyberspace, space travel, alien arrival, and consequences from machines - Vivid pictures of virtual reality

Table 6 Summary of the period between the 1980s and 1990s

Lists of moving picture media in this section

1. ***Akira***, 1988. Directed by OTOMO, K. Japan.
2. ***Back to the Future***, 1985. Directed by ZEMECKIS, R. United States.
3. ***Bicentennial Man***, 1999. Directed by COLUMBUS, C. United States.
4. ***Blade Runner***, 1982. Directed by SCOTT, R. United States
5. ***Brazil***, 1985. Directed by GILLIAM, T.
6. ***ET the Extra-Terrestrial***, 1982. Directed by SPIELBERG, S. United States.
7. ***Enemy of the State***, 1998. Directed by SCOTT, T. United States.
8. ***Gattaca***, 1997. Directed by NICCOL, A. United States.
9. ***Ghost in the Shell***, 1995. Directed by OSHII, M. Japan
10. ***One from the Heart***, 1982. Directed by COPPOLA, F. F. United States.
11. ***The Fifth Element***, 1997. Directed by BESSON, L. France.
12. ***The Lawnmower Man***, 1992. Directed by LEONARD, B. United States
13. ***The Matrix***, 1999. Directed by WACHOWSKIS, T. United States.
14. ***The Terminator***, 1984. Directed by CAMERON, J. United States.
15. ***The Thirteenth Floor***, 1999. Directed by RUSNAK, J. United States
16. ***Total Recall***, 1990. Directed by VERHOEVEN, P. United States.
17. ***TRON***, 1982. Directed by LISBERGER, S. United States.

2.6 The Period Between 2000s and 2010s

2.6.1 Historical Review

Many exceptional Sci-Fi and fantasy moving-picture mediums were introduced between the 2000s and the 2010s. The compelling and stunning detail in Sci-Fi stories is not limited to the films or movies scale on theatre. Technological progress allows for lowering the budget for the high-quality visualisation on drama series scale on streaming or television. From the perspectives of comics, animations, films, and television shows, the science fiction genre embraces a lighter tone with a sense of comedy rather than a darker tone like film noir. As a result, the plots gained more favourable conditions and situations that turned everyday living into spectacles. According to the media, individuals feel like they can be a part of the narrative, which leads to consumption. For example, purchasing toys, visiting a theme park, and purchasing other items depicted on the screen.

Space-age, moving-city, brain or conscience transferability, technology sanction, virtual reality, machine transplant (cyborg), artificial intelligence, and robot are themes in science fiction. Technology dramatically enhances communication quality, transit experience, consumption amount, accurate identification, the definition of habitation, and machine automation. The difference is that some of the gadgets used in the movies are available for purchase and testing by ordering from eBay or Amazon. It convinced people that the predicted era of futuristic digital life had arrived. Some masterpieces, such as *Metropolis (Lang, 1927)*, *TRON (Lisberger, 1982)*, and *Blade Runner (Scott, 1982)*, were updated with new technology and inventions, as well as changed social issues on top of the story. It convinced people that the predicted era of futuristic digitalised lifestyles had arrived.

2.6.2 Influences of Technology and Architecture in Moving Pictures

2.6.2 a) Habitation on Mars

Mars is a place that filmmakers often use as a setting environment for space exploration and travel to other planets. Mars Research (Mars One, NASA), Mars is likely to be habitable with air, water, ice, and geology closely linked to Earth. In addition, other parallel factors have made Mars habitable: water extraction from soil, enough sunlight for solar panels, similar gravity strength, and a comparable rhythm of day and night (24 hours, 39 minutes, and 35 seconds). *Martian* (MarsOne, Scott, 2015) is one the realistic space explorations films. The film depicted clues and demonstrations of how architecture and technology would help solve the problem of how to remain alive on another planet. The movie mentions flammable materials, and the protagonist says NASA is terrified of fire because it could kill people. Nevertheless, fire generates heat and is one of the factors which changes hydrogen into oxygen.

NASA considered Mars's severe conditions, such as temperature, storms, and surrounding environment. The architecture must be portable while highly durable to be a shelter and glasshouse for the plantation. These constraints and requirements shape the forms and functions of architecture and shift human behaviour and socialisation. In 2018, NASA's habitation design contest for Mars exhibited the possible outcomes. NASA was using 3D printing and local materials as ink on Mars. *How would architectural design appear to survive and accommodate human needs (Tangermann, 2018)?* The participants proposed various ways to build architecture and manage resources. The common elements are durable survival and life-sustaining renewable energy. The designs reflected how people could reside in a whole new environment. This kind of conceptual design opens opportunities for designers and architects to develop and suggest creating habitation for the future generation.

Figure 43 Zopherus Habitat (Zopherus, 2018)

Retrieved from https://www.dezeen.com/

Figure 44 Marsha (A.I.Spacefactory, 2018)

Retrieved from https://www.aispacefactory.com/marsha

2.6.2 b) Moving Architecture

As mentioned in (2.4.2 a.2), Archigram's *A Walking City* was a hypothetical future city design. In 2018, *Mortal Engine (Rivers, 2018)* made the concept of a moving city alive on the silver screen. The film uses the metaphor of a moving city that consumes other towns or communities to grow society like agricultural within the massive vehicle. The environmental condition forced cities to keep moving away from praying and hunting for more resources for survival except for the unexpected incident that might crash on Earth, such as an attack from aliens or scarce natural resources. This fantasy is unlikely to come true based on the current situation. The compact cities on wheels demonstrate how people might avoid starvation, drought, and other natural disasters by thriving on the only essentials for living.

2.6.2 c) Wearable Architecture

Architectural designs became reduced in size from compressed cities to wearable architecture, which frequently appeared as battle machines. The suit does more than keep individuals safe from environmental dangers on the inside, and it exemplifies how architecture and transportation can become one. During the 2000s and 2010s, the world could see more contextual backgrounds for moving pictures in Asia than in Western countries. Throughout the study, films consistently demonstrate economic polarization. From the glory days in Berlin to New York and Los Angeles, the focus was shifted to Shanghai, Hong Kong, and Tokyo at the time.

In 2013, *Pacific Rim (Toro, 2013)* speculated that the creature could emerge from beneath Earth's surface. The giant armour themselves is reminiscent of the Japanese *Gundam* franchise. Since these suits are comparable in height to the building, they can defeat creatures while protecting the pilots' actual bodies inside the machine.

Shanghai Fortress (Huatao, 2019) has a cliché storyline in which Shanghai is the last city protecting humanity from alien invasion. According to the film, most capitals derive their energy for self-defence from extracting extraterritorial objects, X*ian Teng.* This energy was derived from oil and fuel. It also symbolized that the city of *Xian Teng* is one of the world's leading economic cities. The film depicted a combination of space-age and cyberpunk subgenres. The technologies used in the scene are like those seen in other movies, including military drones, architectural definition, and retina cognition.

2.6.3 Altered Identity

2.6.3 a) Altered Body and Skin Ideology

Brain or memory implants are the fantasy hope in movies and have been debated for over a century. This medical procedure has the potential to save people from disability and disease, and it also raises concerns about moral and ethical issues. *Avatar (Cameron, 2009), Tron: Legacy (Kosinski, 2010), Black Mirror (Brooker, 2011), Total Recall (Wiseman, 2012), Transcendence (Pfister, 2014),* and *Altered Carbon (Kalogridis, 2018)* are examples of films and streaming series that have used the conscience transfer to tell a story. There are two major memory transfer types: the new body and the digital world.

The architectural space must provide the conditions to maintain bodies and cells. For example, in *Altered Carbon (Kalogridis, 2018)*, people's identity is contained in a ship that allows changing their bodies. The need of storing bodies in a specific condition and place for the operation has appeared in the show. Similarly to *Avatar,* human minds transfer to the synthetic other specie's bodies, and it is crucial to keep the original body functioning for distant control. This concept leads to the aspect of virtual reality, where people could have another identity in other worlds.

2.6.3 b) Altered Conscience and Its Consequences

Summer War (Hosoda, 2009), *Sword Art Online (Ito, 2012)*, and *Ready Player One(Spielberg, 2018)* are the simulated global communities in digital worlds. This kind of virtual world is a new frontier of the 21st century. The *Summer War* shows the vision of how social media works in the 2010s. Communication, consumption and virtual decisions could build consequences in the real world. On the other hand, *Sword Art Online* and *Ready Player One* are the films depicted in the online community that require headgear for logging in. With this concept, the devices have similar properties to *Lawnmower Man (Leonard, 1992),* allowing users to move in the virtual space. In 2016, Oculus Rift launched the VR device sets *(Dingman, 2021),* which made humanity get closer to interacting with virtual reality from a goggle on eyes and gloves or gears on hands.

One of the stunning films, *Minority Report (Spielberg, 2002)*, projected the next future in 2054 in Washington, DC and Northern Virginia. A 'Precrime' organisation operates as a police force, policing social security to prevent crime before it occurs. Technology and architectural design have advanced dramatically in the year 2054 shown in this movie. The image depicts how technologies such as motion capture, holographic projection, multiple platforms of customised advertising, and surveillance security have altered people's perceptions of how they should live.

Individual identification information is inevitable since biological security methods obtain a name, age, residence, and location data. It is a centralised data gathering and monitoring against the fact that huge organisations may utilise to safeguard or destroy society. Some technologies described previously, such as special hand gloves or other devices to monitor motion for computer controlling, retina recognition, and tailored advertising, were already available in the late 2010s. *Her (Jonze, 2013)* also depicted changes in relationships in society when technologies become a significant part of people's lives.

Figure 45 Ready Player One (OASIS scene) (Spielberg, 2018)
Retrieved from https://cinemelodic.es/ready-player-one-2018-parte-2-4/

2.6.4 Sense of Humour in Sci-Fi Moving Pictures

The formality from extremely depressed toward the future has been changed. The comedic narrative and tone of the moving pictures created familiarity with the high-tech gadgets. Since the release of *Iron Man (Favreau, 2008),* the Marvel Universe has captured attention across the world. The storylines and sense of humour in those films, combined with social issues that affected many people, such as LGBTQ people and people of colour, helped this Universe gain much attention ever since. The theme of robots or cyborgs is also popular in science fiction. Throughout decades, the intensity of this subgenre's story in television series has been lighter (romantic comedy) rather than being seriously mentioned to the social problem. For example, *I'm Not a Robot (Dae-yoon, 2017),* a Korean drama series related to artificial intelligence, human-like robot, and the relationship between humans and robots. There is also the remake of the well-known dystopian films; *Osamu Tezuka's Metropolis (Rintaro, 2001)* and *Ghost in the Shell (Sanders, 2017).* These films have the same theme, concept, and message as the original copy. However, image-creation technology has advanced. The movie appeared more promising and exciting due to the high quality of architectural design and special effects.

2.6.5 Summary of the Decade Between the 2000s and 2010s

Between the 2000s and the 2010s, it became clearer that Asian countries such as China, Japan, and South Korea had more potential to be significant issues in films. Science fiction continues to be the most important among other mediums and evolving genres, reflecting current concerns such as climate change, technological advancement, and social issues. In society, the emergence of reality and virtual worlds has occurred. Although this virtual reality may not have the same properties as in films, current technology allows people to connect to the digital world using their phones and devices such as the *Oculus Rift*[2].

People now have more possibilities to immerse themselves in the simulation world. A simulation game, for example, is an altered universe in which people can create a new identity to live with a fictitious character. Architects and designers benefited from this technology, as they could use it as experiment equipment. The biometric identity also becomes part of people's lives by unlocking their phones with fingerprints and facial recognition. The beginning of the prior films illustrated how technology could shift people's behaviour and consumption.

Moreover, architecture in the city is getting taller and more prominent; hence it is difficult to see the ground or the sky. Transportation is spread vertically and horizontally, with roadways already implanted on the façades of buildings and automobiles magnetised. The show also addresses the morality of utilising technology for security by using a metaphor disguised as a discussion of human rights. These are some considerations that architects may need to know to design a new architecture that will retain and be present with evolving technology that will change people's behaviour and lifestyle.

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[2] A brand of VR goggle/eyewear by Meta (Facebook)

Category	Details
a) Period	The 2000s – 2010s
b) World's attention (continent)	America and Asia
c) World's attention (country)	The USA, Japan (Tokyo), Hong Kong SAR, South Korea
d) Major historical event(s)	- Variety of people cultures - Global climate change effects - Natural disasters around the world - Terrorist attacks
e) Art and architecture movement(s)	- Art movements: Minimalism, Modern, and Contemporary - Architecture: high-rise, compact residential area, mix-use typology, community malls, CAD architecture, BIM, and parametric designs.
f) Technological advancement(s)	- Social media platforms (e.g., YouTube and Facebook) - Smartphone - Streaming platforms for moving picture media
g) Result(s) in moving pictures	- The Sci-Fi genre has adapted to a broader interest from the audience - The futuristic design appears in both moving pictures and reality. - Expressed message 'the predicted future is happening now.'

Table 7 Summary of the period between the 2000s and 2010s

Lists of moving picture media in this section

1. ***Altered Carbon (TV series)***, 2018. Directed by KALOGRIDIS, L. United States.
2. ***Avatar***, 2009. Directed by CAMERON, J. United States.
3. ***Black Mirror***, 2011. Directed by BROOKER, C. United States.
4. ***Ghost in the Shell (2017 film)***, 2017. Directed by SANDERS, R. China
5. ***Her***, 2013. Directed by JONZE, S. United States.
6. ***I'm Not a Robot***, 2017. Directed by DAE-YOON, J. South Korea.
7. ***Iron Man***, 2008. Directed by FAVREAU, J. United States.
8. ***Minority Report***, 2002. Directed by SPIELBERG, S. United States.
9. ***Mortal Engine***, 2018. Directed by RIVERS, C. United States
10. ***Osamu Tezuka's Metropolis***, 2001. Directed by RINTARO. United States.
11. ***Pacific Rim***, 2013. Directed by TORO, G. D. United States.
12. ***Ready Player One***, 2018. Directed by SPIELBERG, S. United States.
13. ***Shanghai Fortress***, 2019. Directed by HUATAO, T. China.
14. ***Summer War***, 2009. Directed by HOSODA, M. Japan.
15. ***Sword Art Online***, 2012. Directed by Ito, T. Japan.
16. ***The Martian***, 2015. Directed by SCOTT, R. United States
17. ***Transcendence***, 2014. Directed by PFISTER, W. United States.
18. ***Tron: Legacy***, 2010. Directed by KOSINSKI, J. United States.
19. ***Total Recall***, 2012. Directed by WISEMAN, L. United States.

2.7 The Period Between 2020s and Present

2.7.1 Historical Review

The studies from the 1920s to 2020s reveal how the science fiction genre anticipates and hints at the future of human behaviour and anxieties, architectural changes, and technological adaptability. From novels to television series, humans have pushed the boundaries of imaginative visions to bring beliefs to reality shows with exaggerated storylines that have captivated audiences with the potential of the future. Many films forecasted how the *upcoming changes* might occur in 2019, 2020, and beyond.

Some of the predictions, such as video conferencing, cars, flying gadgets (drones and hoverboards), headset for virtual reality and other Internet of things (IoT) devices, are becoming commonplace in people's lives. Most people, for example, own a *smartphone*, which allows them to get closer to virtual reality (VR) and augmented reality (AR) by using apps like Instagram or Snapchat filters. Moreover, pollution and climate issues are becoming severe and affecting Earth more than before. Including environmental problems such as extreme climate changes, pollution, trashes, and microplastic issues. Consider the air pollution (PM 2.5) situated in many large cities, which has resulted in problems with people's health with respiratory and skin allergies issues as well as the changes of behaviour where people need to adapt with the equipment such as masks and air purifiers for access to the better quality of living. These events increase the societal problem of the poverty divide, in which those who can afford to revive devices continue to live in the same or better-living circumstances. In contrast, those who cannot afford it have to suffer from environmental changes.

2.7.2 Space Travel in Moving Pictures

Intergalactic travel is becoming more real than ever. People will purchase a ticket to visit space with an organisation like *SpaceX*, even though several milestones need to occur before this occurs. Furthermore, human ambitions to colonize other planets, such as Mars, are becoming more solid. Architects, engineers, technologists, and scientists define the appropriate space for the living situation while keeping healthy despite the many challenges (Kotecki, 2019, Cavendish, 2020). Science fictions are creative design tools that boost standard research and design methods. It sharpens concept production and removes constraints for discovering the future and technologies for familiarity to the public.

For example, *Space Sweeper (Jo, 2021)* is a South Korean space-age film available on Netflix. The story projects the year 2092, when Earth is covered in terrifying pollution, and people must find a new location for establishing a new green planet (super plant) on Mars. The show depicts the impact of technological progress, which could have brought humanity to civilization or annihilation. Unfortunately, people still living on Earth have low incomes, and if they want to work in space, they can only be sweepers or work in the black market. On the other hand, rich people can live and enjoy life in a new synthetic environment.

The film's visionary architectural design transported the audience to the predicted future to see how transportation, communication, habitation, consumption, and identification changed. Ordinary citizens can use the doughnut-shaped machine to travel from Earth to the stratosphere. The orbit system connects each place that floats along the planet's radius. However, there is space junk that can destroy or endanger those in orbit. Then, the society needs space sweepers to clean up the debris for ensuring reasons. Communication technology is still based on radio waves, but there is no longer a language barrier because everyone owns an instantly translated device.

2.7.3 Impacts of A.I. and Information Age

Social Dilemma (Orlowski, 2020) is a semi-documentary that combines a play with interviews to explain how social media works and how it may threaten human civilisation. The discussion in this Netflix program explained how the technology's purpose is to enhance people's lives. These platforms, such as Facebook, Google, Instagram, or Snapchat, use people's behaviour to promote brands and contact other people on screens. However, when it comes to commercial commercialisation, the manipulative concept of algorithms asks for more interactions and longer screen time to allow more people to *'see'* and *'click'* to generate massive data for monetizing.

In addition, the show illustrates how technological advancement is misinformed and misused. It may have resulted in catastrophic society either in a utopian and dystopian future. Due to the extreme way computers gather people, they will generate a collection of information. It seduces users to spend more time on screen by connecting with individuals who share the same thinking and social attitudes. As a result, many people will adopt that ideology, bringing forth divisions, civil war, and the devaluation of democracy.

Moreover, people born after 1996 (Gen Z) are more prone to technological advancements since humans always desire to be accepted in society. As a result, people were pushed to think, behave, and appear like most people in the same bubble, which resulted in mental illness and risking the loss of lives. This program also wraps up other Sci-Fi films, including The Truman Show, Terminator, and The Matrix, and how these films depict the past and future reacting to reality and the "danger from machines" (AI).

At the end of the documentary, they argue that humanity should be held accountable for societal changes that may harm Earth and society. In the same way, humans should stop mining the environment for a better future and instead create a

catastrophic end. Regulations and standards should be established for managing information and preventing society from collapsing due to manipulating information through computers upon human minds.

Miss Crow and Mister Lizard (Wu, 2021) is the final film in this chapter. Unlike the movies described above, this Chinese television series demonstrates how technology and architecture appear nowadays to regular people. In this show, technology is applied to save people's lives, monitor their health, and provide a more comfortable lifestyle, including automobiles, LED light projection, and holograms. He is an architect with a mechanical heart who aspires to leave a remarkable and noteworthy architectural legacy. However, he is not a brilliant millionaire who makes machines safeguard the planet like Tony Stark in the movie, *Ironman.* Instead, he employed augmented reality and three-dimensional projection to amaze female protagonists and customers most straightforwardly. Aside from the plot, this programme explains how one's life can adjust to the advancement of technology to live in the contemporary world.

2.7.4 Summary of the Decade Between the 2020s and present

Some forecasts have already been proven true, while the rest have the potential to become a reality for people shortly. It is an era of digital information where everything can be recorded as statistics and numbers. The complexity of producing pictures and virtuality reduces the requirement for equipment and space to portable devices such as cell phones, tablets, laptop computers, VR eyewears, and many more. The COVID-19 epidemic has caused humans to live in either dystopia or utopia scenes that emphasise many social problems within cities. The architectural design may substantially define and benefit society, and associated aspects such as economics, public health, and national security are examples.

People might have seen the regular use of holograms and personalized advertisements, like those in *Minority Report* and *Ghost in the Shell*. According to new technology and lifestyle, the forms and functions of architecture would change dramatically. Nonetheless, there may or may not be a future that people fear and do not want. People are still eager to see and create technological wonder to improve people's lives. These are concerns and hopes for a better world for today and future generations.

Category	Details
a) Period	The 2020s – present
b) World's attention (continent)	America and Asia
c) World's attention (country)	The USA, Japan (Tokyo), Hong Kong SAR, China, South Korea
d) Major historical event(s)	- Pandemic COVID-19
e) Art and architecture movement(s)	1. Art movements: contemporary 2. Architecture: high-rise, compact residential area, mix-use typology, community malls, CAD architecture, BIM, and parametric designs.
3. Technological advancement(s)	- Video conferencing is an essential tool. - Mapping projection
4. Result(s) in moving pictures	- Digitalised reality is the emergence of physical and virtual realities. - Many moving pictures are available on streaming platforms instead of theatres.

Table 8 Summary of the period between the 1980s and 1990s

Lists of moving picture media in this section

1. ***Miss Crow and Mister Lizard***, 2021. Directed by WU, Q. China.
2. ***SPACE SWEEPER***, 2021. Directed by JO, S.-H. South Korea.
3. ***The Social Dilemma***, 2020. Directed by ORLOWSKI, J. United States.

2.8 Summary of historical survey

From the 1920s through the 2020s, an analysis of a century of technical Sci-Fi moving picture media highlighted the media's relationship to other factors such as artistic movements, historical events, economics, and trends. These variables influence the notion of the *'future'* in different eras. People imagine their future lives filled with hopes and concerns. The utopian or dystopian genres cannot reflect either good or bad human satisfaction. However, it may depict civilization, economics, politics, and habitation as it varies between Earth, space, or virtual worlds. If technology advances with innovative ideas, there will be worries about the changes that could affect the world, both in film and real life.

CHAPTER 3:
RESONANCE BETWEEN MOVING PICTURES AND ARCHITECTURE

3.1 Introduction

Architecture in the actual world and architecture in moving pictures resonate between these two disciplines. Technological advancements and societal changes impact architectural and conceptual components, and interpretation and visualization can occur in realism and cinematic worlds. This chapter will focus on the influential architectural inclinations from moving pictures to architecture and another side from architecture to moving images.

The observation from moving images illustrates how they react and participate in the architecture of the cinematic world. The first tendency will examine human living conditions in six areas: transportation, habitation, communication, consumption, identification, and automation. At the same time, the second investigation will primarily focus on architectural practices' inclinations, particularly with formal development and technological aspects. The final DNA extractions (forms and technologies) of both architectural tendencies are discussed in the conclusion of the chapter three.

3.2 Architectural Influences in Moving Pictures Towards the Actual World

3.2.1 Definition of "Human Living Conditions."

According to the second chapter, the Sci-Fi visionary reflects the integration between architectural advancement and the evolution of human civilization. Human behaviour is subject to change throughout time, and the modifications take place in synchrony with the actual activities. The definition of *Human Living Conditions* is based on cinematic research.

This section will focus on how living conditions affect three distinct worlds in the film: Earth, Space, and Virtual Worlds. Although the story's direction, time, and location in each moving image vary, the similar patterns of living conditions is evolved with time. The architectural hypothesis instruments that utilized examination of the media include transportation, habitation, communication, consumption, automation, and identification. They are tools for explaining cityscape, technology, and social interactions as they appear on the screen. Consequently, it shapes the city as an alien yet familiar civilisation.

The six mentioned factors for media interpretation including two as architectural connections, another two as the human activities and the final two as technological evolutions. These connections interact with one another to build a society. The observable features will be explored in the various scenarios. Vehicles and commuting technology enable the population to travel around the city. The fundamental constraint for planning transportation is the physicality of the urban fabric. The town may expand vertically and horizontally, beneath or above ground. It also has an impact on the design of dwellings. Interior and exterior circulation will demonstrate the link between social status and quality of living inside the space.

Communication and consumption are activities that occur because of social interactions. Trading and exchanging maintain societal vitality, which resulted in the growth of urbanscape. The elaborate fantasy of communication is always represented in science fiction through high-tech types of equipment. Therefore, after humans reside in a community, the following consumption happens. Food and clothes are necessary for survival, and it provides energy and protects the body, respectively. These relations progress similarly to languages and architecture by communicating functionalities and programs via the outer skins of architecture.

The most significant technological development is involved in automation and identification in everyday life activities. The mechanic and autonomous features of the networking system enhance the convenience and minimize processing time. At the same time, it provides privacy and security for living in a digitalised world. However, worries about invasion of privacy have arisen due to the increasing use of the internet and digital gadgets. Digital development affects human behaviour and influences the construction as seen in forms, materials, and security systems to provide physical and emotional security in architecture.

In conclusion, the hypothetical tools investigate the visual possibilities in the evolution of architecture, interaction, and technology in moving picture media. Thus, the changing indicator affects people's interaction and the perception of society.

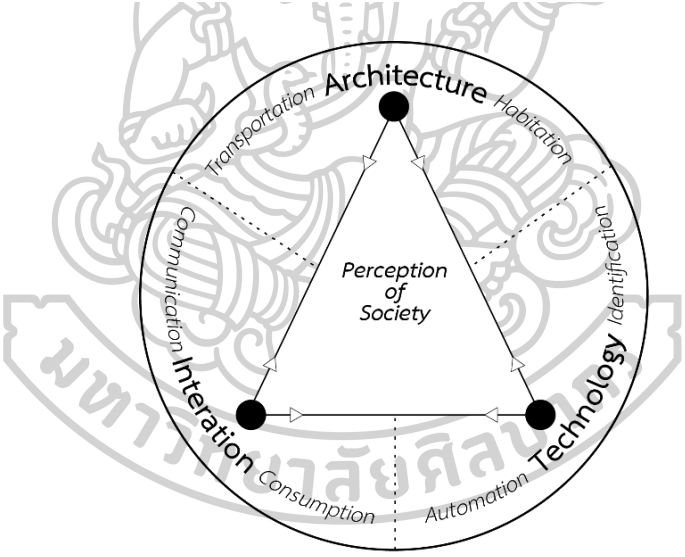

Figure 46 Relationship of the hypothesis tools and society's perception

In the figure above*, The Perception of Society* diagram is the hypothesis tool to investigate the relationship between the binary realms between architecture in moving pictures and the actual world. The three following aspects of architecture, interaction and technology are the essences of the exploration, which could compare and refer between disciplines: architecture, human's interaction and technology.

3.2.2 Discussed Samples

Moving Picture Media *(Year of Release)*	Transportation	Habitation	Communication	Consumption	Automation	Identification
1. Lang, F. (1927). ***Metropolis***	x	x	x		x	
2. Kubrick, S. (1968). ***2001: A Space Odyssey***		x				
3. Cameron, J. (1984). ***The Terminator***					x	
4. Leonard, B. (1992). ***The Lawnmower Man***					x	
5. Scott, T. (1998). ***Enemy of the State***					x	x
6. Columbus, C. (1999). ***Bicentennial Man***					x	
7. Wachowskis, T. (1999). ***The Matrix***			x	x	x	
8. Spielberg, S. (2002). ***Minority Report***	x	x			x	x
9. Favreau, J. (2008). ***Iron Man***					x	
10. Cameron, J. (2009). ***Avatar***					x	
11. Hosoda, M. (2009). ***Summer War***				x		
12. Kosinski, J. (2010). ***Tron: Legacy***	x					
13. Brooker, C. (2011). ***Black Mirror***				x		
14. Niccol, A. (2011) ***In Time***				x		
15. Ito, T. (2012). ***Sword Art Online***				x	x	
16. Pfister, W. (2014). ***Transcendence***					x	
17. Scott, R. (2015). ***The Martian***	x	x		x		
18. Stone, O. (2016). ***Snow Den***						x
19. Sanders, R. (2017). ***Ghost in the Shell***		x				
20. Kalogridis, L. (2018). ***Altered Carbon***		x	x		x	
21. Spielberg, S. (2018). ***Ready Player One***	x				x	
22. Orlowsky, J. (2020). ***Social Dilemma***						x
23. Jo, S.-h. (2021). ***Space Sweeper***	x		x	x		
24. Shankland, T. & Herbots, H. (2021). ***Serpent***						x
25. Wu, Q. (2021). ***Miss Crow and Mister Lizard***					x	

Table 9 Discussing Samples for Human Living Condition Analysis

3.2.3 Transportation in Various Forms

Transportation is an essential component of the Sci-Fi genre, showcasing technological advancement in the region's cityscape—vehicles and infrastructure. Commuting frequently indicates the living conditions of its surroundings. Environmental conditions and nodes of connections are diverse through regulations and limits of vehicle types. The study divides into three categories following the setting worlds: Earth, Space, and Virtual Reality. These three worlds collide and inspire one another. Earth is the most accessible location for understanding scientific possibilities. Natural constraints such as air pressure or gravity are also considered primary factors in designing transportation in space. On the other hand, virtual reality depicts the stimulation and fantastical forms of performance.

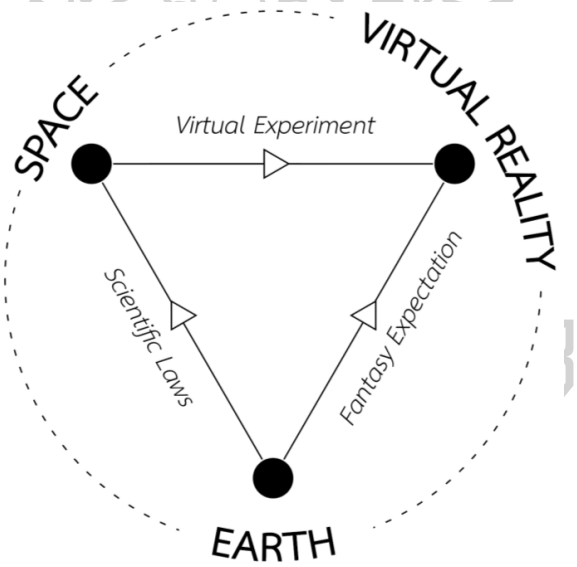

Figure 47 Connection of three worlds

The connections are tied to the physical and visual experiences shown in moving pictures in the three mentioned worlds. Earth projects scientific laws in physics by considering gravity and materiality in the space context while pushing the fantastical expectations via virtual reality. Moreover, some technology is limited by resources; thus, virtual reality is also an area for experiments for conceptual and innovative inventions.

3.2.3 a) Transportation on Earth

Modes of transportation reflect the condition of surrounding terrains and urbanscape movements. It is often based on recognized materials and constructions in the world. The four commuting modes of transportation are railways, roadways, waterways, and airways. In most cities worldwide, these forms of transportation are common for commuters in the twenty-first century. Humans have the most relevant memory and sensation regarding place during watching travelling scenes. Hence, filmmakers utilize these qualities and properties as a visual impact on the audience.

The exaggerated visual in transportation displayed the condition of the city in moving pictures. It also shapes the design of vehicles and driving methods, such as methods of driving manually or via auto-pilot. The driving technology also illustrates the idealistic of *'future cars'* at different times. For example, the car's wheels in *Metropolis (Lang, 1927)* were thinner than those in the film, *Minority Report (Spielberg, 2002).* Aside from the recognition from the wheels, the engine's vigour reflects the world's concerns for resources such as gas and fuel. With the rise of environmental problems, traditional fuels (coal and oil) are replaced with reusable energy resources. As a result, the roadway axials are not horizontally restricted on the ground but could be vertically upward upon the sky or upon the façade of a structure.

Mode of Transportation				
Types of Infrastructure	**Railways**	**Roadways**	**Waterways**	**Airways**
	Train	Road	River	Troposphere
	Tram	Highway	Sea	Stratosphere
	Sky Train	Tunnel	Deep Ocean	
	Underground	Bridge		
	Cable Cars			

Table 10 Mode of Transportation on Earth

Transportation Possibilities on Earth		
Mode of Transportation	**Vehicle**	**Situation**
Railways		
Train	Train	Migrant to the new place ■ Hope ■ New Journey ■ Escaping
Tram	Tram	Resurrecting the past
Sky Trains	Train (Electricity and magnets energy are often suggested in this mode)	City's vital
Underground		Secret agents blended with ordinary people.
Roadways		
Road	Car, Motorbike, Bus, etc.	City's vital, Bad traffic
Bridge		City's Vital, Chasing, Catastrophe
Highway (On roads and the upper floor of the building's tunnels)	High-Speed Vehicle (Cars and Motorbikes)	Chasing
Tunnel		Transition of place
Waterways		
River	Ships, Boats, Vessels	City's Vital
Sea		Catastrophe
Deep Ocean	Submarine	Exploring, discovering conspiracy
Airways		
Troposphere	Aeroplan	Migrant to the new place, Crime
Stratosphere	Balloons	Resurrecting the past, freedom

Table 11 Transportation Possibilities on Earth

The mode of transportation (Table 10) depicts the appearance of roadways that are frequently seen in real life and in moving pictures. On the ground, there are two kinds of transport: roadways (trains, trams, sky trains, undergrounds, and cable cars) and railways (e.g., roads, highways, tunnels, and bridges). The third form of transportation is waterways, including commuting by river, sea, and deep ocean. The various contexts need various types of vehicles to provide comfort and adequate travel circumstances. Finally, two atmospheric layers, the troposphere and stratosphere, allow humans to travel by aeroplanes and hot air balloons.

In the following table (Table 11), the transportating possibilities on Earth diagram depict the detailed explanation from the previous table with examples of vehicles and plausible situations in moving pictures. Due to the scene of transportation, often referred to as the contextual transition, the scene shows emotional and physical impacts on the audience. For example, in *Space Sweeper* (Jo, 2021), the male lead took an unusual aircraft from Earth to outer space as a migrant scene to a new place.

3.2.3 b) Transportation in Space

Travelling in space in moving image media may be visually classified into three types: space station, private spaceship, and military spaceship. The shapes and functions of space vehicles often refer to NASA and other space organizations from other nations, such as Russia, Japan, and China. The frequent trips in the space-age stories include launching from Earth, happening in the exosphere, and transporting other planets. Occasionally, spacecrafts serve as multipurpose vehicles: a military base and a floating residence (more detail on 3.4.2).

Referring to (NASA, Basics of Space Flight), Flyby, orbiter, atmospheric, lander, penetrator, rover, observatory, communication, and navigation spacecraft are the

eight types of spacecraft in real life. The mentioned spacecrafts all aim to discover and investigate in various settings. The design's formality of the vessels in films corresponds to the storyline while taking some elements from the real rovers. The storyline of moving pictures controls forms, functions, and materials to survive in specific conditions. For example, the purpose of the vehicles may vary in size and by distance from Earth.

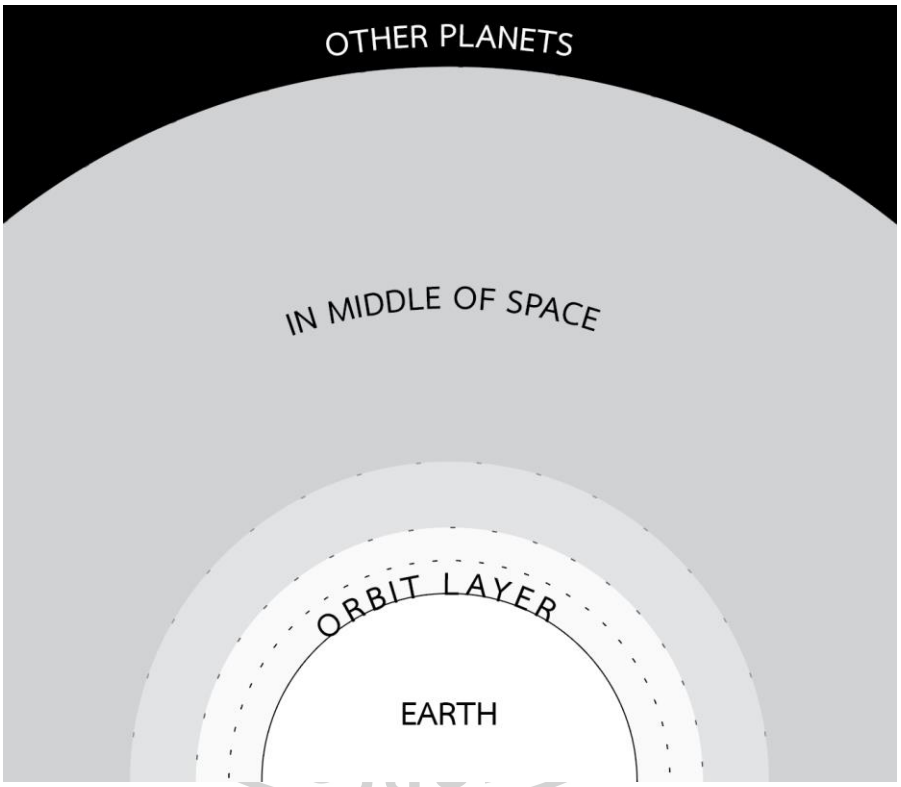

Figure 48 Diagram of Transportation in Space

Most space objects in the atmospheric layer (orbit layer) are satellites and the International Space Station (ISS). Furthermore, medium to giant spaceships travels to other planets in the middle of space outside Earth, as depicted in many distant future scenarios. The diagram *[Figure 48]* shows the relation and distance between the mentioned transportation layers in space.

Possibilities of Vehicles in Space			
Size	Small	Medium	Large
Speed	Fast	Normal	Slow
Population	1-2 people	3-8 people	≥ 10 people
Purpose	Military defending	Specific purposes (Often used as protagonist's vehicle)	Community or headquarter
Transported Method	Multiple Axials		
Energy Resources	■ Solar Panels ■ Electricity ■ Chemical Substances; Hydrogen, Nitrogen, Oxygen, etc. ■ Fuel		
Special Features	■ Armed with the laser gun	■ Rooms for other functions besides the pilot room.	■ Garage(s) for storing or parking other automobiles.

Table 12 Possibilities of Vehicles in Space

The possibilities of vehicles in space *[Table 12]* illustrate the typical spaceships in moving pictures such as *Space Sweeper (Jo, 2021)* and *Star Trek (Roddenberry, 1966)*. Vessels could be visualized by their size, speed, population, and materiality. Moreover, vehicles are often transported in multiple axials, not limited to horizontal and vertical directions.

3.2.3 c) Transportation in Virtual Reality

Transportation in virtual reality is also a platform for experimenting with and stimulating conceptual illustrations before transforming reality. In the virtual world, everything is conceivable. Since the early digital era in the 1970s, the concept of uploading human conscience or manipulating themselves into another existence continues in the Sci-Fi genre's subcategories.

The dimensions of transportation throughout these worlds are limitless. Roadways, like in *Tron: Legacy (Kosinski, 2010)* and *Ready Player One (Spielberg, 2018)*, are flexible and adjustable at sectional movement levels. Large spacecraft can transport large crowds or teleporters that allow people to travel from one location to another. In virtual reality, the physical laws that occur on Earth and in space are merged to fulfil the fantasy desire of living in a new interpretation of life.

Furthermore, other exaggerated abilities for avatars in the virtual world, such as flying or jumping with greater strength, are also possible on this platform. Transportation ideas are not restricted to movies but are widely employed in gamic scenarios such as *Fortnite by Epic Game,* where users move across the map with similar constraints. Some designs rely on recognizable concepts or practices from the physical world.

However, every movement in the simulated world is the product of external control from devices in the actual world. As a result, action in the virtual world co-occurs with activity in the real world, and *Oculus* is an example of a device for accessing virtual reality. The device requires players to move around and interact with the simulated environment. Moreover, players can also use computer screen-based controlling from the keyboard and create movements for their avatars. Hence, the virtual world is the most appropriate for creating and experiencing absolute *future* transportation performance.

Possibilities of Transportation in Virtual Space		
Activity in Real World	**Controlling Devices**	**Activity in Virtual Reality**
Use hand for control	**Hand Controller**	■ First-handed experience with hands movement. ■ Requires monitor, headgear, or goggle glass for visuals.
Wearing like a typical eyewear	**VR eyewear**	■ The integrated daily life between reality and artificial environment. ■ Predicted as an essential gadget after the smartphone. ■ An alternative way to experience the dimension of design without the actual construction.
Wearing full-body trackers ■ Require ample space for setting all devices.	**Entire Body**	■ First-handed experience with whole-body movement. ■ Benefit for medical or military purposes.
Sleep or sit in a pod. ■ The pod frequently connects many cables to the supercomputer for processing. ■ It often refers to nerve control or brain connectivity.	**Headgear**	■ Move freely in the virtual world. ■ Feel pains and touches that occurred in the simulated world. ■ Can be severely injured from inside and outside the virtual world.

Table 13 Possibilities of Transportation in Virtual Space

This table shows the possibilities of transportation in virtual space (Table 13). *Activity in the actual world* column identifies human behavioural actions against devices or types of equipment that allow individuals to interact with virtual space with the relevant *controlling devices*. As a result, the *activity in virtual reality* is varied through the differences in modalities.

3.2.3 d) Transportation in Altered Carbon (Kalogridis, 2018)

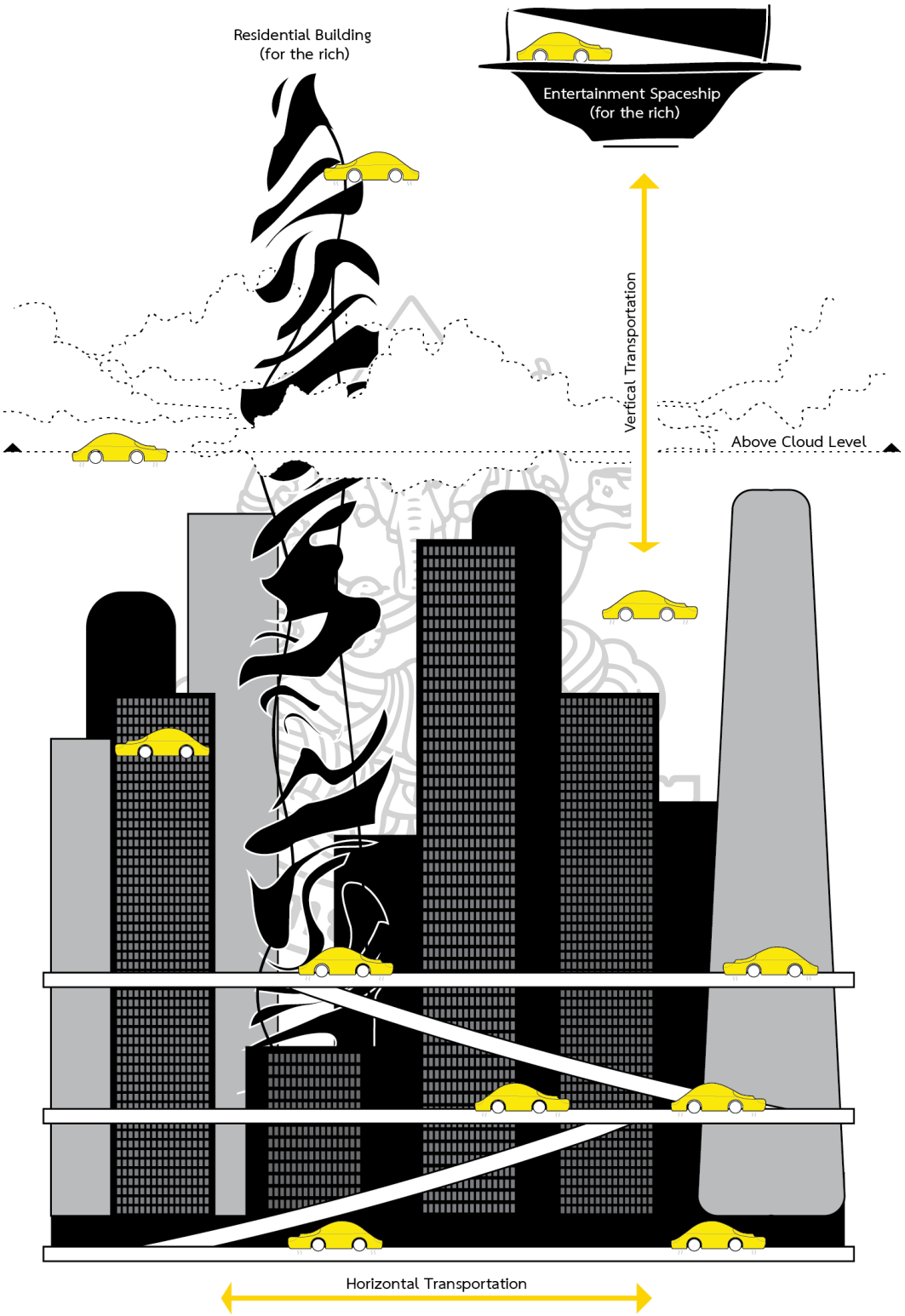

Figure 49 Relation *between Transportation and Architecture in Altered Carbon*

Altered Carbon (Kalogridis, 2018) depicted transportation in all three mentioned settings from Earth, Space, and Virtual Reality. The technology in the transport of this drama series includes all patterns of commuting from horizontal on roads, vertical on the sky and connecting to virtual space.

The diagram above (Figure 50) represents the relationship between transportation and architecture in *Altered Carbon (Kalogridis, 2018).* The yellow colour means how vehicles drive in the city, and infrastructures and cars are designed to correspond to the architectural designs of the city. Vehicular wheels could be both wheeling for horizontal riding direction and fuel tanks for commuting vertically.

The metropolis in *Altered Carbon* is more complicated and chaotic than the city in *Metropolis (Lang, 1927).* High-rises are constructed next to one another. Due to the extreme density of building placements, everything appears bulky and tangled. The highly elevated residential area is high above the cloud and can only be afforded by the wealthy. There is also a floating spacecraft for exclusive entertainment. Due to various typologies and locations, vehicles must travel vertically and horizontally. As mentioned in this chapter, the technology utilized to develop infrastructures is called transportation on Earth and space (3.2.3 Transportation in Various Forms).

The scenario in the show includes virtual and augmented reality which might occur in the distant future. The *goggle eyewear*[3] and hand controllers are the controlling instruments to engage visualisation and movement. The protagonist employs simpler technologies such as the innovative contact lens and the wrist controller to interact with various incidents happening with altered reality.

[3] Goggle eyewear and VR Goggle are the same meaning in this paper.

3.2.4 Habitation

The typology in moving pictures mostly corresponds to *"habitation."* It depicts movements from the inside out with human activities and functional spaces. The residential areas have expressed the interior space by architectural functions. It is not limited to buildings in the city but includes multipurpose vehicles.

The architectural quality silently demonstrates the living condition and their existential period. The comparison between low-rise and high-rise buildings is often used as a metaphor for societal issues, especially social status inequality, wealth and living quality. The design is evolved simultaneously with technology curated for a convenient life. The progressions of architectural sizing, functions and aesthetics are varied over time, as does the environment in the storylines. The location could be on Earth or in Space, and however, it all serves to support activities that connect individuals to society.

Generally, skyscrapers represent the materialistic and capitalistic personas of a metropolis. As shown in *Metropolis (Lang, 1927), Minority Report (Spielberg, 2002), Ghost in the Shell (Sanders, 2017),* and *Altered Carbon (Kalogridis, 2018),* high rises represent the city's vital and perception of the future with visualisation from the growth of technology in architecture and human's lifestyle. Although the exterior architecture in these films depicts spectacular representations of the city, the interiors remain like primary activities in a home, such as cooking, cleaning, and relaxing.

For example, *Metropolis, Altered Carbon, and Space Sweeper* demonstrate a similar concept of societal control over urbanistic design. The poor and the working people live in the lower segment of the city, while the rich and the rulers live in the upper levels. Furthermore, as represented by ascending toward the hierarchical pyramid, the person with the most significant position in society frequently resides at the highest point in the city.

Generally, the film is often designed to symbolise the most prestigious place. As heaven where everything is prosperous and pleasant on top of the city. On the contrary, the lower parts of the town are troubled with dangers and rotten areas of inhabitation. The expanding methods of a city could be new construction on top of existing structures or utterly new architecture instead of abandoning the community. It also influenced the altered axials of commuting in transportation, as it must adapt to move vertically on the façade or have hovering vehicles to fly to other locations. The exits are not limited to the ground floor exits. As a result, the city evolved into a multi-level town where transportation is not limited only to the ground.

In the space-age genre, spacecraft is developed into multi-functional vessels in space. They evolve into a moving city with only the most essential activities for human survival, such as sleeping and working. Futuristic style with shiny and reflective materials is often portrayed through the design constructs of large corporate organisations, such as a high-tech company in *Iron Man (Favreau, 2008)* and a space-related organisation in *Gattaca (Niccol, 1997)*. It represents a well-managed and high societal position in the moving picture. On the contrary, the future of chaos, disordered and malfunctioning culture is generally depicted in dirty and messy areas with the potential for illegal activities, as portrayed in *Altered Carbon (Kalogridis, 2018)* and *Space Sweeper (Jo, 2021).*

2001: A Space Odyssey (Kubrick, 1968) and *The Martian (Scott, 2015)* are examples of differences between the realistic and predictive future scenarios in space travelling. In *A Space Odyssey*, the architectural design and its living condition in the gravity-free environment are illustrated in the film and similarly appeared to the International Space Station (NASA, 2014). However, the room sizes are very condensed and have unappealing aesthetics for living. On the contrary, *The Martian* gave the audience a glimpse of a more comfortable interior design for space travelling. The materials are modern, and the physical size of the interiors appears to be larger vertically and horizontally. The spacecraft's actual design for Mars is similar to the collaboration projects from SpaceX and NASA.

3.2.4 a) Hierarchy of Societal Space

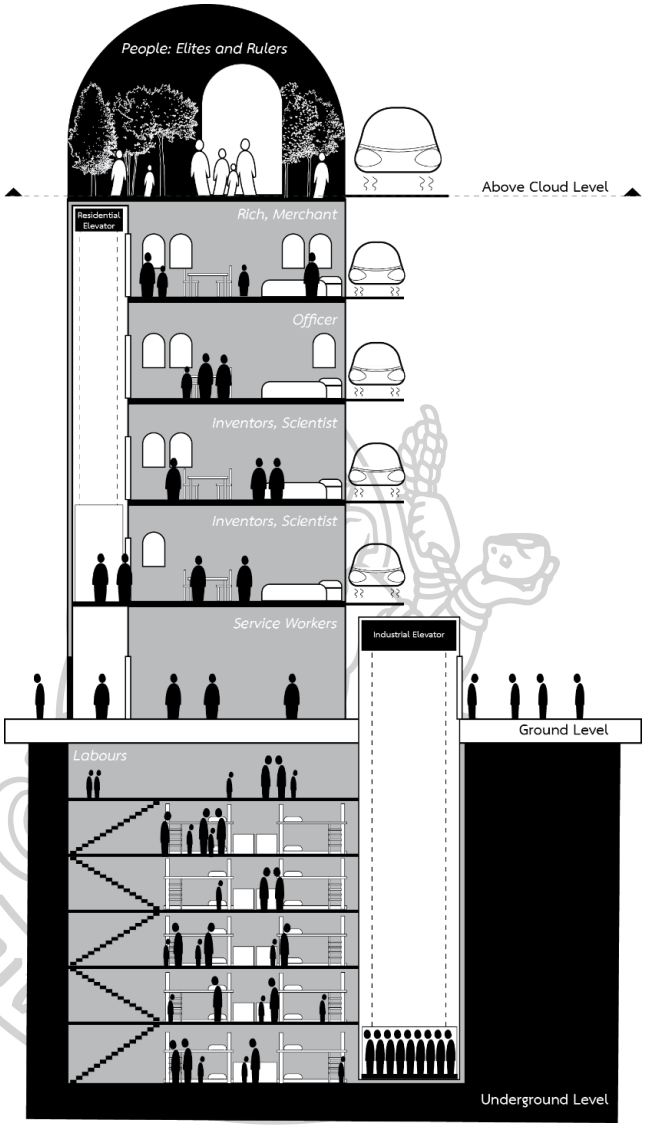

Figure 50 Hierarchy of Societal Space

The diagram *[figure 50]* simplifies the social order in the high-rise urbanscape. In dystopian films such as *Altered Carbon (Kalogridis, 2018)* and *Metropolis (Lang, 1927),* social hierarchy is often represented through the floor level in residential areas. The various degrees of habitation symbolize the societal position of the owner well as the quality of life. Convenient lifestyles are in descending order from the top floors to the underground, implying individual struggles in capitalism.

1. Above Cloud Level

Trees have become luxury items since the ground level is filled with skyscrapers instead of greenery. The parking space is accommodated for flying vehicles. At the above cloud level, buildings and facilities are intended to provide residents with a comfortable and carefree environment. They are occupied by elites, wealthy corporations, and governors who economically and politically mandate the city. The extreme futuristic aesthetics in this level apply the overall creativity and artistic surrounding.

2. Above Ground Level

As aforementioned about the symbolic relation between social hierarchy and residential height, this level reflects the middle-class people who work in organizations in society. Residents may be officers, inventors, scientists, or workers in the service industry. Architectural designs generally rely on functional purpose and aesthetics in creation, and they often are affordable mass-production objects rather than being personalised or unique.

3. Underground Level

The poor who cannot afford a capitalist way of life is situated at the bottommost of society. These people are treated like machines, and they work for a living and only stay in the house to rest. In the architectural aspect of the residential area, the aesthetics are considered extravagant, and only functional products are occupied. Material adaptation for construction could also be seen in the residents' informal habitation, which distort the original purpose of objects to use as something else such as billboards as walls.

3.2.4 b) Prominent Habitat Function

Setting	Moving-Picture Media	Artistic Movements	Architectural Aesthetics	Architectural Elements
Earth	Metropolis (Lang, 1927)	German Expressionism	▪ The solid and heavy design	▪ The division between social classes.
	Minority Report (Spielberg, 2002)	Modern	▪ (Protagonist's house) Light construction with glass and steel.	▪ Emerged programs with digital gadgets.
Space	2001: Space Odyssey (Kubrick, 1968)	Futuristic	▪ Sense of realistic materials for spaceships	▪ The rotating rooms are designed for gravity-free activities to keep the body functioning.
	The Martian (Scott, 2015)	Contemporary	▪ Larger room horizontally and vertically	▪ Systems and activities are intended for people to survive in different environments.
Virtual World	Tron: Legacy (Kosinski, 2010)	Futuristic, Cyber-age	▪ Horizontal Plan ▪ Materials: Silver, White and Neon colors	▪ Functional spaces are highly integrated with computer codes.

Table 14 Prominent Habitat Function

Table 14 shows the relationships between architectural aesthetics, elements, and artistic movement through the different settings with examples from moving pictures. It shows how futuristic movies could be in the three background contexts. Artistic movements indicate the published period of a particular film and reveal a historical period occurring within. Moreover, the movements depict from the architectural aesthetics expressed through materials and lighting. The architectural elements refer to the outstanding features that appeared on the screen. The prominent feature could be conceptual practices that emphasize the message about social classes and technology.

3.2.5 Communication

Cities forms society. Communication is a tool for building society, and sending and receiving messages can be done verbally and nonverbally (Nordquist, 2019). Thus, communication is not limited between people, but architecture can also communicate through design. Technological advancement is a vital variant for expanding the boundary of communication.

Humans develop languages to communicate with people in the shared community, from scratches on rocks and drawing on caves. It is a tool for generating conversation and chronicles. The conversation often starts with two people before transforming into multiple people. Types of interaction are varied from casual to public talks. It requires different methods to convey the message to the audience. As a result, humans have been attempting to invent a convenient communication channel when they cannot speak face-to-face.

Mail, telephone, telegram, radio transmission, television broadcast, and the internet are all methods for overcoming distance. The communication pattern evolves from individual to mass communication based on the earlier orders. The first three methods require at least two participants to simultaneously act as sender and receiver. Radio transmission and television broadcast, on the other hand, are technologies that enable people to consume designed content from organizations to the audience. Nevertheless, with the widespread adoption of the internet system, communication is no longer limited to human-to-human and human-to-machine or artificial intelligence systems.

Communication scenes in the Sci-Fi genre are best conveyed through agents, especially in military organizations in the moving picture. The audience could see the operating rooms and ground officers monitoring events outside with high-tech devices. However, the situation may change over time and place, but the factors relating to technology and communication have remained and evolved.

3.2.5 a) Type of Communication in Sci-Fi Genre

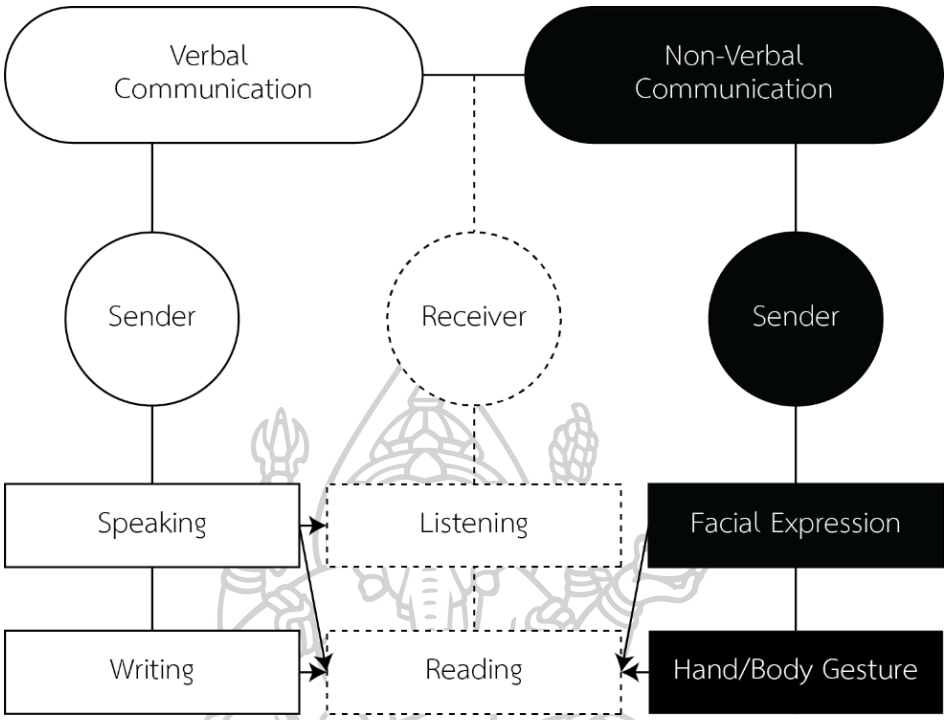

Figure 51 Type of Communication in Sci-Fi Genre

The diagram above demonstrates how the receiver could perceive communication from the different types of communication and senders. Communication, both verbal and nonverbal, requires a sender and a receiver for conducting conversations. Senders might communicate in various ways, including speaking, writing, facial expressions, and hand or body gestures. Reading is the most passive ability that may be grasped, whereas listening requires additional elements, such as individual abilities and surrounding conditions.

In the Sci-Fi genre, the roles in conversation frequently involve people in the degree of formality in communication and interaction with artificial intelligence. The contact of individuals in diverse situations might result in various means of communication. As a result, it also depicts the conditions and connections between the sender and the receiver.

3.2.5 b) Relationship Between Quantity and Level of Communication

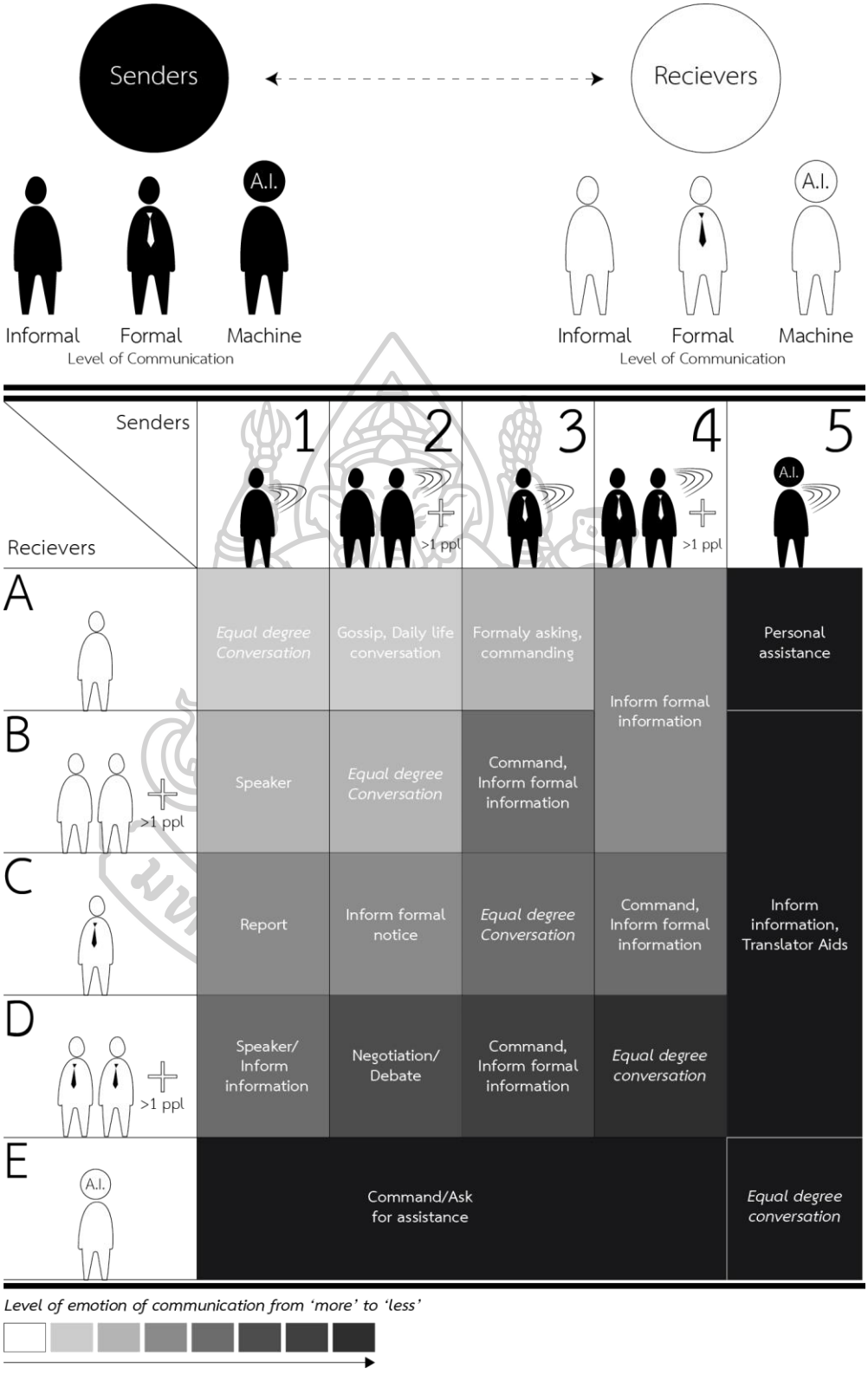

Figure 52 Relationship Between Quantity and Level of Communication

The relationship between quantity and level of communication diagram illustrates the interaction between senders and receivers, categorised in the level of engaged emotion in their matrix matches. Informal level means the conversation that could happen in daily life, and it does not need to show respect or etiquette to another person. The formal level is about commanding and respecting which, at minimum, one of the participants in a conversation is superior. Lastly, the conversation with a machine or artificial intelligence has minor emotional engagement during the interaction as it appears in the matrix's darkest colour.

The relationship in this matrix diagram demonstrates the scenario that could be applied by mail, telephone, television, radio, internet, video call, instant messaging, holograms, intellectual assistance, instant-languages translator and security devices in the following section.

3.2.5 c) Devices for Communication

Device	Type of Communication	Relationship in 3.5.2	Advantage	Disadvantage
Mail	**Type:** ▪ Verbal **Sender:** ▪ Writing **Receiver:** ▪ Reading	1A, 1B, 1C, 1D 2A, 2B, 2C, 2D 3A, 3B, 3C, 3D 4A, 4B, 4C, 4D 5A, 5B, 5C, 5D	▪ The simplest way to communicate with others from far distant. ▪ A hearing or speaking impaired person could use this method for communication.	▪ Rely on third-party to deliver mails. ▪ Fragile mails might be damaged from delivering process. ▪ The sender and receiver must know the written language.
Telephone	**Type:** ▪ Verbal **Sender:** ▪ Speaking **Receiver:** ▪ Listening	1A, 1C 3A, 3C 5A, 5C	▪ The fastest way to connect with the other person. ▪ A visually impaired person could use this method for communication.	▪ Rely on the telephone provider’s network. ▪ The service area is limited.

Table 15 Devices for Communication (1/5)

Device	Type of Communication	Relationship in 3.5.2	Advantage	Disadvantage
Television	**Type:** ■ Verbal ■ Nonverbal **Sender:** ■ Speaking ■ Writing ■ Facial Expression ■ Hand/Body Gestures **Receiver:** ■ Listening ■ Reading	3A, 3B, 3C, 3D 4A, 4B, 4C, 4D	■ The best way to promote propaganda. ■ Besides communication, television can use for entertainment and advertising. ■	■ One-side communication; only senders can design the programs for broadcasts. ■ Need electronics and signals. ■
Radio Transmission	**Type:** Verbal **Sender:** Speaking ■ **Receiver:** Listening	3A, 3B, 3C, 3D 4A, 4B, 4C, 4D	■ Be used in difficult times, such as in the army or space. ■ Radio can use for communication, ■ entertainment and advertising.	■ The boundary of the signal is limited. ■ People in urban areas trends to use other forms of communication.
Internet	**Type:** ■ Verbal ■ Nonverbal **Sender:** ■ Speaking ■ Writing ■ Facial Expression ■ Hand/Body Gestures **Receiver:** ■ Listening ■ Reading	1A, 1B, 1C, 1D, 1E 2A, 2B, 2C, 2D, 2E 3A, 3B, 3C, 3D, 3E 4A, 4B, 4C, 4D, 4E 5A, 5B, 5C, 5D, 5E	■ Everyone can be both sender and receiver at the same time. ■ Saver and faster communication method when compared to mails and telephones. ■ Create a new form of society.	■ Hackers and the government can find the digital traces in the system. ■ Requires more devices for set-up internet system. ■ Easy to create a fake identity for using the internet. ■

Table 15 Devices for Communication (2/5)

Device	Type of Communication	Relationship in 3.5.2	Advantage	Disadvantage
Video Call	**Type:** ■ Verbal ■ Nonverbal **Sender:** ■ Speaking ■ Writing ■ Facial Expression ■ Hand/Body Gestures **Receiver:** ■ Listening ■ Reading **Type:** ■ Verbal ■ Nonverbal **Sender:** ■ Speaking ■ Writing ■ Facial Expression ■ Hand/Body Gestures **Receiver:** ■ Listening ■ Reading	1A, 1B, 1C, 1D 2A, 2B, 2C, 2D 3A, 3B, 3C, 3D 4A, 4B, 4C, 4D 5A, 5B, 5C, 5D	■ The receiver and sender can communicate with audio and visuals. ■ Reduces obstacles of distance. ■ Realtime conversation.	■ The quality of devices and the internet can affect the quality of communication. ■
Instant Message	**Type:** Verbal **Sender:** Speaking ■ **Receiver:** Listening	1A, 1B, 1C, 1D 2A, 2B, 2C, 2D 3A, 3B, 3C, 3D 4A, 4B, 4C, 4D 5A, 5B, 5C, 5D	■ Reduces obstacles of distance. ■ Realtime conversation.	■ Fast-paced communication can generate a high chance of misunderstanding information.

Table 15 Devices for Communication (3/5)

Device	Type of Communication	Relationship in 3.5.2	Advantage	Disadvantage
Holograms	**Type:** ■ Verbal ■ Nonverbal **Sender:** ■ Speaking ■ Writing ■ Facial Expression ■ Hand/Body Gestures **Receiver:** ■ Listening ■ Reading	1A, 1B, 1C, 1D 2A, 2B, 2C, 2D 3A, 3B, 3C, 3D 4A, 4B, 4C, 4D 5A, 5B, 5C, 5D 1E, 2E, 3E, 4E, 5E	■ Method for simulated objects, persons, or environments in three dimensions. ■ Besides communication, holograms can use for entertainment and advertising. ■ An essential element in the cyberpunk genre.	■ Not publicly used in households. ■ Requires higher expense for devices and settings. ■ It is not suitable for use in daylight. ■
Intellectual Assistance (e.g., Siri and Alexa)	**Type:** ■ Verbal ■ Nonverbal **Sender:** ■ Speaking ■ Writing ■ Facial Expression ■ Hand/Body Gestures **Receiver:** ■ Listening ■ Reading	1E, 2E, 3E, 4E	■ Personalised assistance based on collective data from users. ■ Instant help for managing lifestyle.	■ Emotionless ■ Limited answers based on data existed in the system or on the internet. ■ Some complicated commands still need humans to manage.

Table 15 Devices for Communication (4/5)

Device	Type of Communication	Relationship in 3.5.2	Advantage	Disadvantage
Instant-Languages Translators	**Type:** ■ Verbal ■ Nonverbal **Sender:** ■ Speaking ■ Writing ■ Facial Expression ■ Hand/Body Gestures	1E, 2E, 3E, 4E	■ Language is no longer a communication's barrier. ■ Easy to negotiate for business or learning with foreigners.	■ Need to always wear the device for using the translator. (Based on *Space Sweeper (Jo, 2021)*)
Security Devices	**Receiver:** ■ Listening ■ Reading	1E, 2E, 3E, 4E, 5E	■ The use of biometrics as identification for ownership or an authorized individual. ■ The communication in this section often occurs between humans and machines.	■ Some processes are machine-to-machine communication. As a result, only those who understand how it works can repair it when it malfunctions.

Table 15 Devices for Communication (5/5)[4]

[4] Table 15 demonstrates the possibilities of communication devices by referring back to the relationship in communication stated in Figure 53. The advantage and disadvantages of each device indicate how people interact and frame the idea of following activities, which could be tools for designers and architects to design spaces.

3.2.5 d) Architectural Languages

Architecture has languages to communicate with people. The visuals appear as devices for revealing times and typologies with the audience and characters in the story. The sending message through constructed programs, materials, colours, light and people's interaction. The receivers will instantly comprehend and interpret the message depending on their experiences and collective memories.

Samples of Architectural Languages and Movements in Sci-Fi Genre

Time \ Situation	Absolute City (Utopia)	Abandoned City (Apocalypse)	Digitalised City (Utopia & Dystopia)
1. Past (before 2021)	Hellenistic Brutalism	Hellenistic Regency / Victorian	Retro-Futurism
2. Present (2021-2022)	Brutalism	Modernism Contemporary	
3. Future (after 2022)	Space-age		Neo-Futurism

Table 16 Samples of Architectural Languages and Movements in Sci-Fi Genre

Time and situation indicate the background setting in a moving picture. This study was investigated between 2021 and 2022, which is *present* in the above table. Idealistic of past and future periods could be ten years or more from the present time. The three situations refer to the condition of a city that could be designed and organised as a utopia society, abandoned as the apocalypse era and mixed between utopia and dystopia in a digitalised city.

3.2.5 d.1) Absolute City (Utopia)

Figure 53 Metropolis (Lang, 1927)

Retrieved from https://www.archdaily.com/237385/films-architecture-metropolis

The *absolute city* or *utopia* defines the scenario where everything is well-organized. This category's architectural design is commonly emotionless, often expressed from the materials like concrete, stone and steel. The dominant features include perfectionism, heaviness, symmetrical and repetition in the architectural design, leading to social order. It demonstrates the power of the metropolis in moulding people to conform to social orders. An example of this category is *Metropolis (Lang, 1927).*

3.2.5 d.2) Abandoned City (Apocalypse)

Figure 54 Space Sweeper (Jo, 2021)

Retrieved from https://mythcreants.com/blog/space-sweepers-shows-us-what-excellent-messaging-is/

Figure 55 The Matrix (Wachowskis, 1999)

Retrieved from https://joelwilliams825.wordpress.com/2014/12/19/the-matrix-plotstory/

The *abandoned city* represents a fallen civilisation overrun by the corrupted society where people no longer reside. It also represents the troubled times for humanity. The city has frequently been degrading, attacking, polluting, and encroaching. The urbanscape appears unmanaged, where buildings and places are covered with dust and plants.

3.2.5 d.3) Digitalised City (Mixed of Utopia and Dystopia)

Figure 56 Space Sweeper (Jo, 2021)

Retrieved from https://ideadelirium.com/movie-review-space-sweepers-2021/

Figure 57 Altered Carbon (Kalogridis, 2018)

Retrieved from https://screenrant.com/reasons-altered-carbon-the-100-best-Sci-Fi-show-netflix/

The qualities of the *absolute city* and the *abandoned city* may be incorporated as a foundation for *digitalised city's* expansion. The digitalised setting repeatedly occurs in the cyberpunk genre as a metropolis, and the surroundings are designed to stack technological development on top of the previous civilization. It often refers to the fast-paced city where everything is accelerated with technology. The visualised elements that often appear in the city are LED colours, holograms, and other kinds of advanced technology.

3.2.6 Consumption

The concept of trade in society is widely depicted in the media of moving image media, and some scenarios continue to use money in the same way as it is. Trading could happen in various ways, including time and other valuable resources. Currencies, food, health, and clothing trade account for most essential commodities.

3.2.6 a) Economic Exchanging

Trading has been one of the most convenient ways for humans to make a living since prehistoric times. People can swap their chickens for rice or other items if it is on an agreement. The exchanged currency could be anything from time, merits, or objects in the Sci-Fi genre. The indicator of money pattern has relied on the conditions of society and surroundings.

For example, the central currency in the simulated online communities in *Summer War (Hosoda, 2009)*, *Sword Art Online (Ito, 2012)* and *Ready Player One (Spielberg, 2018)* is another currency that is different from the one used and approved by governments. Since this community attracts people worldwide, there has always been a centralized system to obtain reasonably priced money. Although the currency cannot be utilised outside the virtual world, people can exchange their cash for a specific currency. Cryptocurrency represents the mentioned system, and people buy coins for spending or interacting with a particular service or activity, such as collecting assets.

However, for dystopian societies, other forms of money can be tangible or intangible, and they can be valuable objects or hypothetical currency. For example, *In Time (Niccol, 2011)* uses people's lifespan as a medium for exchange. The more they pay, the lesser time they have to live. As well as in the *Black Mirror (Brooker, 2011)* used *Merits* as currency. These are methods in economic exchange that shape society and control the behaviours of citizens.

3.2.6 b) Food

The Sci-Fi genre typically depicts how people in society handle hunger and illness and eating sustains the body and develops a sense of community. The sub-categories of science fiction reflect the quality and quantity of a consumption pattern. Despite this, the precarious position and scarcity of resources force humanity into the habit of consuming for survival.

The Matrix (Wachowskis, 1999) indicates how the food tasted depressing and appeared unpleasant, but they must consume it for health maintenance. The harvesting area has been terminated because of the story's environmental predicament. As well as in *the Space Sweeper (Jo, 2021)*, planting on Earth was impossible and relied solely on synthetic plants from laboratories in the new artificial environment. Moreover, it often implies that comparing oneself to impoverished others, fortune others or others with opposite social statuses are frequently highlighted on the screen.

The video *How It Works: The International Space Station* (TUBE, 2015) explains how NASA and other astronauts reside inside the station. In the actuality of space, food is scarce and limited in space-age films portrayed in films such as *The Martian (Scott, 2015)* and *Space Sweeper (Jo, 2021)*. The astronaut can use a pre-heat mechanism before eating the instant food pre-made from Earth. *The Martian* showed how possible planting could occur under restricted circumstances on Mars, and the regulated environment allows the harvesting process to succeed.

Setting	Food	Effects
Earth (Cyberpunk)	■ Synthesis nutrients	■ Health maintaining ■ Stop starvation
Space	■ Pre-heated instant food pack ■ Synthesis of foods and environment	
Virtual World (Cyberspace)	■ Potions, Foods, etc.	■ It is enhancing some abilities in that world.

Table 17 Sample of Food in Sci-Fi Genre

3.2.6 c) Clothing

A repetition set of patterns in the motion pictures depends on the story's theme and time. It silently introduces the character to the audience without words. The costume is the wearable indicator that tells the individual's setting, time, and role in society, as examples in the table below.

Theme	Motion Picture Media	Role	Clothing Characteristic
Digital World World's Setting	**Bicentennial Man** (1999)	**Protagonist** Robot	▪ Bold metallic panoply. ▪ Contemporary costume of 1999
	Iron Man (2008)	**Protagonist** Millionaire, Engineering Genius	▪ Metallic battle armour ▪ Contemporary costume of 2008 ▪ Businessman ▪ Soldiers/Police ▪ Secretary
Digital Age Cyberpunk	**Ghost in the Shell** (2017)	**Protagonist**	▪ Invisible ability ▪ Skintight metallic bodysuit ▪ Mixing styles between Western and Japanese
	Altered Carbon (2018)	**Rich (Meth)**	▪ Anachronistic luxurious style ▪ Flowy, ivory, gold, and silver ▪ Occasionally naked
		Poor	- Dark shades cloths - Jacket, craft, and hat - Cheap and old texture
Virtual Reality Cyberspace	**The Matrix** (1999)	**Antagonist**	▪ Black suits ▪ Leather shoes ▪ Sunglasses ▪ Communication gadget on ears
	Ready Player One (2018)	**Protagonist**	▪ Long sleeve t-shirt, jacket (denim/blue-grey tone) ▪ Device sets for access virtual world (headset and glove)
Space Age Dystopia	**Space Sweeper** (2021)	**Protagonist**	▪ Long sleeve t-shirt, jacket (dark shade) ▪ Old and dirty

Table 18 Sample of Characteristic of Clothing

Architectural Consumption

Consumption has a similar purpose and meaning in architecture and in humans. Food and clothing help humans maintain their health and protect their bodies while expressing their own personalities. In architecture, energy and the building's façade function, the same way food and clothing do.

1. Energy

Building consumption varies according to the size and features of the community. While food provides energy for humans, buildings employ fuels, wind, water, sunlight, and electricity to create power on the inside. The size of the population would indicate how much energy is required for the building to function.

Setting	Energy Providers	Effects
Earth	■ Reusable energy; winds, water, and solar ■ Fuels ■ Electricity	■ Function all the programs
Space	■ Solar ■ Electricity	
Virtual World	■ Electricity	■ Enable user to get into virtual reality ■ Provides server for running the simulation

Table 19 Sample of Architectural Energy in Sci-Fi Genre

2. **Skin**

Building skins or façades convey programs or functions on the inside. They communicate their languages and histories in the same way that clothes do on the human body. Aside from aesthetics, the skin or fabric of the structure may provide ventilation and aid in energy usage. Furthermore, it indicates how people travel from one place to another both within and outside the architecture.

3.2.7 Automation

Since 1927, *Metropolis (Lang, 1927)* has brought automation to science fiction pictures. It was the time of the industrial revolution's rise when machines began to take the place of humans in manufacturing. The fears and concerns of unknowing technology and imagination inspire people to question its future possibilities, bringing either fortune or disaster upon humans.

As previously mentioned, machines assist people in the industrial production of many products. The action of capitalism is frequently incorporated in dystopian scenarios. Machines can induce changes in society, resulting in new typologies and facilities such as industries and roadways. This machine is the beginning point for the entire tale of automation.

Following the creation of the machine, the new possibility of computerization has been explored to define its limit. The concept of human living conditions has been completely modified. Gadgets and devices provide owners with entertainment and convenience. It is claimed to make people's lives more manageable for them to live autonomously. It also raises the issue of the security and privacy of using these devices as it appeared in *Minority Report (Spielberg, 2002)* and *Enemy of States (Scott, 1998).*

Artificial intelligence is frequently mentioned when a film's setting is set in the future. The created physical appearance utilizes mechanisms and materials that attempt to mimic people. The computer brain links to massive data—the learning ability access endless acknowledgement to respond to human commands. The developer could improve mistakes and errors and reinforce the premise of the human-like robot with the combination of machine and computer. As a result, the idea of cyberpunk, cyberspace, and the digital future is made in many films to project digital life.

Automation in Architecture

The machine is a critical component of the building revolution. Since the industrial revolution, automation has changed the concept of building away from natural shelters and vernacular houses. Mass manufacturing promotes internationalism by allowing identical goods from distant nations to be found anywhere globally. However, the architectural industry has evolved regarding automation in architecture in the twenty-first century.

3D printing and computer numerical control (CNC) equipment are critical breakthroughs for broadening the design spectrum. The computer-aided design (CAD) allows for the creation of new shapes, functionalities, and materials. Designers enable unlimited stimulation and experimentation with computer software projects. This technology could help people save time on construction projects that involve rebuilding houses after natural catastrophes or creating colonies on Mars. Furthermore, materials for house printing may be accessible with on-site resources or spacecraft components to construct a feasible habitat in the harsh territory (Tangermann, 2018, Blahut, 2015).

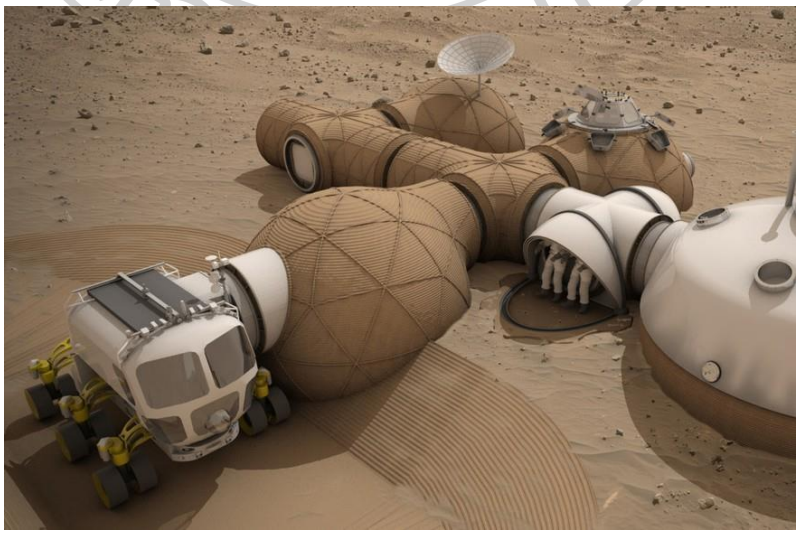

Figure 58 NASA 3D-Printed Habitat Challenge: Team LavaHive

Retrieved from https://www.architectmagazine.com/project-gallery/nasa-3d-printed-habitat-challenge-team-lavahive_o

3.2.7 a) Integration of Machine and A.I.

Possibility of Machine in Sci-Fi Moving Pictures			
Machine Type	Function	Action	Setting Scene
Industrial machine	**Produce products** ■ Printing, Cutting, Attaching, Destroying, etc.	Examples ■ Producing food ■ Producing parts of a mechanism	**Factory**
Internet of Thing (IoT) Devices	**Monitoring activities** ■ Control the surrounding's conditions	Examples ■ Temperature control ■ Smart lock ■ Motion sensor for auto light ■ Distant controller from a mobile phone	**House**
		Examples ■ Attendance checkers ■ Door lock ■ Motion sensor for auto light	**School**
Laboratory Machines	**Involve in any scientific experiments.** ■ Control the testing's conditions	Examples ■ Stimulate result of experimentation ■ Create an absolute requirement for exploration	**Laboratory**
Military Machines	**Defending, Protecting and Communicating**	Examples ■ Monitor potential dangers ■ Control the internal communication of the organisation.	**Military Organisation**
Space Machines	**Defending, Protecting, Printing, and Communicating**	Examples ■ Print architecture ■ Control environmental conditions; thermal, gravity, and UV protection.	**Mars**

Table 20 Possibility of Machine in Sci-Fi Moving Pictures

3.2.7 b) Robot in Human's Form

Humanoid or Android are terms used to describe a robot with a human-like appearance. The reason for employing androids instead of humans might vary. According to their hazardous circumstances, humans cannot perform some activities, while others are difficult to fill with human labour. Space research and exploration, search and rescue, personal assistance and caregiving, education and entertainment, manufacturing and maintenance, public relations, and healthcare are all activities that androids could do (Merkusheva, 2020).

The resemblance anatomy will allow robots to function in the same way that humans do. Even the robot represents emotionlessness and obedience to its command, and it will humanely develop its emotion and conscience. Comparing actions between humans and robots commonly raises questions about humanity and morality. For example, *Bicentennial Man (Columbus, 1999)* pleasantly showed the interaction between humans and androids. Treating like a family member, the robot turned out to be human at heart. Robots were also frequently portrayed as the enemies of humanity. The first sequence of *The Terminator* (*Cameron, 1984)* depicted the menace of computers and robots that ultimately developed to conquer the world. These are variations of how humankind has imaginative views concerning the human-machine invention.

This invention progressively lives with people in terms of architectural design, influencing space design requirements. Even artificial intelligence does not yet have the capability described in science fiction. Nonetheless, the humanoid has begun to be widely used in industrial, caretaking, commercial, and space exploration areas. It implies that designers may have to consider maintaining and managing these robots when they are not used. The exact manner of architectural designs compromises the cohabitation between humans and nature.

3.2.7 c) Transhuman

The theory of transferring human parts, mind and body, has been proposed in the science fiction genre for a long time. Humans always sought immortality, as appeared in myths or the progression of science to prolong life expectancy. According to Cambridge Dictionary, *transhumanism* refers to the action of overcoming physical and mental obstacles. It has the capability of integrating with the body, uploading the mind, and changing the body.

Tony Stark in *Iron Man (Favreau, 2008)* replaced his heart with an arc reactor. As a result, he was transformed into a cyborg. Furthermore, *Miss Crow and Mister Lizard (Wu, 2021)* is a Chinese television program in which the protagonist's heart can be replaced with a mechanical heart. These are examples of how humans may combine body components to save or maintain life when injured.

However, mind transfer to new bodies theory is also featured in *Altered Carbon (Kalogridis, 2018)*. In Altered Carbon, everyone has their information on a gadget called *"Stack"*. It is a chip used for individuals to identify when one's conscience interchanging bodies from one to another. This approach permits humans to live indefinitely if they have stacks and other sleeves to replace. This show raises concerns about identifying since the biometric data cannot use as a measurement anymore.

Brain uploading has several purposes, either for entertainment or survival. Examples of temporary uploading are *The Lawnmower Man (Leonard, 1992), The Matrix (Wachowskis, 1999), Minority Report (Spielberg, 2002), Sword Art Online (Ito, 2012),* and *Ready Player One (Spielberg, 2018).* These films show how the bodies appear asleep while their minds go wild in the virtual world. At the same time, *Transcendence (Pfister, 2014)* presented the idea of permanently uploading their mind to the digital code and emerging as the biological object on Earth.

3.2.8 Identification

Before expanding centralized information, proof of identity was accomplished using a written word, a series of digits, and ID pictures on official papers. It is simple to mimic someone else by fabricating evidence. The digital era allows organizations to have access to information collecting databases for more precise confirmation of identification.

Changing identities are shown in various moving image mediums with crime, espionage, and mischief backgrounds. *The Serpent (Shankland and Herbots, 2021)* exhibited shifting identities to avoid penalties. The scenario was in the 1970s when passports were readily stolen by replacing them with other's ID photos. The immigration service only possesses departure and arrival paperwork as proof of entry and existence in the nation. With the paper-based evidence, all the information has the potential for fault declaration.

The computer and the internet are the instruments for reducing personal data inaccuracy. It has made it easier to trace down and investigate each person's actual identity. The criteria for data collection may range from the name, place of birth, parents, telephone number and home address. Biometric information like fingerprints, retina and facial cognition, or DNA can be employed for more accurate validation. These types of data are presently utilized in identification internationally. Moreover, biometrics is also used in everyday devices such as phones, computers, and access to increase security.

However, the centralized information has prompted concerns about privacy and security to the citizen. *Minority Report (Spielberg, 2002)* and *Enemy of the States (Scott, 1998)* depicted that utilizing information and monitoring individuals without consent raise worries about threatening human rights and individual freedom. Organisations with the authority to access information must uphold ethical and moral standards to protect people's privacy.

3.2.8 a) Type of Identification

Identification might be diverse depending on how information is collected. The form of validations is varied according to its purpose, certificates, or licenses. They serve as proof of eligibility for further actions. Exaggerated technological advancement is commonly applied to the existing approach for visualized identification in the Sci-Fi genre.

The table below demonstrates how each method enables various sorts of detection and utilization. The level of security indicates the degree of difficulty in counterfeiting. The high level of safety makes it difficult to forge information, while the rest fall in order. The example of usage will be discussed more in 3.8.2 *Devices for Identification*.

Method	Detecting Part	Level of Security	Example of Usage
Photograph	Physical appearance	Poor	■ ID Photo
Fingerprint Scanner	Fingerprint	Moderate	■ Biometrics for immigration or security unlock
Facial Detector	Facial Recognition	Moderate	
Voice Detector	Voice Reognition	Moderate	
Retina Detector	Retina Recognition	High	
Laboratory Process	Genetics Information	High	■ Genetics test

Table 21 Type of Identification

3.2.8 b) Devices for Identification

Many smart gadgets have widely used biometric security unlocking since the late 2010s. The formality of utilizing identification for official activities such as immigration is reduced to everyday objects such as a computer or cell phone.

Official and public validation is frequently performed in places where a a considerable amount of population may gather, such as airports or undergrounds. Fingerprint, face, and retina cognition are all methods of verification applied in these places. These are the most efficient and fast methods for verifying people's identities in crowds. Although information must be updated regularly since human fingerprints and faces might slightly change due to ageing or plastic surgery.

The combination of database and artificial intelligence allows autonomous identification operation. For example, in *Minority Report (Spielberg, 2002),* a surveillance system's facial recognition detects the protagonist's face when he approaches the cameras. The tailored advertising appeared whenever he passed by billboards. However, when he was labelled a criminal, the system could identify his location and report to headquarters instantly he got onto the train. This action is in fact, taking place in China to govern and safeguard its citizens. The use of face recognition technology enables the tracking of individuals who may have engaged in wrongdoing or may have failed to follow the law. (Ng, 2020)

The built-in detector is integrated into personal gadgets in people’s hands. Facial detection, fingerprint scanning, and voice commands can control A.I. to unlock or proceed with the transaction. The utilization of these methods provides convenience and a comfortable lifestyle. However, concerns about stolen identities caused by technologies such as *Deepfake* may put individuals in danger, lead them to lose property, or harm their reputation. As a result, the organization that holds this information must safeguard the users' rights, privacy, and security by not disclosing information that might be misused without the user's agreement.

3.2.8 c) Privacy and Security

The internet's centralized data system provides convenience in accessing people's personal information. Privacy and security concerns are often depicted in films that relate to high-tech governments. Counterfeiting data may be more difficult for regular individuals, but persons in positions of authority can taint the truth. *Minority Report (Spielberg, 2002), Enemy of States (Scott, 1998), Snowden (Stone, 2016)* and *Social Dilemma (Orlowski, 2020)* are films and documentaries illustrating the downside of data access intelligence.

In the age of IoT (the internet of things), the individual often carries at least one device that always connects to the internet or satellite network. These loopholes allow others to trace the device's location of the camera and eavesdrop on an owner. Firstly, the action might aid those caught up in emergencies, such as terrorist attacks, kidnappings, or other life-threatening occurrences. On the other hand, the users' privacy may be at risk for some companies' profit.

Snowden's documentary demonstrates how governments violate people's privacy. People could be discreetly hacked and monitored through cameras and microphones. While in *The Enemy of State* and *Minority Report,* protagonists are watched from the surveillance system. *Social Dilemma* also illustrated how voice and word searches on the internet are sent to business companies for advertisement strategies. These actions harm the freedom, privacy, and human rights of users.

Identity encompasses facts in the physical world and personal information in the virtual world (avatar). Since the acts in virtual reality affect the event. The thoughtless organization may also endanger the privacy of internet users. As the world's culture shifts, a digital lifestyle will take centre stage. Concerns regarding privacy and security have been discussed so as to establish the appropriate regulation to regulate society.

Privacy and Security in Architecture

In most pictures, there is a scenario in which the protagonist or antagonist wants to escape from a location populated by a civilian system. Before they can flee, they must understand the floor plan and circulation of the area. This architectural knowledge can help them to analyse the blind spots in the building.

According to University College London, *Space Syntax (UCL)* is a set of tools for analysing spatial configuration. It is a tool that may graphically depict the relationship between human-activity patterns and space layouts, both inside and outside. Methods such as isovist, axial lines, and visual graph analysis (VGA) assist analysts in understanding the physical properties of space.

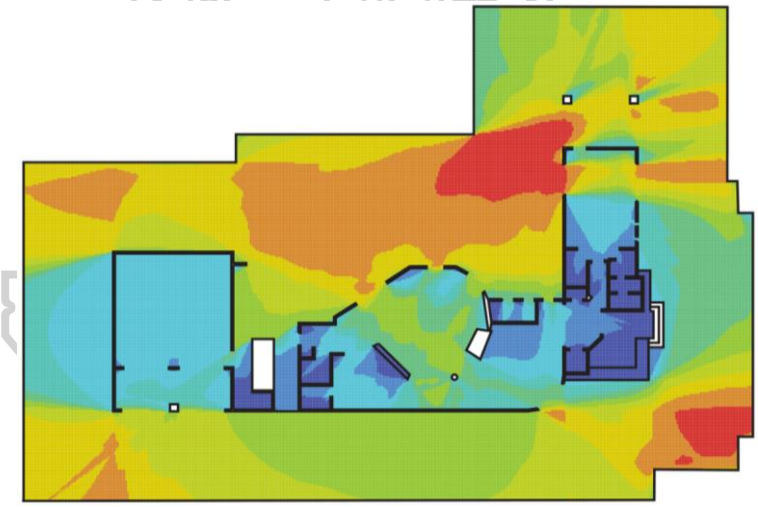

Figure 59 Visible Graph Analysis (VGA) of ULM House (1937)
Los Angeles, California, USA.

This knowledge of the spatial configuration improves life in a confined location, and it gives a crucial notion of constructing space that responds to the degree of privacy desired by the owner. The space's enclosures, location of entries, wall's lengths, and circulation pathways are all utilized to create the area, which may be considered private or public.

3.3 Architectural Influences in the Actual World Towards Moving Pictures

Visual forms and futuristic technologies conveyed on screens could recognise the influences of architecture and architectural design in the real world. Architects' practice has evolved from two-dimensional drawings on paper to three-dimensional visual representations on and off screens. It covers various aspects such as form creation, energy management, material manufacturing, and building construction. The continuous advancement of technology improves and broadens the horizon of architecture to become a *"digital culture"* (Picon, 2010).

3.3.1 Inclination Toward Formal and Physical Components

Countless factors have influenced the shape and form of architecture, resulting from cultural and societal factors, politics, environmental issues, and technological advancement. It can be in arts and design, including painting, drawing, objects, methodology, materials, and buildings. These elements spark movements to which artists, architects, and designers frequently respond. When these elements from art or architecture are untied, they can be traced back to their origins in terms of time, location, and other significant matters.

3.3.1 a) Retro Future Style in Architecture

Retrofuturism, also known as *Retro-Future-Style*, predicts the future in the arts, architecture, fashion, and other forms of entertainment. It is rooted in how architecture and moving images create a futuristic environment for audiences and users, particularly in science fiction-related contexts. Today, retrofuturism inspires innovations, creative ideas, and products whilst also projecting social retrospections (Brahambhatt, 2021). The design's possible context could be in the world when it is confronted with wicked problems such as poverty, overpopulation, and environmental crisis. This movement also depicts space exploration and the fear of the rapid growth of machines and technology.

3.3.1 a.1) Archigram

Archigram was an experimental collective that displayed radical and conceptual drawings and designs from the time's emerging technologies and consumer culture (Hobson, 2020). The second world war's technology, space-age information, and *Buckminster Fuller (1895 – 1983)* are the most influential works. *Sir Peter Cook*, the founder of Archigram, explored the possible future of our world by illustrating how space and form might look with the development of society (Metalocus, 2016). Many moving pictures in futuristic scenarios feature a visual of *Cook's Retrospective,* in which pushed and pulled compartments are attached to the façade like a pixelate building. Forty years later, Mahanakorn Building (2016), designed by the development team and Ole Scheeren, used the same language of push, and pull compartments as the skyscraper's highlighted visual.

Figure 60 Retrospective – Peter Cook, Archigram (1986)

Retrieved from https://www.metalocus.es/en/news/peter-cook-retrospective-museum-architectural-drawing

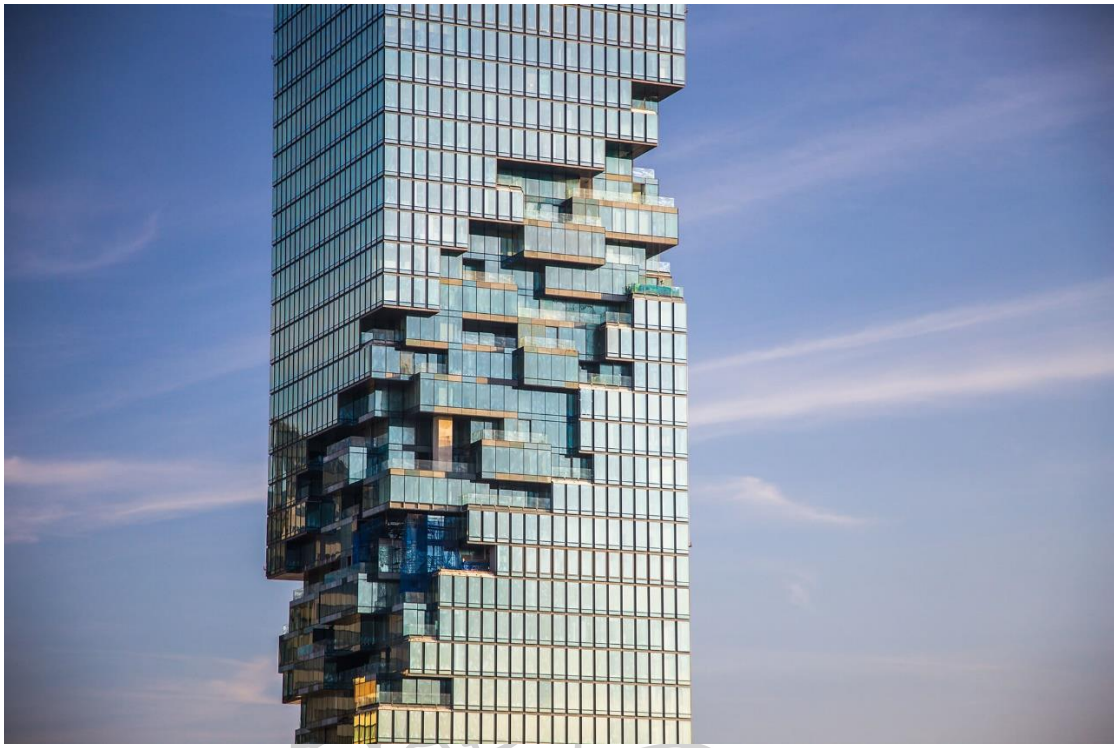

Figure 61 Mahanakorn Building (2016)
Retrieved from https://kingpowermahanakhon.co.th/

3.3.1 a.2) Googie Architecture

Googie Architecture is one of the futurism movements in the post Second World War. The non-geometric form and the clean-and-polish material choices generate the futuristic space-age vibe in the surrounding area. Googie style has touches of humour and expresses the sense of the future in every inch of architecture. It appears in commercial and entertainment media and is sometimes used as a neighbourhood landmark. When every household in America had at least one car in the 1950s, fast food and coffee drive-ins popped up along the roadways (Staff, 2010). When this expressive construction was combined with the advancement of technology for testing and constructing a building, it influenced the subsequent generation of Neo-Futurism architecture.

Figure 62 LAX Theme Building (1959)

Retrieved from https://www.atomic-ranch.com/architecture-design/lax-theme-building/

3.3.1 b) Cybernetics in Architecture

In *Digital Culture in Architecture (Picon, 2010),* the author mentioned that cybernetic theory was influenced by *Cedric Price's Fun Place (1964)* and inspired megastructure. The method of spatial organisation by technological integration between man, machine, and other stakeholders could design patterns, systems, and networks. The dynamic linkage of subparts in architecture brings the new possibility of functions to the world.

The complexity of networking systems links architecture, transportation, and communication to the urban fabric. It enables the development of cities from the domestic to the capital levels for allocating movements from daily life activities and the function of cities in economic, social, and political aspects. For example, *A Computer City by Dennis Crompton (1964) and Plug-In City (Archigram, 1964)* illustrates how the town manages traffic flows, goods and people (Sadler, 2005). This cyber-sociability raises the issue of spatial organisation (Picon, 2010), prompting designers and architects to look for another location to practise - *the virtual world.*

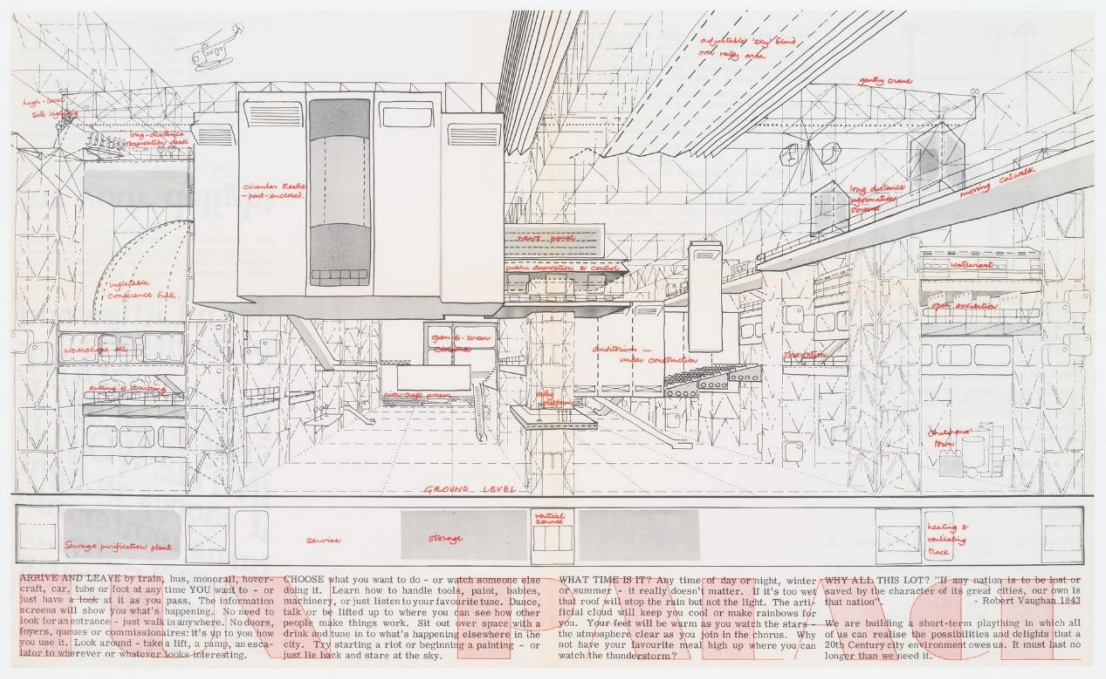

Figure 63 Fun Palace promotional brochure (Prince and Littlewood, 1964)

Retrieved from https://www.cca.qc.ca/en/articles/issues/2/what-the-future-looked-like/32737/1964-fun-palace

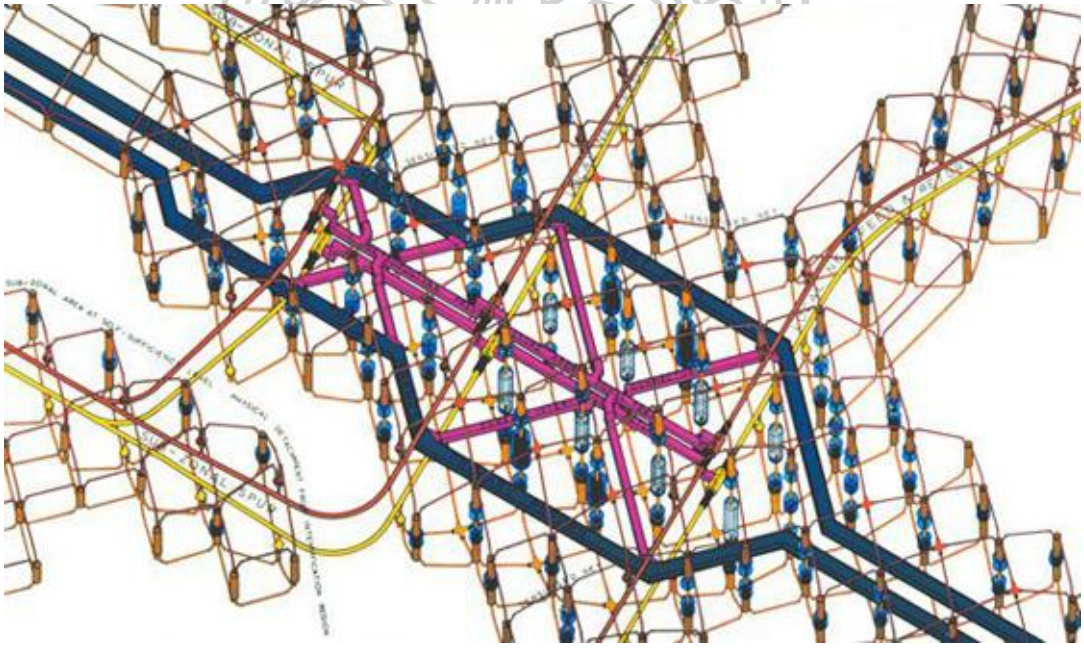

Figure 64 Crompton, Dennis. *A Computer City diagram*. 1964

Retrieved from https://visuallexicon.wordpress.com/2017/10/12/city-as-machine-archigram-peter-cooks-city-and-dennis-cromptons-system/

3.3.1 c) Height in Architecture

The desire to build the tallest structure has been passed down from generation to generation since ancient times. According to common belief, when architecture is a religious symbol, the higher the architecture, the closer to heaven. It evolved into a symbol of capitalism and technological advancement in construction for urbanised contexts. For example, the transition from *Babel Tower (3000-3500 BC), Ulm Minister Cathedral (the 1400s),* and *Burj Khalifa (2004)* is the architecture that humans try to reach the tallest height in societal contexts.

Material development and computer-aided-design assist humans in reaching new heights. Climate is one of the most challenging factors for architects, engineers, and practitioners to calculate and stimulate before building the actual structure. Wind load, sunlight, UV index, and Earthquake simulation can be calculated by using digital simulation via computer software.

Furthermore, the height relationship for the exterior is supposedly constrained by city and nearby neighbourhood regulations. In that case, the interior relation is the room's scale corresponding to the human body—the internal height in houses, offices, schools, hospitals, and government buildings. The sense of space has shifted from bulky to light and spacious, explained by windows. For example, block windows have been replaced with consecutive floor-to-ceiling windows in a living room, allowing more sunlight into the room.

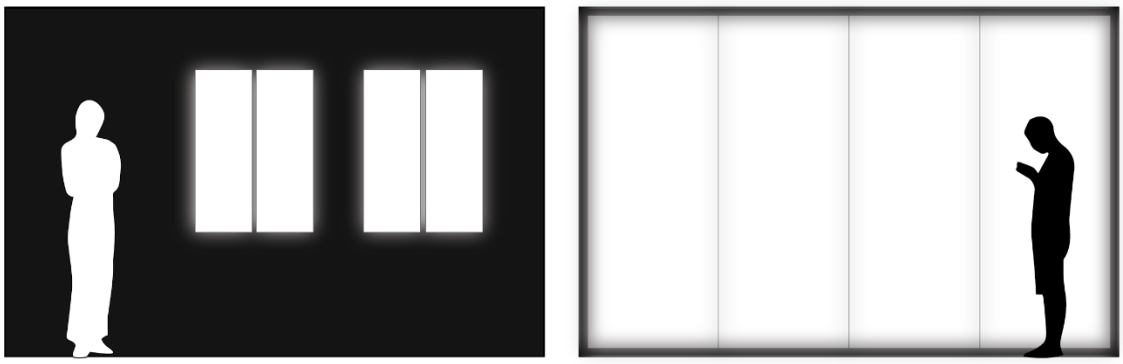

Figure 65 Comparison between block windows and floor-to-ceiling windows

3.3.2 Inclination Toward Technological Advancements and Visions

The key to game-changing architecture and design is technological progress. Using computer software improves architectural construction, material manufacturing, design, and simulation of potential outcomes. Practitioners can explore forms, patterns, or design systems that reduce the time consumers to the working process using artificial intelligence as a tool. It protects against financial and accidental loss while broadening the horizon of creativity and imagination.

3.3.2 a) Sustainable Architecture

Since the 1970s, the world has recognized the crisis of environmental problems, including overpopulation, waste, climate change and pollution. Architecture also reacted as a revolution where integrating greenery became essential. According to the article *How the Architecture Industry Is Reacting to Climate Change (Stamp, 2020),* organisations from both the commercial and public sectors are working to reduce energy consumption and carbon emissions.

Furthermore, the design industry is regaining interest in vernacular characteristics. Consider the *Farm to Table*, in which the kitchen is based on local ingredients, and people reduce footprints from transporting and preserving. As a result, architecture is defined by more than just function or appearance, and it is critical to be and develop a self-sustaining future. *Fallingwater (Wrights, 1936)* is an example of architecture that utilises local materials as a vital sustainability strategy. This strategy lowers the need to import materials from other locations for conserving resources. Both tactics of using local resources contribute to an increase in the sense of vernacular and regional identities that arose in architecture and the potential of activities. It encourages newcomers, either the building or people, to the existing surroundings.

Figure 66 Fallingwater (Wrights, 1936)

Retrieved from https://ciprianicharlesdesigns.wordpress.com/2014/05/07/frank-lloyd-wrights-iconic-fallingwater/

In the early twentieth century, R. Buckminster Fuller developed the Geodesic Dome as an entire structure on the ground with infinite dimensions (Marks, 2021). According to the Buckminster Fuller Institute, during a severe housing scarcity in the United States in 1944, the geodesic dome allowed the quick building of human shelters that could be installed anywhere. The dome form is particularly sustainable in many ways, from the materials used for construction to the structure's energy consumption. The dome takes fewer materials than ordinary buildings since the skeleton and surface sheets are required. The dome can be more sophisticated with an inside system tailored to the situation and its purpose. It can reflect sounds and circulate airflow (Dhalleine, 2021) to level the temperature, reducing the need for external equipment for associated tasks.

Figure 67 Geodesic Dome (Sadao and Fuller, 1967)
U.S. Pavilion at the World Fair in Montreal
Retrieved from https://www.architecturaldigest.com/gallery/buckminster-fuller-architecture

In the late twentieth century, smart buildings responsive to energy, greenery, and societal issues, became mainstream. Natural resources such as materials, weather, climate, cultures, and surroundings are becoming increasingly important in architectural design. The energy management strategy could result in a circular supply system that is both renewable and reusable. Thus, one of the sustainable architectural designs is the prefabricated architecture that allows for adaptation to its local environment – climate, geography, and site orientation. *Green Magic Homes* are

the company that serves the prefabricated building system (Beyondhomes, 2020) that promises long-term eco-friendly living through the integration of the home's topography. The firm comes with various modular options from which clients may select and adapt to the requirements. The *Green House in Norway* is an example of how they cover the roof with soil and vegetation. According to *Green Magic Homes'* official website, the green roof helps provide sound insulation and protects against exterior weather, temperature, and natural disasters.

Figure 68 Green Magic Homes – Norway

Retrieved from https://greenmagichomes.com/project/norway/#iLightbox[gallery_image_1]/3

3.3.2 b) Fluidity of Form in Architecture

The fluidity of form in architecture is possible to construct because of the advancement of computer-aided designs (CAD) and computer-aided manufacturing (CAM). Parametric techniques and organic form use a database of information, coordinate and label instead of pixel (Zampi and Morgan, 1995) for communication between design and manufacturing components. It is possible to derive that these

digital designs are scalable and can be constructed to exact measurements from the computerized numerical control (CNC) machine such as a 3D printer and laser cutting.

"*Forms are frozen movement or still in a continuous flow (Picon, 2010).*" From the quote, it can be derived from animation, spatial transformation, and motion in natural or abstract resources. This technology allows engineers, architects, and design-related professionals to seek construction, materiality and interpreted energy management. Furthermore, the fluid forms are expressive, performative, and innovative. At the same time, in terms of formal progression, unlike the Modernist movement, which emphasised geometrical purity in forms and spatial reappearance. It responded to the needs of contemporary society for more complexity and variety by developing computational design procedures and cutting-edge fabrication technologies (Anastasiadi, 2010).

3.3.2 b.1) Blobitecture

Blobitecture is an abbreviation of *'BLOB (**B**inary **L**arge **Ob**ject)'* and *'Architecture',* the organic and amoeba-like form *(Picon, 2010).* Blobitecture, unlike Greek-style geometry-based architecture, is built on mathematical coordination in CAD software features with an extensive binary object (Craven, 2018). In the 1990s, Blobitecture adapted paraboloids and hyperboloids in the architectural design with concrete shells, tensile structures, plastic casts and pneumatic structures (Picon, 2010).

During the early age of Blobism, many international well-known architects participated in the movement, including Greg Lyn, Frank Gehry, Peter Cook, Peter Eisenman, Norman Foster, Massimiliano Fuksas, Patrik Schumacher, Jan Kaplický, Amanda Levete and Zaha Hadid (Craven, 2018). *Blobs Architecture* frequently uses parametric designs at all stages of the design process, from sketch to construction.

For instance, *Kunsthaus Graz (2003)* featured designs from two remarkable architects, Sir Peter Cook and Collin Fournier, as examples of early *Blobitecture.* The building is extraterritorial towards its surrounded buildings. The official site of this museum (KunsthausGraz) stated that the strange forms and toy-like materials performed as the city's attraction at the beginning of the millennium. Kunsthaus is regarded as one of the Archigram movements that welcomed and inspired a new era through a whole computerised process.

Future System, led by *Jan Kaplický*, is a hi-tech architectural practice often referred to as Blobism. This design practice produced sketches, drawings, prototypes, and actual construction using monocoque[5] and other vehicle design languages (RIBAJ, 2015), which reminds the space-age influences designs in the 1960s. As RIBA's journal, *Romance Never Dies (2015)*, mentioned, Future Systems has created and inspired resonances for NASA, which Kaplický drew inspiration from spaceships and science fiction pieces. Later, Future Systems and David Nixon worked on NASA's International Space Station design.

Birmingham's Selfridges Department Store was one of many avant-gardes, futuristic, and space-age inspired significant works in the United Kingdom (Schwaller, 2009). The building's flowing and organic skin are frequently compared to Kunsthaus Graz as excellent case studies for Blobitecture.

[5] Monocoque (n.) an aircraft or vehicle structure in which the chassis is integral with the body.

Figure 69 Kunsthaus Graz (Cook and Fournier, 2003)

Retrieved from https://arquitecturaviva.com/works/kunsthaus-graz-

Figure 70 Birmingham's Selfridges Department Store (Future System, 2003)

Retrieved from https://www.parcmonceauwestport.com/what-is-blobitecture-architecture/

3.3.2 b.2) Neo-Futurism

The definition of futurism has changed over time, depending on technological and societal trends at the point in time. From space-age futurism to neo-futurism, computer-aided design plays a more significant role than in the past. The complexity of the design process can be simplified and stimulated via the *digital twins,* in which the design occurs in the physical world and on the computer screen (RedShift, 2021). The organic and flowy forms that could be mathematically generated from the coordination in the software lead to the possibility of making uniqueness to the physical world.

Zaha Hadid is one of the remarkable architects of the neo-futurism movement. Her works include a large span from small scale jewellery to as large as an international airport. The book Form in Motion (Hiesinger and Schumacher, 2012) discusses how Hadid's drawings and paintings communicate her designs. Her trademark is influenced by early modern Russian artist-theorists, fine arts, and mathematics talents, resulting in a new architectural language that has been seen in a variety of her works around the world. *Russian Constructivism* and *Russian Suprematism* are movements consisting of basic geometric shapes and forms strongly influenced by Futurism and Cubism (Magro, 2017). They *did not relate to the realistic images* for designing art pieces (Magro, 2017).

Hadid's signatures also integrate the natural process of botanical formation and mathematical interpretation to construct the structure system while transmitting morphological metamorphosis forms. Regarding computer-aided design (CAD) and computer-aided manufacturing (CAM), these technologies aid in the creation of object-oriented designs with three-dimensional previews that can then be transferred into a manufacturing system.

Soho Galaxy is a mixed-use building in Beijing that houses retail, offices, and an entertainment complex (Hadid, 2012). The architecture is about more than just creating an immersive experience through shifting plateaus and abstract flowing formal compositions. The design took the traditional Chinese courtyard as a model for creating open spaces (Etherington, 2012), emphasising the architecture's synergy with its surroundings. This building exemplifies how futuristic architecture in neo-futurism differs from previous generations by enhancing functions, immersive settings, and unified experiences.

Figure 71 Soho Galaxy Beijing (Hadid, 2012)

Retrieved from https://www.dezeen.com/2012/10/29/galaxy-soho-by-zaha-hadid-architects/

3.3.2 c) Cyberspace and Virtual Reality Designs

This digital technology is reshaping the experience of the physical world (Picon, 2010). It has reformed and redefined the working process, including drawing, simulating, and constructing. Designers and practitioners can use three-dimensional software like Rhino, Revit, and other Building Information Modelling (BIM) applications to comprehend the design with humans and other concerns in the physical world before manufacturing. Cyberspace and virtual reality is the digitalised realism where people can interact with the object as if it is a real object in the real world (Zampi and Morgan, 1995). The clickable and zoomable world (Picon, 2010) allows for creating and designing digital pieces with simulated perception and generating multiple versions of reality. This opportunity allowed the designer to manufacture their design and create channels to communicate and entertain people.

Domestic use of virtual reality (VR) and augmented reality (AR) technology on everyday devices like laptops, tablets, and phones have also sparked interest and shifted the definition of the existing space by the overlayed layer of digitalised three-dimensional production. Moreover, the use of digital screens and their composition could create an illusion of visual dimension that intrigue the experience of perception. For instance, in 2021, New York Times Square revealed how the world has arrived at the predictions in *Metropolis (Lang, 1927)* and *Ghost in The Shell* (Oshii, 1995) that dazzling moving picture billboards will ring the city. However, holograms as semi-permanent advertisements were not used in 2021. As seen in Ghost in the Shell (Sanders, 2017), SMTown Coex Atrium LED façade in Seoul has come closer to the picture of a three-dimensional advertisement. An anamorphic illusion with matching audio (Malone, 2020) allows used as a stage for K-Pop advertising to engage with a fresh experience towards their audiences. SM Entertainment, a well-known Korean agency in South Korea, pioneered elevating K-Pop to cyberspace. Avatars and a braided storyline of pieces in the industry, akin to what Hollywood did with the Marvel Cinematic Universe (MCU), K-Pop has been lifted to cyberspace. This news has energised and hastened the trend of using cyberspace to socialise and entertain oneself due to the growing attention to the Metaverse.

Figure 72 New Year Eve, New York Times Square (Rahman, 2021)

Retrieved from https://www.howtogeek.com/776099/how-to-watch-the-2021-times-square-new-years-eve-ball-drop/

Figure 73 SMTown Coex Atrium LED Facade

Retrieved from https://www.bdcnetwork.com/south-koreas-smtown-coex-atrium-led-facade-contains-giant-crashing-wave

The limitations of cinema or animation do not constrain virtual reality architecture. Architects, designers, and developers are needed to help create the virtual environment for gaming simulation, in which players can travel the digital realm as avatars. It is a challenging task for creators to develop an exciting, immersive experience that allows people to be both amazed and familiarised at the same time. They would be astounded by the design and advancement of technology while also being familiar with how virtual platforms may be navigated.

Epic Games' Fortnite is a streaming video game published in 2017. It is a platform where individuals may socialise online in gamic and non-gamic settings. It has been widely discussed in the internet world, particularly in Crypto Currencies and the Metaverse. Although the version of Metaverse depicted in the film Ready Player One (Spielberg, 2018) will not be available shortly or within the next decade due to technological limitations.

The ideal of socialising concurrently with the virtual world continues whether the user is the fundamental beginning of the Metaverse's future (Park, 2020). As a result, the definitions of architecture and engineering diverge from those of the physical world. Building calculations based on gravity and mathematics, architecture in the virtual world has no gravity and requires technical design detailing to appear and interact on online platforms.

Figure 74 Fortnite x Ariana Grande FULL EVENT! (Faiz, 2021)

Retrieved from https://www.youtube.com/watch?v=iTiBp-ORNEo

In 2021, *Fortnite* staged virtual concerts in which artists' avatars played, and the audience was able to three-dimensionally engage with the environment alongside the artist in the digital realm. This event marks the beginning of designers and architects to explore the purpose of architecture and how its design may benefit users and creative professionals. It also introduces how architectural design could abridge the gap between the physical and digital worlds.

3.4 Conclusion

Since the late 2010s, the fantasy of digital life shown in earlier films has become a reality. The categorical concepts of transportation, habitation, communication, consumption, automation, and identification are required for a city to function. The overview of each topic demonstrates the effect of one element on other ones. Although technology has advanced through time, these ties have retained a sense of civilization and community.

Architectural Influences in Moving Pictures Towards the Actual World	
Formal and Physical Components	**Technological Advancements and Visions**
Proportion (Scale)	**Transportation Infrastructure**
Case 1: Metropolis (Lang, 1927)	Case 1: Metropolis (Lang, 1927)
Case 2: 2001: A Space Odyssey (Kubrick, 1968)	Case 2: Altered Carbon (Kalogridis, 2018)
Case 3: Space Sweeper (Jo, 2021)	Case 3: Ready Player One (Spielberg, 2018)
Architectural Languages and Characteristics	**Automation and Facilities**
Case 1: Metropolis (Lang, 1927)	Case 1: The Matrix (Wachowskis, 1999)
Case 2: Altered Carbon (Kalogridis, 2018)	Case 2: The Martian (Scott, 2015)
Case 3: Ready Player One (Spielberg, 2018)	Case 3: Iron Man (Favreau, 2008)
Activities and Functionalities	**Identification and Privacy**
Case 1: Metropolis (Lang, 1927)	Case 1: Minority Report (Spielberg, 2002)
Case 2: Space Sweeper (Jo, 2021)	Case 2: Altered Carbon (Kalogridis, 2018)
Case 3: The Martian (Scott, 2015)	Case 3: Enemy of States (Scott, 1998)

Table 22 Architectural Influences in Moving Pictures Towards the Actual World

This chapter indicattes both influenced tendencies from moving pictures to architecture and architecture to moving pictures. The following tables (Table 22 and Table 23) summarise case studies and samples of architectural design as categorised in the following tables.

Architectural Influences in the Actual World Towards Moving Pictures	
Formal and Physical Components	**Technological Advancements and Visions**
Retro Future Style in Architecture	**Sustainable Architecture**
Case 1: LAX Theme Building (1959)	Case 1: Fallingwater House (Wrights, 1936)
Case 2: Retrospective (Archigram, 1986)	Case 2: Geodesic Dome Home (Fuller, 1967)
Case 3: Mahanakorn Building (2016)	Case 3: Green Magic Homes (2015)
Cybernetics in Architecture	**Fluidity of Form in Architecture**
Case 1: Cedric Price's Fun Place (1964)	Case 1: Kunsthaus Graz (2003)
Case 2: Computer City (Archigram, 1964)	Case 2: Jan Kaplicky of Future System
Case 3: Plug-In City (Archigram, 1964)	Case 3: Soho Galaxy (Hadid, 2008-2012)
Height in Architecture	**Cyberspace and Virtual Reality Designs**
Case 1: Babel Tower (3000 – 3500 BC)	Case 1: SMTown Coex Atrium LED Facade
Case 2: Ulm Minster Cathedral (14th Century)	Case 2: Fortnite
Case 3: Burj Khalifa (2004)	Case 3: Arsenal Contemporary Art Gallery in Griffintown

Figure 75 Architectural Influences in the Actual World Towards Moving Pictures

The proof and reasoning that happens in moving visuals also reflect the architecture in the actual world. The fundamental approaches in the science fiction genre are frequently founded on the potential principles before adding extra fantasy, desire or worry about the happening occurrences. As a result, the reality of architectural design is inextricably linked to both physical architecture and architecture that appeared in moving pictures.

CHAPTER 4:
BINARY ANALYSIS BETWEEN ARCHITECTURE AND MOVING PICTURES OF FUTURE ARCHITECTURE

4.1 Introduction

The preceding chapters provide an overview of the historical development of the relationship between Sci-Fi moving pictures and associated architectural designs. The hypothetical tools are used to analyse and classify architectural and technological aspects from the evidence proven in the third chapter.

The binary analysis of futuristic architecture and its relevant moving pictures is treated as a retrace of the study. The following tools are applied to consider each comparison from the similarity and connection. Functionality, DNA influential direction and architectural influences with an inclination between formal components and technological visions are the main factors for studying the comparison.

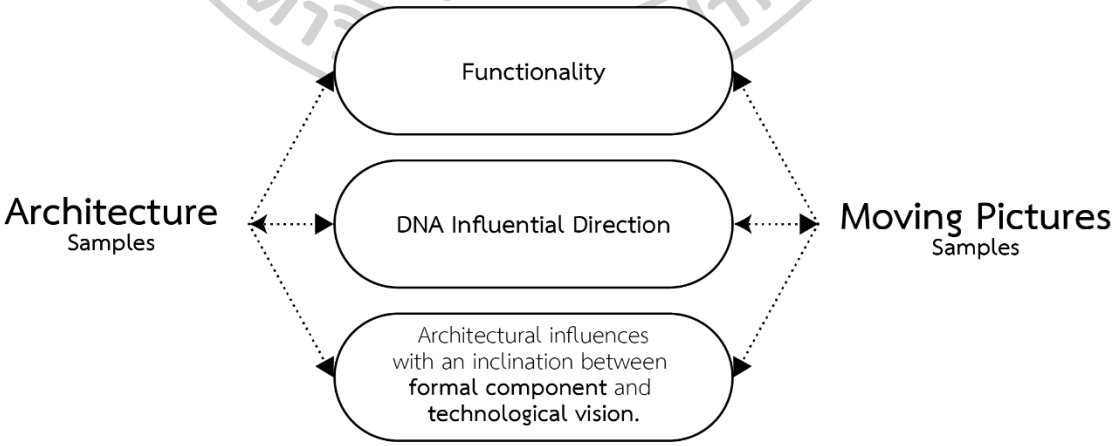

Figure 76 Tool for the binary analysis of future architecture and its relevant moving picture.

4.1.1 Functionality

Architectural functions of both the actual world and moving pictures have corresponded to the study for selecting the samples for analysis. According to chapters two and three, the repetitive function that appeared the most is habitation. Thus, the category in this analysis divides into residential and non-residential projects. The selected case studies narrow the scope of the investigation and focus on similar elements for comparisons and their relationships.

4.1.2 DNA Influential Direction

The direction of influential DNA is separated in two ways; the inclination from the actual world architecture toward moving pictures and the tendency from moving images toward real-world architecture. The analysis of DNA influences indicates how the design is established, occurs, and changes in the world. It refers to the study in the second chapter of the historical review.

4.1.3 Architectural Influences with an Inclination between Formal Component and Technological Vision

The influential and architectural aspects in the analysis will strongly refer to chapter three, section *3.2 Architectural Influences in Moving Pictures toward the Actual World*, and *3.3 Architectural Influences in the Actual World Towards Moving Pictures*. However, the discussion of this chapter and its analysis will focus mainly on formal components and technological advancements relating specifically to architecture.

4.2 Residential 1: Living Skyscraper For New York City

Figure 77 Living Skyscraper For New York City (Lesiuk et al., 2021)
Retrieved from https://www.evolo.us/living-skyscraper-for-new-york-city/

4.2.1 Project's Detail

a) **Project Type:** Conceptual Proposal Project

b) **Year Published:** 2021

c) **Architect(s)/Designer(s):** Andrii Lesiuk, Mykhaylo Kohut, Sofiia Shkoliar, Kateryna Ivashchuk, Nazarii Duda, Mariia Shkolnyk, Oksana-Daryna Kytsiuk and Andrii Honcharenko

d) **Site Location:** New York, USA

4.2.2 Relationship between Architecture and Moving Pictures

a) **Functionality:** Residential Structure

b) **DNA Influential Direction:** from *"Moving Picture"* to *"Architecture"*

c) **Architectural Influence:** Formal Components

4.2.3 Analysis and Discussion

Living Skyscraper For New York City is a high-rise project that integrated the idea of a green-living façade. This design condenses the concepts of sustainable architecture, environmental issues, and urban issues (eVolo, 2021). Plantation and architecture were incorporated to respond to the high-rise concept in the past—predicting a scarcity of green space. This project demonstrated how the architectural solution could help alleviate the problematic growth of urbanism.

The architects claimed that this conceptual idea is flexible for various purposes. Residential dwellings, public buildings, and isolated constructions are the possible outcomes. The skyscraper tree is a living organism that offers green areas and creates self-supporting structures as it grows (eVolo, 2021). This project's technology is employed to create a façade that could be extended and expanded in the future. The automation technique used in this project is a prefabricated idea. Mixing the natural character of plants with inorganic elements forms the beginning of how the forest might happen in an urban environment.

Green buildings and green façades have been explored and investigated significantly since the 1970s. However, the concept of self-support sustainability in design is the 21st Century concern. This *Living Skyscraper* shares a similar idea to Wakanda, where the urban landscape grows along with nature. Over the years, the growing tree built upon the structure would hold the value of place and time, and it would bring about the sense of locality of the future, which would help reduce the internationalist redundancy in architecture.

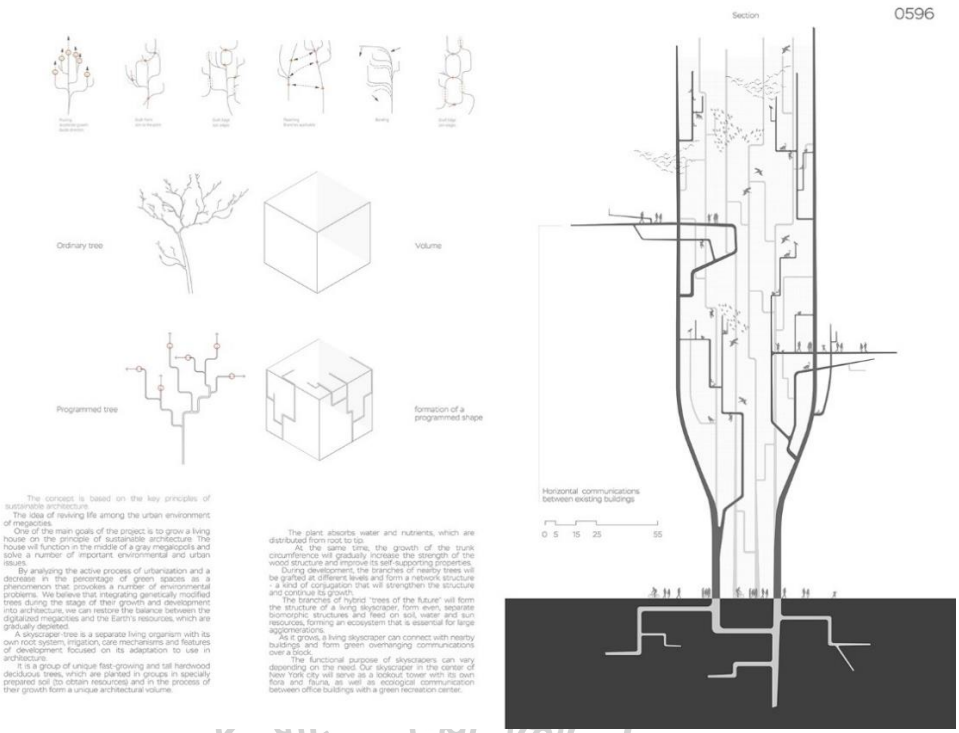

Figure 78 Living Skyscraper For New York City (Lesiuk et al., 2021)

Retrieved from https://www.evolo.us/living-skyscraper-for-new-york-city/

4.2.3 a) DNA Influential Direction

Since the late seventieth to late ninetieth, the awareness of environmental impacts has been provoked significantly from this period. The 42nd president of the United States of America, Bill Clinton, declared the Greening of the White House measures on Earth Day 1993 (ClintonWhiteHouse, n.d.). According to Clinton's White House website, the seven categories of greening action consist of *Building Envelope, Lighting, Heating-Ventilation and Air Conditioning (HVAC), Plug Loads, Waste, Vehicles and Landscaping* (ClintonWhiteHouse, n.d.).

Consequently, the prominent greening actions mainly relate to materiality in construction and methods for managing energy. The visuals characters of the buildings aim to control natural resources such as daylight and wind by maximising the usage of construction materials.

4.2.3 b) Architectural Influence

From the 1970s to the 1990s, the style of architecture is full of concrete and less sign of life. At the same time, many science fiction genres in novels, comics or moving pictures mentioned possibilities of how the future could embrace a greener vision of architecture.

In *Black Panther (Stan Lee, 1966),* the city of the East African nation, *Wakanda* (Malkin, 2018), characterised how the future of urbanism and vernacular architecture could blend in together. Flora and fauna have appeared in the structures, and greens are essential for displaying fertility and a hopeful future in the hyper-futuristic reality. The visionary of how the futuristic metropolis coexists with the environment is depicted through the film. The ecosystem of the structure gives a digitalized but sustainable appearance to the city.

"There is density in Wakanda, but it does not seem oppressive. I immediately saw urbanism at all scales. I saw tall towers, I saw midrise towers, and I saw human-scale urbanism. It looks like regional architecture as opposed to this anywhere-ness that we seem to have in our global architecture these days. I saw an architectural expression that was not only organic but of its place and of its culture." Brent Toderian, a formal Vancouver's chief planner and an urbanist, gave an opinion on Black Panther in an Architectural Digest article (Malkin, 2018)

Besides the human-scale urbanism, which Toderian mentioned, the evolvable structures that could grow with the city also relate to the conceptual thinking of a town like Wakanda. In the Marvel Universe Cinematic (MCU)'s Black Panther (Coogler, 2018), the message of living harmoniously with nature is constantly portrayed through conversation and visual designs in the film. Moreover, the local identity and advanced technology were integrated to show the city's vitality through the urban-landscape scenarios, as shown in the following figures.

Figure 79 Black Panther (Coogler, 2018)

Retrieved from https://www.architecturaldigest.com/story/5-things-you-didnt-know-about-black-panthers-kingdom-of-wakanda

Figure 80 Black Panther (Coogler, 2018)

Retrieved from https://www.architecturaldigest.com/story/the-real-life-possibilities-of-black-panthers-wakanda-according-to-urbanists-and-city-planners

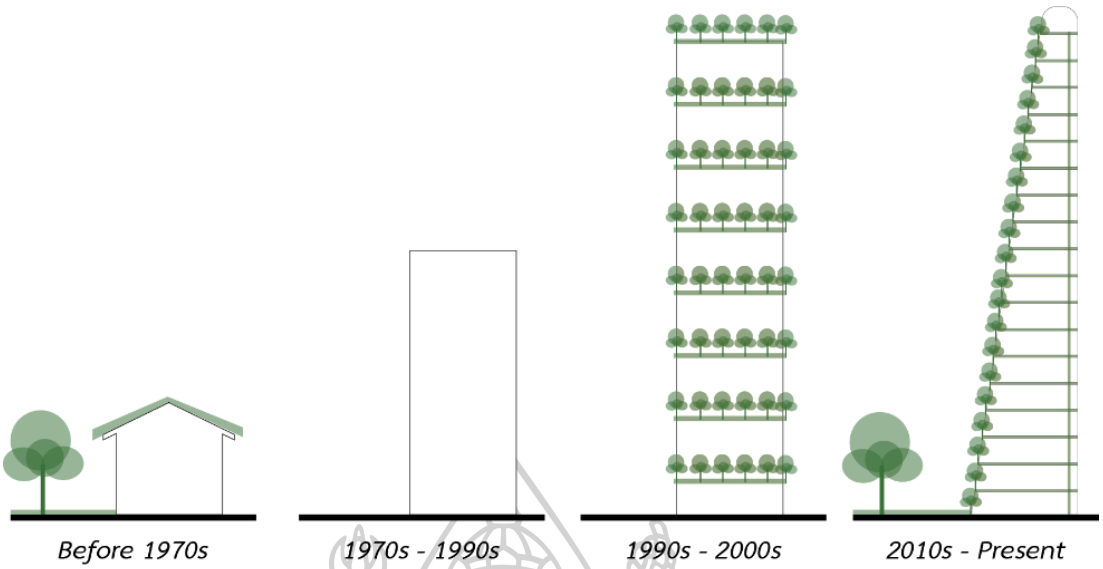

Figure 81 Development of Green Architecture

In conclusion, the development of green architecture and the relationship between building and planting has progressed throughout time. Before the 1970s, the building and greenery were distinct, which meant that planting was not embedded into the structure. Meanwhile, throughout the 1970s, green space was drastically diminished, coinciding with the environmental crisis. In comparison to the subject of sustainability, the function of architecture in establishing authority and making a political statement was more explicit. After the 1990s, a boost in environmental consciousness in regulations and designs has resulted in a significant increase in the merger of plantation importance onto structures.

Additionally, after the decade of the 2010s, technology and materials have advanced dramatically. Integration of plantations as a part of construction for sustainability and consideration of circular environmental management has become a norm for the future of architecture. Thus, *Living Skyscraper For New York City* is a sample of showing how green architecture has developed and influenced by moving pictures.

4.3 Residential 2: The Svart Hotel

Figure 82 The Svart Hotel (Snohetta, 2017 - 2019)

Retrieved from https://snohetta.com/projects/366-svart

4.3.1 Project's Detail

a) **Project Type:** Concept Design, Project Terminated

b) **Year Published:** 2017 – 2019 (planned to open in 2021)

c) **Architect(s)/Designer(s):** Snohetta

d) **Site Location:** Svartisen, Norway

4.3.2 Relationship between Architecture and Moving Pictures

a) **Functionality:** Residential Structure

b) **DNA Influential Direction:** from *"Moving Picture" to "Architecture"*

c) **Architectural Influence:** Formal Components

4.3.3 Analysis and Discussion

The Svart Hotel (spa and wellness consultant) is the World's first energy-positive off-grid destination to encourage people to protect and uphold nature. The self-sustainable resort aims to provoke and educate travellers through the local community (Svart, 2021). The architectural design adopted vernacular architecture as a symbol to connect community and natural surroundings while representing the city's unique identity.

The elegance of the natural environment is increased visually by applying different scales between humans and nature. The round form allows visitors to enjoy the panoramic views from every room and visit in privacy. This strategic design also applies in many space travel moving pictures such as *2001: A Space Odyssey (Kubrick, 1968)* and *Passenger (Tyldum, 2016).* The rotating spacecraft in the film depicts such a bold representation of humanity that it uplifts people through wonderous senses of space and time as though arriving at the new colony on another planet.

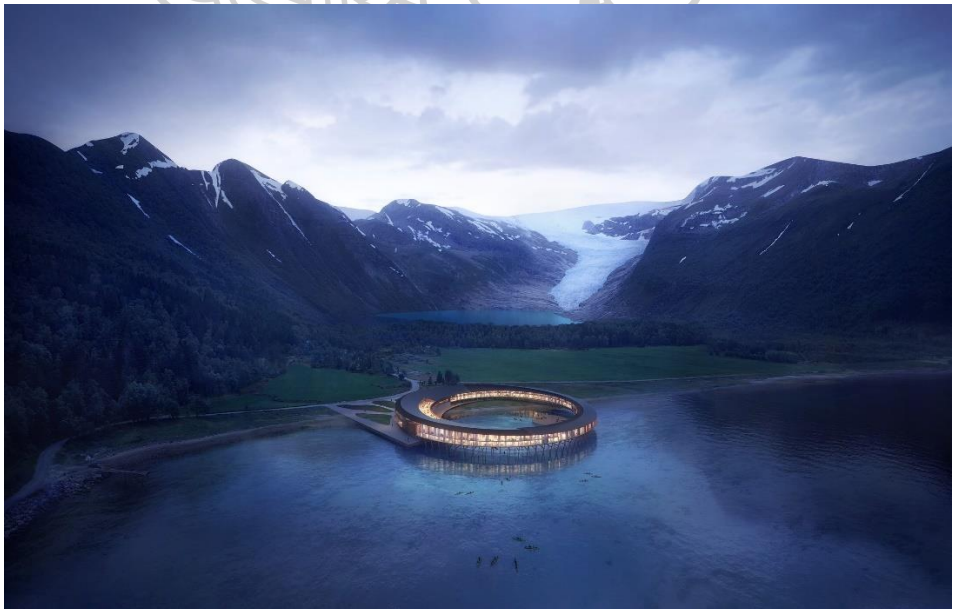

Figure 83 The Svart Hotel (Snohetta, 2017 - 2019)

Retrieved from https://snohetta.com/projects/366-svart

4.3.3 a) DNA Influential Direction

Besides the colours and lighting of the resort, the circular form of architecture has been seen in history, from vernacular architecture to spaceships in moving pictures. Its spiritual, magical and defensive symbolism is expressed in urban planning, religious places and ancient settlements (Bardzinska-Bonenberg, n.d.). Due to its social changes, the circle shape has been developed and reinterpreted over time. It becomes a plethora of functional, structural, aesthetics and prestige, and emotional supports (Bardzinska-Bonenberg, n.d.) Moreover, the circular shapes refer to the cosmic and futuristic vehicles and architecture in the moving pictures.

One of the examples of a circular settlement is *Fujian Tulou.* In 2018, UNESCO listed and described *Fujian Tulou* on their website; *"Fujian Tulou is a property of 46 buildings constructed between the 15th and 20th centuries over 120 kilometres in the southwest of Fujian province, inland from the Taiwan Strait … Several high storeys are built with an inward-looking, circular, or square floor plan as housing for up to 800 people each. They were built for defence purposes around a central open courtyard with only one entrance and windows to the outside only above the first floor. (UNESCO, 2018)"*

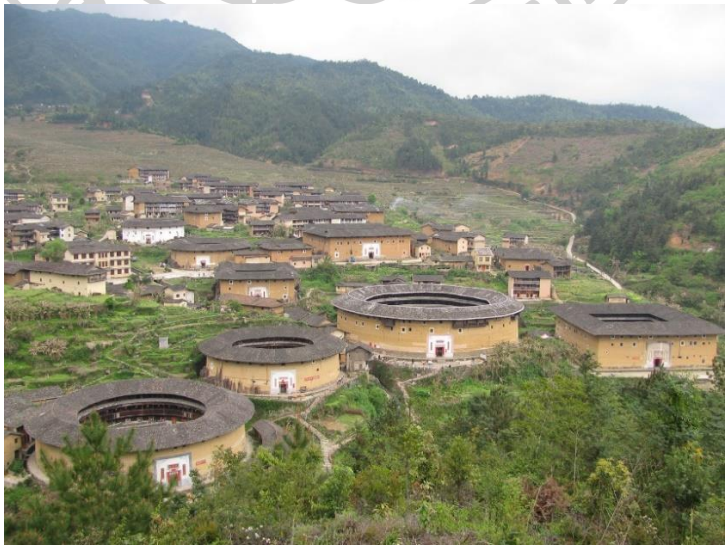

Figure 84 Fujian Tulou photo by Yee Tong Loh

Retrieved from https://socks-studio.com/2014/02/01/walls-as-rooms-4-the-hakka-tulou-community-housing-for-equals/

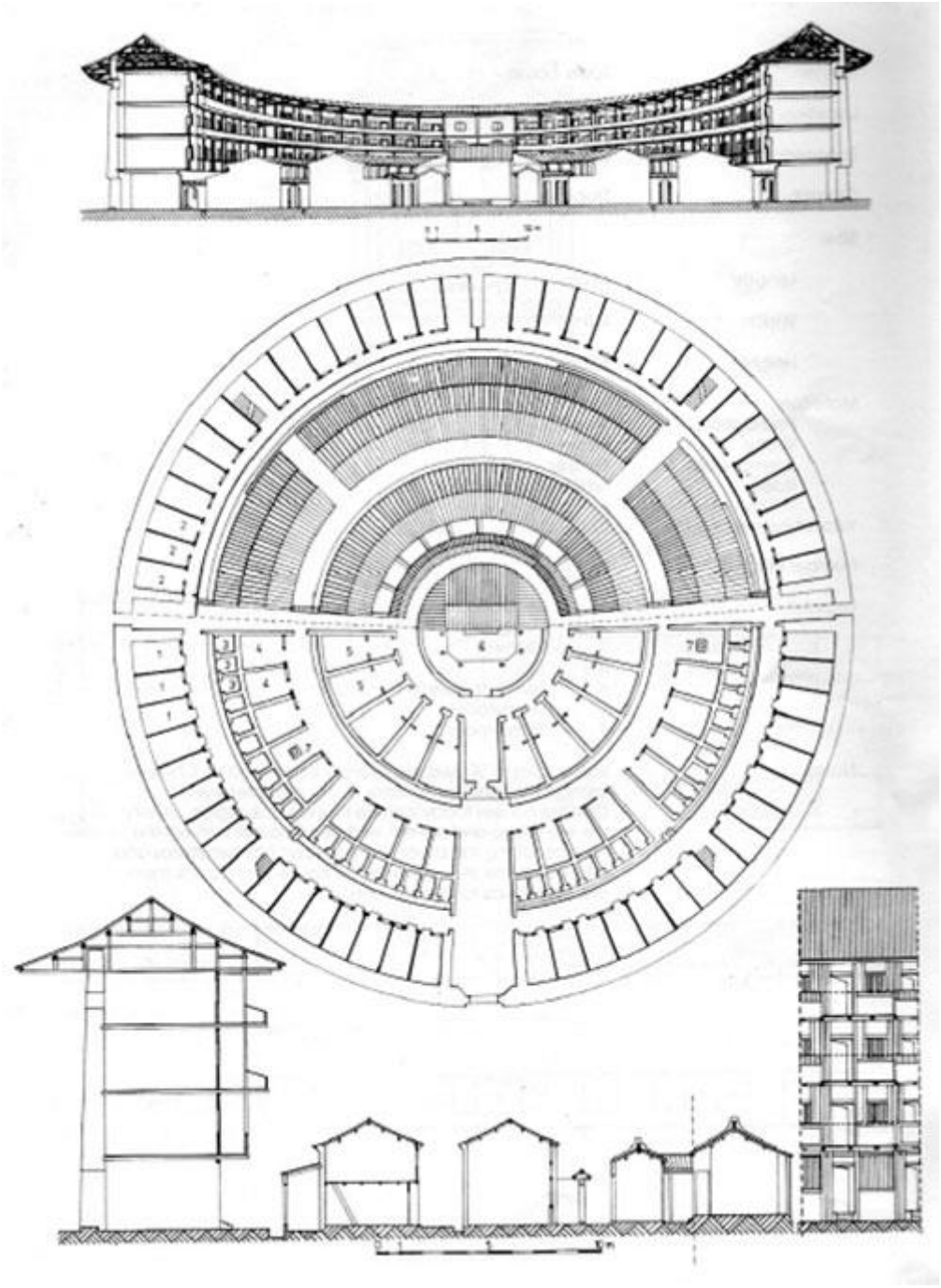

Figure 85 Typical Tulou communal dwelling in Southern China (elevation, plan, and section)
(Source: Michi Bier, "Asian Dwellings – A Typology", an exhibition catalogue published in 1991
Retrieved from https://socks-studio.com/2014/02/01/walls-as-rooms-4-the-hakka-tulou-community-housing-for-equals/

Figure 86 Passenger (Tyldum, 2016)

Retrieved from https://www.projectorreviews.com/benq/benq-ht3550-a-4k-uhd-home-theater-projector-with-dynamic-iris-summary/

On the other hand, the circular form in spacecrafts in science-fiction moving pictures has the opposite design with *Fujian Tulou* by its outward-looking surroundings. Due to the functionality requiring the different purposes. Tulou meant to be more defensive by blocking the visibility from outsiders, while vehicles need a vision for navigating and avoiding obstacles and dangers. Moreover, the film *Passenger (Tyldum, 2016)* depicted how tiny a human is compared to nature via a window frame.

The two instances above show that the circular form of architecture is not the main factor in determining its function. The size and location of windows are also essential components in defining interior space. It describes a sense of being a defensive shelter and protecting privacy and security to the residents or being a place for relaxation. Moreover, the definition of architecture is changed due to societal conditions and technological development.

The conceptual diagrams below depict plans and sections defining *Tulou* and *Svart Hotel's* residential units. They are not proportional to the actual space but rather convey the concept of window placement and its relation to rooms with human height. In consequence, it narrates the function of the architecture and the method of allowing natural light and energy to get inside the residential units.

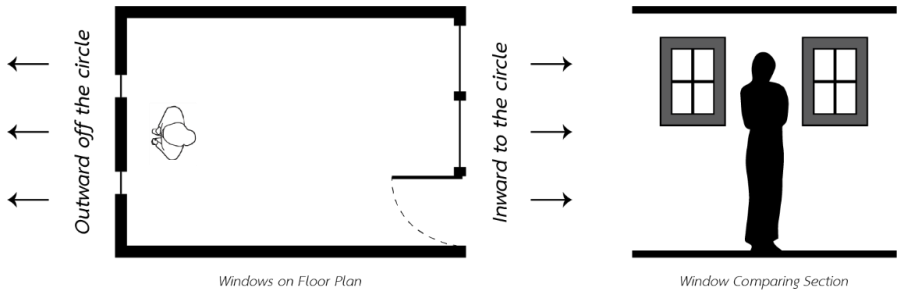

Figure 87 Conceptual Analysis Plan and Window Section of *Tulou*

In the first diagram of *Tulou*, windows on the exterior are facing outward of the circular shape of the architecture. Due to the function and its purpose to keep privacy and security to the dwellers. As the *Tulou* is the vernacular habitat community, all residential units face inward the courtyard in the circle. Windows that receive the natural light are taken from the courtyard area. In contrast, outward from the ring, the small windows on the external wall are employed to provide security, improve seclusion, and observe outside threats.

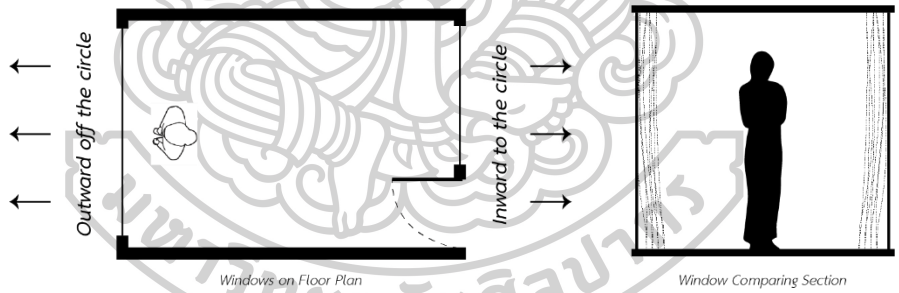

Figure 88 Conceptual Analysis Plan and Window Section of *Svart Hotel*

On the other hand, *Svart Hotel* needs to increase the maximality of panoramic views. As a result, the windows' materiality, scale, and function fundamentally oppose *Tulou's* windows. The large floor-to-ceiling windows are commonly found in places where the boundaries between interiors and exteriors are blurred. These window types are used by resort, office, and limited space rooms. It allows more natural light with the scenario of surroundings compared to the windows used in *Tulou*.

4.3.3 b) Architectural Influence

The advertised branding and design elements are intended to bring the distance between people and nature closer. Location nature preservation, innovation, technology integration, off-grid solution development, greenhouse farming, and a sustainable operation and comprehensive approach to the guest journey are the seven essential pillars of this hotel (Svart, 2021).

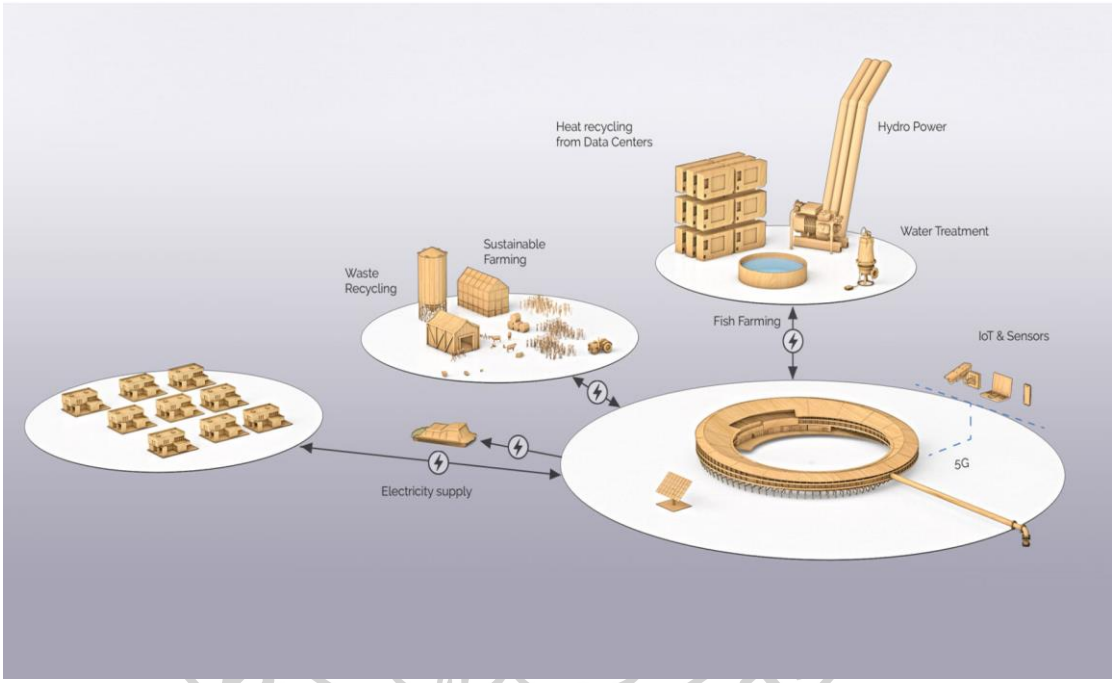

Figure 89 Off-Grid System Diagram of The Svart Hotel (Snohetta, 2017 - 2019)
Retrieved from https://www.svart.no/vision/

The Svart Hotel provided accommodation and associated activities such as farm to table and exclusive activities inside and outside the resort (GlobeTrender, 2020). The off-grid system enables each service to assist one another while also benefitting the local community. The design incorporates the idea of renewable energy by using nature-friendly materials on the rooftops, such as wood and solar panels, to minimise carbon footprints and energy consumption.

The hotel uses materials to provide insulation, warmth, and natural light into the architecture in terms of energy-saving exercise. The solar panels offer hydro energy reducing the carbon footprint, which becomes an energy source during summer (Chen, 2018). Similar automation and facilitative methods frequently appear in space travel stories where energy supplies are limited, and renewable resources are necessary for the journeys or missions to another planet. For example, in *The Martian (Scott, 2015)*, the film shows how humans can survive in insufficient resources based on the technology that helps manage water, air, electricity, and plantation. Moreover, the choices of the materiality of the spaceships are also adjustable to be a shelter for unexpected events.

Figure 90 Plantation on Mars - The Martian (Scott, 2015)

Retrieved from https://www.newscientist.com/article/dn28238-the-martian-the-science-of-surviving-a-space-catastrophe/

4.4 Residential 3: Jeddah Tower

Figure 91 Jeddah Tower (Smith and Gill, 2010)

Retrieved from https://edition.cnn.com/style/article/jeddah-tower-saudi-arabia-new/index.html

4.4.1 Project's Detail

a) **Project Type:** Concept Design, Project Terminated

b) **Year Published:** 2010 - Present

c) **Architect(s)/Designer(s):** Adrian Smith + Gordon Gill Architecture

d) **Site Location:** Jeddah, Saudi Arabia

4.4.2 Relationship between Architecture and Moving Pictures

a) **Functionality:** Residential Structure

b) **DNA Influential Direction:** from *"Architecture"* to *"Moving Picture"*

c) **Architectural Influence:** Technological Advancement

4.4.3 Analysis and Discussion

Figure 92 Residential Concept in the Jeddah Tower

Retrieved from https://thejeddahtower.org/the-tower/

According to the official website of *the Jeddah Tower,* this building functions as the city's business centre. This complex tower serves three primary functions: *residential, commercial,* and *tourism.* The residential area separates into four tiers based on luxury and convenience. The premium services and designs seek to attract inbound and international travellers to stay at this fully equipped building. It is not only the architecture that serves the purposes mentioned above but also aims to support the city's economy and local citizens.

4.4.3 a) DNA Influential Direction

Skyscrapers have been a symbol of capitalism and urbanisation for more than a century in human history. The architectural design conveys several meanings to its landscape, imagery, technology, economics, and politics. The gigantic skyscrapers soaring above the cloud level in the Aerium are not only built with cutting-edge technology, and it also allows inhabitants on the upper floors to avoid seeing or living with citizens who dwell under the cloud floor (Gilmore, 2019).

Figure 93 The Aerium in Altered Carbon (Kalogridis, 2018)
Retrieved from https://www.vaultofculture.com/vault/towering/aerium

In *Altered Carbon,* the cityscape is filled with sky-high buildings where height is not the only factor to identify its meaning to the whole neighbourhood. The visual forms of the structures in *the Aerium*[6] looks like a skeleton structure with abstract bone-like visuals. Although this creation seems like uncompleted designs, it illustrates how skyscrapers could express its luxury and uniqueness in such complete contrast to other surrounding buildings in the city.

[6] The area of the most luxurious area in *Altered Carbon (Kalogridis, 2018)*

Figure 94 Kovacs watches the city Altered Carbon *(Kalogridis, 2018)*

Retrieved from https://www.vaultofculture.com/vault/towering/aerium

The growing density of towers alters the urban-landscape scenario. Lights in each window represent the vitality generated by the vertical community, and humans look tiny compared to these phenomena of organic mechanisms in the metropolis. The RGB (Red, Green and Blue) colours represent the digital age in the same way as how it is used in the overall digital design. These scenarios are often derived, adapted and depicted as a distant future of our digital world where virtuality and reality collide.

Figure 95 Skyscrapers under the cloud level Altered Carbon (Kalogridis, 2018)

Retrieved from https://www.vaultofculture.com/vault/towering/aerium

4.4.3 b) Architectural Influences

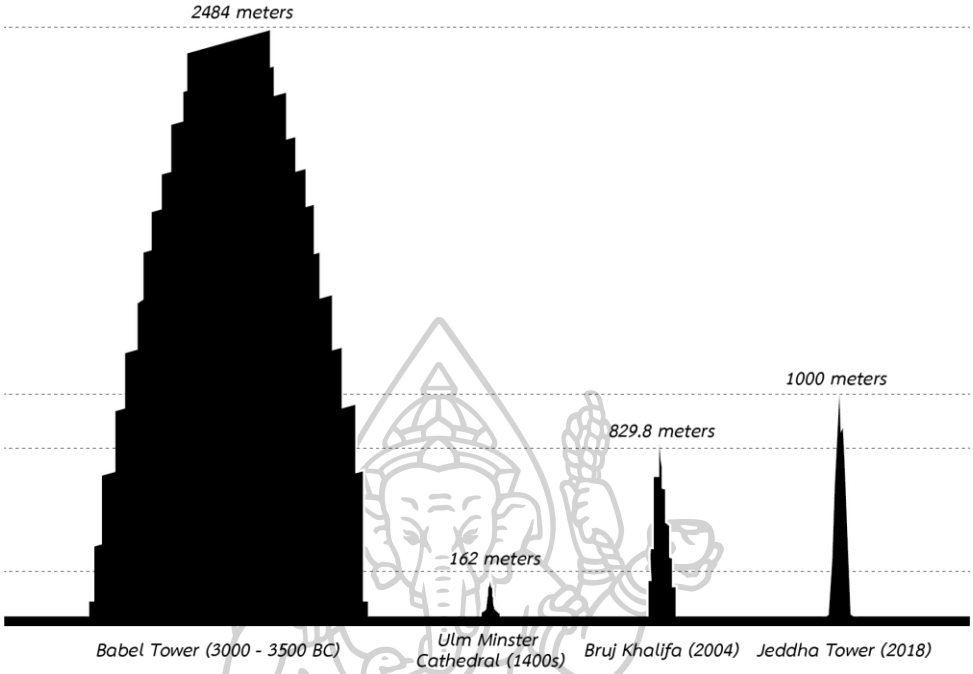

Figure 96 Factors of Height Diagram – Examples

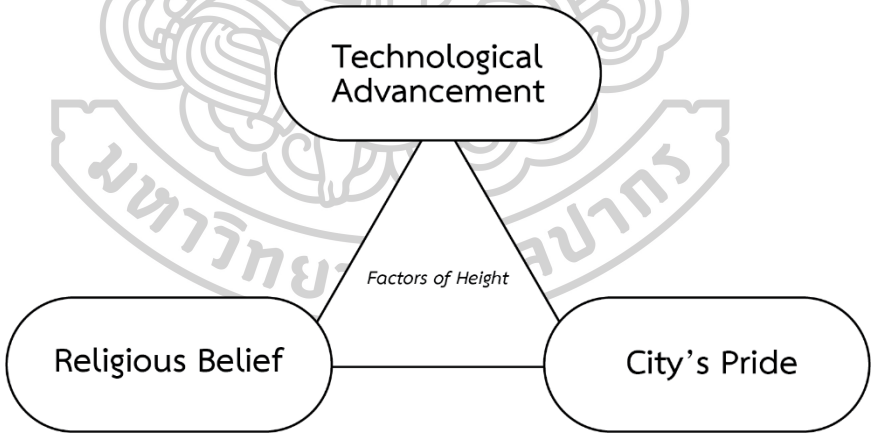

Figure 97 Factors of Height Diagram

Humans always try to achieve the highest height, with the three factors evolving from time to time. First, as appeared in the religious architecture, *Babilon Tower (3000 – 3500BC)* and the gothic cathedral, *Ulm Minster Cathedral (the 1400s),* are *religious belief* evidence of the concept *that the higher a building, the closer distance to god.*

Secondly, the referred conception reflects that the higher the height is, the more it needs to rely on construction technology such as materials, engineering and simulating for safety and durable architecture. Lastly, after capitalism arrived, the height of a building became the city's pride, also as the or a symbol of the economic progression and construction technology. It appeared in *Metropolis (Lang, 1927)* and *Altered Carbon (Kalogridis, 2018)* that skyscrapers symbolise the civilization of ultra-modern cities. Moreover, *Burj Khalifa (2004)* and *Jeddha Tower (Smith and Gill, 2010)* are the buildings that hold the same statements as they appeared in the mentioned moving pictures.

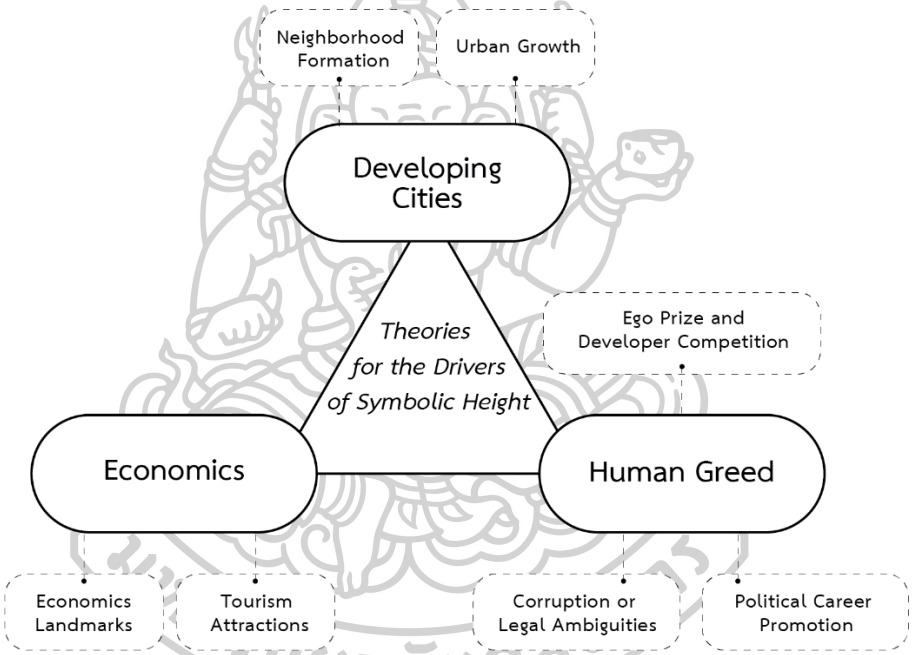

Figure 98 Adapted Diagram of Theories for the Drivers of Symbolic Height (Barr, 2019)

Jason M. Barr said in *The Economics of Skyscraper Height (Part II)* essay with seven hypotheses (Barr, 2019) that associated three categories of developing cities, economics, and human greed in his article of *Theories for the Drivers of Symbolic Height.* Thus, when comparing two models, the Factors of Height Diagram and Barr's Theories, it becomes apparent in the fact that whichever contribute to the making of this supreme height are not only restricted to a mere architectural image but also exemplifies the ongoing aspects of societal changes.

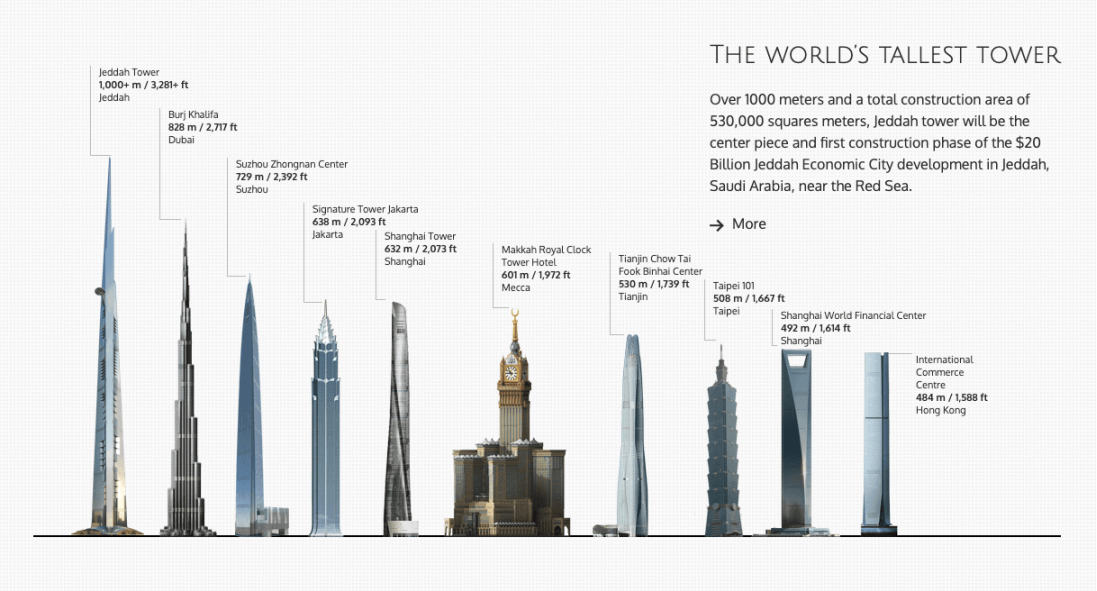

Figure 99 The World's Tallest Tower

Retrieved from https://thejeddahtower.org/

Lastly, *Jeddah Tower* is a pending project that would be the world's tallest building at approximately one thousand meters high in the early 2020s (Lo, 2018). This building might resemble the ultimate upscale neighbourhood in *Altered Carbon (Kalogridis, 2018)*, known as *the Aerium.* The above-cloud positioning would heighten feelings of luxury and exclusivity compared to other residential areas. While *Jeddah Tower's* height still cannot reach highest as the height of *Babel Tower* for the approximate height of two kilometres, indicated by Professor J.E. Gordon in *Structures or Why Things Don't Fall Down (1991),* (Encyclopedia, n.d.) the Jeddah Tower undoubtedly symbolises the eager of mankind which wants to achieve the *Modern Babel Tower.*

4.5 Residential 4: The Future Tower

Figure 100 The Future Tower (MVRDV, 2018) Photo by Ossip van Duivenbode

Retrieved from https://www.archdaily.com/906774/future-towers-mvrdv

4.5.1 Project's Detail

a) **Project Type:** Constructed Project

b) **Year Published:** 2018

c) **Architect(s)/Designer(s):** MVRDV

d) **Site Location:** Pune, India

4.5.2 Architectural relations in moving pictures and the design

a) **Functionality:** Residential

b) **DNA Influential Direction:** from *"Architecture" to "Moving Picture"*

c) **Architectural Influence:** Formal Component

4.5.3 Analysis and Discussion

MVRDV's *The Future Tower* seeks to create a community that appreciates diversity and embraces individuals from all backgrounds. Construction budget limitations and space layout influenced the mountain-like structure. Due to the broad floor area ranging from 45 to 450 square meters, this architecture reimagines the city and draws more young people, elders, and new extended families (Griffiths, 2018).

Figure 101 Hong Kong Sky (Architecture of Density, 2003)

Retrieved from https://www.fastcompany.com/1681772/the-mesmerizing-skyscrapers-of-hong-kong-in-eerily-beautiful-close-up

In the moving picture such as *Metropolis (Lang, 1927), Blade Runner (Villeneuve, 2017, Scott, 1982), Altered Carbon (Kalogridis, 2018)*, and *Space Sweepers* (Jo, 2021) mentioned the societal problems, especially the overcrowded population reflected through the walls of skyscrapers in the city. As mentioned in the

second chapter, the architectural clue in *Metropolis* portrays an urban setting where skyscrapers are continuously erected like a mountain and flying birds are replaced with aviation hovering in the sky (Nakmontanakum, 2022). The prediction from the movie, Metropolis, shows the reciprocation of architecture that could trace back to the problems, societal conditions and progression of technologies that shift the definition of 'future architecture' through time. *The Future Tower* (MVRDV, 2018) answers the need for more cost-effective construction and lower power use by reinventing building orientation and design while referring to buildings that appeared in the moving pictures mentioned earlier.

4.5.3 a) DNA Influential Direction

In terms of sculpture, *The Future Tower (MVRDV, 2018)* recalls *the Tyrell Building* from *Blade Runner (Scott, 1982)* since it is designed like a mountain or ziggurat. These structures serve as city landmarks, allowing people to distinguish specific locations from other architectural construct in the city.

Figure 102 (Left) *The Future Tower (MVRDV, 2018)*

Retrieved from https://www.dezeen.com/2018/12/06/mvrdvs-future-towers-low-cost-accommodation-india/

Figure 103 (Right) Tyrell Building in Blade Runner (Scott, 1982)

Retrieved from https://readyplayerone.fandom.com/wiki/Tyrell_Building

4.5.3 b) Architectural Influences

Due to the high construction cost, elevators are limited to the four vertical cores, which function as the primary internal circulations (Griffiths, 2018). Stairs and corridors are used as primary methods for moving from one place to another. This approach provides a sense of community while also preserving energy and electricity. The planning design of *The Future Tower* might perhaps be inspired alongside a layout design of spacecraft where materials and resources are restricted.

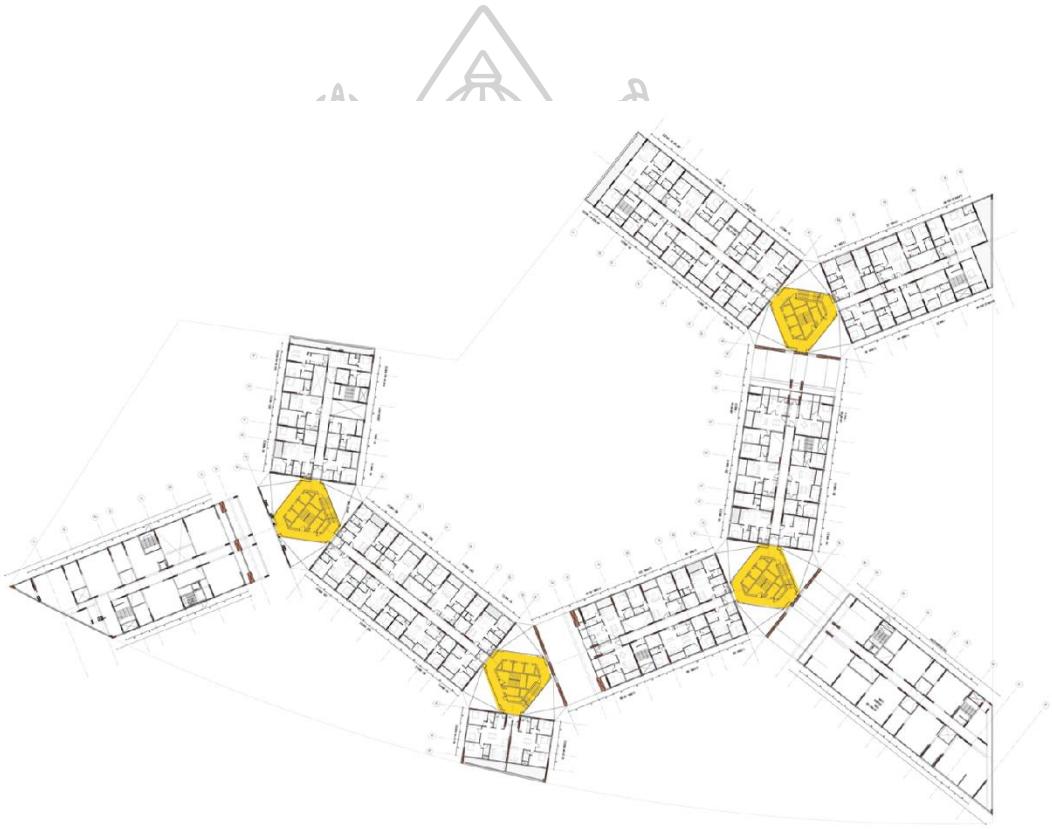

Figure 104 *The Future Tower Plan (MVRDV, 2018)*

Retrieved from https://www.archdaily.com/906774/future-towers-mvrdv/5bfef31208a5e5220900030a-future-towers-mvrdv-floor-plan

4.6 Non-Residential 1: Qianhaiwan Tower

Figure 105 Qianhaiwan Tower (Sou-Fujimoto-Architects, 2021)

Retrieved from https://www.yankodesign.com/2021/06/18/this-exquisite-aerial-tower-with-99-floating-islands-by-sou-fujimoto-architects-visualizes-our-diverse-future/

4.6.1 Project's Detail

a) **Project Type:** Concept Design, Project Terminated

b) **Year Published:** 2021 - Present

c) **Architect(s)/Designer(s):** Sou Fujimoto Architects

d) **Site Location:** Qianhaiwan, China

4.6.2 Architectural relations in moving pictures and the design

a) **Functionality:** Entertainment Tower

b) **DNA Influential Direction:** from *"Moving Picture"* to *"Architecture"*

c) **Architectural Influence:** Technological Advancement

4.6.3 Analysis and Discussion

The material of the pillars as a conceptual framework imitates water flow, giving the upper deck the appearance of floating in the sky. It gives an impression of a mysterious spaceship or aliens' sculpture spire. This skyscraper's avant-garde architecture with Sci-Fi appearance makes it one of the *Qianhaiwan's* attractions (MCNULTY-KOWAL, 2021).

4.6.3 a) DNA Influential Direction

There often are scenes in each moving picture in the science fiction genre showing the part of a city's entertainment area. The area could deliver society's positive or negative side, which sometimes encourages many illegal activities.

The formal designs of entertainment places are generally outstanding and instantly matching its very function of the building. The *Qianhaiwan Tower* is an entertainment venue with a restaurant, exhibition area and café. It is ironnically reminiscent to *Head In The Clouds* in *Altered Carbon (Kalogridis, 2018)*, serving as exclusive houses for an array of illegal activities.

Figure 106 Head In The Clouds in Altered Carbon (Kalogridis, 2018)

Retrieved from https://altered-carbon.fandom.com/wiki/Head_in_the_Clouds

Still, *Head in the Clouds* represents a negative entertainment business with illegal activities. However, in terms of design, this spaceship delivers the message of exclusivity of welcoming only flying vehicles, and where only the true elites and the wealthy can aspire upon. On the contrary, *Qianhaiwan Tower* was designed to be more friendly, pedestrianised, and welcoming people to experience an entire building through an act of walking.

4.6.3 b) Architectural Influences

Figure 107 Qianhaiwan Tower (Sou-Fujimoto-Architects, 2021)

Retrieved from https://www.yankodesign.com/2021/06/18/this-exquisite-aerial-tower-with-99-floating-islands-by-sou-fujimoto-architects-visualizes-our-diverse-future/

Qianhaiwan Tower is a gigantic structure that makes humans appear insignificant when looking from a far distance. The technological advancement in construction and materials allows the building to appear floating with the illusion of a water-falling effect. This tower's main activities perform as a tourist attraction, an exhibition area, a restaurant, and a café. The space is separated into two sections: one is beneath the water's surface and another on the upper deck, 268 metres above sea level (MCNULTY-KOWAL, 2021). People can access and enjoy the tower at the bay together with the prior two mentioned areas.

Moreover, the tower has similar roles and impacts on the city as skyrises. Referring to *Factors of Height (Nakmontanakum, 2022)* and *Theories for the Drivers of Symbolic Height (Barr, 2019), Qianhaiwan Tower* benefits the city by demonstrating technological advancement to attract tourism which eventually supports the economics of the area.

4.7 Non-Residential 2: Horizon Home

Figure 108 Horizon Home by Meta (Facebook)

Retrieved from https://www.youtube.com/watch?v=vstZcYVzLgc

4.7.1 Project's Detail

a) **Project Type:** Conceptual Project

b) **Year Published:** 2021

c) **Architect(s)/Designer(s):** Meta (Former Facebook)

d) **Site Location:** United States

4.7.2 Architectural relations in moving pictures and the design

a) **Functionality:** Virtual Home

b) **DNA Influential Direction:** from *"Moving Picture"* to *"Architecture"*

c) **Architectural Influence:** Technological Advancement

4.7.3 Analysis and Discussion

Horizon Home is the ultimate idea of combining home with virtual experiences such as Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (XR). This virtual home is designed under the ideation of *Metaverse,* where simulated environments are unified (XRToday, 2021). Horizon Home is a future vision of a new form of social space where people can interact and communicate with multiple dimensions of sensorial perception.

4.7.3 a) DNA Influential Direction

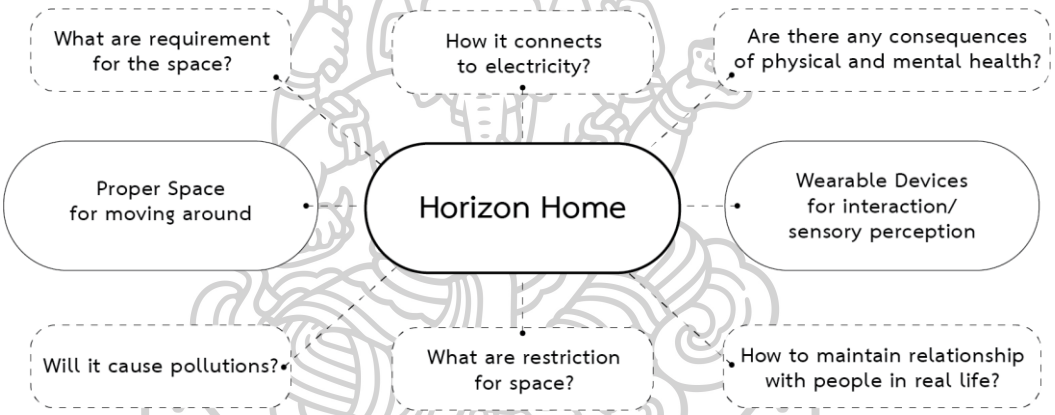

Figure 109 Questions for Horizon Home Development

In developing *Horizon Home*, architectural qualities must provide users with a safe and proper space to move around in physical and virtual worlds. It also relates to the configuration of devices to generate a convincing sensory experience, including seeing, touching, and hearing. Based on the existing products available in the market, such as Oculus goggles, an interaction among people will not be physically gathered, remaining isolated as how people experience via screening devices during its early phase of public usage. Thus, it raises questions about how architects and other professions could avoid an inevitably depressing future between humanity and technology as predicted in moving pictures such as Black Mirror (Brooker, 2011) and Minority Report (Spielberg, 2002).

According to the historical review, humanity has mentioned living in virtual reality since the 1960s. It was a fantasy for people who wished to escape the existing reality. The innovative visions of virtual living have been developed and explored, as evidenced in moving pictures such as *Logan's Run (Anderson, 1976), Tron (Lisberger, 1982), Matrix (Wachowskis, 1999) v* and *Altered Carbon* (Kalogridis, 2018). However, Black Mirror (Brooker, 2011) and Ready Player One (Spielberg, 2018) are the most controversial moving picture. In comparison, Black Mirror depicts the world and societies that have been immersed in extreme advancements in technology (Aninditya, 2021, Heritage, 2021). At the same time, Ready Player One has been discussed how Metaverse could be more realistic by showing how the space is occupied while the users goes online.

Figure 110 Ready Player One (Spielberg, 2018)

Retrieved from https://www.vox.com/culture/2018/3/22/17140312/ready-player-one-movie-adaptation-bad-good

4.6.2 b) Architectural Influences

Horizon Home required the digital architecture to participate in the platform to create the scenario for users. The technologies for creating these virtual environments were mentioned in the third chapter, which includes computer-aided designs (CAD), computer-aided manufacturing (CAM) and Digital Twins (RedShift, 2021).

Although it is the virtual reality, the design still needs to be worked out in the same rigorous way as how an architectural practice is achieved. Moreover, some technology, such as augmented reality (AR) and mixed reality (XR), still require the physical space to exhibit the design in conjunction with the virtual world itself. A digital architecture needs to be simulated and tested for its complicated design before manufacturing in the physical world, but with more creativity and less restriction from gravity or physics.

However, the virtual worlds rely on computers' performance and ability to allow people to create and experience dedicated details. Thus, to deliver the experience as how it appears in the film like Ready Player One, it is still necessary to wait further until the performance and cost of production become comparable and thus more competitive.

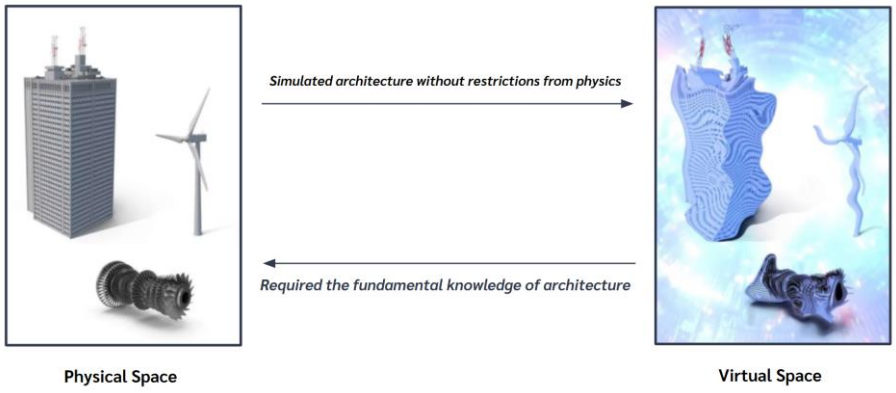

Figure 111 Adapted Digital Twins Relationships Diagram (RedShift, 2021)

Retrieved from https://redshift.autodesk.com/what-is-a-digital-twin/

4.8 Non-Residential 3: Ping An Asset Tower-

Figure 112 Ping An Asset Insurance Tower

Retrieved from https://www.ai-o.com/project/ping-an-asset-tower/

4.8.1 Project's Detail

a) **Project Type:** Conceptual Project

b) **Year Published:** 2022

c) **Architect(s)/Designer(s):** AI-O

d) **Site Location:** Shenzhen, China

4.8.2 Architectural relations in moving pictures and the design

e) **Functionality:** Office Tower

a) **DNA Influential Direction:** from *"Moving Picture"* to *"Architecture"*

b) **Architectural Influence:** Formal Component

4.8.3 Analysis and Discussion

Ping An Asset Insurance Tower is a structure incorporating 21st-century traits, such as environmental sensitivity and a people-centred design (AI-O, n.d.). The building provides open space that seamlessly combines the private areas into and within the fabric of public environment. It enables people and nature to flourish and circulate throughout the city in the same manner as they do within the building.

The philosophy of *Ping An Asset Insurance Tower* is set in opposite characters to the skyscrapers seen in *Metropolis (Lang, 1927).* High-rise structures are a sign of capitalism and a micro-independent metropolis, with the interior space separated from the cityscape. The tower represents buildings in a century after the film was published, and it demonstrates how the idea and image of high-rises have evolved through time.

Figure 113 Ping An Asset Insurance Tower

Retrieved from https://www.ai-planetworks.com/high-planet/ping-an-asset-insurance-tower

4.8.3 a) DNA Influential Direction

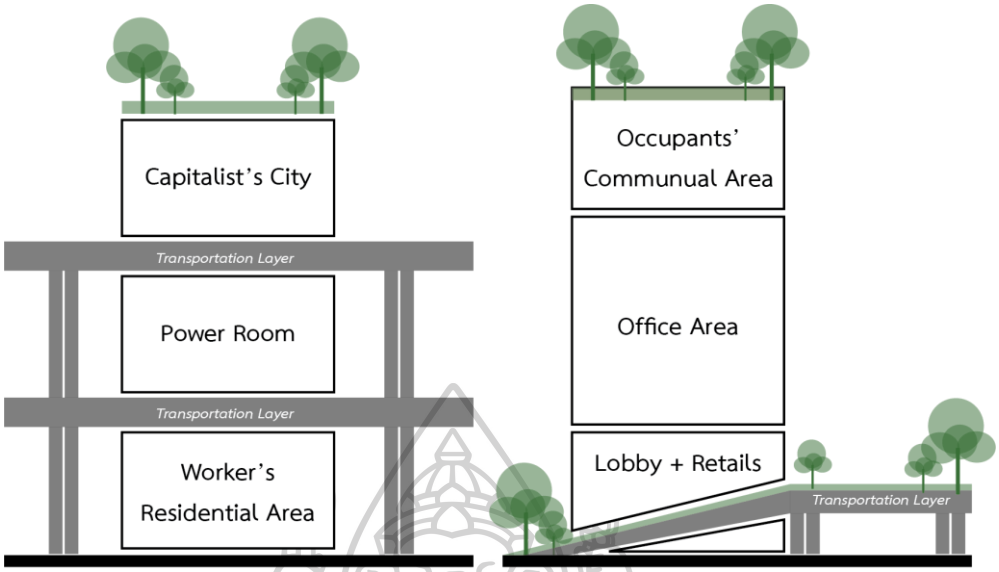

Figure 114 Comparison Diagrams of Skyscraper's Functionality

As mentioned earlier, Ping An Asset Insurance Tower allows people and nature to become a united component of the opening area of the property, in contrast to the buildings in *Metropolis (Lang, 1927).* The above diagrams compare the building structures and functionalities between the two skyscrapers with different contexts of time and societal interpretation.

The city of *Metropolis* is separated into three distinct sections: the capitalist's city, the power room, and the worker's residential area. The movie demonstrates socials hierarchies through the functionalities that appears in the different levels of the city. As a result, it demonstrates the inequality in an urbanscape, where greenery is restricted only for access by the wealthy.

On the contrary, a century later, the world is attempting to establish a sustainable future in which people and nature can coexist. Ping An Asset Insurance Tower is an example of how a structure may be harmoniously integrated with its surroundings through the well-designed urban planning, green landscape, and community spaces.

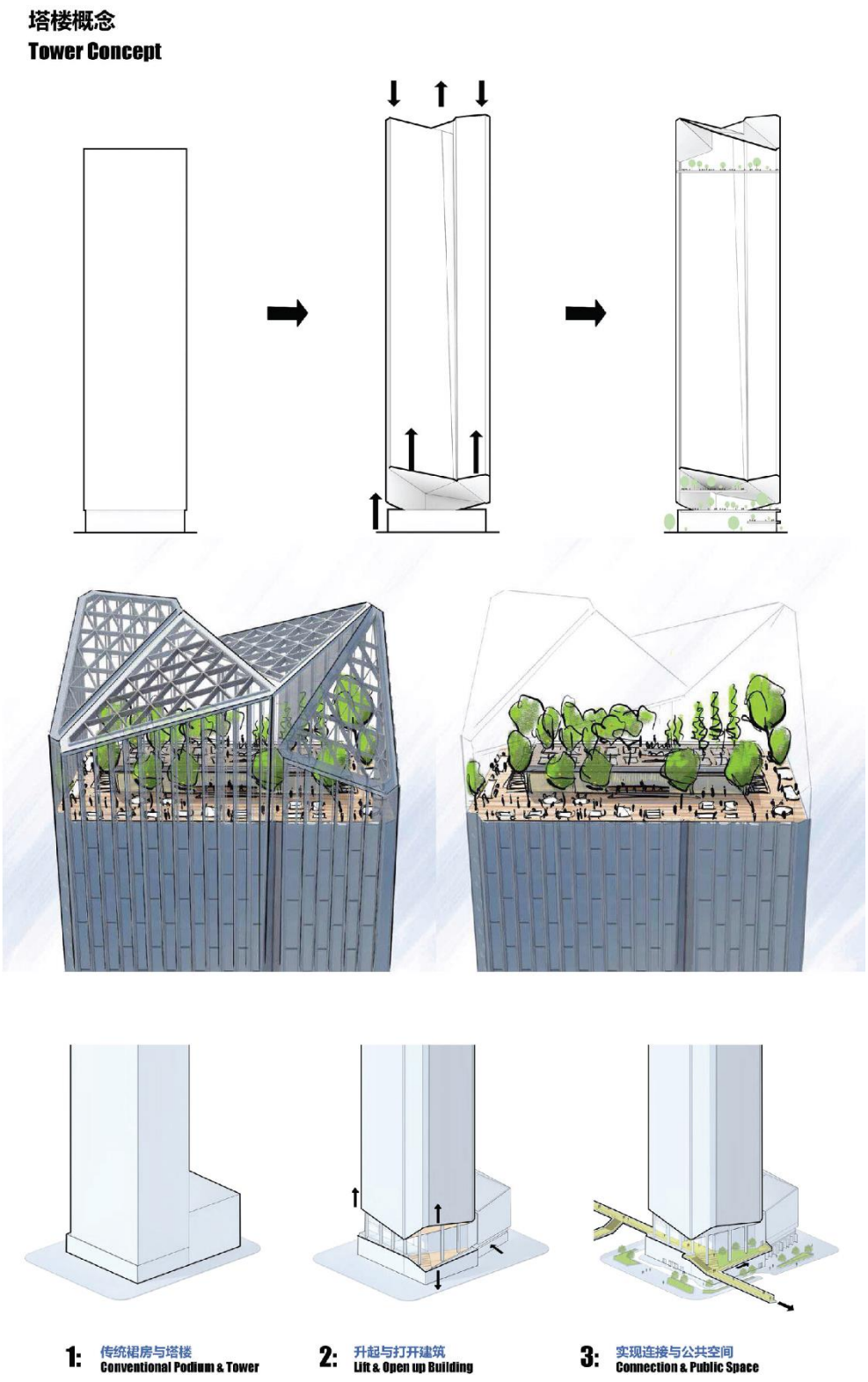

Figure 115 Tower's Concept - Ping An Asset Insurance Tower

Retrieved from https://www.ai-planetworks.com/high-planet/ping-an-asset-insurance-tower

4.8.3 b) Architectural Influences

Figure 116 Comparison between Metropolis (Lang, 1927) and Ping An Asset Insurance Tower[7]

The towers in *Metropolis* demonstrated depression and desperation of the future when it overlapped with wartime and the crashing of the global economy. Thus, the movie reflects the dystopian version of the future and describes the nightmare of capitalism.

On the other hand, Ping An Asset Insurance Tower is an example of how architecture may prevent a nightmare from happening since architecture can establish raw innovative representations so to acknoledge any conditions of our future and can educate users through its sustainable deigns. Access to nature shown beniefits to enhance sleep, reduce stress, boost happiness, reduce negative emotions, encourage pleasant social interactions, and even help people find purpose (Douglas and Douglas, 2021).

Unlike the skyscraper in *Metropolis*, the tower introduces natural light and green space while using lighter materials for construction. At the same time, buildings in the film are bulky with concrete material and its external envelope consist of confined windows. Thus, architecture in the twenty-first century should respond to both physicality and mentality of humans issues occurring in the world.

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[7] *(LEFT) Metropolis* ***Metropolis****, 1927. Directed by LANG, F. Germany.*
Retrieved from http://www.filmwalrus.com/2014/03/film-atlas-germany-metropolis.html
(RIGHT) ***Communal Rooftop's Ping An Asset Insurance Tower***
Retrieved from https://www.ai-planetworks.com/high-planet/ping-an-asset-insurance-tower

4.9 Non-Residential 4: Powerhouse Telemark

Figure 117 Powerhouse Telemark (Snohetta, 2020)

Retrieved from https://snohetta.com/project/523-powerhouse-telemark-a-sustainable-model-for-the-future-of-workspaces

4.9.1 Project's Detail

a) **Project Type:** Constructed Building

b) **Year Published:** 2020

c) **Architect(s)/Designer(s):** Snøhetta

d) **Site Location:** Porsgrunn, Norway

4.9.2 Architectural relations in moving pictures and the design

a) **Functionality:** Workplace

b) **DNA Influential Direction:** from *"Architecture"* to *"Moving Picture"*

c) **Architectural Influence:** Formal Component

4.9.3 Analysis and Discussion

The Powerhouse Telemark is an office building with a diamond-cut shape. Each surface of the building's façade serves a distinct purpose for the structure. The solar cell was almost entirely installed on the South-East facing façade, which can produce 256,000 kWh per year. In contrast, the West, North-West, and North-East façades are clad with wooden balusters that provide natural shade and insulation (Snohetta, 2020).

4.9.3 a) DNA Influential Direction

The *Powerhouse Telemark's* prominent feature is the building's solar energy usage. Since *Edmond Becquerel*, a French physicist, discovered the photovoltaic phenomenon in 1839, the solar cell has been studied and evolved for almost two centuries (Smithsonian, n.d.). In 1973, the University of Delaware created one of the first solar buildings with a solar rooftop, *Solar One* (Smithsonian, n.d.). Simultaneously, scientists, critics, architects, and artists have attempted to maximise the use of this renewable energy through various products, studies, publications, and moving images.

Star Trek (Roddenberry, 1966), 2001: A Space Odyssey (Kubrick, 1968), Star Wars (Lucas, 1977), the Martian (Scott, 2015), and *Space Sweepers (Jo, 2021)* are all discussed directly or indirectly of how those spacecraft may self-power and rely on solar power. *"Above Earth, there's no day and night cycle and no clouds or weather or anything else that might obstruct the sun's ray, so a constant power source is available", said Ali Jajimiri,* professor of electrical engineering at the California Institute of Technology (Snowden, 2019). The quote backs up the theory that moving pictures in the science fiction genre, particularly those with a space-age theme demonstrate how technology could realistically evoke a direct interaction between people and architecture.

4.9.3 b) Architectural Influences

Figure 118 Powerhouse Telemark (Snohetta, 2020)[8]

Unlike architecture, a vessel can travel and receive power from the sun on all surfaces because of its mobility. Construction on Earth must be meticulously analysed and developed to maximise the ability of solar cells usages. *Powerhouse Telemark* embraced the skewed and tilted façades for the different objectives. The East-facing façade gives an expression toward the context of Herøya industry park with 45 degrees tilting notch. Moreover, 24 degrees sloping roof gains the maximum solar power from *Energy Producing Façade (Pintos, 2020).*

As a result, the tilted façade provides the illusion of being tilted, and the ground is not flat. The illusion creates a futuristic atmosphere that resembles the dramatic moment as though a vehicle could takes off from the ground. Furthermore, the angled façades allow for more natural light during the day, which is one of the effective energy-saving strategies in this building.

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[8] [LEFT] Elevation Drawing of Powerhouse Telemark

Retrieved from https://www.archdaily.com/950507/powerhouse-telemark-snohetta/5f9b0aa163c017d535000172-powerhouse-telemark-snohetta-elevation?next_project=no

[RIGHT] Interior of Powerhouse Telemark

Retrieved from https://snohetta.com/project/523-powerhouse-telemark-a-sustainable-model-for-the-future-of-workspaces

4.10 Epitomizing Cases of Influences Between Architecture and Moving Pictures

Architecture	*Functionality*	*DNA Influences*	*Influential Inclinations*	*Moving Pictures*
Living Skyscraper (Lesiuk et al., 2021)	Residential	**Moving Picture** to Architecture	Technology	**Black Panther (Coogler, 2018)**
The Svart Hotel (Snohetta, 2017 - 2019)	Residential	**Moving Picture** to Architecture	Formal Components	**Passenger (Tyldum, 2016)**
Jeddah Tower (Smith and Gill, 2010)	Residential	**Architecture** to Moving picture	Technology	**Altered Carbon (Kalogridis, 2018)**
The Future Tower (MVRDV, 2018)	Residential	**Architecture** to Moving picture	Formal Components	**Blade Runner 2049 (Villeneuve, 2017)**
Qianhaiwan Tower (Sou-Fujimoto-Architects, 2021)	Non-Residential	**Moving Picture** to Architecture	Technology	**Altered Carbon (Kalogridis, 2018)**
Horizon Home (Meta, 2021)	Non-Residential	**Moving Picture** to Architecture	Technology	**Ready Player One (Spielberg, 2018)**
Ping An Tower (AI-O, 2022)	Non-Residential	**Architecture** to Moving picture	Formal Components	**Metropolis (Lang, 1927)**
Powerhouse Telemark (Snøhetta, 2020)	Non-Residential	**Architecture** to Moving picture	Formal Components	**Space Sweeper (Jo, 2021)**

Table 23 Epitomizing Cases of Influences Between Architecture and Moving Pictures

4.11 Conclusion

The historical overview in the second chapter and influential resonances between architecture and moving images in the third chapter interconnect with the eight cases covered in this binary analysis. The mentioned case studies in this chapter show commonalities in their origins which could be traced back to influential characteristics.

The identified elements are derived from architecture and moving pictures, implying that the future architectural relationship is not a linear one but rather the one that crosses over and evolves dynamically. The technologies featured in moving pictures could come from tangible items or theories. While evaluating the effective practicalities, market feasibilities and technical productivities, several projects of digital visualisations reflect how the technologies could ultimately fit people's needs and their lifestyles.

By visualisation, DNA influences between moving pictures and architecture could be observed. In certain circumstances, artists or architects take inspirations from writings such as research materials, forum discussions, academic critiques so to develop their influential designs. Case studies demonstrate that DNA in a project is derived from various sources. However, the projects often express whether the design is influenced by either architectural inspirations or Sci-Fi pictures based on their different appearances.

In conclusion, functionalities, DNA influential directions and architectural influences with an inclination between formal components and technological visions are intertwined and cannot be separated as independent variables.

CHAPTER 5: CONCLUSION AND DISCUSSION

From the 1920s to the 2020s, the concept of the future changed with every discovery or invention. It unknowingly evolves and changes with similar patterns that affect transportation, communication, consumption, automation, and identification. The influences that impact both architectural designs and moving pictures include society's expectations about politics, economics, philosophy, and concerns about new changes at each specificity of time.

Problems and Issues mentioned In moving pictures between the 1920s and 2020s		
Environmental Problems	Technology in Transportation	Computer Development
Overpopulation	Technology in Communication	Technological mixture with simulated experience
Social Inequality	Manufacturing and Space Management	

Table 24 Problems and Issues mentioned In moving pictures between the 1920s and 2020s

With films, television broadcasts, animation, games and streaming, moving picture media has developed and adapted to people's behaviours and technological developments. People do not need to be at the opera theatre to watch a live play, but they could watch the records from any cinema. After developing transmission and television, people could access more of the mass media. The condition of the world's and regional's society shapes the contents and platforms of media. For example, in the 1930s – 1940s, the purpose of mass media is not only for entertainment values but also to distribute propaganda for politics, economics, and military propositions. Furthermore, the contextual background of science-fiction stories is not confined only to issues bound to Earth. However, it often features travelling and dwelling in space or on other planets far beyond.

Architectural Contexts		
Earth	Space	Virtual Reality

Table 25 Architectural Aspects in Three Different Settings

As mentioned in the study, the environmental situation in the science fiction genre frequently occurs in the three worlds (three realms): Earth, space, and virtual reality. These are the contextual situations related to the physicality of architecture and how humans behave against their different surroundings. Many scenarios depend on a variety of subjective interpretations and within are those different architectural standpoints.

The differences between the mentioned contextual settings influence the variety of aesthetics, materials, construction, and architecture appearing in motion pictures. At the same time, it affects designers to produce designs for the actual world. The three critical contexts for the discussion in this study are listed below.

Setting on Earth

According to temporal sensitivity, the contextual background on Earth in moving images frequently refers to lifestyle and behaviour that audiences may relate themselves to the narration on screens. Transportation, habitation, and technology used for convenience in living are varied through time. For example, transportation in ancient times is mostly relied on walking and riding animals. With the future projections from the cyberpunk genre, the high-technological personalised vehicular innovation may eventually happen.

Setting in Space

The stories in space frequently deal with the integration of mobility and habitation technology. Spacecrafts were often utilised for space travel to new colonies or vehicles for wars. Vessels often represent the concept of a micro-city, and everything of life's necessities is crammed into a limited space. It serves as an architectural structure that typically functions as shelter, storage, living area, and vehicle.

Setting in Virtual Reality

Virtual reality is the ultimate setting since it incorporates the with features of the two previous sets. It is widely used in computing and automation, in which any structure can be created regardless of physics laws. It is also frequently referred to as entertainment platforms that allow users to participate in a simulated environment in an alternate reality.

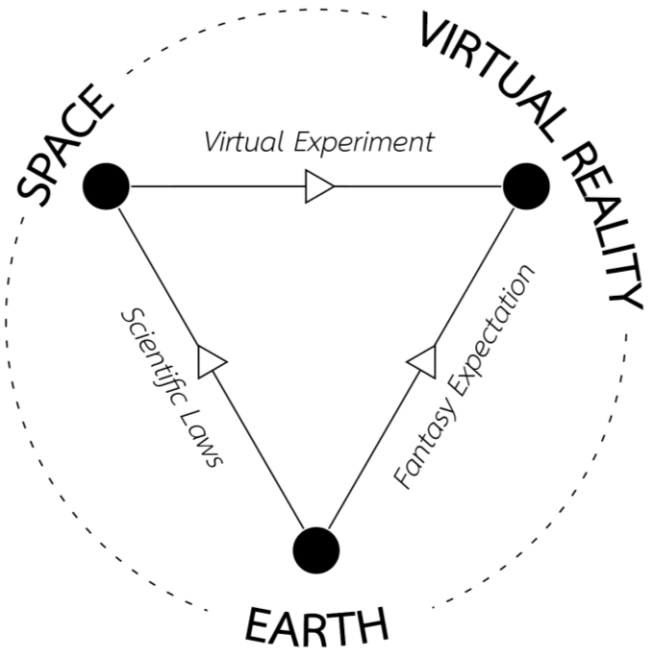


Figure 119 Connection of three worlds

Influential Direction from "Moving Picture" to "Architecture"		
Architecture	**Human**	**Technology**
Transportation	Consumption	Automation
Habitation	Communication	Identification

Table 26 Hypothesis Tools for DNA Inclunations

Following the historical overview in the second chapter, the extraction of human living conditions has six dimensions. Transportation, habitation, communication, consumption, automation, and identification are elements of structures in a civilisation that may have been develop through time. The purpose and complexity of artefacts may have evolved in tandem with technological advancement. Nonetheless, the basic requirements for humans to interact as a civilization are constant.

Transportation reflects nodes and movements in a city. The physical state of a city's structure influences the shapes and functions of infrastructure and automobiles. As prophesied in *Metropolis*, the city grow vertically *(Lang, 1927)*. Transportation is confined to horizontal movements and upward travels to higher levels and beyond the skyline.

As a result, the habitation in science fiction adapts to the state of the city. The upper floors are reserved only for the wealthy, who could afford to enjoy the privileges of panoramic scenarios and amenities. The impoverished person is limited to staying on the ground or below the city, with only enough space for essential activities such as eating and resting. It is the most prominent representation of societal class division.

For the space-age theme, the design and functionality of spacecraft are influenced by technological advancements and discoveries made by space organizations such as *NASA*. The spaceship is designed to serve several functions. Some are designed to resemble walking cities, which have all the fundamental activities humans require (eating, sleeping, exercising, and working). *Mars* often appears as a hope of humanity's monumental evacuation, as evidenced by *NASA* and *SpaceX's* efforts.

Human interaction activities involve communication and consumption. Information and objects or services serve as the medium of trade. They are the features that helped humans to survive in society. Automation and identification are the most closely connected to technological development. They illustrate how the world could completely be transformed from analogue into the digital era. As previously said, the interconnected parts give more convenience and accessibility to behave in a capitalist society.

Architecture is constantly adapting to the vitality of the city and the demands of its people. The status of cities is continually developing in terms of functionality, typology, and creative trends. As a result, changes in the six dimensions impact human behaviour and architectural design.

Influential Direction from "Architecture" to "Moving Picture	
Formal and Physical Components	**Technological Advancements and Visions**
Retro Future Style in Architecture	Sustainable Architecture
Cybernetics in Architecture	The fluidity of Form in Architecture
Height in Architecture	Cyberspace and Virtual Reality Design

Table 27 Hypothesis Tools for DNA Inclunations II

The mentioned six dimensions evolved to include more areas for the resonance between moving pictures and architecture by re-categorising to study the architectural influences in the actual world toward moving pictures. The study shows the two main categories of study, which are formal and physical components, and technological advancements and visions.

The first category contains the sub-category of retro-future, cybernetics and extreme heights in architecture which are often mentioned and referred to in both moving pictures and architecture. The second category indicates more the application of technology to architectural design, especially sustainable architecture, fluidity of form, and virtual reality designs. The study is combined as a hypothetical tool for retracing the epitomizing cases in the fourth chapter, as shown in the following table.

Epitomizing Cases of Influences Between Architecture and Moving Pictures	
Architecture	*Topics*
Living Skyscraper (Lesiuk et al., 2021)	Plantation Embed in Architectural Structure
The Svart Hotel (Snohetta, 2017 - 2019)	Formal and Physical influentials with technological management for energy
Jeddah Tower (Smith and Gill, 2010)	Influences and Symbols of Height in Architecture
The Future Tower (MVRDV, 2018)	Vertical Habitation
Qianhaiwan Tower (Sou-Fujimoto-Architects, 2021)	Landmark of the Future
Horizon Home (Meta, 2021)	Virtual Home and the Future of Habitation
Ping An Tower (AI-O, 2022)	Workplace Architecture and Community Integration
Powerhouse Telemark (Snøhetta, 2020)	Sustainable Management with Formal Design

Table 28 Topics of Epitomizing Cases of Influences Between Architecture and Moving Pictures

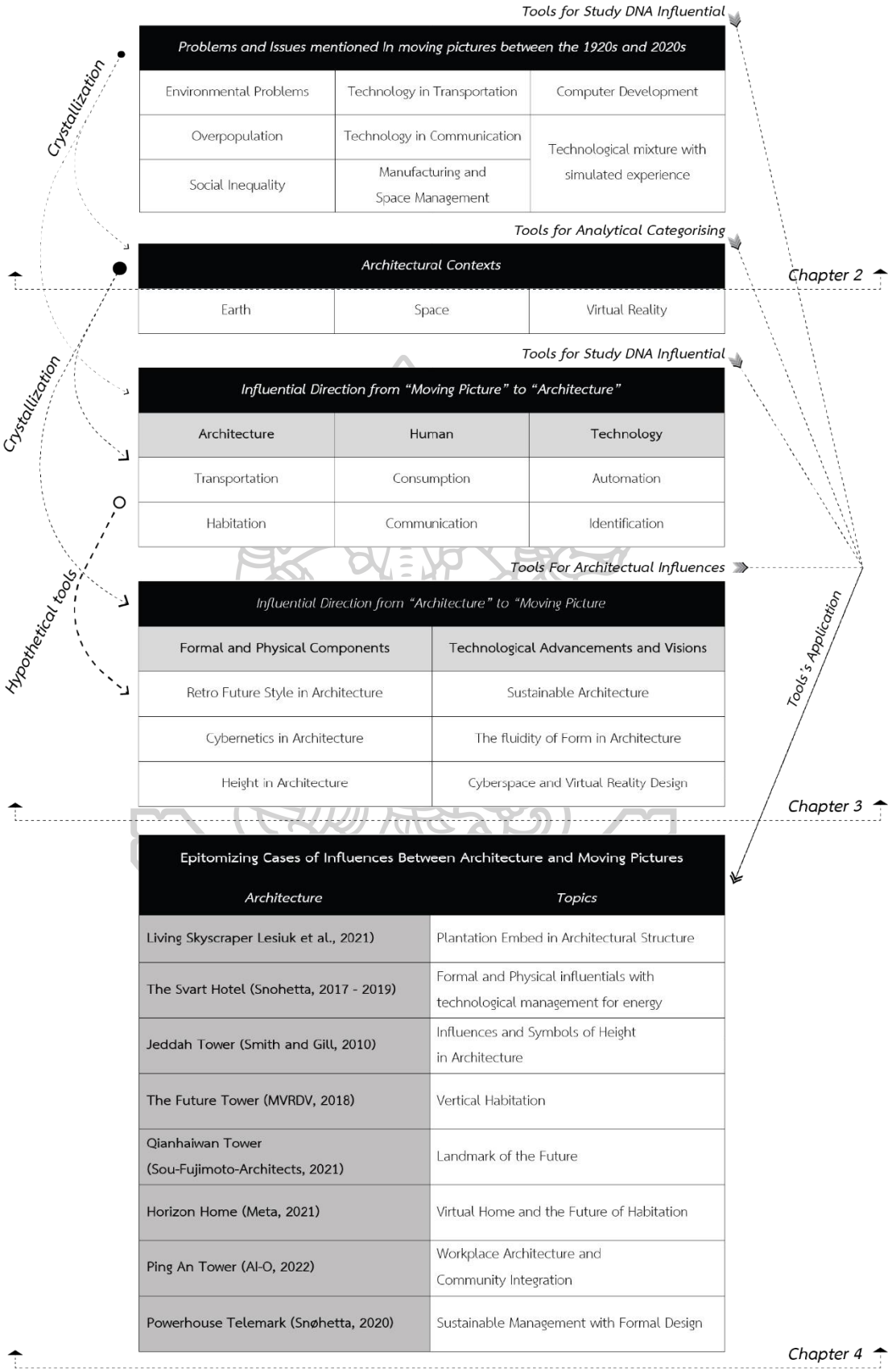
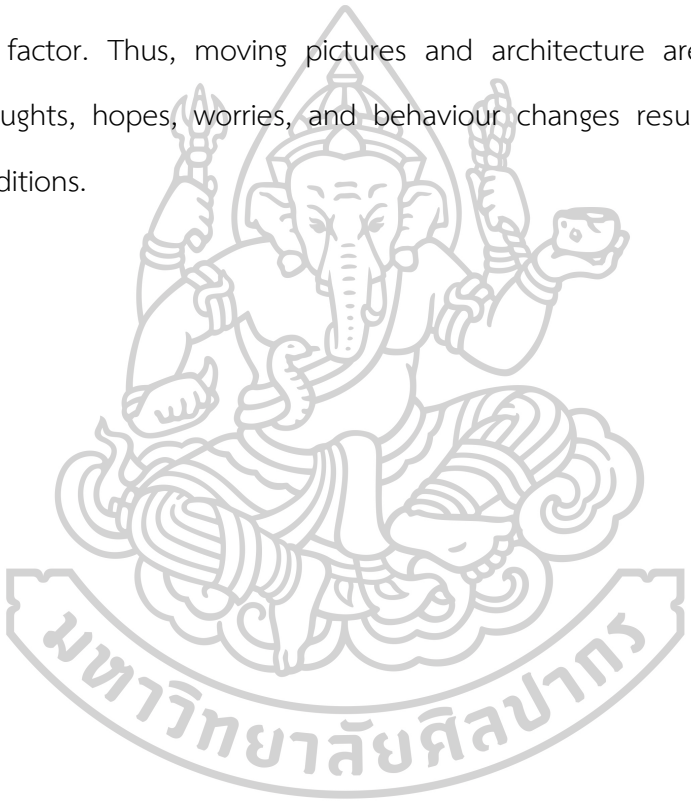


Figure 120 The Master Map of Study Progression

To summarise, the future of architecture is shaped and influenced by the past. Technological advancement is the essential key to bringing the ideations and theories to life by demonstrating how technology or the fresh invention could interact with people through Sci-Fi moving pictures. Any conceptual architecture could be traced back to the root of the concept, which frequently relates to chronologies of historical events. Moreover, the patterns of resonances between moving pictures and real-world architecture are intertwined and cannot be isolated as a single factor. Thus, moving pictures and architecture are apparatuses that indicate thoughts, hopes, worries, and behaviour changes resulting from humans' societal conditions.



REFERENCES

1920s – 1960s: Television [Online]. Elon University School of Communication. Available: https://www.elon.edu/u/imagining/time-capsule/150-years/back-1920-1960/ [Accessed June 20, 2021].

History of Virtual Reality [Online]. The Franklin Institute. Available: https://www.fi.edu/virtual-reality/history-of-virtual-reality [Accessed June 10, 2021].

The Roaring Twenties | Boundless US History [Online]. Available: https://courses.lumenlearning.com/boundless-ushistory/chapter/the-roaring-twenties/ [Accessed June 16, 2021].

2012. ***Media, Technology, and Communication***. *A Primer on Communication Studies.*

2016. ***How L'Inhumaine Marked the Beginning of the End for the First Avant-Garde Impressionists*** [Online]. Flicker Alley. Available: https://www.flickeralley.com/inhumaine-and-the-impressionists/ [Accessed June 10, 2021].

A.I.SPACEFACTORY 2018. MARSHA. NASA.

AI-O. n.d. ***Ping An Asset Tower*** [Online]. Available: https://www.ai-o.com/project/ping-an-asset-tower/#:~:text=The%20Ping%20An%20Asset%20Insurance,thoroughfare%20pass%20through%20the%20site. [Accessed December 30, 2021].

ALEN, W. V. 1930. ***Chrysler Building***. 405 Lexington Avenue, Manhattan, New York.

ANASTASIADI, A. 2010. ***Fluidity & Design by Zaha Hadid*** [Online]. Dezeen. Available: https://www.dezeen.com/2010/02/19/fluidity-design-by-zaha-hadid/ [Accessed June 20, 2021].

Logan's Run, 1976. Directed by ANDERSON, M. United States.

ANINDITYA, I. 2021. ***Ready Player One? The Metaverse Went from Fiction to Reality*** [Online]. Wadzpay. Available: https://wadzpay.com/ready-player-one-the-metaverse-went-from-fiction-to-reality/ [Accessed December 30, 2021].

AUGUSTIN, A.-C. 2016. ***Bringing the Film Set To Life*** [Online]. Article in the Exhibition

Catalogue GOLEM. Available: www.jmberlin.de/en/node/4702 [Accessed June 20, 2021].

BAILEY, J. 2020. ***Everything you've ever wanted to know about cyberpunk design*** [Online]. 99designs. Available: https://99designs.com/blog/design-history-movements/cyberpunk-design/ [Accessed June 10, 2021].

BARDZINSKA-BONENBERG, T. n.d. Ring-and-Circle, Symbolic and Practical Meaning of The Form in Town Planning and Architecture. ***11th CTV back to the sense of the city.***

BARR, J. M. 2019. ***The Economics of Skyscraper Height (Part II)*** [Online]. Building the Skyline. Available: https://buildingtheskyline.org/skyscraper-height-ii/ [Accessed October 30, 2021].

BAUER, P. 2021. ***History of film: Additional Information*** [Online]. Britannica.com. Available: https://www.britannica.com/art/history-of-the-motion-picture/additional-info#contributors [Accessed June 15, 2021].

BENSON, P. 2020. ***Space Age furniture in Sci-Fi films*** [Online]. Film and Furniture. Available: https://filmandfurniture.com/2020/06/space-age-furniture-in-sci-fi-films/ [Accessed June 10, 2021].

The Fifth Element, 1997. Directed by BESSON, L. France.

BEYONDHOMES. 2020. ***What Are Magic Green Homes? 2021*** [Online]. Beyondhomes. Available: https://www.beyondhomes.ca/what-are-magic-green-homes/ [Accessed June 30, 2021].

BLAHUT, C. 2015. ***NASA 3D-Printed Habitat Challenge: Team LavaHive*** [Online]. architectmagazine. Available: https://www.architectmagazine.com/project-gallery/nasa-3d-printed-habitat-challenge-team-lavahive_o [Accessed June 30, 2021].

BOAKE, T. M. ***Architecture And Film: Experiential Realities And Dystopic Futures***.

BRAHAMBHATT, R. 2021. ***Retro-futurism and why it matters: a foray into alternative futures seen from the past*** [Online]. Available: https://www.zmescience.com/other/feature-post/retro-futurism-and-why-it-matters-a-foray-into-alternative-futures-seen-from-the-past/ [Accessed October 30, 2021].

Black Mirror, 2011. Directed by BROOKER, C. United States.

Just Imagine, 1930. Directed by BUTLER, D. United States.

The Terminator, 1984. Directed by CAMERON, J. United States.

Avatar, 2009. Directed by CAMERON, J. United States.

Demon Seed, 1977. Directed by CAMMELL, D. United States.

CAVENDISH, L. 2020. ***Welcome to the future: 11 ideas that went from science fiction to reality*** [Online]. Space.com. Available: https://www.space.com/science-fiction-turned-reality.html [Accessed June 10, 2021].

CHEN, J. 2018. ***A Hotel That Looks Like a Spaceship is Being Built Just Above the Arctic Circle***. [Online]. Elite Readers. Available: https://www.elitereaders.com/hotel-looks-like-spaceship-arctic-circle/ [Accessed June 30, 2021].

CLARKE, J. R. 1974. ***Expressionism in Film and Architecture: Hans Poelzig;s Sets for Paul Wegener's The Golem***. Art Journal, 34, No. 2 (Winter 1974-1975), 115-124.

CLINTONWHITEHOUSE. n.d. ***The Greening of the White House*** [Online]. Available: https://clintonwhitehouse3.archives.gov/initiatives/climate/greeningsummary.html [Accessed August 30, 2021].

COLLINS, F. 2019. ***Der Golem (1920)*** [Online]. Available: https://www.framerated.co.uk/der-golem-1920/ [Accessed June 10, 2021].

COLTON, D. 2013. ***'Things to Come' could still come to pass*** [Online]. USA TODAY. Available: https://www.usatoday.com/story/life/2013/06/17/criterion-things-to-come-blu-ray/2431231/ [Accessed June 5, 2021].

Bicentennial Man, 1999. Directed by COLUMBUS, C. United States.

Black Panther, 2018. Directed by COOGLER, R. United States.

CRAVEN, J. 2018. ***The Binary Large Object of Blob Architecture*** [Online]. ThoughtCo. Available: https://www.thoughtco.com/what-is-blob-architecture-blobitecture-177203 [Accessed June 28, 2021].

CROMPTON, D. 1967-1968. Southbank Centre. River Thames in London, England.

I'm Not a Robot, 2017. Directed by DAE-YOON, J. South Korea.

DANKS, A. 2017. ***Before On the Beach: Melbourne on Film in the 1950s*** [Online].

Available: https://www.sensesofcinema.com/2017/screening-melbourne/melbourne-on-film-1950s/ [Accessed June 10, 2021].

The Naked City, 1948. Directed by DASSIN, J. United States.

DEGRAFF, A. 2017. Metropolis. ***Cinemaps: An Atlas of 35 Great Movies***. Philadelphia: Quirk Books.

DHALLEINE, T. 2021. ***Why Geodesic Domes Are Such Incredible Structures*** [Online]. EcocampPatagonia. Available: https://www.ecocamp.travel/blog/why-geodesic-domes-are-incredible-structures [Accessed June 30, 2021].

DINGMAN, H. 2021. ***FIVE YEARS OF VR: A LOOK AT THE GREATEST MOMENTS FROM OCULUS RIFT TO QUEST 2*** [Online]. OCCULUS. Available: https://www.oculus.com/blog/five-years-of-vr-a-look-at-the-greatest-moments-from-oculus-rift-to-quest-2/ [Accessed June 20, 2021].

DOUGLAS, K. & DOUGLAS, J. 2021. ***Green spaces aren't just for nature – they boost our mental health too*** [Online]. NewScientist

Available: https://www.newscientist.com/article/mg24933270-800-green-spaces-arent-just-for-nature-they-boost-our-mental-health-too/#:~:text=Access%20to%20nature%20has%20also,sense%20of%20meaning%20to%20life. [Accessed December 30, 2021].

EDELSON, Z. 8 ***Lessons in Modern Architecture Through the Movies*** - *Architizer*.

EDITORS, H. C. 2009. ***First commercial movie screened*** [Online]. A&E Television Networks. Available: https://www.history.com/this-day-in-history/first-commercial-movie-screened [Accessed June 10, 2021 2021].

EDITORS, H. C. 2017. ***Weimar Republic*** [Online]. Available: https://www.history.com/topics/germany/weimar-republic [Accessed].

High Treason, 1929. Directed by ELVEY, M. United Kingdom.

ENCYCLOPEDIA, N. W. n.d. ***Tower of Babel.***

ETHERINGTON, R. 2012. ***Galaxy Soho by Zaha Hadid*** [Online]. Available: https://www.dezeen.com/2012/10/29/galaxy-soho-by-zaha-hadid-architects/ [Accessed June 30, 2021].

EVOLO. 2021. ***Living Skyscraper For New York City*** [Online]. Available:

https://www.evolo.us/living-skyscraper-for-new-york-city/ [Accessed].

Iron Man, 2008. Directed by FAVREAU, J. United States.

Soylent Green, 1973. Directed by FLEISCHER, R. United States.

FULLER, R. B. & SADAO, S. 1968. ***Tetrahedron City Project***, Yomiuriland, Japan.

GARDNER, W. O. 2020. ***Liquid Cities***. University of Minnesota Press.

GIBSON, W. 1984. ***Neuromancer***, Ace.

GILMORE, S. 2019. ***The Vault of Culture*** [Online]. Available: https://www.vaultofculture.com/vault/towering/aerium [Accessed June 30, 2021].

GLOBETRENDER. 2020. ***'ENERGY-POSITIVE' SVART HOTEL REVEALS SPA VISION FOR 2022 OPENING*** [Online]. Available: https://globetrender.com/2020/07/09/svart-hotel-spa-wellness-2022-opening/ [Accessed June 30, 2021].

GRIFFITHS, A. 2018. ***MVRDV's "mountainous" Future Towers provides low-cost accommodation in India*** [Online]. Available: https://www.dezeen.com/2018/12/06/mvrdvs-future-towers-low-cost-accommodation-india/ [Accessed July 30, 2021].

HADID, Z. 2016. ***The Opus Tower***. Dubai.

The War of the Worlds, 1953. Directed by HASKIN, B. United States.

HERITAGE, S. 2021. ***As Black Mirror Turns 10, Just How Well Did It Predict the Future?*** [Online]. The Guardian. Available: https://www.theguardian.com/tv-and-radio/2021/nov/26/as-black-mirror-turns-10-just-how-well-did-it-predict-the-future [Accessed December 30, 2021].

HOBSON, B. 2020. ***"At first, almost nobody took any notice of Archigram" says Peter Cook in exclusive Dezeen interview*** [Online]. Available: https://www.dezeen.com/2020/05/11/archigram-origins-peter-cook-video-interview-vdf/ [Accessed October 30, 2021].

Summer War, 2009. Directed by HOSODA, M. Japan.

HOWELLS, J. M. & HOOD, R. 1922. ***Chicago Tribune Headquater.*** 435 N. Michigan Ave. Chicago, Illinois, USA.

Shanghai Fortress, 2019. Directed by HUATAO, T. China.

ISLAM M ABOUHELA, KHALED MOHAMED DEWIDAR & EL-GOHARY, A. F. 2007.

Significance of Future Architecture in Science Fiction Films.

ISLAM M ABOUHELA, K. M. D., AMR FAROUK EL-GOHARY ***The Image of Future City in Science Fiction Films.***

ISOZAKI, A. & ASSOCIATES 1990. ***Art Tower Mito.*** 1 Chome-6-8 Gokencho, Mito, Ibaraki 310-0063, Japan.

Sword Art Online, 2012. Directed by ITO, T. Japan.

JACKSON, J. & STAFF, P. M. 2021. ***The 50 Best Dystopian Movies of All Time*** [Online]. Paste Magazine. Available: https://www.pastemagazine.com/movies/dystopian-movies/best-dystopian-movies-of-all-time-1/ [Accessed June 10, 2021].

Space Sweeper, 2021. Directed by JO, S.-H. South Korea.

JOHNSON, J. 2019. ***Discover Art Deco design: everything you need to know about the iconic movement*** [Online]. 99designs. Available: https://99designs.com/blog/design-history-movements/art-deco-design/ [Accessed May 30, 2021].

Her, 2013. Directed by JONZE, S. United States.

Altered Carbon, 2018. Directed by KALOGRIDIS, L. United States.

On the Waterfront 1954. Directed by KAZAN, E. United States.

KOECK, R. 2013. Routledge.

Tron: Legacy, 2010. Directed by KOSINSKI, J. United States.

KOTECKI, P. 2019. ***Here Are 15 Wild Sci-Fi Predictions About Future Technology That Actually Came True*** [Online]. Science Alert. Available: https://www.sciencealert.com/these-15-wild-sci-fi-predictions-about-future-tech-actually-came-true [Accessed June 10, 2021].

2001: A Space Odyssey, 1968. Directed by KUBRICK, S. United States

KUNSTHAUSGRAZ. ***Architecture*** [Online]. Kunsthaus Graz. Available: https://www.museum-joanneum.at/en/kunsthaus-graz/architecture [Accessed August 20, 2021].

Metropolis, 1927. Directed by LANG, F. Germany.

Woman in the Moon, 1929. Directed by LANG, F. Weimar Republic.

LAUTNER, J. 1949. ***Carling House.*** 7144 Hockey Trail, Los Angeles, CA 90068.

LEIBLING, R. 2018. ***The Aesthetics of Science Fiction. What does SciFi Look Like After Cyberpunk?*** [Online]. Medium. Available: https://medium.com/adjacent-possible/the-aesthetics-of-science-fiction-what-does-scifi-look-like-after-cyberpunk-ba9f1991e75c [Accessed June 20, 2021].

The Lawnmower Man, 1992. Directed by LEONARD, B. United States

LESIUK, A., MYKHAYLO KOHUT, SHKOLIAR, S., IVASHCHUK, K., DUDA, N., SHKOLNYK, M., KYTSIUK, O.-D. & HONCHARENKO, A. 2021. **Living Skyscraper For New York City**. eVolo.

TRON, 1982. Directed by LISBERGER, S. United States.

LO, A. 2018. ***Jeddah Tower: What does the world's next tallest skyscraper look like now?*** [Online]. CNN Style. Available: https://edition.cnn.com/style/article/jeddah-tower-saudi-arabia-new/index.html [Accessed].

THX-1138, 1971. Directed by LUCAS, G.

Star Wars, 1977. Directed by LUCAS, G. United States.

LUEBERING, J. E. ***Grosses Schauspielhaus*** [Online]. Available: https://www.britannica.com/topic/Grosses-Schauspielhaus [Accessed June 20, 2021].

Sweet Smell of Success, 1957. Directed by MACKENDRICK, A. United States.

MAGRO, M. 2017. ***Russian Suprematism and Constructivism.*** Available from: https://melvinmagro.wordpress.com/2017/01/21/russian-suprematism-and-constructivism/ Jan 20, 2022].

MALKIN, M. 2018. ***The Real-Life Possibilities of Black Panther's Wakanda, According to Urbanists and City Planners*** [Online]. Architectural Digest. Available: https://www.architecturaldigest.com/story/the-real-life-possibilities-of-black-panthers-wakanda-according-to-urbanists-and-city-planners [Accessed June 30, 2021].

MALONE, D. 2020. ***South Korea's SMTown Coex Atrium LED Facade contains a giant crashing wave*** [Online]. Building Design + Construction. Available: https://www.bdcnetwork.com/south-koreas-smtown-coex-atrium-led-facade-

contains-giant-crashing-wave [Accessed June 30, 2021].

MARKS, R. W. 2021. ***R. Buckminster Fuller*** [Online]. Encyclopedia Britannica. Available: https://www.britannica.com/biography/R-Buckminster-Fuller [Accessed October 30, 2021].

MARSHALL, C. 2020. ***Take a Drive Through 1940s, 50s & 60s Los Angeles with Vintage Through-the-Car-Window Films*** [Online]. Available: https://www.openculture.com/2020/03/take-a-drive-through-1940s-50s-60s-los-angeles.html [Accessed June 21, 2021].

MARSONE. ***Why Mars, and not another planet?*** - *A Mission to Mars* [Online]. Mars One. Available: https://www.mars-one.com/faq/mission-to-mars/why-mars-and-not-another-planet [Accessed June 20, 2021].

MCNULTY-KOWAL, S. 2021. ***THIS EXQUISITE AERIAL TOWER WITH 99 FLOATING ISLANDS BY SOU FUJIMOTO ARCHITECTS VISUALIZES OUR DIVERSE FUTURE!*** [Online]. Yanko Design. Available: https://www.yankodesign.com/2021/06/18/this-exquisite-aerial-tower-with-99-floating-islands-by-sou-fujimoto-architects-visualizes-our-diverse-future/ [Accessed July 30, 2021].

Things to Come, 1936. Directed by MENZIES, W. C. United Kingdom.

MERKUSHEVA, D. 2020. ***10 Humanoid Robots of 2020*** [Online]. ASME Foundation. Available: https://www.asme.org/topics-resources/content/10-humanoid-robots-of-2020 [Accessed June 30, 2021].

METALOCUS. 2016. ***"PETER COOK: RETROSPECTIVE" AT THE MUSEUM FOR ARCHITECTURAL DRAWING*** [Online]. Metalocus. Available: https://www.metalocus.es/en/news/peter-cook-retrospective-museum-architectural-drawing [Accessed].

Mad Max, 1979. Directed by MILLER, G. United States.

MILLER, M. 2017. ***Design Lessons From A Century Of Sci-Fi*** [Online]. Fast Company. Available: https://www.fastcompany.com/90128069/design-lessons-from-a-century-of-sci-fi [Accessed June 10, 2021].

MVRDV 2018. The Future Tower. India.

NAKMONTANAKUM, S. 2022. ***The Future of Architectural Design; The Integration between Human and Technologies in Sci-Fi Moving Picture.*** M.Arch

Research, Silpakorn University.

NASA. 2014. ***1968 Science Fiction is Today's Reality*** [Online]. NASA. Available: https://www.nasa.gov/mission_pages/station/main/2001_anniversary.html [Accessed June 10, 2021].

NASA. ***Basics of Space Flight.*** NASA. Available: https://solarsystem.nasa.gov/basics/chapter9-1/ [Accessed June 10, 2021].

NEUMANN, D. 1999. ***Film Architecture: From Metropolis to Blade Runner,*** London, Prestel.

NG, A. 2020. ***How China uses facial recognition to control human behavior*** [Online]. cnet. Available: https://www.cnet.com/news/in-china-facial-recognition-public-shaming-and-control-go-hand-in-hand/ [Accessed June 30, 2021].

Gattaca, 1997. Directed by NICCOL, A. United States.

In Time, 2011. Directed by NICCOL, A. United States.

NORDQUIST, R. 2019. ***What Is Communication?*** [Online]. ThoughtCo. Available: https://www.thoughtco.com/what-is-communication-1689877 [Accessed June 20, 2021].

O'DONNELL, V. ***Science Fiction Films and Cold War Anxiety*** [Online]. Encyclopedia.com. Available: https://www.encyclopedia.com/arts/culture-magazines/science-fiction-films-and-cold-war-anxiety [Accessed 30 June, 2021].

The Social Dilemma, 2020. Directed by ORLOWSKI, J. United States.

Ghost in the Shell, 1995. Directed by OSHII, M. Japan

Akira, 1988. Directed by OTOMO, K. Japan.

PARK, G. 2020. ***Silicon Valley is racing to build the next version of the Internet. Fortnite might get there first.*** [Online]. The Washington Post Available: https://www.washingtonpost.com/video-games/2020/04/17/fortnite-metaverse-new-internet/ [Accessed June 30, 2021].

Transcendence, 2014. Directed by PFISTER, W. United States.

PICON, A. 2010. ***Digital Culture in Architecture: An Introduction for the Design***

Professions, Birkhäuse.

PINTOS, P. 2020. **Powerhouse Telemar**k / Snøhetta.

PLIM, A., HUDDLESTON, T., ANDREW, G., BRAY, C., CALHOUN, D., CLARKE, C., WIT, A. D. D., FRANKEL, E., JOHNSTON, T., KHERAJ, A., ROTHKOPF, J., SEMLYEN, P. D., SMITH, A. & UHLICH, K. 2021. ***The 100 best sci-fi movies*** [Online]. Timeout. Available: https://www.timeout.com/london/film/the-100-best-sci-fi-movies [Accessed June 10, 2021].

POLLOCK, D. 1999. ***Skywalking: The Life And Films Of George Lucas***, Da Capo Press; Updated ed. edition (May 31, 1999).

POPPICK, S. 2015. ***10 Back to the Future Predictions That Came True*** [Online]. Money. Available: https://money.com/back-to-the-future-day-predictions-accuracy/ [Accessed June 30, 2021].

Aelita: Queen of Mars 1924. Directed by PROTAZANOV, J. USSR: Walker Art Center.

REDSHIFT. 2021. ***What Is a Digital Twin? How Intelligent Data Models Can Shape the Built World*** [Online]. Autodesk. Available: https://redshift.autodesk.com/what-is-a-digital-twin/?utm_medium=website&utm_source=archdaily.com [Accessed December 20, 2021].

RIBAJ. 2015. ***Romance Never Dies*** [Online]. RIBAJ The RIBA Journal. Available: https://www.ribaj.com/culture/jan-kaplicky-drawings-at-the-aa [Accessed June 30, 2021].

Osamu Tezuka's Metropolis, 2001. Directed by RINTARO. United States.

Mortal Engine, 2018. Directed by RIVERS, C. United States

Star Trek: The Original Series, 1966. Directed by RODDENBERRY, G. United States.

ROWLINGS, E. 2018. ***'A Walking City' — Archigram and Ron Herron*** [Online]. Emily Rowlings. Available: https://medium.com/@emilyrowlings/a-walking-city-archigram-and-ron-herron-7dbf2c8fae99 [Accessed June 8, 2021].

The Thirteenth Floor, 1999. Directed by RUSNAK, J. United States

Berlin - Die Sinfonie der Großstadt, 1927. Directed by RUTTMANN, W. Weimar Republic.

SAAVEDRA, J. 2020. ***How 2001: A Space Odyssey May Have Predicted a Surprising***

Aspect of Space Travel [Online]. Den of Geek. Available: https://www.denofgeek.com/movies/2001-a-space-odyssey-prediction-space-travel/ [Accessed June 10, 2021].

SADLER, S. 2005. ***Archigram: Architecture without Architecture***, MIT Press; Illustrated edition.

Ghost in the Shell (2017 film), 2017. Directed by SANDERS, R. United States.

Blade Runner, 1982. Directed by SCOTT, R. United States.

The Martian, 2015. Directed by SCOTT, R. United States, United Kingdom.

Enemy of the State, 1998. Directed by SCOTT, T. United States.

The Serpent, 2021. Directed by SHANKLAND, T. & HERBOTS, H. United Kingdom: Netflix.

SHAW, L. 2017. ***How Chicago's Tribune Tower Competition Changed Architecture Forever*** [Online]. ArchDaily. Available: https://www.archdaily.com/880899/how-chicagos-tribune-tower-competition-changed-architecture-forever [Accessed 30 May, 2021].

SILVERSTEIN, B. A. 2004. ***1920s: A Decade of Change***.

SMITH, A. & GILL, G. 2010. **Jeddah Tower**.

SMITHSONIAN. n.d. ***A Brief History of Solar Panels*** [Online]. Smithsonian Magazine. [Accessed].

SNOHETTA 2017 - 2019. **The Svart Hotel**. Svartisen, Norway.

SNOHETTA. 2020. ***Powerhouse Telemark – a Sustainable Model for the Future of Workspaces*** [Online]. Snohetta. Available: https://snohetta.com/project/523-powerhouse-telemark-a-sustainable-model-for-the-future-of-workspaces [Accessed December 30, 2021].

SNOWDEN, S. 2019. ***Solar Power Stations In Space Could Supply The World With Limitless Energy*** [Online]. Forbes. Available: https://www.forbes.com/sites/scottsnowden/2019/03/12/solar-power-stations-in-space-could-supply-the-world-with-limitless-energy/ [Accessed December 30, 2021].

SONTAG, S. 1965. ***The Imagination of Disaster*** [Online]. Commentary Magazine. Available: https://www.commentarymagazine.com/articles/susan-sontag/the-imagination-of-disaster/ [Accessed June 15, 2021 2021].

SOU-FUJIMOTO-ARCHITECTS 2021. **Qianhaiwan Tower**.

Close Encounters of the Third Kind, 1977. Directed by SPIELBERG, S. United States.

E.T. the Extra-Terrestrial, 1982. Directed by SPIELBERG, S. United States.

Minority Report, 2002. Directed by SPIELBERG, S. United States.

Ready Player One, 2018. Directed by SPIELBERG, S. United States.

STAMP, E. 2020. ***How the Architecture Industry Is Reacting to Climate Change*** [Online]. Architectural Digest. Available: https://www.architecturaldigest.com/story/climate-change-design-architecture [Accessed October 30, 2021].

STAN LEE, J. K. 1966. ***Black Panther***.

STONE, E. D. & DESKEY, D. 1932. **Radio City Music Hall**. 1260 Sixth Avenue, New York.

Snowden, 2016. Directed by STONE, O. France

SVART. 2021. ***The Svart Hotel*** [Online]. [Accessed].

TANGERMANN, V. 2018. ***Here Are The Finalists For NASA's Mars Habitat Design Competition*** [Online]. Futurism. Available: https://futurism.com/nasa-mars-habitat-design-competition [Accessed June 20, 2021].

Playtime, 1967. Directed by TATI, J. France.

Pacific Rim, 2013. Directed by TORO, G. D. United States.

TUBE, D. 2015. **HOW IT WORKS: The International Space Station**. *This explains each interior area, crew living quarters, and scientific equipment.* 28:57 ed.

Passengers, 2016. Directed by TYLDUM, M.

UNESCO. 2018. ***Fujian Tulou*** [Online]. UNESCO. Available: https://whc.unesco.org/en/list/1113/ [Accessed June 30, 2021].

Total Recall, 1990. Directed by VERHOEVEN, P. United States.

VICI, S. B. 1973. ***Villa Ronconi***. Rome, Italy.

The Fountainhead, 1949. Directed by VIDOR, K. United States.

Blade Runner 2049, 2017. Directed by VILLENEUVE, D. United States.

The Matrix, 1999. Directed by WACHOWSKIS, T. United States.

WALLACE, K. 2020. ***Cyberspace Is One Of Cyberpunk 2077's Greatest Mysteries*** [Online]. GAMEiNFORMER. Available:

https://www.gameinformer.com/2020/07/07/cyberspace-is-one-of-cyberpunk-2077s-greatest-mysteries [Accessed June 10, 2021].

WALLACE, L. 2009. ***Best Sci-Fi Flicks of the '60s, '70s, According to You*** [Online]. WIRED. Available: https://www.wired.com/2009/11/gallery-reader-sci-fi-2/ [Accessed June 10, 2021].

WATERWORTH, E. L. & WATERWORTH, J. A. 2001. Focus, Locus, and Sensus: The Three Dimensions of Virtual Experience. ***CyberPsychology & Behavior*****,** 203-213.

Der Golem, wie er in die Welt Kam, 1920. Directed by WEGENER, P. & BOESE, C. Weimar Republic.

Das Cabinet des Dr Caligari, 1920. Directed by WIENE, R. Weimar Republic.

Forbidden Planet, 1956. Directed by WILCOX, F. M. United States.

The Day the Earth Stood Still, 1951. Directed by WISE, R. United State.

Total Recall, 2012. Directed by WISEMAN, L. USA.

WOLFE, E. 2019. ***The History of Video Conferencing from 1870 to Today*** [Online]. lifesize. Available: https://www.lifesize.com/en/blog/history-of-video-conferencing/ [Accessed June 20, 2021].

WRIGHTS, F. L. 1936. ***Fallingwater House***. United States.

Miss Crow and Mister Lizard, 2021. Directed by WU, Q. China.

XRTODAY. 2021. ***What Is Meta Horizon Home?*** [Online]. XR Today. Available: https://www.xrtoday.com/virtual-reality/what-is-meta-horizon-home/ [Accessed December 30, 2021].

ZAMPI, G. & MORGAN, C. L. 1995. ***Virtual Architecture,*** McGraw-Hill.

Back to the Future, 1985. Directed by ZEMECKIS, R. United States.

ZOPHERUS 2018. Zopherus Habitat. NASA.

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