



REPUBLIC OF TÜRKİYE

ALTINBAŞ UNIVERSITY

Institute of Graduate Studies

Department of Architecture

**THE IMPACT OF BIOPHILIC DESIGN
IN COFFEE SHOPS:
A CASE STUDY OF CUP OF JOY
NİŞANTAŞI, İSTANBUL**

Siwar SASSI

Master's Thesis

Supervisor

Asst. Prof. Dr. Merih KASAP

İstanbul, 2025

**THE IMPACT OF BIOPHILIC DESIGN IN COFFEE SHOPS:
A CASE STUDY OF CUP OF JOY NIŞANTAŞI, ISTANBUL**

Siwar SASSI

Department of Architecture

Master's Thesis

ALTINBAŞ UNIVERSITY

2025

The thesis titled THE IMPACT OF BIOPHILIC DESIGN IN COFFEE SHOPS: A CASE STUDY OF CUP OF JOY NIŞANTAŞI, ISTANBUL prepared by SIWAR SASSI and submitted on 30/05/2025 has been **accepted unanimously** for the degree of Master of Science in Architecture.

Asst. Prof. Dr. Merih KASAP
Supervisor

Thesis Defense Committee Members:

Asst. Prof. Dr. Merih KASAP	Department of Interior Architecture and Environmental Design, Altınbaş University	_____
Doç. Dr. Elif SÖNMEZ	Department of Interior Architecture and Environmental Design, Altınbaş University	_____
Prof. Dr. Ümit ARPACIOĞLU	Department of Architecture, Mimar Sinan Fine Arts University	_____

I hereby declare that this thesis meets all format and submission requirements for Architecture Master's thesis.

I hereby declare that all information/data presented in this graduation project has been obtained in full accordance with academic rules and ethical conduct. I also declare all unoriginal materials and conclusions have been cited in the text and all references mentioned in the Reference List have been cited in the text, and vice versa as required by the abovementioned rules and conduct.

Siwar SASSI

Signature



DEDICATION

To the Memory of my late father, who life took too soon.

Your absence is felt every single day, but your presence lives on in my soul. I carry your dreams in my heart, your lessons in my mind, and your memory in everything I do. I dedicate this work to you with all my love, hoping it honors the life you lived and the love you gave.

To my beloved mother, your love is limitless, your strength immeasurable. Through every hardship, you have been my anchor and my inspiration. This journey would have been impossible without your encouragement, your silent sacrifices, and your prayers, this achievement is as much yours as it is mine.

To my sisters, my lifelong companions, my strength in moments of doubt, thank you for your constant love, encouragement, and for believing in me when I needed it most.

To my esteemed supervisor, Asst. Prof. Dr. Merih KASAP, your unwavering support and encouragement have been instrumental in shaping this thesis. Your insightful guidance and thoughtful feedback have enriched my work. I am truly thankful for the opportunity to learn under your mentorship.

Lastly, I would like to extend my heartfelt thanks to everyone whose support, encouragement, and contributions have accompanied me throughout this journey. Your presence has added meaning to every step, and I remain deeply grateful for the role you've played in this achievement.

In deepest appreciation and humility.

ABSTRACT

THE IMPACT OF BIOPHILIC DESIGN IN COFFEE SHOPS: A CASE STUDY OF CUP OF JOY NİŞANTAŞI, ISTANBUL

SASSI, Siwar

M.Sc. Architecture, Altınbaş University,

Supervisor: Asst. Prof. Dr. Merih KASAP

Date: May/2025

Pages: 137

The rise of urbanization and fast-paced lifestyles has led to a growing disconnection between people and the natural environment. This separation has increased stress, reduced comfort, and well-being in the built environment. In this context, coffee shops emerge as an important place, as many social researchers have emphasized the significance of “third places”, those spaces that are separate from home as the first place and work as the second place, they are frequently utilised as places to study, work, and socialise. However, it reflects the broader disconnection from nature by relying on artificial lighting, synthetic materials, and small layouts. Biophilic Design offers a promising solution to this issue and has increasingly become a prominent approach in architecture and interior design. It seeks to promote psychological well-being and improve the general standard of the constructed surroundings, especially indoor spaces like coffee shop settings.

This study aims to analyze biophilic design's impact on customer behavior and evaluate how biophilic design affects customers' comfort and well-being, focusing on the case study of Cup of Joy Nişantaşı in Istanbul, Turkey. The study achieved these objectives by utilizing quantitative and qualitative methods such as evaluation of biophilic design patterns, behavioral mapping, observations, and interviews conducted in the selected coffee shop.

Keywords: Biophilic Design, Coffee Shops, Customer Experience, User Perception, Behavior Mapping.

TABLE OF CONTENTS

	<u>Pages</u>
ABSTRACT	vi
LIST OF TABLES.....	xv
LIST OF FIGURES.....	xv
LIST OF CHARTS.....	xv
ABBREVIATIONS.....	xv
1. INTRODUCTION	1
1.1 STATEMENT OF THE PROBLEM.....	3
1.2 RESEARCH OBJECTIVES	4
1.3 RESEARCH QUESTIONS	4
1.4 PURPOSE AND SCOPE OF THE THESIS	4
2. BIOPHILIA AND BIOPHILIC DESIGN	5
2.1 THE HISTORY OF HUMANS WITH NATURE	5
2.2 BIOPHILIA HYPOTHESIS	6
2.2.1 Theories Supporting the Relationship of Biophilia and the Built Environment ...	7
2.2.1.1 Attention Restoration Theory (ART).....	7
2.2.1.2 Stress Reduction Theory (SRT)	7
2.2.1.3 Biophilia Hypothesis.....	8
2.3 BIOPHILIC DESIGN	9
2.4 BIOPHILIC DESIGN PRINCIPLES.....	9
2.4.1 Direct Experience of Nature.....	11

2.4.2 Indirect Experience of Nature	16
2.4.3 Experience of Space and Place.....	19
2.5 PATTERNS OF BIOPHILIC DESIGN.....	21
2.5.1 Nature in the Space.....	22
2.5.2 Natural Analogues	30
2.5.3 Nature of the Space	34
3. COFFEE SHOPS	39
3.1 OVERVIEW OF COFFEE SHOPS: DEFINITION AND CHARACTERISTICS..	39
3.1.1 The History and Role of Early Coffee Houses.....	39
3.1.2 Coffee Shops as Third Places	43
3.2 BENEFITS OF BIOPHILIC DESIGN IN COFFEE SHOPS.....	47
3.3 GLOBAL EXAMPLES OF BIOPHILIC COFFEE SHOPS.....	49
4. METHODOLOGY	59
4.1 RESEARCH DESIGN	59
4.2 CASE STUDY: CUP OF JOY, NIŞANTAŞI	60
4.2.1 Background and History.....	61
4.2.2 Spatial and Visual Analysis.....	62
4.3 RESEARCH METHODS	65
4.3.1 Visual Documentation.....	65
4.3.2 Observation	65
4.3.3 Evaluation of Biophilic Design Pattern.....	66
4.3.4 Behavioral Mapping	67

4.3.5 Interviews	68
4.4 ETHICAL CONSIDERATIONS.....	69
5. RESULTS AND DISCUSSION	70
5.1 EVALUATION RESULTS OF BIOPHILIC DESIGN PATTERNS	70
5.2 BEHAVIORAL MAPPING RESULTS	75
5.3 OBSERVATIONAL RESULTS.....	84
5.4 INTERVIEW RESULTS	86
5.5 DISCUSSION	96
5.6 RECOMMENDATIONS.....	99
6. CONCLUSION	102
REFERENCES	105
APPENDIX A.....	115
APPENDIX B.....	116
APPENDIX C.....	118
APPENDIX D.....	121

LIST OF TABLES

	<u>Pages</u>
Table 2.1: Experiences and Attributes of Biophilic Design by Kellert and Calabrese (Kellert et al., 2011)	10
Table 3.1: Zhicang Coffee – Descriptive Overview and Visual Representation.....	50
Table 3.2: Tanatap Ring Garden Coffee Shop – Descriptive Overview and Visual Representation	53
Table 3.3: The Harudot Coffee Shop – Descriptive Overview and Visual Representation	56
Table 4.1: The 14 Patterns of Biophilic Design Extracted from Browning Et Al (Browning et al., 2014)	66
Table 5.1: Evaluation Results of Cup of Joy According to Biophilic Design Patterns Identified by Browning Et Al (Browning et al., 2014).....	70
Table 5.2: Demographic Characteristics of Customers	75
Table 5.3: Behavioral Maps for 20 Customers.....	76
Table 5.4: Detailed information on Behavioral Mapping of Customers in Cup of Joy Nişantaşı	78
Table 5.5: Number and Percentage of Customers’ Activities	80
Table 5.6: Number and Percentage of Customers’ Seating Area	81
Table 5.7: Number and Percentage of Customers’ Duration of Stay	82
Table 5.8: Interview Questions and Customer's Responses	86

LIST OF FIGURES

	<u>Pages</u>
Figure 2.1: The Composition of the Term Biophilia (Produced by Author).....	6
Figure 2.2: Zhicang Coffee Shop (Silva, 2024)	11
Figure 2.3: The Large Glass Windows in Bun Pastry & Beverages Coffee Shop (Negoro, 2025).....	12
Figure 2.4: Jewel Changi Airport Singapore (Pintos, 2024).	13
Figure 2.5: Tanatap Ring Garden Coffee Shop (Abdel, 2024)	13
Figure 2.6: The Singapore Airport Butterfly Garden (Cahill, 2023).....	14
Figure 2.7: Grand Stone Fireplace in a Rustic Timber-Frame Interior (Frame, 2024).	15
Figure 2.8: The Sydney Opera House (Fessenden, 2015)	117
Figure 2.9: The Kew Gardens Visitor Centre, London (Forge, 2024)	18
Figure 2.10: La Do Coffee (Caballero, 2025).	19
Figure 2.11: Manire House as an example of Prospect and Refuge (Caballero, 2024).	20
Figure 2.12: Building Moss and Birch Garden, New York Times (Browning et al., 2014).	22
Figure 2.13: A fountain in Granada, Spain’s Calat Alhambra (Browning et al., 2014).....	23
Figure 2.14: The Dockside Green Community, Vancouver Island (Browning et al., 2014)	24
Figure 2.15: Singapore’s Khoo Teck Puat Hospital (Browning et al., 2014)	26
Figure 2.16: The Courtyard of Robert and Arlene Kogod (Smithsonian American Art Museum, n.d.).....	227
Figure 2.17: Louis Kahn’s Yale Center for British Art (Browning et al., 2014)	28

Figure 2.18: The Greenroof of COOKFOX Architects' New York (Browning et al., 2014)	29
Figure 2.19: Victor Horta's design of the Brussels Hotel Tassel (Browning et al., 2014)...	31
Figure 2.20: The Bank of America Tower's Leather-Clad Elevator in New York (Browning et al., 2014).	32
Figure 2.21: The Ceiling Structure in Toronto (RedPat, 2014).....	33
Figure 2.22: The Salk Institute's Central Plaza located in California (Browning et al., 2014).	35
Figure 2.23: Mesa Verde's Cliff Palace (Cliff Palace , Mesa Verde National Park CO ,VisitMesaVerde.com, n.d.).....	36
Figure 2.24: Katsura Imperial Villa and Garden in Kyoto, Japan. (Mehran, 2023)	37
Figure 2.25: The Suspended Mass in Los Angeles (Browning et al., 2014).	38
Figure 3.1: An Ottoman Coffeehouse, 1875 (Daily Sabah, 2018)	40
Figure 3.2: A Derek Lucas Painting of Lloyd's Coffee House (Adkins & Adkins, 2023)..	41
Figure 3.3: Ray Oldenburg's Definitions of Third Place (Produced by Author).....	47
Figure 4.1: Location Map of Cup of Joy, Nişantaşı and its Surroundings (Produced by Author)	60
Figure 4.2: Exterior View of Cup of Joy at Kalyon Cultural Center, Nişantaşı (Kalyon Kültür, 2021)	61
Figure 4.3: Site Zoning and Sun Analysis of Cup of Joy (Produced by Author).....	62
Figure 4.4: Site Plan of Cup of Joy (Produced by Author)	63
Figure 4.5: Visual Mapping of Cup of Joy Nişantaşı (Produced by Author).....	64
Figure 5.1: Codes of Behavioral Mapping Representing Activities, Seating Preferences, Duration of Stay and Circulation Path at Cup of Joy Nişantaşı	75

Figure 5.2: Behavioral Mapping – Activities Summary Plan. 79

Figure 5.3: Behavioral Mapping – Seating Preferences Summary Plan. 80

Figure 5.4: Behavioural Mapping – Duration of Stay Summary Plan. 81

Figure 5.5: Behavioral Mapping - Circulation Paths in Cup of Joy..... 83



LIST OF CHARTS

Pages

Chart 4.1: Flowchart of Methodology and Results.....	59
Chart 5.1: Customers' Rating.....	95



ABBREVIATIONS

ART : Attention Restoration Theory

SRT : Stress Reduction Theory



1. INTRODUCTION

Nowadays, more than ever, architecture and design recognize the importance of natural spaces on human well-being. Due to the effects of widespread industrialization, urbanization has been perceived as a process that distances humans from nature. However, the construction of buildings is one of the factors that has destroyed nature, by drying up water features and even cutting down trees. Unfortunately, the population continues to urbanize, and humans' disconnection with nature increases, resulting in negative effects on mental and physical health (Soga & Gaston, 2016).

In response to this increasing disconnection, the concept of biophilia has become more relevant. It refers to the biological urge in humans to seek relationships with nature (Wilson, 1984). This concept, when applied to the built environment, is known as biophilic design, which is a strategy that integrates natural elements to promote psychological and physiological well-being. It also promotes ecological and social balance by encouraging interaction and collaboration among people (Kellert, 2018). Although biophilia is an inherent disposition, like other human tendencies, it needs stimulation and growth through exposure and design (Kellert & Calabrese, 2015).

In practice, biophilic design strives to renew the fundamental human-nature relationship, promoting well-being across living, working, and leisure settings. The COVID-19 pandemic, which began in 2019, has accelerated this trend and given it a new twist. In recent years, under the pandemic, consequently, there has been a growing interest in applying the concept of biophilia to indoor spaces, by using green and naturally ventilated spaces. Biophilic design is emerging as a solution that fulfills the need for safe and comfortable spaces and satisfies the human desire to stay connected to nature, to support physical and psychological health (Harte & Regrut, 2021; Carabelli, 2020).

Among the spaces transforming, coffee shops hold a particularly meaningful place. They are known as third places, those spaces that offer an alternative to home and work that foster a sense of community (Oldenburg, 1989).

They are more than simply locations to get a cup of coffee; they have evolved into meaningful social spaces where people gather, interact, even working and studying (Waxman, 2004; Woldoff et al., 2013).

The growing appeal of coffee shops is also tied to their design. café designs have shifted from purely functional spaces to experience, driven environments that focus on providing comfort and beauty According to a study by Lisa Waxman (2004) Customers now value ambiance and atmosphere, such as good lighting, natural views, and fresh air. This is what is expressed by biophilic design. (Agarwal et al., 2009; Waxman, 2004).

Ultimately, integrating biophilic design into coffee shop architecture not only enhances user satisfaction but also offers a solution for maintaining human-nature relationships in contemporary urban life. Within this framework, this thesis explores the influence of biophilic design in a modern coffee shop setting, specifically focusing on the case of Cup of Joy Nişantaşı, Istanbul, to understand its impact on customer experience and behavioral engagement through a qualitative methods, such as interviews and observations and quantitative tools like behavioral mapping to record how people interact with the space and how design features influence those interactions.

This study is structured into six chapters. Starting with the first which consists of the introduction, the statement of the problem, research objectives, research questions, as well as the purpose and scope of the thesis.

The second chapter will focus on biophilia, touching historical connection with human and nature. and the theories supporting it, It also outline the foundational elements of biophilic design, and the three main categories of design patterns.

The third chapter presents the historical and social evolution of coffee shops, highlighting their role as third places. It also examined the advantages of biophilic design in coffee shops. And finally, three coffee shops as global examples, which demonstrated the applied use of biophilic design strategies.

In chapter four, the Methodology of this research will be examined, including the research design, the case study, its details, and justifying the research methods, which include how collection of on-site data done, as well as the ethical considerations.

The fifth chapter, This chapter presents and interprets the outcomes of the evaluation of biophilic design patterns, behavioral mapping, observations, and interviews conducted in the selected coffee shop, and then a Discussion of the findings as well as the recommendations.

Then, finally, the Conclusion will summarize the key findings and insights gained from the study and emphasize the significance of the research outcomes.

1.1 STATEMENT OF THE PROBLEM

Urbanization has accelerated over the past two decades due to rapid population growth and industrialization. This leads to the transformation of natural landscapes into settings created by humans. Often contributing to environmental deterioration and separating people from the natural world.

In modern cities, people often seek out coffee shops not only for convenience but as environments that inspire creativity, reduce stress, and provide a psychological escape from urban pressures. However, many coffee shop interiors rely heavily on artificial materials and lighting, often neglecting the integration of natural elements. While some coffee shops, such as Cup of Joy Nişantaşı Istanbul, have begun to incorporate design elements that are biophilic like natural light and greenery, the actual impact of these elements on customers' behavior and well-being remains underexplored.

There is a lack of empirical research evaluating how biophilic design influences user experience in real-world commercial settings. Although biophilic design has been extensively studied in residential and institutional architecture, it remains under-researched in hospitality environments such as coffee shops. This study seeks to contribute new insights by addressing this gap. It investigates how biophilic design, as implemented in Cup of Joy Nişantaşı, affects customer perceptions and interactions with the space.

1.2 RESEARCH OBJECTIVES

The goals of this study are:

- a. To investigate the integration of biophilic design elements within Cup of Joy Nişantaşı, based on the fourteen patterns of biophilic design.
- b. To analyze the impact of biophilic design on customer behavior and preferences through behavioral mapping.
- c. To explore customer perceptions and interpretations of biophilic design in the coffee shop through interviews.

1.3 RESEARCH QUESTIONS

What biophilic design patterns are present and absent in Cup of Joy Nişantaşı?

What are the most influential biophilic design elements in Cup of Joy Nişantaşı?

The main research question guiding this study is: How does biophilic design affect customer comfort and well-being in a coffee shop environment?

1.4 PURPOSE AND SCOPE OF THE THESIS

This study intends to explore the application and impact of biophilic design in coffee shops. The research focuses on a single case study, Cup of Joy Nişantaşı, located in Istanbul, Turkey. The principal goal of this study is to investigate how biophilic design influences customers' perceptions and behaviors. It uses a mixed-methods approach that consists of visual documentation, the evaluation of biophilic design patterns, behavioral mapping, on-site observation, and interviews with customers. The purpose is not only to assess the presence of biophilic elements but also to understand their role in shaping spatial experience, user satisfaction, and emotional well-being. The scope is limited to one location to allow for a detailed, context-specific analysis that can offer understanding into the broader implications of biophilic design in similar environments.

2. BIOPHILIA AND BIOPHILIC DESIGN

2.1 THE HISTORY OF HUMANS WITH NATURE

Since the dawn of humanity, humans have been linked to nature. They have had a dynamic and changing relationship throughout history. When hunter-gatherer societies first appeared, approximately 40,000 years ago. During this period, people depended entirely on wild plants and animals to meet their needs for food, shelter, and tools. As Edward O. Wilson stated that people have lived as hunter-gatherers for more than 99% of the history of humankind, interacting with other organisms (Wilson, 1984). Early humans saw themselves as part of nature. This profound connection greatly impacted their daily lives and culture because they saw themselves as a part of nature rather than something distinct from it (Moghadam et al., 2015).

With the development of agrarian societies, a major transformation occurred about 10,000 years ago. Humans transitioned from a nomadic existence to settled communities and began to cultivate animals and plants. This change led to the emergence of agriculture, and thus to the formation of cities and civilizations. Early agrarian societies still maintained a close relationship with nature. Agriculture plays an important role in advancing human civilization while preserving nature (Moghadam et al., 2015).

Humans continued to interact with nature through farming within early urban environments. However, this connection began to weaken dramatically with the industrial revolution's beginning, which led to create distance between people and the natural world. Nature was increasingly perceived as a resource to be controlled and exploited, which contributed to widespread environmental degradation, including deforestation, pollution (Jaffar, 2020).

Even though this disconnection exists, modern understanding of environmental problems has initiated new efforts to rebuild harmony between humans and nature. International environmental movements have highlighted the value of ecological preservation and sustainable development. By being aware of the damage caused by the industry, these contemporary reactions show a growing desire to mend the link that humans previously shared with their environment. The relationship between humans and nature has progressed through social, cultural, and technological transformations, but with growing awareness,

hope for a future based on respect, sustainability, and ecological balance is growing (Jaffar, 2020).

Due to the increasing disconnection from nature caused by industrialization, biophilic design has gained attention as a way to re-establish the human-nature connection by embedding elements such as natural textures, shapes, and materials into constructed environments, because Biophilic design represents our innate affinity for nature and supports well-being. This design strategy emphasises that even in modern environments, Humans still need this contact with nature for health and balance (Kellert, 2008).

2.2 BIOPHILIA HYPOTHESIS

The word biophilia originates from Greek, combining “bio,” meaning life, and “philia,” meaning love or affection (Figure 2.1). It refers to the fundamental love of humans for all that is living, the satisfaction that human beings feel when they come into contact with nature (Barbiero, 2024, Kayihan, 2018). The expression was first used by social psychologist Erich Fromm in his book *The Anatomy of Human Destructiveness* in 1973 (Fromm, 1973). Dr. Edward O. Wilson developed the idea suggesting that this affinity for nature is based on evolutionary biology and functions as a genetic predisposition that influences human well-being (Wilson, 1984). Wilson described biophilia as an innate tendency to “focus on life and life-like processes” and a “positive complementarity” between humans and other animals, enduring even in contemporary artificial surroundings (Kellert & Wilson, 1993).

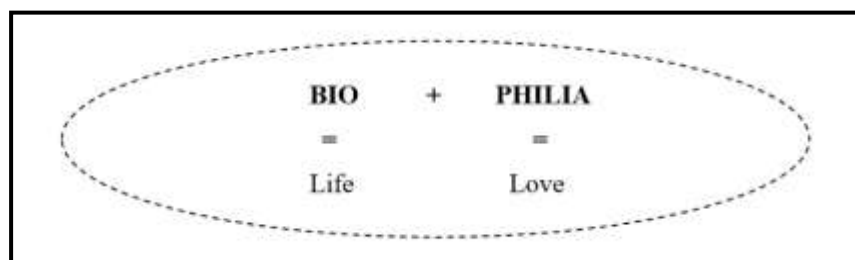


Figure 2.1: The Composition of the Term Biophilia (Produced by Author).

2.2.1 Theories Supporting the Relationship of Biophilia and the Built Environment

From the time of human evolution, people have constantly adapted their environment to their needs and interests, inspired by nature. This link with nature has influenced human behavior and helped us to meet existential challenges. This part will present the theories that support the connection between biophilia and architectural spaces in the following sections.

2.2.1.1 Attention Restoration Theory (ART)

Attention restoration theory is a theory developed by Rachel and Steven Kaplan, posits that restorative settings help restore attentional resources that have been depleted, and also suggests that nature is innately captivating and compels our uncontrollable attention. Since we see nature without actively focusing on it, this kind of attention involves little effort. Because it enables us to unwind and recuperate, this passive interaction with nature provides restorative benefits in contrast to the concentrated attention required in the everyday environment, such as coffee shops, which are used for all customer activities like study and remote work. Kaplan's (1989) research states four essential elements distinguish these environments, the first one is being away, which is experiencing a situation different from one's usual surroundings, then fascination, which is the interaction with naturally attention-grabbing stimuli that let the mind relax. The third element is extent, which refers to an environment that offers enough scope and coherence to stimulate the mind, and the fourth element is compatibility, which presents the setting that aligns with a human's purposes and goals, promoting a harmonious interaction. In those environments, people can go through four steps of the restoration process: concentrating on the present, achieving peace of mind, reflecting on life, and restoring attention (Kaplan & Kaplan, 1989).

2.2.1.2 Stress Reduction Theory (SRT)

Stress Reduction Theory (SRT) is developed by Roger Ulrich, which suggests that stress can be quickly reduced by being in natural settings that elicit favourable emotional reactions. As stated by Ulrich, natural environments have the power to create a positive effect, while also reducing physiological markers of stress. In contrast, urban or manufactured environments elicit negative effects on human like anxiety or sadness (Ulrich et al., 1991).

In the context of interior environments, such as coffee shops, integrating natural elements, including natural light, natural materials, and views of nature, can enhance a restorative atmosphere, which aligns with SRT's emphasis on how nature may help promote "psychophysiological stress recovery." By adding nature-inspired features to hospitality spaces like coffee shops, not only can they attract patrons but also reduce stress and support their mental well-being amidst daily routines.

A study by Maspul (2023) examining the connection between coffee shop patrons' coping mechanisms and well-being found that adding natural elements, such as plants, and maximizing daylight can produce a more serene and revitalizing ambiance that promotes visitor relaxation.

2.2.1.3 Biophilia Hypothesis

The biophilia Hypothesis asserts that people are naturally connected to the natural world, suggesting that this link is crucial to mental and emotional health. This theory was originally proposed by Erich Fromm, then developed by Edward O. Wilson in his book in 1984. It is predicated on the idea that a fundamental component of human well-being and a deeply ingrained evolutionary history is the human connection to nature (Wilson, 1984).

Wilson underlined that instinctive and emotional reactions are not solely intellectual also play a role in shaping this relationship. He maintained that conscious and unconscious psychological processes impact how people engage and react to their natural surroundings. According to Wilson, the relationship between human and nature cannot be just explained by logic, because it is also connected by affective dimensions, and he proposed that disconnection from nature is seen in urbanized and artificial environments, which may cause health problems, this is way he underlined the importance of maintaining regular contact with nature for overall psychological and physiological well-being (Wilson, 1984).

In addition, Wilson thought that fostering a love of the natural world might lead to more sustainable and peaceful lifestyles when combined with ecological consciousness. His theory is based on a deep respect for life and the intricacy of natural systems, both of which are central to biophilic philosophy (Wilson, 1984).

2.3 BIOPHILIC DESIGN

Biophilic design began in the late 20th century, it was developed in a time when people were designing spaces that separated people from nature. Biophilic design is an architectural representation of the biophilia principle. Biophilic design aims to integrate biophilic principles into the built environment to foster meaningful and beneficial relationships between people and the natural environment within modern architectural and landscape contexts (Kellert, 2008).

A wide range of research has examined the connections between nature, well-being, and human health, they are still relevant and well-supported today. Also, they demonstrate the good effects of nature exposure on both physical and emotional health (Ulrich, 1984).

The effectiveness of biophilic design is based on these results, since it seeks to introduce aspects of nature into architectural spaces to enhance life quality and restore some harmony between habitats that are natural and those that are human-made.

2.4 BIOPHILIC DESIGN PRINCIPLES

Modern society faces several barriers to positive interaction with nature, leading to a growing disconnect in domains like industrial, health, education, urban design, and architecture. This disconnect restrains the design of the built environment, where humans devote the majority of their time, and makes it difficult to achieve contact with nature, resulting in insufficient access to natural elements.

According to the study conducted by Kellert et Calabrese (Kellert et al., 2011), the efficient implementation of biophilic design requires five fundamental principles, these theories represent foundational conditions for successful biophilic design, which include:

- a. Biophilic design necessitates the sustained interaction with nature.
- b. Biophilic design identifies the ways that humans have adjusted to their natural surroundings in ways that, have historically enhanced their well-being and health.
- c. Biophilic design fosters an emotional connection to certain environments and spaces.
- d. Biophilic design promotes good relationships between nature and human that stimulate a

greater feeling of connection and accountability toward both people and environmental societies.

- e. Designing biophilic solutions is an integrated, interrelated and mutually supporting approach to architecture.

Three categories were created for biophilic design approaches, and 24 experiences based on the experiences of nature were used to help designers apply biophilic design examples in the right way. As shown in Table 2.1, these categories are divided into three sections: Direct Experience of Nature, Indirect Experience of Nature, and Experience of Space and Place. Which highlights a basic aspect of how people experience nature (Kellert et al., 2011).

Table 2.1: Experiences and Attributes of Biophilic design by Kellert and Calabrese (Kellert et al., 2011).

Direct Experience of Nature	Indirect Experience of Nature	Experience of Space and Place
Natural Light	Images of Nature	View and Refuge
Air	Natural Materials	Complexity
Water	Natural Colors	Whole Part Integration
Plants	Natural Light and Air Stimulation	Transitional Spaces
Animals	Forms and Shapes	Mobility and Wayfinding
Weather conditions	Inspired by Nature	Cultural and Ecological Connectedness
Landscape	Richness of Details	
Fire	Age, Change, and the patina of time	
	Geometrics	
	Biomimicry	

2.4.1 Direct Experience of Nature

This indicates that individuals are in direct contact with environmental elements such as plants, water, and animals, which are already present in the constructed world (Kellert et al., 2011).

Natural light: Exposure to natural daylight plays a vital role in supporting human health and overall well-being, allowing orientation to daytime, night-time, and the seasons, as we respond to the position and cycles of the sun. Natural light awareness can also assist with movement, wayfinding, and overall comfort and satisfaction. Natural light goes beyond basic exposure, adopting visually appealing shapes and structures, through creative light-shadow interplay, diffuse, variable light, and light-spatial properties integration. As demonstrated in Figure 2.2, glass walls and reflective materials and colors can be used to bring natural light to interior spaces. Shifts between illuminated and shadowed areas, along with changing levels of brightness over time, can give the impression that the light is moving. (Kellert et al., 2011).



Figure 2.2: Zhicang Coffee Shop (Silva, 2024).

Air: Natural ventilation greatly influences comfort and productivity. The sensation of natural airflow across a built environment can be further enhanced by temperature, humidity, air movement, and atmospheric pressure variations. These variations could either be obtained by outdoor access, such as operable windows for free flow of air, or through sophisticated technological and engineering measures as the Figure 2.3 shown (Kellert et al., 2011).



Figure 2.3: The Large Glass Windows in Bun Pastry & Beverages Coffee Shop (Negoro, 2025).

Water: As a basic necessity, water is indispensable to life, its incorporation in the built environment has been shown to lessen stress, enhance well-being, and improve overall performance. The human relationship with water becomes most meaningful when its multimodal experience engages sight, taste, movement, sound, and touch. Several design strategies may help satisfy this inherent connection, for example, by granting visual access to lakes, rivers, or oceans, or by incorporating the aesthetic presence of fountains, aquariums, and artificial wetlands. Water in architecture appears most benevolent when it is perceived as sparkling clean, in motion, and intriguing to several sensory modalities, accompanied by gentle and calming sounds (Kellert et al., 2011).

As shown in the figure 2.4, the Rain Vortex at Jewel Changi Airport exemplifies the integration of water in architecture. Its cascading flow, dynamic movement, and soothing sound create a rich multisensory experience.



Figure 2.4: Jewel Changi Airport Singapore (Pintos, 2024).

Plants: One of the best ways to naturally bridge a site with an interior space is by incorporating vegetation, particularly flowering plants. Greenery lifts mood and relieves stress while promoting well-being, comfort, and efficiency. Few plants or individual specimens may have an important influence; for a better positive outcome, vegetation in architectural interiors and designed landscapes should be undertaken in excess, with ecological integrity in mind, ensuring that predominant species are natives rather than exotic or invasive. (Kellert et al., 2011).



Figure 2.5: Tanatap Ring Garden Coffee Shop (Abdel, 2024).

Animals: Animal life has always been an important aspect of the history of humankind. However, its integration into the built environment can become problematic and is sometimes the subject of differing opinions. Design objects, such as vegetated rooftops, aquatic displays, landscaped areas, bird feeding stations, enclosed bird habitats, and the cutting-edge use of nanotechnology, webcams, videos, binoculars, and spotting scopes, can help stimulate positive animal-human interactions. Such rare or singular animal encounters likely make a negligible impact. Wherever possible, interspecies interactions should involve a wide range of species, preferably native rather than non-native ones (Kellert et al., 2011).



Figure 2.6: The Singapore Airport Butterfly Garden (Cahill, 2023).

Weather: Dating back to antiquity, climatic conditions have always had a profound impact on the lives of people and is a sort of tie that connects them with nature; it was the fulcrum for their survival and welfare. Experiencing weather in a built environment can enrich and enliven. Such experiences could be through direct exposure to the outdoor elements or simulated by creating atmospheric conditions through controlling airflow, temperature, and ambient pressure. Design strategies to enhance such experiences include views of the outdoors, operable windows, balconies, colonnades, pavilions, gardens (Kellert et al., 2011).

Landscape: Natural landscapes are composed of interconnected elements like plants, animals, and geological elements. People prefer savanna-like landscapes, characterized by large trees, an open understory, and water features. Even simple natural scenery is often favored over artificial or human-made environments. Rewarding opportunities allow actual involvement in self-sustaining ecosystems, rich in biodiversity and providing ecological services such as water regulation and pollination. Such opportunities can also be provided by the use of constructed wetlands, green roofs, and simulated aquatic spaces. Engagement with those systems can be promoted through views, platforms, and direct participation (Kellert et al., 2011).

Fire: The control of fire is arguably one of the finest achievements of mankind, as it helped in harnessing energy beyond the level of living beings and in the transformation of materials. Fire is a source of comfort and discomfort. In architecture, the atmosphere of warmth can be provided by simple physical means through fireplaces and hearths, along with imaginative combinations of light, color, movement, and materials with differing capacities for heat conduction (Kellert et al., 2011).



Figure 2.7: Grand Stone Fireplace in a Rustic Timber-Frame Interior (Frame, 2024).

2.4.2 Indirect Experience of Nature

Indirect nature experiences refer to the representation or image of nature, it involves engaging with materials, or patterns that reflect natural elements, such as images, organic materials and processes like aging (Kellert et al., 2011). The following characteristics are incorporated into the biophilic design as a means of experiencing nature indirectly:

Images of Nature: Nature exists to be portrayed in the built environment from images depicting plants, animals, landscapes, water, and geological elements that evoke emotion and intelligence. Airplants can be depicted not only in photographs, paintings, and sculptures but also in murals, videos, and even digital simulations. A single image alone may lack impact. Nature art should find itself in large quantities, competing with other styles that portray built elements to create an atmosphere that influences how people think and feel (Kellert et al., 2011).

Natural Materials: It is incredibly fascinating to see how these materials mirror the adaptive nature of organic matter, trying to cope with survival challenges. The metamorphosis of these materials often brings forth positive aesthetics and tactile responses that are extremely difficult to replicate in synthetic alternatives. Wood, stone, wool, cotton, and leather are some popular natural materials employed in building and design, appearing in products, furnishings, fabrics, and interior and exterior design (Kellert et al., 2011).

Natural Colors: Humans are naturally diurnal creatures, and color has always played a pivotal role in locating resources and navigating the environment. With the advent of modern technology, the vivid hues of artificiality can find expression. Still, biophilic designs of built environments must emphasize the softer, earth-tone colors found in the natural colors of soil, rocks, and plants. Bright hues are to be seen only in accents where they deliberately highlight things pleasing to human nature, such as flowers and sunsets while repelling artificial colors that hurt visual harmony (Kellert et al., 2011).

Natural Light and Air Stimulation: Building technology and construction have undergone developments that permit indoor lighting and conditioned air; however, static environments are generally formed, often to the detriment of physical and mental well-being. Artificial lighting can therefore be designed to mimic the spectrum and dynamic characteristics of natural light. The air conditioning system can recreate the effects of natural ventilation

through controlled air movement, temperature, humidity and barometric pressure (Kellert et al., 2011).

Forms and Shapes: Nature-inspired shapes and forms can be most enchanting. From leaf prints on columns to plant motifs on structure façades and nature-inspired animal motifs on fabrics and coverings, the variety is endless. The introduction of these natural forms creates a vibrant, animated environment, pulsating with the energy of a living organism, transforming an otherwise drab area (Kellert et al., 2011).

Inspired by Nature: Imaginative portrayals can reimagine the enriching experience of nature. While they may not exist in nature itself, these representations retain design elements from the natural world. For instance, the Sydney Opera House extends its "wings" referencing the form of a bird (Kellert et al., 2011).



Figure 2.8: The Sydney Opera House (Fessenden, 2015).

Richness of Details: The natural realm has a huge variety and great diversity and is regarded as having the highest information density anywhere on Earth for humans. Environments, whether natural or artificial, that are rich in information and provide a cornucopia of choices and opportunities usually appeal to humans provided that complexity is clear and easily understandable. As shown in Figure 2.9, the Kew Gardens Visitor Centre embodies information richness through the juxtaposition of various natural elements and organic architectural forms, rendering a sensory experience befitting the intricacies of nature. This richness is coherently and accessibly communicated, for elements of design are easily

understood by the visitors when allowed to interact with the environment without being overwhelmed (Kellert et al., 2011).



Figure 2.9: The Kew Gardens Visitor Centre, London (Forge, 2024).

Age, Change, and the Patina of Time: Life, on the one hand, reflects nature in its dynamic processes of growth and aging. On the other hand, people often show a positive response to change and aging, as these processes exemplify nature's ability to adapt to shifting conditions. These dynamic processes are most impactful when enjoyed in the context of the qualities of unity and stability. A sense of change and temporality may be conveyed using design methods that integrate materials characterized by natural aging processes, the weathering of surfaces, and other methods of conveying the passage of time (Kellert et al., 2011).

Geometries: Some of the naturally occurring geometries categorize mathematical patterns frequently met within nature. Such patterns, in general, are characterized by associated hierarchy mapped through several scales, fluid, and curved bodies as opposed to fixed ones, primarily self-similar. Designs yet exhibit subtle variations from one instance to another. This includes fractals, in which base shapes repeat in predictable but varied ways, thus identifying a balance between similarity and variation. In addition to these fractals, some major cases include the Golden Ratio and Fibonacci Sequence, which represent an ordered scaling that these patterns use in nature (Kellert et al., 2011).



Figure 2.10: La Do Coffee (Caballero, 2025).

Biomimicry: Biomimicry means that whatever one can learn from forms, structures, and norms found in nature, particularly from other species, can be applied to human problems and goals. Such innovations taken from nature could be the idea of termite mounds with climate-regulating properties, the incomparable tensile strength and efficiency of spider webs, and indeed, thermal insulation provided by some furs among animals. Biologically inspired solutions applied through technology confer new functional advantages to humanity and help nurture respect for nature's ingenuity and creativity (Kellert et al., 2011).

2.4.3 Experience of Space and Place

This refers to the aspects of nature's physical characteristics that have contributed to human well-being and welfare such features consist of mobility, open view and organized intricacy. The following characteristics are incorporated in biophilic design's experience of space and place:

View and Refuge: Humans have evolved to thrive in habitats that provide a dual advantage: prospect and refuge. Prospect implies panoramic views from which a person can survey opportunities and threats, refuge implies safe, enclosed spaces that give one a sense of safety and comfort. When these conditions are applied to constructed spaces, they serve the purposes of protection and stimulation: a very powerful combination. Biophilic behaviors can be engendered by outward views, visual connectivity between interior spaces, and secure, protected areas (Kellert et al., 2011).



Figure 2.11: Manire House as an Example of Prospect and Refuge (Caballero, 2024).

Complexity: People tend to admire complexity in both natural and artificial environments, as it signifies an abundance of options and opportunities. However, too much intricacy can cause confusion and chaos. The most attractive environments are organized to provide a healthy amount of complexity. In other words, these environments tend to be rich in variety while maintaining coherent relationships that balance complexity with order (Kellert et al., 2011).

Whole Part Integration: Environments appealing to people are where disparate elements come together to form a harmonious unity. This sense of a unified whole can sometimes come into being through an arrangement of spaces in sequence or connection, and adjunctive provisions for distinctive and recognizable boundaries. An equally contrasting possibility is that harmony, the coming together of the elements of space, can be improved by reference to a central focus, whether that focus is functional or thematic (Kellert et al., 2011).

Transitional Spaces: The walkable space relies on a clear sense of the relationship between areas, with obvious and deliberate transitions for support. This includes anything from famous transitional types, such as hallways and doorways, or thresholds and gateways, to those that blend indoor and outdoor environments, such as patios, colonnades, courtyards, and porches (Kellert et al., 2011).

Mobility and Wayfinding: Comfort and well-being often depend on the individual's ability to move fluidly through different and sometimes complex environments. Well-defined paths and clear entry and exit points are paramount to ease of movement and a feeling of safety; conversely, deprivation of either leads to disorientation and discomfort (Kellert et al., 2011).

Cultural and Ecological Connectedness: Humans used territoriality as an evolutionary tactic to improve protection, manage resources, and permit mobility and adaptability. The preference for familiar environments is a cultural and ecological imprint. Culturally inspired designs strengthen the bond with a place, making it feel like a special human domain. Similarly, ecological attachments to a place, for example, understanding local terrains, native species, flora, and weather conditions, can foster a deep emotional connection to a place. These ecologically and culturally anchored ties support the drive to preserve both natural and human-made surroundings (Kellert et al., 2011).

2.5 PATTERNS OF BIOPHILIC DESIGN

Over the past two decades, much research has provided credence to the notion that people possess an intrinsic bond with the natural world. Researchers have discovered and categorized 14 biophilic design patterns that emphasize the emotional, physical, psychological, and cognitive connections between individuals and the built environment in order to better comprehend and implement this relationship (Browning et al., 2014). In order to provide clarity and consistency, the term “pattern” has been deliberately used to substitute terms like “attributes” in the language of biophilic design. The idea of design patterns draws inspiration from works like *Patterns of Home* (Jacobson et al., 2002), as well as other studies on form, complexity, and language (Salingaros, 2013).

Three categories comprise the biophilic design patterns: Nature of the space, Nature in the space, and nature analogues. These categories provide a thorough framework for implementing biophilic design ideas into practice and developing environments that enhance well-being (Browning et al., 2014).

2.5.1 Nature in the Space

The word “Nature in Space” introduces the existence of nature into a setting. this includes elements like greenery, water, animals, wind, sound, and smell. Some examples of nature in space: aquariums, flowers, green walls, fountains, and potted plants. Individuals have good experiences of nature in space when they can associate with these natural components in meaningful ways, especially when there is variety, movement, and multisensory contact (Browning et al., 2014). There are seven patterns of biophilic design in nature in the space, the following points will show the biophilic design patterns of this category in more detail.

Visual connection with nature is the first pattern, which introduces that the spaces are designed with that pattern, can create an atmosphere that is both energetic and peaceful, as shown in Figure 2.12. Seeing natural factors such as time and weather enhances relaxation. According to research, taking in nature promotes happiness and attentiveness, lowers blood pressure. Real biodiversity delivers more psychological advantages, but even looking at pictures of nature has positive impacts (Fuller et al., 2007). The favoured natural landscape typically encompasses trees, flowering plants, and clean water. Positive effects are noticeable within minutes, Studies show that mood and stress recovery occur faster when people view nature, whether through a window or in person (Barton & Pretty, 2010; Tsunetsugu & Miyazaki, 2005).



Figure 2.12: Building Moss and Birch Garden, New York Times. (Browning et al., 2014).

Non-visual connection with nature: This connection relates to sensory experiences behind the visual approach, including olfactory cues, gustatory elements, auditory stimuli and tactile sensations that evoke individuals' recall of natural environments. Areas with these components feel peaceful, healing and serene. Research shows that sounds of nature, like avian vocalizations or the sound of the sea, can improve recovery from stress by 37% compared to urban noise, while together reducing cognitive weariness (Alvarsson et al., 2010; Jahncke et al., 2011). Research suggests that combining auditory and visual stimuli enhances positive impacts. This is demonstrated by results that show people feel more psychologically restored when they watch natural scenes with accompanying sounds (Hunter et al., 2010). Scent is another essential element, contact with natural aromas, like herbal oils, has been demonstrated to boost immune function and help with relaxation (li et al., 2012 ; Kim et al., 2007). Furthermore, physical interaction with natural elements like plants or water has been linked to reduced stress (Koga & Iwasaki, 2013). Additionally, including natural noises in spaces, giving access to natural textures, and merging several senses for a better effect are some design concepts for establishing non-visual relationships. The Alhambra in Granada, Spain, as shown in Figure 2.13 is one known example of how sound, smell, and touch can all be integrated into design (Browning et al., 2014).



Figure 2.13: A fountain in Granada, Spain's Calat Alhambra (Browning et al., 2014).

Non-rhythmic sensory stimuli: The gentle rustle of foliage and the sight of butterflies' movement are good examples of non-rhythmic sensory which can offer energizing and renewing moments of attention. natural, unpredictable interactions temporarily and unobtrusively capture attention, providing a positive distraction. however, brief exposure to non-rhythmic stimuli, such as looking up at distant natural elements for 20 seconds every 20 minutes, helps relax the muscles and improve comfort (Vessel et al., 2012).

The dynamic characteristics of natural stimuli are frequently absent from the built environment, which creates spaces that can seem repetitive. When the sensory elements are included, like the sound of water, they can restore the feeling of being in harmony with nature. These elements are most effective when they occur periodically and are not overly repetitive, as humans process natural movement and sounds more positively than rhythmic patterns (Beauchamp et al., 2003). Throughout the year, seasonal elements can also provide continuous sensory stimulation, the Dockside Green in Vancouver, Canada, which is shown in igure 2.14 as an example of this design concept, which provides the rainwater management residents with sensory-rich experiences, enhancing well-being through connection to nature.



Figure 2.14: The Dockside Green Community, Vancouver Island (Browning et al., 2014).

Thermal & airflow variability: Effective thermal and airflow diversity in space design creates dynamic, comfortable, and rejuvenating environments that encourage flexibility and control. This design approach is informed by studies on natural ventilation and its effects on comfort, productivity, and well-being. Research suggests that modest sensory diversity in light, sound, and temperature reduces monotony and improves concentration, while static environments may lead to boredom. According to the theory of alliesthesia, pleasant thermal sensations are perceived more strongly when the body is initially warm or cold rather than neutral (Arens et al., 2006). Natural movements such as gentle breezes, have been shown to enhance focus through "soft fascination." (Kellert et al., 2011). In classrooms, varying thermal conditions have been associated with improved student performance, while changes in ventilation velocity have been shown to enhance comfort and cognitive function, including short-term memory (Wigö, 2005).

The goal of this design approach is to enable individuals to adapt their environment to their needs while incorporating natural temperature variations and airflow. In contrast to conventional thermal designs, which aim for narrow temperature ranges to meet predefined comfort levels, introducing unpredictability similar to that found in outdoor environments can improve pleasure. By providing personal control through devices like operable windows, fans, or adjustable shades, users can modify their environment and enhance comfort without increasing energy consumption. Research suggests that this strategy promotes occupant comfort and sustainability by expanding the acceptable temperature range by two degrees Celsius above and below conventional norms (Nicol & Humphreys, 2002). In addition to reducing energy consumption and promoting environmental responsibility, these designs enhance the sensory experience by incorporating natural variations. Thermal and airflow variability are effectively integrated into the design of Khoo Teck Puat Hospital in Singapore as shown in Figure 2.15, which was created by RMJM Architects. Its passive design improves thermal comfort by introducing fresh air from outdoor courtyards, and patient rooms feature operable windows for individual control. (Browning et al., 2014).



Figure 2.15: Singapore's Khoo Teck Puat Hospital (Browning et al., 2014).

Presence of Water: water existence is also another patterns of biophilic design which can trigger both energy and calmness, affected by factors like sound, fluidity, illumination, and proximity. Research shows that environments featuring water reduce stress, foster tranquility, and enhance concentration and mood. Both Natural and urban spaces featuring water are generally preferred for their ability to evoke positive emotional responses (Jahncke et al., 2011; Karmanov & Hamel, 2008; White et al., 2010). Being in nature-rich areas with water noticeably enhances emotional well-being and self-worth relative to similar settings without water (Barton & Pretty, 2010).

Moreover, the auditory and tactile properties of water features can lower stress levels. (Alvarsson et al., 2010; Pheasant et al., 2010). The goal of incorporating water into the design is to create a multi-sensory experience that soothes, uplifts, and alleviates mental strain. The beneficial effects of water endure over time, with even small elements having lasting impacts (Biederman & Vessel, 2006). To attain the best results, designers should prioritize dynamic water flow, adjust features to ensure comfort, and emphasize energy-efficient, sustainable designs, particularly in water- scarce regions. The Robert and Arlene Kogod Courtyard in Washington, DC, as shown in Figure 2.16 is a prime example of effective water design. It features a thin sheet of water cascading over stone, reflecting light and encouraging interaction, which enhances the space's tranquil ambiance (Browning et al., 2014).



Figure 2.16: The Courtyard of Robert and Arlene Kogod (Smithsonian American Art Museum, n.d.).

The Dynamic & Diffuse Light: This is a pattern that creates a sense of time and movement within a space, balancing dramatic effects with a calming atmosphere. Lighting has long been recognized for its ability to influence mood, performance, and overall well-being, with early studies showing that daylight can positively impact productivity and mood across various settings (Nicklas & Bailey, 1996). More recent research has looked into how different levels of light can affect our circadian rhythm and improve health. For instance, sunlight changes throughout the day shifting from yellow in the morning to blue at midday and red in the evening affecting our body temperature and heart rate (Kandel et al., 2012).

The aim of this pattern is to create illumination that promotes well-being, without making the space feel overly uniform or harsh. For instance, glare occurs when there's a stark contrast in brightness between two surfaces, which can lead to discomfort (Browning et al., 2014). The contrast is that task and accent lighting provide flexibility and variation, while diffused lighting on walls and ceilings produces a calming background. The way light flows, like sunshine coming through a tree's branches, gives the scene depth, and makes the room feel more vibrant. By carefully adjusting the color and intensity of the light without creating discomfort, the space's experience is improved.

Louis Kahn's design for the Yale Center for British Art is a superb illustration of this pattern (Figure 2.17). With its mix of window orientations, clerestories, skylights, and a central atrium, the building's interior spaces allow light to enter in various ways. In addition to improving the experience of the visitor to the artwork, this deliberate use of light preserves the optimal circumstances required for its preservation (Browning et al., 2014).



Figure 2.17: Louis Kahn's Yale Center for British Art (Browning et al., 2014).

Connection with Natural Systems: A space designed to foster a link with organic systems can increase awareness of seasonal transitions and ecological cycles, while fostering a feeling of inclusion in a broader context. Often the things experienced in such settings include nostalgia, relaxation and enlightenment. Although there is limited empirical evidence about the health benefits, this pattern is believed to positively influence well-being, akin to the presence of water pattern (Kellert et al., 2011). Observing and understanding natural processes can modify individuals' perspectives, enhancing their interaction with the environment. The primary aim of this pattern is to promote environmental stewardship and enhance the understanding of ecological systems. Simple measures such as presenting views of deciduous trees or flowering plants can achieve this, as can more complex strategies like integrating rainwater gardens or weather-responsive bioswales.

Deepening this connection is often significantly facilitated by temporal fluctuations, such as seasonal changes or weather patterns (Browning et al., 2014). Using materials and structures that respond to environmental factors, such as rainfall or solar heat, can strengthen the link

with natural systems. In areas that encourage interaction with nature, such as gardens or seasonal cookery, this connection is further enhanced, particularly for children, patients, and the elderly.

For instance, the penthouse office of COOKFOX Architects in New York, as shown in Figure 2.18, features a green roof area of 3000 square feet that reflects the vitality of the seasons. Workers began to perceive the roof as an ecosystem instead of just a decorative feature after observing phenomena like hawks hunting or bee activity changing during extreme weather. It reinforced their knowledge of natural cycles, including the variations between honey collected in the summer and autumn. Individual well-being and collective ecological responsibility can be fostered by this closer connection to natural systems, which has the potential to change how people perceive and interact with their surroundings (Browning et al., 2014).



Figure 2.18: The Greenroof of COOKFOX Architects' New York (Browning et al.,

2.5.2 Natural Analogues

Natural analogues are objects that evoke the natural world without being alive. These may include nature-inspired items, materials, colors, shapes, or patterns. A connection to nature might be suggested through furniture with organic shapes, artwork resembling leaves or shells, or materials that have been processed or altered, such as granite or wood. The most satisfying experiences with Natural Analogues occur when these nature-inspired elements are presented in an orderly, occasionally shifting manner and are rich in detail (Browning et al., 2014). This category includes three patterns of biophilic design, which will be shown in the next three points.

Biomorphic Forms & Patterns: environments characterized by biomorphic forms and patterns create an atmosphere that reduces stress, stress, enhances focus, and boosts cognitive function by shifting attention. These spaces elicit a sense of coziness, fascination, and immersion (Joye, 2007). Despite the human preference for organic and biomorphic forms, the scientific basis for this attraction remains unclear. Although the brain recognizes that these patterns are inanimate, they are often perceived as symbolic representations of life (Vessel, 2012).

Nowadays, Designers still apply biomorphic structures and ornaments to a variety of components such as windows, walls, and furniture, creating more holistic environments that establish visual balance and an equilibrium with the natural world. These timeless shapes assist in easing tensions, boosting mental functions, and enhancing the beauty of architectural environments. Their application at an initial stage during the design makes it more rational and more effective economically.

Victor Horta's Hotel Tassel in Brussels (1893), as shown in Figure 2.19, presents a biomorphic design by embedding vine-like motifs, soft lines, and other organic shapes in walls, railings, mosaics, and furniture pieces.



Figure 2.19: Victor Horta's design of the Brussels Hotel (Browning et al., 2014).

Material Connection with Nature: The connection with nature pattern emphasizes the need to use nature's materials in our built structures in order to improve health. When wood, leather or stone is used in buildings, the feeling and atmosphere is often more real and real-life, leading to sensations that are soothing and integrate people with nature. There is as yet very little scientific investigation on the tangible health benefits of natural materials, however, recently emerging ones indicate very positive physiological and psychological effects to these materials (Browning et al., 2014).

Tsunetsugu, miyazaki, and Sato (2005) state in their study that the application of wood in interiors, especially at a 45% ratio, boosts pulse rate while lowering blood pressure. The study portrays this as beneficial (Tsunetsugu et al., 2005). Contrarily, the excess application of wood, like ninety percent coverage, generates unfavorable effects in an environment where anxiety would be harmful. Such instances would be in spas or resorts, however in settings where an individual has to think deeply it would be bad as they would be overly relaxed. Additionally, Lichtenfeld et al. (2012) tested how the color green would perform in its reaction to cognitive activities, they suggested it would improve creativity, while also confirming it would have no impact on analytical tasks. This can be applied in broad concepts where the color green encourages and evokes a sense of positivity while also improving the physiological system (Lichtenfeld, Elliot, Maier, & Pekrun, 2012).

The natural materials that are used with a purpose, in the right kind and right amount, are intended to create environments which ensure mental and emotional health. It is important to use natural materials in their raw form, wood and stone in particular, due to the interaction with the senses which is absent in manufactured substitutes. Wood, grains and green color for instance are natural textures that are useful in spaces intended for enjoying creative activities or relaxing (Browning et al., 2014).

A clear example of this pattern is the façade of elevator in the Bank of America Tower in New York as presented in Figure 2.20 which made of leather so that the users are encouraged to feel and touch the buildings and feel close to nature (Browning et al., 2014).



Figure 2.20: The Bank of America Tower's Leather-Clad Elevator in New York (Browning et al., 2014).

The Complexity & Order: This is a pattern that focuses on the use of fractal geometries and visual symmetry in designs that are to be psychologically appealing. This equilibrium in terms of complexity assists in creating a restorative design by being neither too excessive nor overly simple. The intent is to be able to create a setting that has enough of information without it being stress inducing (Browning et al., 2014).

The research conducted on fractals, more so in nature and artisanship, indicates the impact that geometric patterns can have on the thoughts of humans. According to a variety of studies, fractal dimension ranging from 1.3 to 1.8 has been found to generate some benefits for human psychological wellbeing and on the other hand there is too much complexity

which isn't beneficial and on the contrary stressful.

As an example, overstimulation of complex visuals has brought about the more complex designs, and this are associated with nausea, headaches and spinning sensations, especially from high stimulation in visual areas (Browning et al., 2014).

Salingaros (2012) indicates in their study that the third iteration of fractal designs, with a scaling factor of three, can produce spaces that exhibit new combinations of order and complexity. Such patterns have elements of beauty combined with a certain degree of order, and this can help lower stress and facilitate thinking. However, patterns caused by designing with maximum second iteration and complexity are often uninspiring and less effective to stimulate the mind (Salingaros, 2012).

As shown in Figure 2.21 the Santiago Calatrava's design of Allen Lambert Galleria, Toronto, demonstrates the penchant for using Complexity & Order in architecture. The ambience is filled with patterns of fractal structures for instance, the surround columns of the space that extend to the form of a tree, stimulating the environment to be conducive without intimidating the viewer (Browning et al., 2014).



Figure 2.21: The Ceiling Structure in Toronto
(RedPat, 2014).

2.5.3 Nature of the Space

Nature of the Space refers to how the layout or design of a space can reflect the natural world. This includes our natural desire to see beyond what's immediately around us, our attraction to things that feel a little risky or unknown, and the excitement of discovering something hidden. The best experiences of Nature of the Space happen when the design includes these elements, combined with natural features like plants, materials, and patterns that remind us of nature (Browning et al., 2014). Nature of the Space encompasses four biophilic design patterns. They will be presented in the next pages.

Prospect: This pattern of biophilic design model believes in designing spaces that are spacious, reassuring and have a focus on new surroundings. The model allows for some control while also providing ample opportunity to look around and absorb the space. Studies show that spaces that have favorable prospect conditions can alleviate stress levels, vulnerability and boredom while simultaneously improving comfort and fatigue (Browning et al., 2014).

The theoretical foundation of the prospect pattern lies in evolutionary psychology and the savanna hypothesis (Orians & Heerwagen, 1992), which posits that humans are naturally inclined toward habitats resembling african savannas, open landscapes with shaded trees, water sources, and evidence of habitation. These elements indicate security, means, and chances for existence. It has been found that far views, that is those that are more than 30 meters, are liked because they enhance perception and lessen anxiety (Herzog & Bryce, 2007). Rich and information in-depth views describe a good prospect, for example, both interior and exterior conditions can exist at the same time. A considerable range of cope can be provided through the numerous ways. In the case of indoor settings where rooms overlook other rooms or even outdoor locations, such conditions do enhance the prospect; mirrors, elevated surfaces, if present, with proper sighting among spaces will also do (Hildebrand, 1991).

The prospect can be enhanced by architectural measures that aim at positioning the buildings, windows or even the workplaces to overlook and open scenery or landscaping.

The addition of savannah ecosystems or comprehensive bodies of water within the surroundings increases psychological acuity. The use of low walls or trees to create a visual length of not less than six meters and optimally thirty meters can also ensure that ideal prospect conditions are met. In this experience, moving areas up 12-18 inches with ceilings is also recommended (Browning et al., 2014). As shown in Figure 2.22, the Salk Institute for biological studies possesses a revered Prospect in design. The angled fins that outline this raised courtyard and the long rill that goes toward the Pacific Ocean without a doubt are a pure example of Prospect (Browning et al., 2014).



Figure 2.22: The Salk Institute's Central Plaza located in California (Browning et al., 2014).

Refuge: This pattern formulates areas that are comforting and protective in feeling, encouraging a shelter for activities which include working, relaxing, healing, and pondering. These areas seem to be in a different location from that of the outer region, but at the same time feel linked to that region, and thus are suitable for deep thinking and care. Refuge is important when it comes to protecting and the reduction of stress, leaving an effect on blood circulation by lowering the pressure and heart rate and increasing attention, concentration, and sense of security (Browning et al., 2014).

Refuge environments, it turns out, produce a greater health response than Prospect alone, and this penalty is compounded as the two are combined (Grahn & Stigsdotter, 2010). Studies in urban parks seek evidence that the ratio of these two environments denotes more than size or frequency of exposure, arguing instead that immersive spaces with these two conditions

create greater restoration (Appleton, 1996; Ruddell & Hammitt, 1987).

Refuge designs create little sheltered spaces in larger areas as part of restorative environments. These little areas give their protection, privacy, and possibility for reflection, rest, or cognitive tasks. While never closed within themselves, they still afford some relationship to the environment in which they exist. Ceiling heights, light, and spatial arrangements are major design considerations. Effective refuge balances the two opposing values: protection and maintaining a relationship to the larger area. Design considerations must be based on the purpose of the user experience and activity (Grahn & Stigsdotter, 2010).

Refuge areas like the Cliff Palace at Mesa Verde (Figure 2.23) which allows one to stay in touch with nature while still receding into architectural protection. Such spaces combine the qualities of being open and enclosed in a way that they do not feel isolated, while being restorative. There's a great breadth in the users' needs that can be accommodated through Refuge design, whether someone wants to be relaxed, carry out thinking tasks, wants seclusion, or protection from blazing elements. With the integration of Refuge into biophilic design, the spaces become more than just serving a tangible purpose; they also are very restorative and enrich the individual's psyche, thus making them an indispensable part of an environment aimed at improving human welfare (Browning et al., 2014).



Figure 2.23: Mesa Verde's Cliff Palace (Cliff Palace, Mesa Verde National Park CO, VisitMesaVerde.com, n.d.).

Mystery: This pattern in biophilic design gives the users the need to extend and it is the reason for anticipation of users with respect to space. It is achieved by a denial then reward approach which rolls out partial views, boundaries that are occluded, reveals which are incremental and all these incite interest and get the people to move. This pattern is consistent with human cognition system which suggests an innate desire for searching (Kaplan & Kaplan, 1989) and also corroborated by studies showing that the environment with a medium to large extent at ranges of visual depth (≥ 20 ft) elicits appropriate responses, however, a shallower field of vision is likely to cause negative or fear reactions (Herzog & Bryce, 2007). Mystery conditions are beneficial for the enhancement of space preference, considering the effectiveness of the approach with a non-invasive environment for building up the required space values in terms of people's interest (Browning et al., 2014).

The Mystery pattern is based on exploration treated as research concerning individual levels of vision and effects psychological of waiting. Anticipating a note in music comes close to this form of brain activity where the cue of what is to be is extremely pleasurable. A good example of this is the garden in Japan at Katsura imperial villa in Kyoto, as shown in the Figure 2.24, where paths and focal points that are not directly visible are integrated into the space in order to have the feeling of deep motivation to move forward and concentrate more on the space.



Figure 2.24: Katsura Imperial Villa and Garden in Kyoto, Japan. (Mehran, 2023).

Risk/peril: This pattern in biophilic design incorporates an element of danger and curiosity. Such spaces built emphasizing in this pattern are cautious but feel a moderate threat in return for the implicit safety that is trustable. What differentiates fear from risk/peril is the degree of control. While fear arises from an uncontrollable threat, risk/peril, on the other hand, involves a manageable sense of fear that, when appropriately engaged, can positively influence the user (Rapee, 1997). This pattern stimulates the brain's dopamine response, which promotes motivation problem-solving, and memory. Whereas, adults who engage in short-term controllable risks enhance cognitive stimulation and engagement, while excessive exposure to high risk can lead to stress or low self-esteem. This pattern's basis can also be dated to the childhood growth that comes from self-assessment, which incorporates safe risk-taking behavior (Browning et al., 2014).

Risk/Peril design aims to provide safety and curiosity to users, as seen in Los Angeles' suspended Mass artwork in Figure 2.25, where a horde of visitors resists the urge to tip over a large boulder that is safely secured into position. To engage in Risk/Peril design elements and manage them according to your specific use case entails the 'at your own risk' approach. The design approach focuses on individualistic user safety, allowing flexibility and balance in risk and safety. This approach creates a natural space for the target audience, making it feel more natural (Browning et al., 2014).



Figure 2.25: The Suspended Mass Artwork in Los Angeles (Browning et al., 2014).

3. COFFEE SHOPS

3.1 OVERVIEW OF COFFEE SHOPS: DEFINITION AND CHARACTERISTICS

The term “coffee shop” is often used interchangeably with café, coffeehouse or coffee bar. However, there are distinct characteristics that differentiate a coffee shop from others that serve food and beverages. According to WordNet (Chadios, 2005), a coffee shop is defined as a small restaurant that serves drinks and snacks. Typically operating in the same space as a café or coffee house. although the coffee shop is a term frequently misused, It has two major distinguishing elements from other types of restaurants. First, a coffee shop sells mainly coffee, allowing patrons to sit for hours, at the cost of a single drink. This characteristic is nearly impossible to replicate in traditional restaurants or bars. The economy has made coffee shops gathering places for sharing ideas and thoughts, and at times, for political movements.

Revolutions have sparked there, and artists, philosophers, and musicians have influenced each other. Second, coffee shops operate continuously from morning to evening, unlike restaurants, coffee shops do not have peak hours at lunchtime or dinnertime. Their continuous operation, combined with a convivial atmosphere and thoughtful architectural design, fosters social interaction among patrons. Additionally, the coffee shop is a space where people gather to drink coffee and socialize. Many social researchers and writers have highlighted the significance of coffee shops in the public sphere (Chadios, 2005).

3.1.1 The History and Role of Early Coffee Houses

This research examines the impact of biophilic design in coffee shops, making it essential to understand the historical role of coffeehouses as social and cultural hubs. Before the coffeehouse rose in popularity in Europe, the tavern was truly the most important venue for a public meeting place, either unable or unwilling to entertain at home, people instead opted for taverns as meeting places to drink and socialize (Smith, 2022). Though taverns were primarily drinking places, they served as the heart of conversation, debate, and informal networking. This social environment eventually paved the way for the coffeehouse, which began overtaking taverns as a new form of social space.

Origins in the Ottoman Empire: in the ottoman empire, coffeehouses (kahvehane) served as important social institutions. established with the first coffeehouse in istanbul in 1553, they were initially reserved for the elite but gradually became a place for all strata of society. while european taverns generally served alcohol, ottoman coffeehouses emphasized good coffee and discussion. these establishments became prime spaces for storytelling, poetry recitations, shadow theater performances, and political conversations and debates. over the centuries, ottoman coffeehouses became an obvious component of the public sphere, influencing the social and cultural fabric of the empire (Ediz, 2008; Aktaş, 2011).



Figure 3.1: An Ottoman Coffeehouse, 1875 (Daily Sabah, 2018).

Introduction to Europe: The viennese have always boasted that their city introduced the first coffeehouses in europe (Oldenburg, 1989). however, the first coffeehouses were most likely arabic in origin. this provided for an atmosphere of legalistic controversy, which became emasculated almost on a grand scale for about 150 years, beginning in the late fifteenth century, with the advent of coffee consumption as a habit in the near east. particularly in mecca and cairo in the 16th century efforts were made to stop its use, but the coffee-drinking argument was more distinctly aimed at the coffeehouses. over time, the coffeehouses were found to be a good place to socialize, conversation, and discussions on political events, and despite prolonged controversy, they were eventually integrated into mainstream society (Waxman, 2004).

Rise of English Coffeehouses: The coffeehouse became a critical part of english society in the seventeenth century. Early english coffee houses were the hub of commerce and cultural activities, with people from all social classes congregating there (Waxman, 2004), consistent with Oldenburg's (1989) concept of "third places," which promoted inclusivity and free speech by placing all people on an equal ground. coffeehouses evolved an "identity clientele" whereby people with like interests started to gather in particular local areas over time. For example, Lloyd's coffee house in london became a gathering place for ship-owners, sailors, and traders to discuss maritime issues. Others provided specialized areas for business and intellectual interaction to academics and businesspeople (Smith, 2022).

English coffeehouses were often called "penny universities" since, for the price of a penny, one could get in and take part in the animated conversation that constitutes intellectual entertainment (Ellis, 1956). The newspaper was read aloud multiple times throughout the day to stay up to date with current daily news, allowing the illiterate to participate in debates.



Figure 3.2: A Derek Lucas Painting of Lloyd's Coffee House (Adkins & Adkins, 2023).

Furthermore, Oldenburg (1989) holds in their concept of the third place that it is a place that serves against exclusivity and levels all humanity on equal grounds. Moreover, several English coffee shops had developed a set of rules for behavior that they displayed in each coffee shop to foster the image of a well-behaved gentleman. (Ellis, 1956). Such codes frequently stipulated that all customers were welcome to sit anywhere they chose; no seats

were held for the exclusive use of any patrons so that the less desirable areas of the coffeehouse would be filled by others. All patrons were treated with respect to create a welcoming and inclusive environment for diverse members of society (Ellis, 1956).

Oldenburg (1989) asserts that a building for an English coffee area is necessary because “all were to be equal under its roof.” Another set of rules prohibited playing cards and dice; swearing in the coffeehouse was also a crime, and those found guilty were fined twelve pence. For fighting, the offender had to treat all whom he had offended. (Oldenburg, 1989) Due to seventeenth-century English coffeehouses excluding women from their premises, it might have made men comfortable, but created conflict in the house. Therefore, a petition was written by the women: “The Women's Petition Against Coffee” (Ellis, 1956). There was controversy and concern over this statement: it was asserted that coffee might cause male impotence. So, women also complained that their husbands had been reduced to gossiping, turning what they heard into tales, while also spending all the family resources at the coffee venue (Ellis, 1956). One year later, after the women petition against coffee shops, King Charles II issued a proclamation suppressing coffeehouses. In his opinion, coffeehouses encourage inactivity and keep workers far from their crafts. However, his true worry, most likely sprang from the intensely political atmosphere and his anxiety that the discussions there may be not particularly supportive to his government. The whole idea of closing the coffee shops caused a furious public uproar but in the end he withdrew the declaration (Waxman, 2004).

Viennese Coffeehouses: Viennese coffeehouses, though not the first or foremost, can certainly claim to have lasted longest (Oldenburg, 1989). Vienna promotes the daily encounters of its citizens in public spaces through the Viennese lifestyle. The pavements cafés of Paris and Vienna were frequented by artists, writers, and musicians (Smith, 2022). Unlike English coffeehouses, which historically restricted women, Viennese coffeehouses never closed their doors to them. Before the advent of supermarkets and you'd run out of eggs in the morning some housewives would bring coffee, chocolate, or schmand (cheese strudle) around to Vienna at lunchtime, men were already there from an early hour for lunch.

This natural mingling enabled both through sharing space without much conflict (Waxman, 2004).

From their illustrious service and lovely interiors, Viennese coffeehouses are considered among the best in the world. For early Viennese establishments, unlike their English counterparts, patrons' social position was taken into consideration when seating. Even some frequent visitors had their tables reserved. Viennese coffeehouses, the English coffeehouse indeed came to be read-yet the growth of daily newspapers aided their demise. English coffee -fewer people read, Viennese patrons took consumption into account as an all-encompassing pleasure. Others have compared Viennese coffee houses to reading rooms or even libraries, for their atmosphere and arrangement (Vaganova, 2024). However, Coffee houses were a daily visit of the locals as they planned business inside these cafes. Although the coffee houses in Vienna went through a difficult time due to the Nazi regime they soon came back into vogue once more, re-establishing their cultural importance (Waxman, 2004).

Decline and Legacy: By the middle of the 1900s, coffeehouses had far less influence on English culture. Some people believe that the rise of newspapers became available, coffeehouses declined in popularity since people's daily news was now being fed to them not by one another but instead through newspapers. As was proper of any coffeehouse where the important levelling was concerned, this broke down when some became particular about the social company they endorsed, interacting with people who engaged in related trades. The original tenets upon which the coffeehouses stood were completely disregarded (Ellis, 1956). As articulated by Oldenburg (1989), the once-unmatched third places in England, coffeehouses, should not be reduced to just mere beautiful “wax museums for the 'living dead’”. He stressed that there can be no life without conversation (Oldenburg, 1989).

3.1.2 Coffee Shops as Third Places

Author of *The Great Good Place*, social theorist Ray Oldenburg (1989) underlined the value of “third places”, those spaces separate from home and work that help individuals navigate daily life. In the book, he describes the third place as “the heart of a community’s social vitality,” a basic concept for bringing people together and building a sense of belonging. Oldenburg looked to societies in his view as better balanced between home, work, and third places. He believed that societies which successfully meet the need for meaningful places, such as thriving neighborhoods or classic small towns, tend to provide a more laid-back and contented way of life. In his view, inclusive social settings that promote a feeling of

community, productive pursuits, and preserving harmony in domestic life are the keys to true well-being (Oldenburg,1989).

In contemporary society, the notion of Third Places has become more than a physical space. Technological developments have adapted this idea to include virtual spaces, giving respect to the change in social interactions (Crick, 2011). Moreover, Olsen, Carroll, and Brody (1994) describe coffee places as the perfect spot for those who need company yet still wish to be alone, establishing them as a subject of the commercial third-place paradigm. Recent evolutions of this trend, Third-wave coffeehouses, still support Oldenburg's framework with spontaneous social interactions among the roving customers and their barista staff (Manzo, 2015). This is turning the notion of social spaces on its head and creating places for the free exchange of ideas and discourse. Expanding on this, third-wave coffee shops serve as modern third places for Generation Z, also referred to as “digital natives,” (Curaoglu et al.,2023). These coffee shops combine real-world and virtual connectivity offering places for socializing, working, and enjoying great coffee. Generation Z favors open and semi-open seating configurations that balance comfort and social interaction as well as designs that protect individual privacy, especially for work-related activities. Such adaptability can extend to entrepreneurial activities. According to Fuzi (2015), coffeehouses serve as ideal “third places” where entrepreneurs can sit back and relax while planning their businesses, a space conducive to idea generation with less pressure than the office. The flexibility of these third places allows visitors to regulate the duration of their stay, enjoying the place and its amenities, be it collaborating, brainstorming alone, or informal networking (Fuzi, 2015). The pandemic has increased the demand for hybrid spaces that incorporate both users into the individual and virtual realities, note the authors. This transition to digital is taking place in regard to the access to and perception of third places. As Memarovic et al. (2014) have indicated the use of social networks or smartphone applications plays a role in how individuals discover and visit third places.

Most coffee houses are active on social media, thus enabling potential customers to get a preview of their facilities, ambience, location, upcoming events, or workshops (Kandari & Chaudry, 2019). One of the functions of these platforms is to extend these third places into the virtual realm, linking together the physical and online communities. Coffee shops have continually changed from lone spaces into what this generation requires, a multi-purpose

space in which people now socialize, work, and engage digitally, entering into a social-technological requirement (Curaoglu et al.,2023).

Oldenburg (1989) enumerated eight characteristics of third places (Oldenburg, 1989). Their characteristics will be introduced in the next points.

Neutral ground: These third places are neutral grounds where people can easily join or leave each other's presence without anyone needing to act as the host. As Oldenburg explains how cities and neighbourhood can only really fulfil their potential for connection if there's a common space where people can naturally come together and spend time, without needing a specific reason (Oldenburg, 1989).

A Levelling Place: The second characteristic of a third place is that it serves as a leveller. The term "levellers" was used to describe an extreme leftist political group during the time of Charles I, which advocated for the abolition of all distinctions of rank, position, or class that existed among men. Afterward, it began to encompass anything regarded as "which reduces men to an equality". When a place levels distinctions, it would, by definition, be a place of inclusivity (Oldenburg, 1989).

Conversation as the Main Activity: The third characteristic of a third place is that conversation is the main activity. Oldenburg basically says that what really defines a third place is the ease and quality of conversations people have there (Oldenburg, 1989).

Accessibility: The fourth characteristic of a third place is its accessibility. This means that a person can arrive alone any time of day, embrace the welcome, and find someone they recognize. According to Philip Slater, genuine community life occurs when people frequent a location where they frequently run into familiar faces (Oldenburg, 1989).

Presence of Regulars: The fifth characteristic of a third place is the presence of regulars; some of these individuals attend almost every gathering, forming the core of the community. According to Oldenburg, the social environment fostered by the other guests is what entices people to return to a third place rather than the amenities provided by the management. In this way, the regulars give the space its unique character and charm (Oldenburg, 1989).

A Low Profile: The sixth characteristic identifies the third place as simple and having a low physical profile. Oldenburg stated that the third place should be seen as something we expect as part of life. It must be part of our everyday environment and an integral part of our communities. He said that newer places are often chain establishments in prime locations, aiming to attract transient customers (Oldenburg, 1989).

A Playful Mood: The seventh characteristic of a third place is jolly. Oldenburg emphasizes this playfulness as critical because happiness and acceptance triumph over fear and estrangement. Huizinga (1950) proceeds to speak on the meaning of play, which encompasses some shared experience through two major feelings: being together apart and having something really important in common. He says that this is also one of the reasons why people keep coming back to the same place: they want to recreate and recapture, and in a sense revivify, the play experience. Oldenburg also mentions that people return to third places because they associate them with positive experiences from the past (Oldenburg, 1989).

A home away from home is the final characteristic of a third place would be a “home away from home.” According to psychologist David Seamon (1979), home becomes one point of orientation in our lives; we come and go based on its geographical location. Oldenburg (1989) said, “that if the individual has a third place, the place also 'has him'”. As an example of his overall argument, Felton (2012) depicts the domestic-public interplay as connecting private households with public coffee houses. He cites a family enjoying a relaxed Saturday morning at a coffee shop where they create the conditions of “domestic ease and comfort” outside the home. Thus, coffeehouses also serve another function, as extensions of home, providing space for solitude and connection with others in public spaces (Oldenburg, 1989). Figure 3.3 shows the definition of third place.



Figure 3.3: Ray Oldenburg's Definitions of Third Place
(Produced by Author).

3.2 BENEFITS OF BIOPHILIC DESIGN IN COFFEE SHOPS

Biophilic design, which mean incorporates natural features into built environments, has become as a transformative strategy in different settings, such as coffee shops This design concept not only improves visual appeal but also supports environmental sustainability and customer pleasure. The following sections explore these benefits in detail.

Biophilic design in coffee shops significantly improves the customer experience by creating spaces that are both beautiful and emotionally supportive. The integration of natural elements such as natural lighting, plants, and organic materials creates a calming and welcoming atmosphere that contributes significantly to customer satisfaction. Research has shown that being in an interior natural environment fosters emotional well-being and relaxation, which raises satisfaction levels and strengthens the bond between the user and the surroundings (Quan et al., 2024). This sense of cosiness and closeness to nature, let the customers to stay longer and return more frequently, which strengthens their loyalty and fosters favourable associations with the area. In addition, it provides emotional advantages, biophilic design improves coffee shops' aesthetic appeal. The application of natural materials, like stone, wood, as well as vegetation and water features, not only elevate the visual attractiveness of the space, but also contributes to visual comfort, encouraging customers to spend more time within the environment (Afara et al., 2024). Consequently,

coffee shops that have biophilic features can see better sales performance and higher client retention (Ortegón-Cortázar & Royo-Vela, 2023). The richness of biophilic design makes the space warm, memorable, and stand out from conventional interiors.

Furthermore, patrons frequently link biophilic settings to a better overall quality and perceived value. As studies indicate that environments that offer a healing, nature-integrated ambience are more likely to develop a sense of loyalty in humans (Hung & Chang, 2022; Ortégón-Cortázar & Royo-Vela, 2023). Biophilic qualities become part of the brand identity, which enhance the emotional attachment of the patrons, so it strength the competitive position in the market.

Beyond the customer-centered benefits, biophilic design in coffee shops also supports environmental sustainability, by encouraging resource efficiency and lowering the environmental impact for example, the implementation of natural materials like bamboo or wood and the use energy-efficient systems, like natural light and ventilation, also this can reduce lower operational costs and energy consumption (Tabassum & Park, 2024). Additionally, the presence of greenery maintains a healthy indoor atmosphere for customers and employees, by regulating humidity and filtering pollutants (Alabor et al., 2024; Raturi et al., 2024).

Moreover, by using native plants and ecological elements that attract pollinators and small wildlife, biophilic design can improve biodiversity and ecosystem services. Designing outdoor seating areas with native plants can support habitat and enhance the urban ecosystem (Kabinesh et al., 2024). The incorporation of green surfaces and water features also helps to mitigate the effects of urban heat island, also reducing the environmental impact of commercial establishments on their surroundings (Hung & Chang, 2024; Lefosse et al., 2023)

Furthermore, the objectives of waste reduction and a sustainable materials cycle are strongly aligned with the principles of biophilic design, Coffee shops can reduce their environmental impact in the same time protecting design quality, by implementing low-waste strategies such as recycling and repurposing materials by using reclaimed wood for furniture.

The sound environmental management can be further assisted through strategic space planning and the application of soundscaping techniques that improve the acoustic

experience by integrating white noise which helps mask unwanted noise, or using natural sound buffers can contribute to a peaceful and focused atmosphere, supporting customer comfort and well-being (Tabassum & Park, 2024; Verma, 2023). Altogether, the integration of biophilic design in coffee shop interiors not only improves the user experience but also supports ecological responsibility and long-term operational sustainability.

3.3 GLOBAL EXAMPLES OF BIOPHILIC COFFEE SHOPS

Biophilic design has gained tremendous popularity in hospitality spaces, particularly coffee shops, for enhancing aesthetics and the well-being of visitors. As urbanization continues to spread, the natural elements are very much required in the built environment to reconnect human beings with nature and restore their mental health (Kellert, 2018). In traditional coffee shops serving as social hubs and “third spaces” coffee shop design increasingly relies on biophilic design for immersive, nature-inspired interiors (Oldenburg, 1989).

This part represents three exemplary designs for coffee houses: Zhichang Coffee in Xi'an, China, Tanatap Ring Garden in Jakarta, Indonesia, and The Harudot by Nana Coffee Roasters in Thailand.

The case studies present natural elements in divergent environmental perceptions, conditioned by diverse geographies and cultural contexts, regarding material usage, organisation of spaces, and sensory experience for creating a symbiotic relationship between architecture and environment.

The first coffee shop is Zhicang Coffee in Xi'an, China as shown in Table 3.1, which presents a general overview of the coffee shop, including key project details and a visual representation of its spatial organization.

Table 3.1: Zhicang Coffee – Descriptive Overview and Visual Representation.

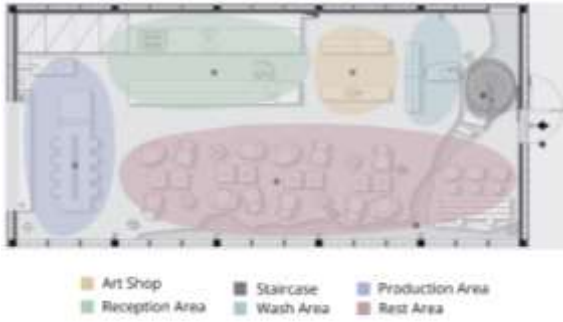
Description	Visual Reference
Coffee Shop Name: Zhicang Coffee Location: Mihe Farm, China Year Built: 2024 Area: 150m² Architects: MOS Wood & Stone Design	 Zoning plan of zhicang coffee.
The farm's natural landscape caters to the need for nature, greenness, and bountiful and healthy living among city dwellers. the project is intended to provide a place of retreat for the guests to sit, enjoy the landscape and have a cup of coffe (Silva, 2024).	 Exterior view of zhicang coffee shop.

Table 3.1: Zhicang Coffee – Descriptive Overview and Visual Representation. “Table Continued”.

Zhicang Coffee integrates biophilic design, emphasizing proximity to nature, light, and materials that create environmental harmony. The architectural concept focuses on the surrounding terrain, where trees of different densities would naturally enclose a triangular open space. This inspired the unique triangular prism shape of the café, visually integrating with the landscape. The form provides stability against weather conditions on the elevated farm site. Its upward offers an advancing experience for visitors toward the highest point of the farm, maintaining an interactive nature experience (Silva, 2024).	 The unique triangular prism shape of the café.
One of the defining characteristics of Zhicang Coffee is that it was conceived as a “container of light,” where natural light influences the way visitors interact with the space. Large transparent glass panes on the south-facing façade establish a visual link between inside and the surrounding natural environment of the farm. The inside is well-lit during the day because to the large amount of windows, and at night it shines like a “lighthouse,” with the lighting precisely adjusted to emphasize the transparency and openness (Silva, 2024).	 Zhicang Coffee’s design enhances transparency and natural light integration.

Table 3.1: Zhicang Coffee – Descriptive Overview and Visual Representation. “Table Continued”.

The fenestration draws in views from the greenery surrounding the café, strengthening the interface between the café and nature. Sustainably sourced cedar wood and stone materials afford an organic, tactile quality, warmth, and grounding, fostering a connection to deep natural elements (Silva, 2024).	 The horizontal fenestration framing the surrounding greenery.
The interiors of the café are a peaceful retreat that primarily relies on bright spaces and biophilic touches. The selection of natural materials, combined with ample daylight and ventilation contributes to the calming atmosphere from a well-being perspective. The use of strategic sustainable materials is also reflective of environmental responsibility in making the space not only aesthetically enticing but also ecologically sound (Diandra, 2025).	 The interior’s bright, open space with natural materials and plants.

The second coffee shop is Tanatap Ring Garden, as presented in Table 3.2, which illustrates a general overview of the coffee shop, including key project details and a visual representation of its spatial organization.

Table 3.2: Tanatap Ring Garden Coffee Shop – Descriptive Overview and Visual Representation.

Description	Visual Reference
Coffee Shop Name: Tanatap Ring Garden Location: Jakarta, Indonesia Year Built: 2021 Area: 750m² Architects: RAD + ar	 Zoning of Tanatap Ring Garden.
The design intends to exhibit an indoor area that vanishes behind an uncomplicated multi-story garden. the spaces created are sequential rather than original. At its core, the project is built around the idea of playfulness and togetherness. The architects envision a fresh, dynamic civic space that is sustainable and independent government-run infrastructure in rapidly growing urban centers like Jakarta, where accessible and well-maintained public spaces are limited (Abdel, 2024).	 The interior of Tanatap Ring Garden Coffee Shop.

Table 3.2: Tanatap Ring Garden Coffee Shop – Descriptive Overview and Visual Representation.
 “Table Continued”.

The architects developed three strategies to integrate the café into nature. First, visitors circulate through existing trees. Second, from the principal entrance, the structures are connected by an intimate underground passage. Thirdly, hidden entrances in the lobby and bar areas introduce variation in spatial proportions, vegetation density and daylight access. This intervention ensures that the new landscape harmonizes with the garden (Abdel, 2024).	 The outdoor of Tanatap Ring Garden Coffee Shop.
The design was an experiment to observe user responses to altered spatial hierarchy. RAD+ar studies visitor behavior in defined areas they perceive as unfamiliar. Using intentionally undefined café furniture can blend with the hardscape and landscape. This explored how visitors define their own meaning of comfort with seeing these elements. The design acts as a social experiment on redefining the third space in open garden environments (Abdel, 2024).	 Amphitheatre seating in Tanatap Ring Garden Coffee Shop.

Table 3.2: Tanatap Ring Garden Coffee Shop – Descriptive Overview and Visual Representation.
 “Table Continued”.

The entrance to the Ring Garden leads guests along a tree-linked pathway that softens the distinction between indoor and outdoor spaces. Inside, delicate traces of skylight and activity from the garden above evoke curiosity. The central coffee bar grounds the space, guiding visitors to hidden rooms that gradually unfold with growing natural light. These areas guide visitors into the expansive, multi-tiered central garden, gently drawing them into lush tropical surroundings (Abdel, 2024).	 Entrance of Tanatap Ring Garden Coffee Shop.
Visitors are drawn into the Ring Garden’s natural setting as they enter the plaza, where light and color entice them in a profoundly sensory way (Abdel, 2024). Their interiors provide occupants with privacy while filled with abundant natural light. The integration of wall structures within The blocks of glass achieves a sense of lightness, dispersing as visitors move through the interior (Abdel, 2024).	 A semi-outdoor seating area showcasing the interplay of glass blocks.

The architects RAD+ar of the Tanatap Ring Garden coffee shop viewed the COVID-19 pandemic as a limited chance to model sustainable outdoor tropical commercial spaces, merging biophilic elements like natural ventilation, local vegetation, and sunlight to balance human activity with natural ecosystems.

The third coffee shop is The Harudot coffee shop, as shown in Table 3.3, which provides a broad summary of the coffee shop, including key project details and a visual representation of its spatial organization.

Table 3.3: The Harudot Coffee Shop – Descriptive Overview and Visual Representation.

Description	Visual Reference
Coffee Shop Name: The Harudot Location: Chonburi, Thailand Year Built: 2023 Area: 475 m² Architects: IDIN Architects	 Exterior view of The Harudot by Nana Coffee Roasters.
The division of the building mass into smaller components makes the building feel more human-scaled, establishing various areas like meeting room, coffee drinking area, restrooms, and coffee drinking zone as shown in the figure underneath (Abdel, 2024).	 Zoning of the Harudot coffee shop.

Table 3.3: The Harudot Coffee Shop – Descriptive Overview and Visual Representation. “Table Continued”.

The café is designed with harmony with nature in mind. The exterior presents a gable structure, while the interior is finished with naturally prepared pinewood that enhances tactile contact with the environment. As you enter here, it is a curvilinear pathway that invites movement giving that enchanting spatial experience a quality and richness of interaction between structure and nature. These elements of design aim at sensory engagement and ecological harmony (Abdel, 2024).	 The façade of The Harudot coffee shop.
In certain areas, the enormous gable roof shape of every mass was lifted to allow tree penetration through an open void above forming a semi-outdoor space below. The empty spaces also generate curved outlines that add rhythm and liveliness to the architecture. Due to these voids and sunshine enter the open-air court, establishing a sense of nature within an otherwise enclosed atmosphere as shown in the figure. These openings extend into the interior space, where translucent barrisol membranes enclose the voids, dispersing light evenly and producing a cosy, softly glowing environment (Abdel, 2024).	 The interior with a skylight and a central tree.

Table 3.3: The Harudot Coffee Shop – Descriptive Overview and Visual Representation. “Table Continued”.

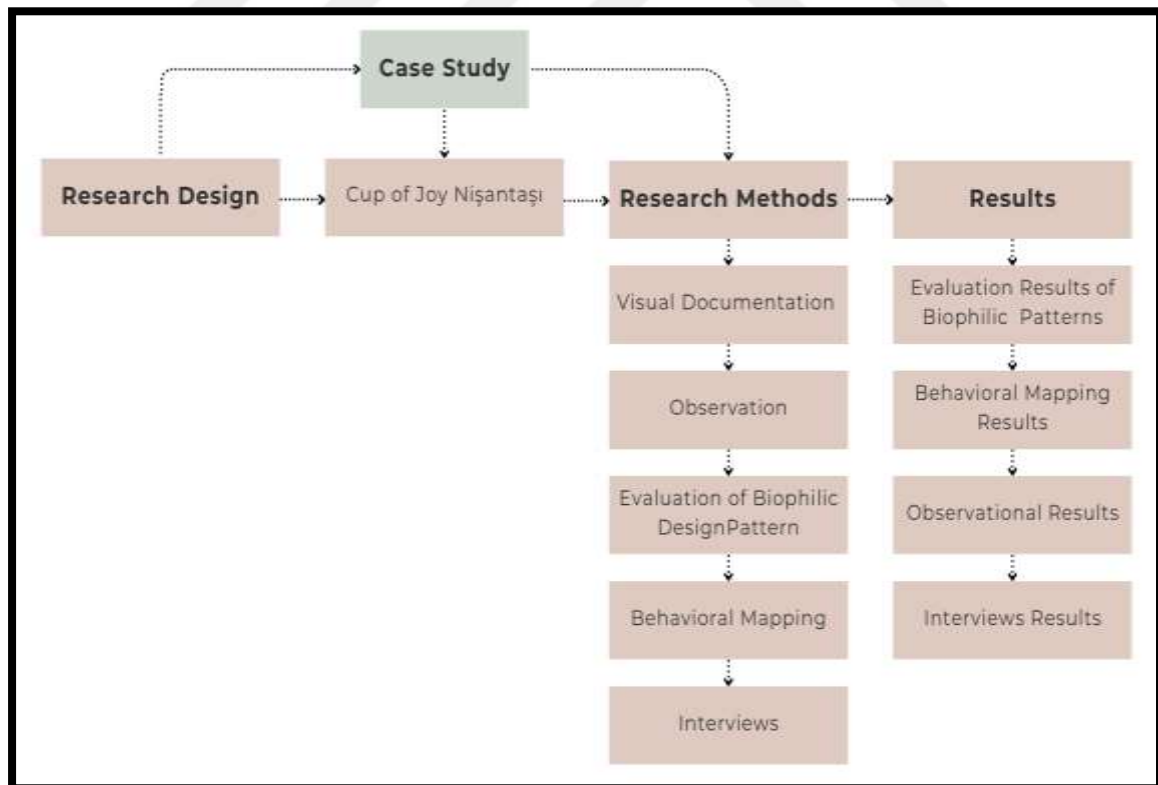
The seating arrangement itself is designed to flow like a ribbon, wrapping around the interior environment for continuity while at the same time varying counter heights according to the different functions and uses. To go with the coffee theme, the outside seats are composed of resin combined with coffee grounds, leaves, and rice (Abdel, 2024).	 The seating arrangement of the Harudot coffee shop.
The terrazzo floor's pattern of flower petals, which appear to have fallen from real trees, is another whimsical feature, this evokes the natural imagery of petals gently falling from trees. This design element fosters a connection to biophilic design patterns (Abdel, 2024).	 The terrazzo floors of flower petals.

4. METHODOLOGY

4.1 RESEARCH DESIGN

This study serves as a mixed-methods approach to assess the impact of biophilic design within coffee shops. The research focused on a single case study: Cup of Joy Nişantaşı in Istanbul. Integrating quantitative and qualitative methods, Qualitative aspects are examined through observational analysis, using biophilic design patterns analysis, integrating subjective and Experiential insights from visitors' engagements with biophilic elements. The quantitative side relies on behavioral mapping to produce quantifiable information on customer movements, Activities, seating preferences, and duration of stay. However, the interview included both qualitative and quantitative methods to determine visitor experiences. This mixed-method approach offers an in-depth exposition of how biophilic design nuances visitor experience from various perspectives.

Chart 4.1: Flowchart of Methodology and Result.



4.2 CASE STUDY: CUP OF JOY, NİŞANTAŞI

The goal of this study is to examine the effects of biophilic design on customer behavior in coffee shop settings. Several key criteria influenced the selection of the case study. Its unique incorporation of biophilic features like open space, vegetation, and natural lighting. Also, it provides visitors with a tranquil escape from the city with its lush outdoor seating area. It is located on the european side of istanbul in one of the busiest neighborhoods, making it particularly relevant for exploring how nature-based design strategies can enhance comfort, well-being, and user engagement in urban settings. As shown in the figure 4.1, the location map and its surroundings, which further demonstrate cup of joy's position from urbanity, clearly put it alongside other landmarks, as well as highlighting its greater role as a green space amidst a busy district. Not far from osmanbey metro station, the café's strategic positioning allows it to attract a diverse crowd, from remote workers, the students as well as tourists.

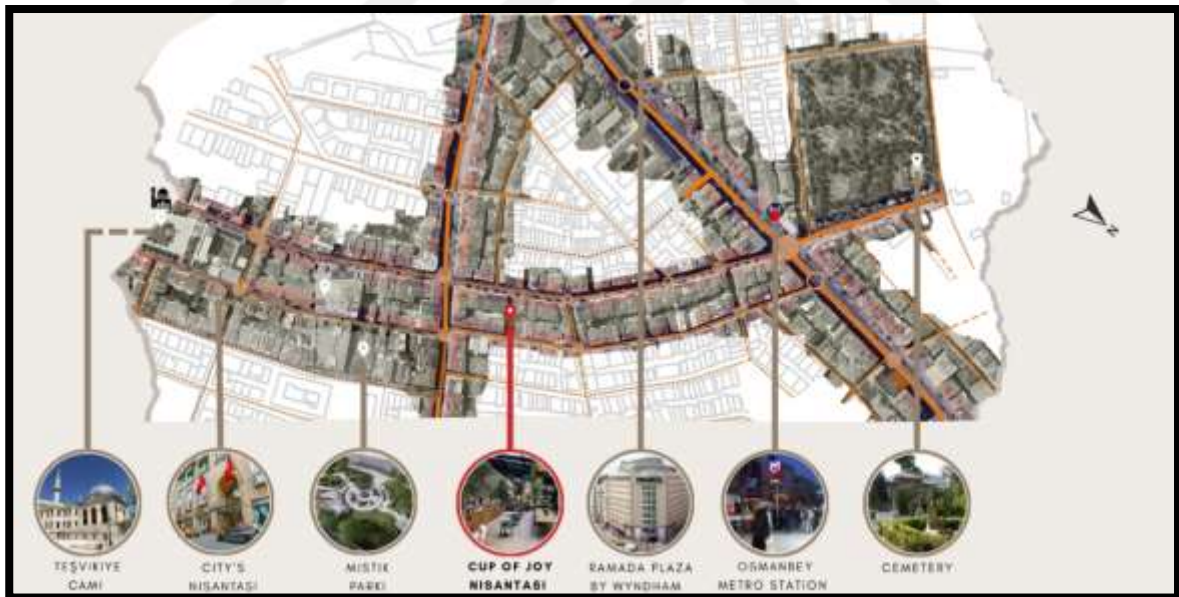


Figure 4.1: Location Map of Cup of Joy, Nişantaşı and its Surroundings (Produced by Author).

4.2.1 Background and History

Cup of joy is located in Nişantaşı, Istanbul, Turkey, and was designed by toner architecture. Opened in it is at the back of kalyon cultural centre, founded in 2020, which serves as a young cultural institution that promotes today's artistic and cultural production (Kalyon kültür, 2021). The history of this building was mansion, originally commissioned by sultan Abdülhamid ii, the building was gifted to ottoman politician Köse Mehmet Raif Paşa in 1889, and it later became home to his daughter, poet Ihsan Raif Hanim. Celebrated for its atmosphere of poetry, music, and art, the building was subsequently occupied by the mardin family and served several public functions, including a community center and district governorship. After being restored in 2013, it became an agreement to lease the space to the kalyon cultural foundation in 2019 and inaugurated by the kalyon cultural center in 2020 (Kalyon kültür, 2021). The organisation donated the garden to cup of joy, turning it into a roomy, lush haven. This calm, inviting area creates the impression of an urban “oasis” within the restored historic site and provides the perfect getaway from Nişantaşı's busy crowds (Kahve dergisi, 2020).



Figure 4.2: Exterior View of Cup of Joy at Kalyon Cultural Center, Nişantaşı (Kalyon Kültür, 2021).

4.2.2 Spatial and Visual Analysis

The plan of Cup of Joy Nişantaşı consists of two main zones, including indoor and outdoor seating areas. The principal entrance is on the eastern side of the coffee shop, providing direct access to the outdoor seating area. Also, there is a secondary entrance for the indoor area, each space is represented by a distinct color in the legend beneath the plan to indicate its specific function as shown in Figure 4.3, also shows the spatial organization of the coffee shop, the circulation, as well as Environmental elements such as seasonal wind directions and the sun's path.

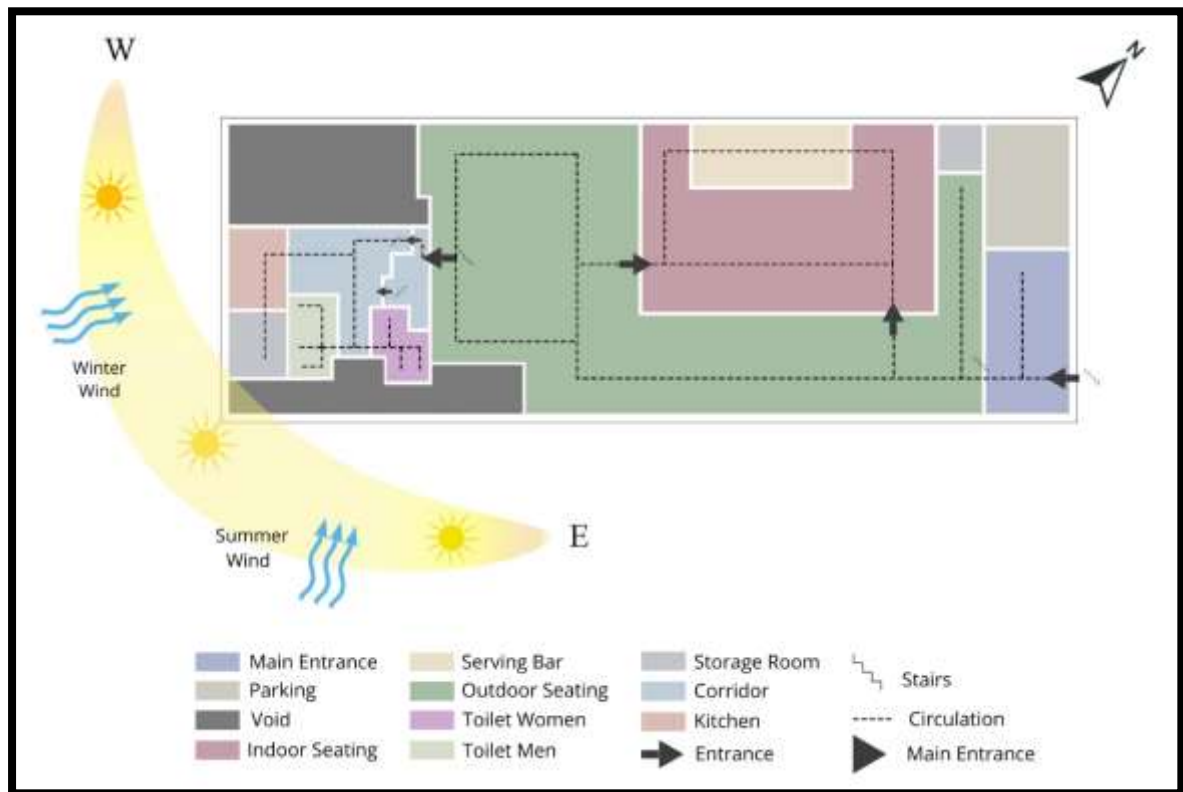


Figure 4.3: Site Zoning and Sun Analysis of Cup of Joy (Produced by Author).

In addition, as shown in Figure 4.4, which illustrates the furniture layout plan, provides a clear understanding of the arrangement of the space and the distribution of seating throughout the coffee shop. The plan reveals a well-considered configuration of various seating types, including individual tables and a large communal table positioned at a strategic place to encourage social interaction. The layout supports both individual and group use, with circulation path that allow smooth movement between areas, also the places distribution supported different user needs and activities. Throughout the entire floor area, both indoors and outdoors, earth bricks are used, which creates a natural, warm atmosphere. The biophilic experience in the area is improved by the thoughtful placement of natural components and plants, which provide a feeling of comfort and positivity.



Figure 4.4: Site Plan of Cup of Joy (Produced by Author).

Figure 4.5 further demonstrates the spatial organization across the entire coffee shop by integrating annotated photographs with the floor plan of the coffee shop. It draws attention to the area's functional zoning, which includes the entrance, service counter, and several separate indoor and outdoor seating areas. This visual mapping effectively conveys the arrangement, diversity of seating, and the connexion between interior and exterior spaces.

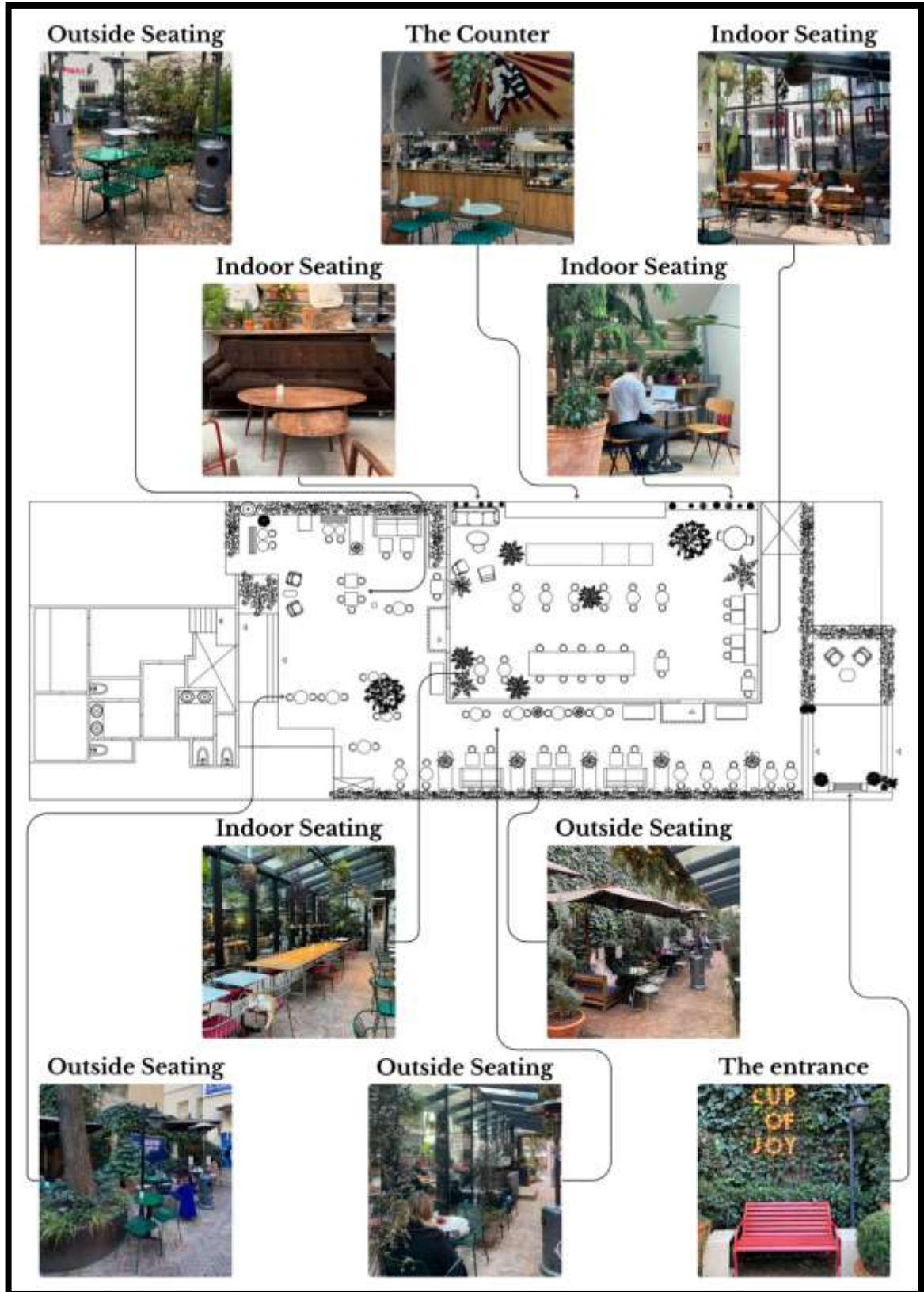


Figure 4.5: Visual Mapping of Cup of Joy Nişantaşı (Produced by Author).

4.3 RESEARCH METHODS

This part outlines the methods adopted in this research, explaining every detail of the key components, which include visual documentation, observation, an evaluation of the biophilic Design Patterns based on an established framework, behavioral mapping, as well as an interview with customers.

4.3.1 Visual Documentation

Visual documentation is an essential component of this study, complementing observational analysis by providing objective evidence of biophilic design elements in the selected coffee shop. Photography serves as the primary method, capturing features such as greenery, natural light, materials, and spatial arrangements to create a tangible space record. As Harper (2000) points out that photography isn't just about taking pictures, but it can help us understand social processes better. This method allows the researcher to revisit and analyze design details, document dynamic changes such as lighting throughout the day, and supplement observational findings with visual evidence. Besides, the photographic documentation, architectural drawings, including a floor plan of the chosen coffee shop, are created based on direct on-site measurements to illustrate spatial organization. Moreover, a Location Map situates the coffee shop within its surroundings, revealing information on the external urban environment that may affect the biophilic experience.

4.3.2 Observation

Observation is a significant part of this research as the behaviors of visitors in a coffee shop and their interactions with the environment can be best studied through direct observation as blumer (1969) suggested, both “exploration” and “inspection” are important methods for examining the empirical social world, especially in everyday settings like coffee shops.

The study's observation sessions were conducted in Cup of Joy, Nişantaşı, over several days to capture a variety of customer behavior patterns. The length of an observation is essential in qualitative research. Every customer was observed from the time he or she entered the coffee shop until they left, ranging from 30 minutes to more than 3 hours. Each session recorded the general engagement with biophilic design elements, movement patterns, and

overall spatial usage to guarantee a thorough analysis. This involved looking at how patrons interact in the space, their preference for seating areas, their interaction with the natural elements, and the general atmosphere, and to obtain more objective and spontaneous results, the group to be observed was not provided with guidance counseling in advance, according to cherry (2023), naturalistic observation allows researchers to witness authentic behavior and reactions as they occur naturally, without manipulation or artificial control (cherry, 2023).

4.3.3 Evaluation of Biophilic Design Pattern

In this section, the selected coffee shop will be evaluated based on the fourteen Biophilic Design patterns by Browning et al. (2014) as shown in table 4.1, through direct observation and visual documentation. A structured assessment table will be utilized to determine whether each biophilic pattern is present or absent and its level of integration in the coffee shop.

Table 4.1: The 14 Patterns of Biophilic Design Extracted from Browning et al (Browning et al., 2014).

Category	Design pattern	Definition
Nature in the space	Visual connection with nature	Visual access to nature's elements, living organisms, and ecological processes (Browning et al., 2014).
	Non-Visual Connection with Nature	Auditory, olfactory, or gustatory stimuli that engender a deliberate and positive reference to nature, living systems (Browning et al., 2014).
	Non-Rhythmic Sensory Stimuli	Random and fleeting interactions with nature can be studied through statistics, though they remain inherently unpredictable (Browning et al., 2014).
	Thermal & Airflow variability	Subtle changes in air temperature, relative humidity, airflow across the skin and surface temperatures that mimic natural environments (Browning et al., 2014).

Table 4.1: The 14 Patterns of Biophilic Design Extracted from Browning Et Al
(Browning et al., 2014). “Table Continued”.

	Presence of Water	An element that enriches spatial experience through visual, auditory, or tactile interaction with water (Browning et al., 2014).
	Dynamic & Diffuse Light	Leveraging varying intensities of light and shadow that change over time to create conditions that occur in nature (Browning et al., 2014).
	Connection with Natural Systems	A healthy ecosystem is characterized by an awareness of natural processes, particularly seasonal and temporal changes (Browning et al., 2014).
Natural Analogues	Biomorphic Forms & Patterns	Abstract representations of natural curves, patterns, textures, or recurring numerical forms (Browning et al., 2014).
	Material Connection with Nature	Elements derived from nature, minimally altered, which represent the surrounding environment’s ecology or geology, fostering a strong place identity (Browning et al., 2014).
	Complexity & Order	Rich sensory information that adheres to a spatial hierarchy similar to that encountered in nature (Browning et al., 2014).
Nature of the Space	Prospect	An unimpeded view over a distance for surveillance and planning (Browning et al., 2014).
	Refuge	A secluded spot offering refuge from environmental elements and the primary flow of activity, with protection overhead and at the back (Browning et al., 2014).
	Mystery	The promise of additional information obtained through partially obscured views or other sensory tools that encourage a person to explore the surroundings more thoroughly (Browning et al., 2014).
	Risk/Peril	A recognizable danger combined with a trustworthy defense (Browning et al., 2014).

4.3.4 Behavioral Mapping

Behavioral mapping is a research tool used to observe and document human behaviors in a specific environment over a defined period. It is especially useful in understanding how users interact with a space and how design elements influence their choices and

activities. This method can be either place-based, focusing on the physical location of behaviors, or individual-based, focusing on specific users and their movement through space. It has been widely used in spatial and urban research, as seen in studies by Golick and Ward Thompson (2010), to analyse the relationship between space design and user behavior.

In this study, place-based behavioral mapping was employed to examine visitor behavior within the coffee shop. The objective was to record how customers use different areas of the café, particularly those incorporating biophilic design features like organic materials, plants, and natural lighting.

Behavioral mapping was carried out for twenty customers, this sample size was considered sufficient for this study. Classic behavioral mapping research (Whyte, 1980) and empirical studies like Rainbolt et al. (2012), which used 20 participants in a similar observational mapping context, provide a standard for identifying significant spatial behavior patterns in specific situations using tiny samples. The study was conducted on both weekdays and weekends, during peak and off-peak hours, to gather data on seating preferences, duration of stay, and types of activities (e.g., working, relaxing, socializing). The layout of the café was sketched and used as a mapping tool, where the positions and behaviors of customers were recorded using marks.

This method helped collect quantitative data about user preferences related to spatial design, which will later be analyzed to explore potential correlations between behavioral patterns and biophilic elements.

4.3.5 Interviews

Seidman (1998) affirmed that interviewing is one of the fundamental methods to inquire, he further argued that storytelling is a vital part of the meaning-making process, and interviews enable researchers to understand others' experiences in depth. Therefore, a semi-structured interview was chosen as a means of gathering data for this study to investigate how customers at cup of joy nişantaşı perceive biophilic design features and their effects on well-being, comfort, and overall experience. It is essential to create an atmosphere of trust and

real conversation with participants (Janesick, 2000). To facilitate this, allow flexibility for participants to express their thoughts freely.

Interviews were conducted face-to-face with 10 patrons. These participants from the 20 customers were previously observed and included in the behavioral mapping process. The initial plan was to undertake interviews with all 20 observed customers, however, interviews were completed with 10 customers because the remaining customers were busy.

The interview sessions were held in the coffee shop. For participants' privacy, the interviews were manually recorded on paper. Before the interview, permission consent was obtained from the participants, the interviews took between 15 - 30 minutes.

14 questions were asked in the interview; the semi-structured interview questions were purposefully open-ended to encourage participants to provide detailed responses on their various thoughts and experiences of Cup of Joy. Also, some of the questions were rated by the participants from 1 to 5. (The interview questions can be found in Appendix A).

4.4 ETHICAL CONSIDERATIONS

To ensure ethical standards in this research, participants were thoroughly informed about the study's aims and procedures before its beginning. Their voluntary participation was secured through an informed consent process. In order to protect their privacy and prevent any potential harm, all personal data was treated with strict confidentiality, and participants' identities were neither recorded nor disclosed at any stage of the research. In addition to the ethical protocols, the university's ethical committee also examined and approved this study (A copy of the approval letter can be found in Appendix B).

5. RESULTS AND DISCUSSION

5.1 EVALUATION RESULTS OF BIOPHILIC DESIGN PATTERNS

This table serves as a comprehensive evaluation of how the coffee shop incorporates these patterns into its physical space. It offers a visual link to the natural world, which aligns with the principles of biophilic design.

Table 5.1: Evaluation Results of Cup of Joy According to Biophilic Design Patterns Identified by Browning Et Al (Browning et al., 2014).

No	Biophilic Design Pattern	Presence	Level of Integration	Visual Evidence/Reference
1	Visual Connection with Nature	✓	High	 Large glass windows connect customers to the outdoors, letting plenty of sunlight inside the space.
2	Non-Visual Connection with Nature	✓	Moderate	 The pleasant aromas of freshly brewed coffee and herbs in the space create a sensory connection, captivating the sense of smell and cultivating a link to nature.

Table 5.1: Evaluation Results of Cup of Joy According to Biophilic Design Patterns Identified by Browning Et Al (Browning et al., 2014) “Table Continued”.

3	Non-Rhythmic Stimuli	Sensory	✓	High	 The coffee shop, with its large windows and skylights, experiences non-rhythmic changes, such as the shifting weather, movement of clouds, and birds flying overhead.
4	Thermal Variability	& Airflow	✓	High	 With its greenery, the outdoor seating area allows fresh air to flow naturally, creating a refreshing and vibrant environment.

Table 5.1: Evaluation Results of Cup of Joy According to Biophilic Design Patterns Identified by Browning Et Al (Browning et al., 2014) “Table Continued”.

5	Presence of Water	-	-	-
6	Dynamic & Diffuse Light	✓	High	 Sunlight streaming through the skylight creates dynamic light and shadow patterns.
7	Connection with Natural Systems	✓	High	 Outside seating with thickening green wall connects the visitors to the natural cycles. As plants grow and change over time.
8	Biomorphic Forms & Patterns	-	-	-

Table 5.1: Evaluation Results of Cup of Joy According to Biophilic Design Patterns Identified by Browning Et Al (Browning et al., 2014) “Table Continued”.

9	Material Connection with Nature	✓	Moderate	 Using earth bricks throughout the entire cladding of the coffee shop.
10	Complexity & Order	-	-	-
11	Prospect	✓	Moderate	 The café's glass wall can give an open view of the greenery outdoors, allowing customers to feel connected to nature while sitting indoors.

Table 5.1: Evaluation Results of Cup of Joy According to Biophilic Design Patterns Identified by Browning Et Al (Browning et al., 2014) “Table Continued”.

12	Refuge	✓	Low	 The corner in the outside area can present a refuge, distanced from the center of the coffee shop.
13	Mystery	-	-	-
14	Risk/Peril	-	-	-

(For enhanced visibility, all photos included in the table are also provided in larger size in Appendix C, along with additional photos of the coffee shop to further introduce and illustrate its design features).

The evaluation shows that the majority of biophilic design patterns were present. While several patterns, such as visual access to natural elements and sensory stimuli that are not rhythmic, are successfully included in the coffee shop, certain patterns were discovered to be either absent, such as biomorphic forms & patterns, or the presence of water, or underrepresented, such as prospect and refuge. These results show that some spatial and symbolic aspects of biophilic design are lacking, even though important sensory elements are well integrated. Improving underrepresented patterns may improve the user experience and foster a stronger bond with nature.

5.2 BEHAVIORAL MAPPING RESULTS

20 customers were observed according to the behavioral mapping method in Cup of Joy, as shown in Table 5.2, which offers information about the gender of the coffee shop customers. 12 out of 20 respondents (60%) identified as female, and 8 out of 20 respondents (40%) identified as male.

Table 5.2: Demographic Characteristics of Customers.

Demographic Characteristics	Female	Male
Number of customers = 20	12	8
Rate (%)	60%	40%

The Figure 5.1 below presents the codes used to map user behaviors in the coffee shop's layout, including the main activities, preferred seating area, duration of stay as well as the circulation path. This coding scheme enables a clearer comprehension of user preferences and spatial usage, the next pages will show more details.

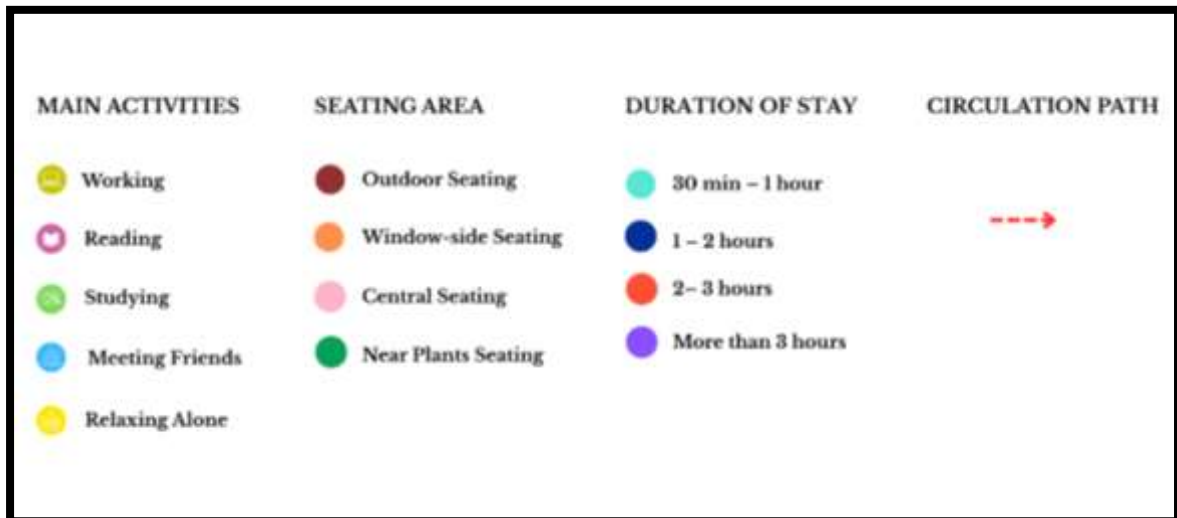


Figure 5.1: Codes of Behavioral Mapping Representing Activities, Seating Preferences, Duration of Stay and Circulation Path at Cup of Joy Nişantaşı.

Table 5.3 shows the Behavioral Mapping of 20 customers observed at Cup of Joy, their circulation path, activities, seating area, and the time spent in the coffee shop (The behavior mapping of 20 customers can be found more clearly in Appendix D).

Table 5.3: Behavioral Maps for 20 Customers.

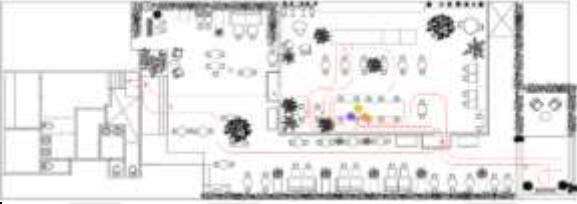
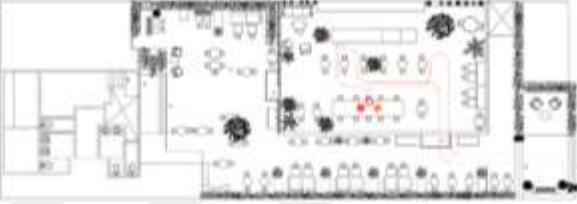
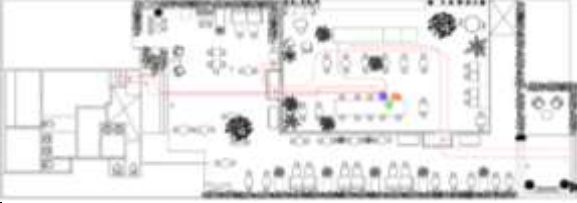
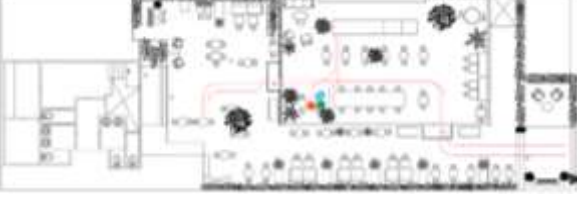
Behavioral Map – Customer 1	Behavioral Map – Customer 2
	
Behavioral Map – Customer 3	Behavioral Map – Customer 4
	
Behavioral Map – Customer 5	Behavioral Map – Customer 6
	
Behavioral Map – Customer 7	Behavioral Map – Customer 8
	

Table 5.3: Behavioral Maps for 20 Customers “Table Continued”.

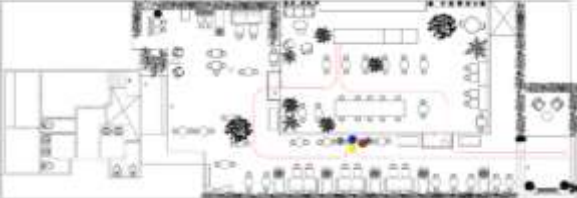
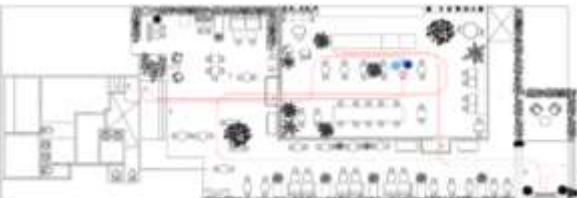
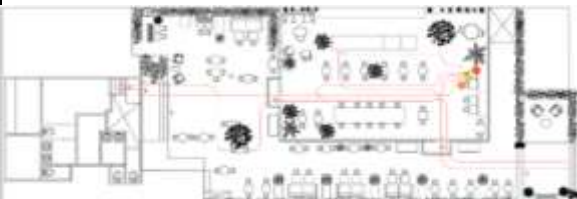
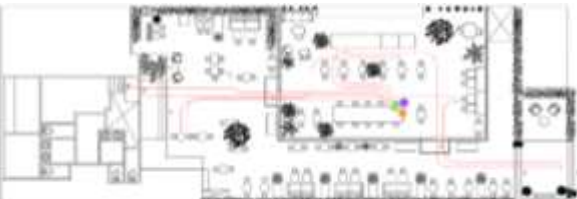
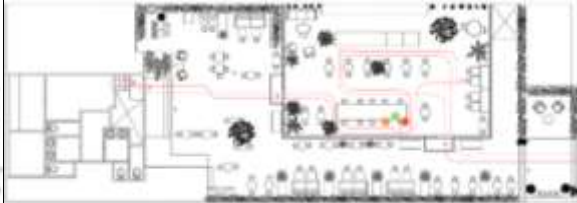
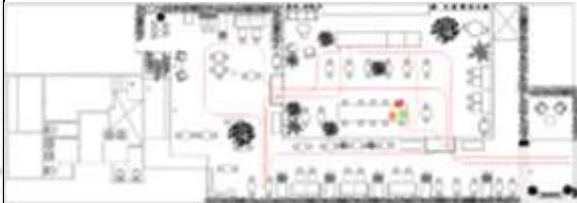
Behavioral Map – Customer 9	Behavioral Map – Customer 10
	
Behavioral Map – Customer 11	Behavioral Map – Customer 12
	
Behavioral Map – Customer 13	Behavioral Map – Customer 14
	
Behavioral Map – Customer 15	Behavioral Map – Customer 16
	

Table 5.3: Behavioral Maps for 20 Customers “Table Continued”.

Behavioural Map – Customer 17	Behavioural Map – Customer 18
	
Behavioural Map – Customer 19	Behavioural Map – Customer 20
	

After the behavioral mapping was conducted for each customer in the coffee shop, the results were organized into Table 5.4, documenting the information of the 20 customers, such as gender and seating area. This table gives a concise summary of how patrons use the area.

Table 5.4: Detailed Information on Behavioral Mapping of Customers in Cup of Joy Nişantaşı.

Customer N°	Gender	Seating area	Duration of Stay	Main Activity
1	Female	Window-side Seating	More than 3 hours	Working
2	Male	Window-side Seating	2– 3 hours	Reading
3	Female	Window-side Seating	More than 3 hours	Studying
4	Female	Near Plants Seating	2– 3 hours	Reading
5	Female	Outdoor Seating	1–2 hours	Meeting Friends
6	Female	Window-side Seating	More than 3 hours	Studying
7	Female	Window-side Seating	More than 3 hours	Working
8	Male	Near Plants Seating	2– 3 hours	Meeting Friends
9	Male	Outdoor Seating	1–2 hours	Relaxing Alone
10	Female	Near Plants Seating	More than 3 hours	Studying

Table 5.4: Detailed Information on Behavioral Mapping of Customers in Cup of Joy Nişantaşı
“Table Continued”.

11	Male	Near Plants Seating	More than 3 hours	Working
12	Female	Central Seating	1–2 hours	Meeting Friends
13	Male	Window-side Seating	2– 3 hours	Meeting Friends
14	Female	Window-side Seating	30 min – 1 hour	Meeting Friends
15	Male	Window-side Seating	2– 3 hours	Working
16	Female	Window-side Seating	More than 3 hours	Studying
17	Female	Central Seating	1– 2 hours	Meeting Friends
18	Female	Window-side Seating	2– 3 hours	Studying
19	Male	Outdoor Seating	2– 3 hours	Meeting Friends
20	Male	Window-side Seating	2– 3 hours	Studying

Afterwards, 4 summary plans were created to conclude the behavioral mapping data of all customers, the first plan presents the activities summary, the second plan indicates the seating Preferences Summary, the third plan shows the summary of the duration of stay, and the final plan for the circulation path of all 20 customers. Each summary plan overlays the individual behavioral maps of the 20 customers to identify the most frequently occurring patterns.

Firstly, Figure 5.2 below presents the plan where the 20 activities summary of every customer, overlaid on top of each other to determine the most frequently occurring activity. Color points represent activity types, (as defined in the Legend in Figure 5.1).

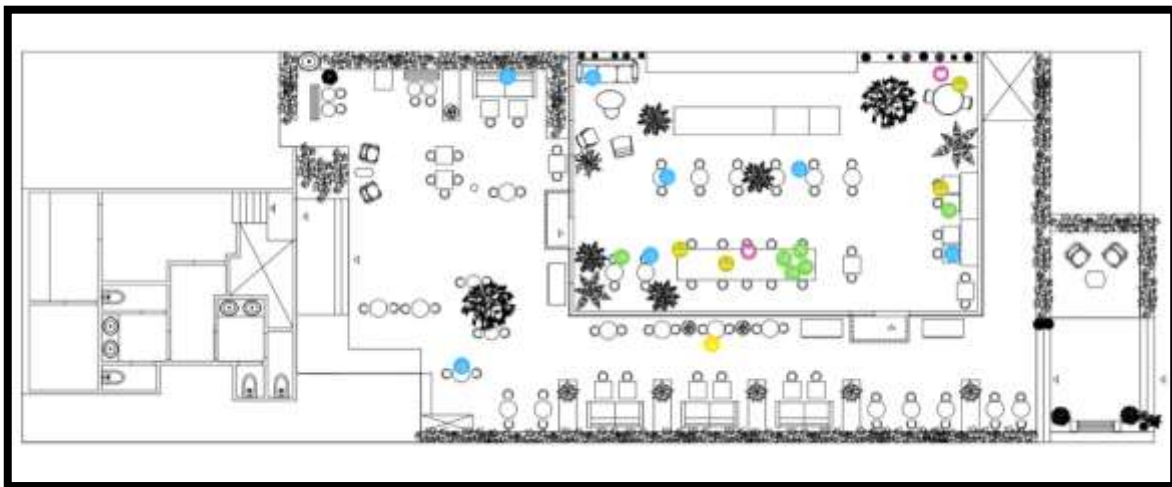


Figure 5.2: Behavioral Mapping – Activities Summary Plan.

Table 5.5 shows the number of customers and the percentage of each activity. The most frequently occurring activity is Meeting Friends, with 7 customers (35%), which suggests that Cup of Joy serves as a gathering place that promotes communication. However, the overall number of customers who came to study is 6, representing 30% of the 20 customers, the total number of customers came to work is 4 which represent 20% of the 20 customers, the number of patrons comes work and study is 10 equals to (50%) which indicates that Cup of Joy is also frequently used as a setting that is conducive to motivation and concentration, separate from home and work.

Table 5.5: Number and Percentage of Customers' Activities.

Activities	Working	Studying	Reading	Meeting Friends	Relaxing Alone
Number of customers = 20	4	6	2	7	1
Rate (%)	20%	30%	10%	35%	5%

Furthermore, Figure 5.3 illustrates the 20-seating preferences summary plan for each customer, which is overlaid on top of each other to determine the most frequently occurring seating area. (See the Legend in Figure 5.1 for color codes).



Figure 5.3: Behavioral Mapping – Seating Preferences Summary Plan.

The observational data shows that 55% of the 20 customers chose Window-side Seating as presented in Table 5.6, This indicates that most customers prefer to sit exposed to daylight and have views of the outside, harmonizing with the key biophilic design principles, which enhance the visual bond with nature.

In contrast, just 10% of the 20 customers choose to sit in the central seating, which would suggest that there is less comfort or environmental stimulation there. The seating area near plants was preferred by 20% of the 20 patrons, showing that greenery may have a positive impact. 15% of the 20 customers chose to sit outside, a preference that may be affected by favorable weather conditions and quieter environment compared to the indoor setting.

Table 5.6: Number and Percentage of Customers' Seating Area.

Seating Area	Outdoor Seating	Window-side Seating	Central Seating	Near Plants Seating
Number of customers = 20	3	11	2	4
Rate (%)	15%	55%	10%	20%

The duration of stay summary plan for 20 customers who were observed is shown in Figure 5.4, It is superimposed on top of each other to identify the most time spent by the 20 customers. (See the Legend in Figure 5.1 for color codes).

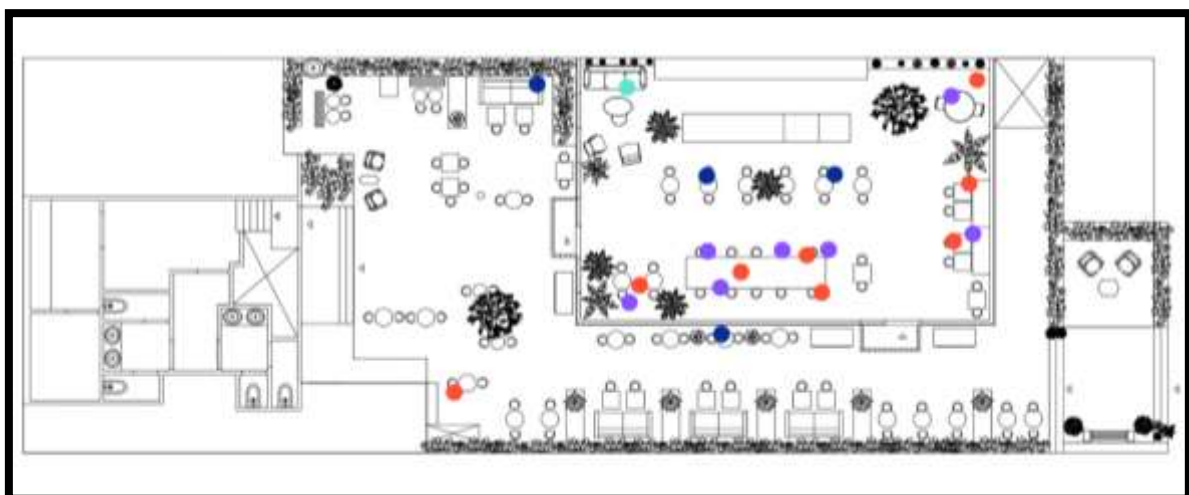


Figure 5.4: Behavioral Mapping – Duration of Stay Summary Plan.

Table 5.7 presents how long each of the 20 patrons stayed in Cup of Joy, 40% of the total costumers remained between 2 and 3 hours, whereas 35% stayed for more than 3 hours in the coffee shop. However, fewer customers had shorter visits: just 5% stayed between 30 minutes and an hour, while 20% stayed between one and two hours. The analysis results show that Cup of Joy encourages longer stays, which indicates that customers are quite comfortable and satisfied.

Table 5.7: Number and Percentage of Customers' Duration of Stay.

Duration Of Stay	30 min – 1 hour	1 – 2 hours	2– 3 hours	More than 3 hours
Number of customers = 20	1	4	8	7
Rate (%)	5%	20%	40%	35%

The behavioral mapping results show the circulation paths of 20 customers in Cup of Joy, the red lines indicate the frequency and direction of movement, from entering the café until leaving it, including their reactions when they enter, how they move into the coffee shop to choose their spot, and this is shown by the arrow directions. Recording every action of the customers, this reveals that that customer movement is predominantly concentrated within the indoor areas of Cup of Joy. Firstly, almost every customer enters the interior of the coffee shop to discover the atmosphere before choosing which seating area is suitable. While the coffee shop is self-service, therefore, the center and the counter are more crowded. However, as illustrated in the summarized circulation plan (Figure 5.5), there is less movement outside compared to the interior, but the choice of seating places is mostly near the windows and plants on the figure's right side, and at the large table, which is also near the window.

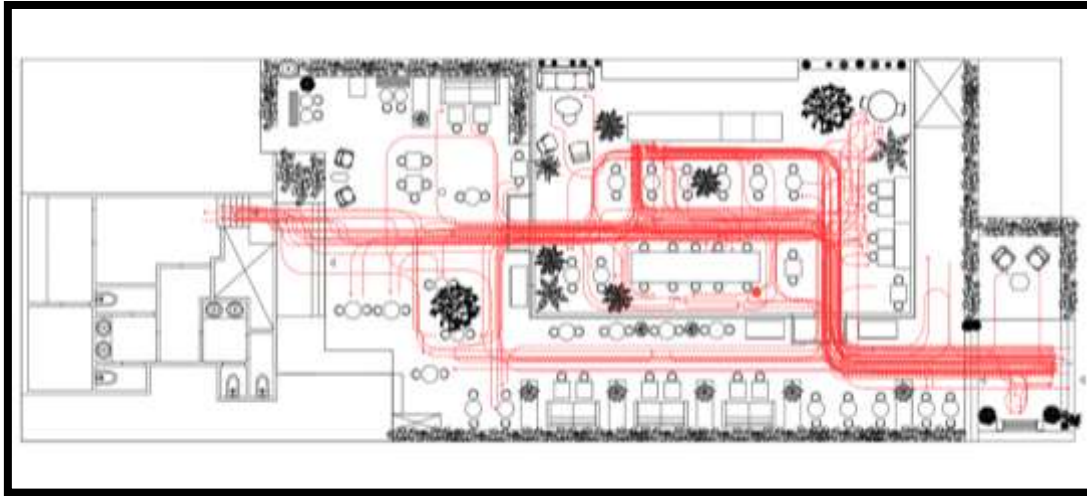


Figure 5.5: Behavioral Mapping - Circulation Paths in Cup of Joy.

The behavioral mapping findings at Cup of Joy Nişantaşı reveal that the coffee shop effectively supports both social interaction and individual productivity, aligning with the multifunctional nature of contemporary coffee shops. According to the activity analysis, 35% of customers visited Cup of Joy to meet friends, highlighting its role as a social hub that encourages communication and informal gatherings. At the same time, 30% came to study and 20% to work, with a combined 50% engaging in work or study related activities, indicating that the space also caters strongly to focused tasks and quiet individual use. This supports research by Kellert (2005), who emphasized that biophilic atmosphere enhance cognitive performance and support attention restoration.

Seating preferences further emphasize the influence of the interior environment on user behavior. 55% of patrons chose window-side seating, confirming a clear preference daylight and view of the exterior, which is a core biophilic design features that foster a direct view of nature. This finding is consistent with studies by Kaplan and Kaplan (1989), which indicate that access to daylight and nature views contributes to stress reduction and improved mood. Additionally, 20% selected spots near plants, reinforcing the positive psychological impact of greenery, as supported by Lohr et al. (2004), who found that interior vegetation can significantly lower stress levels. Only 10% occupied central seating, possibly due to lower

sensory stimulation or reduced environmental quality. The outdoor area, chosen by 15% which suggests that access to fresh air and quitter setting is also valued.

Duration of stay further supports the idea of comfort and satisfication, 40% of customers remained for 2-3 hours, and 35% stayed over 3 hours, which justify that the coffee shop encourages extended visits. Longer dwell times in biophilic spaces have been linked to greater psychological well-being and perceived comfort, as supported by research from Gray and Birrell (2014), who found that nature-rich commercial interiors promote lingering behavior.

Circulation analysis also revealed that movement was mostly concentrated indoors, with customers typically exploring the interior before choosing their seating, and clustering around the counter and central space due to the self-service. Nevertheless, the most frequently occupied areas remained those near windows, plants, and the large table, suggesting a strong preference for zones enriched by biophilic elements and visual openness. This spatial behavior reflects what Heerwagen (2006) argues that spaces offering prospect, refuge, and natural stimuli not only attract users but also influence their movement and choice of place. Collectively, these patterns affirm that Cup of Joy's spatial configuration, especially its incorporation of natural features, contributes significantly to both user satisfaction and behavioural engagement.

5.3 OBSERVATIONAL RESULTS

Observations were conducted throughout various times of the day. The interior environment featured several biophilic elements, including plants and greenery, which are present everywhere. Furthermore, the application of organic materials, such as earth brick in the flooring throughout all the coffee shop areas, daylight from large windows, and even the colors used in the coffee shop, are inspired by nature. The seating layout has a variety of forms (circle, rectangle, and square) and materials (wood and marble). All of these characteristics give the coffee shop a natural vibe.

During the observation sessions, it was noted that the majority of customers entering Cup of Joy Nişantaşı immediately sought seating indoors. customer behavior appeared to be influenced by the spatial distribution of natural elements. The 20 customers observed most

headed directly towards the seating areas near the windows, these areas appeared to be the most preferred. The solo customers who were observed studying, reading, or working on laptops were often seen in places with natural light access. Social groups were more likely to occupy centrally located tables further from the windows but still within visual contact with green elements. There were two customers observed when they first entered, who showed noteworthy behavior, they seemed to search for seating at a large table located near the window on the right side of the layout and at the large wooden table positioned close to the window, likely as their first choice, when they couldn't find a seat there, one of them chose to sit outside, and he was scrolling on his phone, while the other one chose to sit inside, both of them waiting for a seat to become available. They were watching this place all the time, they were so interested sitting there. Furthermore, a prominent notice was observed, in areas rich with natural elements, patrons stayed for longer periods, with some occupying the same spot for more than two hours, they are also shown relaxed, with minimal restlessness. In contrast, areas lacking biophilic elements have lower turnover rates. The outside seating area was available, it was not the primary choice for the majority of customers. While a small minority of patrons initially opted for the outdoor seating, most of the observed customers chose to sit indoors. This trend further suggests that, despite the option of outdoor seating, the indoor areas, especially those enriched with natural elements like plants and sunlight, were considered more desirable for the majority of customers. In terms of the physical layout, the entrance to the coffee shop does not immediately direct customers to a clear path inside. Instead, it provides them with a choice between entering the indoor or outdoor areas. This may explain some initial hesitation or the momentary pause that occurred as customers made their decision. Despite the freedom to choose, the trend clearly shows a preference for indoor seating. Interestingly, many customers seemed to be entering for the first time, as they appeared to survey the layout before settling on a spot, and they took photos of areas characterized by biophilic features. Moreover, it was noticed in the observation sessions, which were conducted over several days, that there are some customers who visit the coffee shop frequently during the week.

The patterns recorded during observation will be further explored through an interview with 10 customers in the next part to understand more about some customers' opinions.

5.4 INTERVIEW RESULTS

The interviews are one of the techniques in this study, they include both open-ended questions (qualitative data), and rating scale questions (quantitative data), as shown in Table 5.8, which presents 14 interview questions with the responses of the customers. Interviews were conducted with 10 customers in the coffee shop. The goal of this interview is to gather customers' opinions about the biophilic elements existing and how they can influence their experience in the coffee shop.

Table 5.8: Interview Questions and Customer's Responses.

The Interview Questions	The customer's responses	Customer's Rating (1–5)
1. How often do you visit this coffee shop?	C1: I came here like 3 times a week when I am in Turkey.	-
	C2: I come here 2 times a week to recharge my mind.	
	C3: I visit this coffee shop 3 days per week. I came here to study.	
	C4: I visit this coffee shop more than 2 times a week, most of the time I come alone, sometimes with my family.	
	C5: I came one day a week, mostly on Saturday.	
	C6: As a remote student, I visit this place frequently, about 4-5 times a week.	
	C7: I come here daily.	
	C8: Maybe one time a week.	
	C9: Almost every day, it becomes a daily routine before going to work.	
	C10: I came to this coffee shop 4 times a week.	
2. What do you like the most about this place?	C1: I like the windows here because they make the space so luminous.	-
	C2: The good coffee and the natural vibe.	

Table 5.8: Interview Questions and Customer's Responses “Table Continued”.

	C3: I like the glass ceiling, as sometimes, while sitting inside, I can gaze up at the sky, and then I feel more relaxed while studying.	
	C4: I like the harmonious design of this coffee shop.	
	C5: What I like most about this cafe is that it combines the beauty of the place with the quality of the food.	
	C6: I like the light from those glass panels.	
	C7: I like the natural vibe here.	
	C8: The staff working here are cool.	
	C9: I love sipping my coffee here, surrounded by so much greenery.	
	C10: The vibe is amazing	
3. How would you describe the atmosphere of the coffee shop?	C1: Cozy and bright.	-
	C2: It is comfortable.	
	C3: It's comfortable, I like it.	
	C4: The atmosphere is so pleasant.	
	C5: The atmosphere is calming and inviting.	
	C6: Very cozy, it helps me concentrate.	
	C7: The atmosphere is fresh and calm.	
	C8: It is friendly.	
	C9: Perfect for relaxing and improving the mood.	
	C10: It is peaceful, especially with the natural light.	
4. Have you noticed any natural elements in the design of this space? If yes, what did you notice?	C1: Of course, the natural light and the floor material.	-
	C2: Yes, the plants that are everywhere.	
	C3: Yes, natural light enters from the big windows.	
	C4: Yes, the plants and the sun.	
	C5: Yes, the fresh air and the greenery.	
	C6: Yes, the plants hang from the ceiling and in the corners of the place.	

Table 5.8: Interview Questions and Customer's Responses “Table Continued”.

	C7: Yes, sunlight.	
	C8: Yes, the plants.	
	C9: Yes, the sunlight and the plants.	
	C10: Yes, the plants.	
5. Do you feel connected to nature when you're in this coffee shop? Why or why not? Please rate it from 1 to 5	C1: Yes, so much, it makes me feel like I am in a garden.	C1: 5
	C2: Yes, as there are some natural elements, like the plants, the incorporation of natural materials like wood and marble.	C2: 3.5
	C3: Yes, I feel connected to nature even when I'm not sitting in the outdoor area, the space is open and well-ventilated.	C3: 4
	C4: Yes, it makes me feel like I'm inside a greenhouse due to the transparent and ventilated space.	C4: 4.5
	C5: Yes, there is good air circulation, also the greenery in this space, which is one of the natural elements.	C5: 3.5
	C6: Yes, I feel connected to nature because plants and colors remind me of nature.	C6: 3.5
	C7: Yes, the coffee shop has a strong relationship with nature, because the greenery is everywhere.	C7: 4.5
	C8: Not so much, it has some natural elements, but it doesn't feel like you're really in nature, maybe because it sometimes becomes a busy space.	C8: 2
	C9: Yes, because the presence of all these plants creates a natural atmosphere.	C9: 3.5
	C10: Yes, the space gives me the feeling that I am in touch with the natural world.	C10: 4
6. How much do you feel that natural light is important in coffee shop settings? Please rate it from 1 to 5		C1: 5
		C2: 3.5
		C3: 4
		C4: 3.5
		C5: 4
		C6: 4.5

Table 5.8: Interview Questions and Customer's Responses “Table Continued”.

		C7: 5
		C8: 2.5
		C9: 3
		C10: 4
7. How much do the natural materials in the coffee shop influence the overall comfort? Please rate it from 1 to 5		C1: 3.5
		C2: 3
		C3: 4.5
		C4: 4
		C5: 3
		C6: 4.5
		C7: 4
		C8: 2.5
		C9: 3.5
		C10: 3
8. How much do you feel the plants enhance this coffee shop's atmosphere? Please rate it from 1 to 5		C1: 3.5
		C2: 4
		C3: 3
		C4: 4
		C5: 4.5
		C6: 4.5
		C7: 4
		C8: 3
		C9: 3.5
		C10: 3.5
		C1: 4
		C2: 4

Table 5.8: Interview Questions and Customer's Responses “Table Continued”.

9. How much do the sounds, smells, and textures in the coffee shop enhance your feeling of connection to nature? Please rate it from 1 to 5		C3: 3
		C4: 3.5
		C5: 3
		C6: 3
		C7: 2.5
		C8: 1
		C9: 2
		C10: 3.5
10. Do the natural elements influence your experience or mood in the coffee shop? How? Please rate it from 1 to 5	C1: Yes, I feel productive while I am working, that's why I came here.	C1: 4.5
	C2: Yes, it keeps me calm and in a good mood.	C2: 4
	C3: Yes, it inspires me and helps me advance while I am studying.	C3: 4
	C4: Yes, so much, that's why I always come here.	C4: 5
	C5: Yes, the presence of the natural elements positively affects my mood.	C5: 3.5
	C6: Of course, it affects me because with the pressure of studying, the nature around me makes me feel comfortable.	C6: 4
	C7: Yes, when I come here, my mood becomes better.	C7: 3.5
	C8: Yes, a little bit.	C8: 3
	C9: Yes, it has an impact on giving me positive energy every time I come here.	C9: 4
	C10: Yes, so much, I can focus better here because there is a kind of positive energy that helps me move forward in my studies.	C10: 4.5
	C1: Yes, I like open spaces, the big windows here make the space open to the outside, in the same time protected from cold or rain, however, I can see the rain from the sky windows, there are so many coffee shops that include nature in their design but not like this coffee shop do.	C1: 4.5

Table 5.8: Interview Questions and Customer's Responses “Table Continued”.

11. Do you feel more relaxed or focused here compared to other coffee shops? Why? Please rate it from 1 to 5	C2: Yes, I live a bit far from here, and there are some coffee shops in my area, but after coming here with my friend, it became my favorite place to relax.	C2: 4
	C3: Yes, it's more comfortable, every time I want to change the place, and I try other coffee shops, but I come back here.	C3: 4.5
	C4: Honestly, there are other beautiful coffee shops where you can feel comfortable, but this coffee shop has some kind of attachment; it gives me peace of mind.	C4: 3.5
	C5: Other coffee shops have some of the criteria of this coffee shop, but I feel this place is special.	C5: 4
	C6: Yes, I feel relaxed. that's why I came here to escape the noisy coffee shops.	C6: 3.5
	C7: Yes, when I tried other coffee shops, I feel normal there compared to this coffee shop. here, the mood is better, I think.	C7: 3
	C8: In my opinion, there's not much difference from other coffee shops, but that doesn't stop me from feeling relaxed when I meet with my friends here.	C8: 3
	C9: Yes, I came here to drink my cup of coffee peacefully.	C9: 3.5
	C10: Yes, it is a unique coffee shop that keeps me relaxed, concentrated, and comfortable.	C10: 4
12. Do you usually choose a specific area to sit in? What attracts you to that spot? Why?	C1: Every time I come here, especially in the morning, I choose to sit in this spot because of its strategic location, and I feel comfortable.	-
	C2: Often, I prefer to sit in the corner because I feel that place is more private for reading my journal, also near the serving bar where they prepare coffee, I like the smell of coffee so much, if I am with my friend, we can talk and hear each other easily, as the coffee shop sometimes gets crowded.	
	C3: I prefer sitting near the window because I want the sunlight that enters, which gives me energy while I study.	
	C4: I tried sitting outside before, but I used to sit here indoors between plants, because I feel more cozy.	
	C5: I often sit outdoors, and I feel more comfortable here.	

Table 5.8: Interview Questions and Customer's Responses “Table Continued”.

	C6: I've always loved sitting on the orange sofa by the window. because the sofa is comfortable and I feel private when I'm close to it. I remember one time I sat in the middle because of the crowd. I felt like someone was watching me, and I wasn't comfortable.	
	C7: My favorite sitting area is indoors near the window. I feel I am more productive here.	
	C8: Most of the time, I want to sit indoors, especially here, when this spot isn't available, I prefer to sit outdoors in a corner.	
	C9: I often sit outdoors the coffee shop to smell the fresh air.	
	C10: I often want to sit in the corner or near the windows, because I feel more focused. It feels like home, at the same time, away from home. That's why I chose to come to this place.	
13. Do you think incorporating nature into coffee shop spaces is important? Why?	C1: Sincerely, yes. My experience with a natural coffee shop is good, whether I come to work or with friends. It changes the atmosphere.	-
	C2: Yes, I think it is important because nature can make spaces feel less constrained and more welcoming.	
	C3: Absolutely, it creates a more balanced atmosphere for focusing and relaxing.	
	C4: Yes, very important, it brings a sense of peace to the space and encourages the customer to come back.	
	C5: Because nature helps create a relaxing atmosphere.	
	C6: Frankly, yes. because it gives me a sense of calm and inspiration.	
	C7: Yes, I think it enhances the atmosphere more.	
	C8: Not obligated, I think other designs could work too.	
	C9: Yes, it's important because it makes the space feel calmer.	
	C10: Yes, it is ok that nature is important, but sometimes, there is some people have allergy from some plants so we must take in consideration their case.	

Table 5.8: Interview Questions and Customer's Responses “Table Continued”.

14. Is there any problem, anything you would add or change in the design of this space?	C1: No, I didn't notice any problems.	-
	C2: Yes, sometimes it gets noisy.	
	C3: Sometimes, the coffee shop becomes too crowded, which impacts comfort.	
	C4: Yes, I think the space lacks a bit of privacy.	
	C5: Yes, there are some corners in this coffee shop not well designed compared to the overall coffee shop.	
	C6: Some of the seating is uncomfortable, I think made of metal, especially for people like me who go to work and study for hours. If there's no available spot on the sofa, I have to sit on a chair, and not all the chairs are comfortable.	
	C7: No, I like everything here, for that reason, I come here every day.	
	C8: Yes, I think it would be better if the ceilings weren't transparent. For privacy, and for people who prefer a Low-light space.	
	C9: Everything seems well.	
	C10: The space is a bit too open; I prefer cozy corners sometimes to concentrate.	

In this context, the majority of the participants visit Cup of Joy between three to five times a week, reflecting a strong connection to the area, highlighting how the coffee shop is a part of their daily routine, whether they come to socialize, work, study even relax alone.

Several responses illustrated the coffee shop's natural ambiance, as one of the participants defined the atmosphere: “Perfect for relaxing, and for improving the mood. “. Meanwhile, some customers liked the quality of coffee and food, but most of the participants concentrated on the natural atmosphere. They emphasized how the design of the coffee shop shaped their experience, since the space is comfortable and fresh.

The customers noticed some natural design features, particularly the natural light and the greenery. As one participant described the coffee shop as transparent, ventilated, and protected like a greenhouse, consequently, it enhances their mood and makes them feel more positive than in other coffee shops. As they refer to the special bond with the coffee shop, they believe that it offers a unique experience, demonstrating the power of how design can affect users.

Numerous interviewees favor spots by windows, plants indoor the coffee shop, and others would rather sit outside. However, some of them prefer to sit in the corner for more privacy and comfort. Most of the customers had favorable opinions on the usage of natural elements and strongly supported these design choices for creating a welcoming setting.

When participants were asked the problems that may be presented, or if there was anything they would add or change in the design, several were satisfied with the current design; in contrast, a few recurring issues appeared from some of the customers, which are the lack of privacy and corners in the coffee shop, also it gets crowded sometimes, as well as some seating is not comfortable.

From the interview, seven questions were selected to assess customers' perceptions of the biophilic design elements, each question was rated by the customers on a scale from 1 (totally disagree) to 5 (totally agree). The questions (Q1-Q7) examined several facets of the biophilic experience, such as connection to nature, the importance of daylight, the influence of natural materials, and the sensory side (sounds, smells, textures).

The questions were as follows:

Q1: Do you feel connected to nature when you're in this coffee shop? Why or why not?
Please rate it from 1 to 5

Q2: How much do you feel that natural light is important in coffee shop settings? Please rate it from 1 to 5

Q3: How much do the natural materials in the coffee shop influence the overall comfort?
Please rate it from 1 to 5

Q4: How much do you feel the plants enhance this coffee shop's atmosphere? Please rate it from 1 to 5

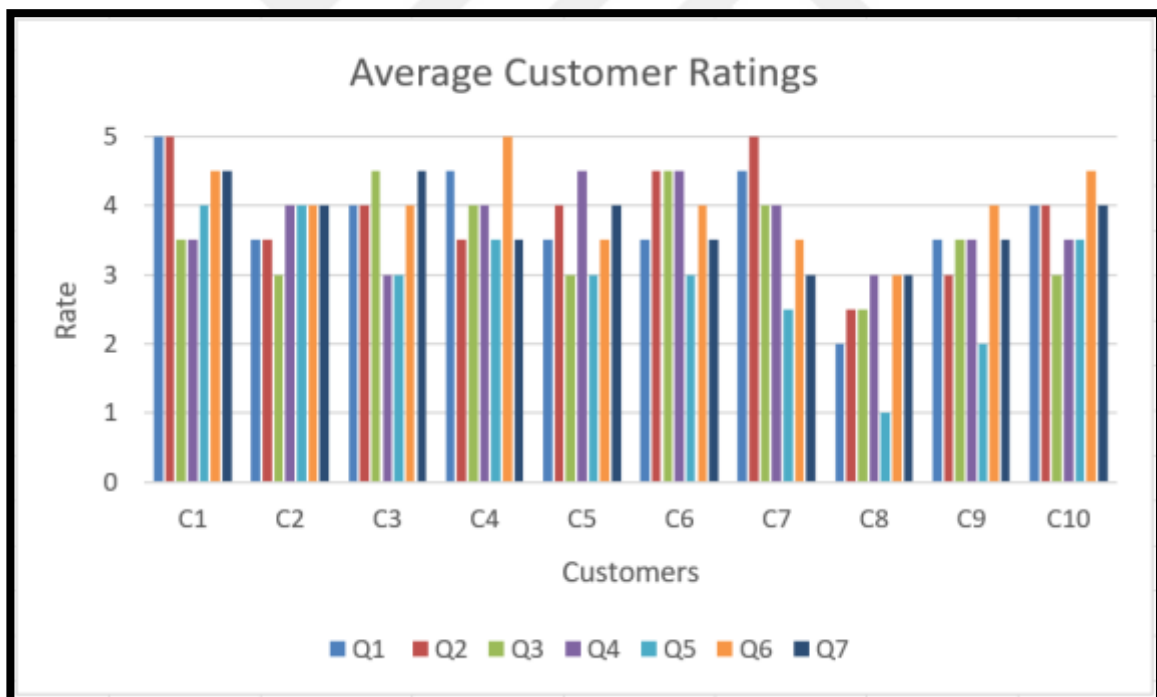
Q5: How much do the coffee shop's sounds, smells, and textures enhance your connection to nature? Please rate it from 1 to 5

Q6: Do the natural elements influence your experience or mood in the coffee shop? How? Please rate it from 1 to 5

Q7: Do you feel more relaxed or focused here compared to other coffee shops? Why? Please rate it from 1 to 5

The results of the rate of the interview questions conducted with customers of Cup of Joy are presented in Chart 5.1.

Chart 5.1: Customers Rating.



Ten customers' (C1 to C10) average ratings of natural elements within a coffee shop environment by regarding their perceptions, as shown in Chart 5.1. The results show an overall positive response, the majority of ratings fall between 3 and 5 for every question. Notably, the first two questions, connection to nature (Q1) and the importance of natural

light (Q2) received high ratings, especially from customer 1 and customer 7. Furthermore, natural light was the most highly achieved biophilic element among the others, while the presence of plants came in second.

Question number five, which discusses the sound, smell, and texture in the coffee shop, received a significantly low rating from all customers compared to the other questions. There is some variation observed, as demonstrated by customer 8 answers, which gave slightly lower ratings on some aspects compared to others. However, in general trend remains strongly positive, which suggest that natural elements significantly enhance customer comfort, mood, and relaxation within the coffee shop setting.

5.5 DISCUSSION

This section discusses the findings from various research methods, including evaluating biophilic design patterns, behavioral mapping, observational analysis, and interviews conducted at Cup of Joy Nişantaşı. The objective is to explore how the biophilic design patterns are integrated in the selected coffee shop, which patterns are present and absent, and to analyze the influence of biophilic design on customer behavior, perception, and spatial preferences. Each method offers distinct insights that give unique perspectives on the impact of nature-integrated design on customers' experience in the coffee shop.

The findings are also discussed in relation to the main research questions of this study. Concerning the first research question regarding the status of biophilic design patterns, the evaluation revealed that Cup of Joy Nişantaşı contained 9 out of 14 biophilic design models developed by Browning et al. Several patterns were implemented in the coffee shop, such as visual connection with nature and thermal & airflow variability; these elements, like the presence of plants and the use of natural resources, helped to creating a visually warm and inviting atmosphere that many customers appreciated. However, certain biophilic patterns were either minimally present or absent, such as mystery and refuge, the absence of these patterns does not diminish the value of the existing biophilic elements. Biophilic design is inherently flexible and does not require the full implementation of every pattern. Instead, it allows for the strategic selection of features that align with a specific setting's functional needs and available resources. This adaptability supports its application in diverse environments, including small-scale or commercial interiors, such as coffee shops.

According to Terrapin Bright Green, the 14 patterns of biophilic design are intended as a flexible framework, and their effectiveness depends on the quality of implementation rather than the total number applied.

Behavioral mapping showed distinct spatial patterns that demonstrated a strong preference for places enriched with natural characteristics. Throughout different times of the day, the seating zones nearest to the windows were always filled, because they provided a good natural light. The customers frequently stayed in these spaces for extended periods, often occupied with focused activities such as studying, reading, or working on their laptops. This behavior of almost all customers implies that the biophilic elements directly influenced how they selected and utilised specific areas of the coffee shop, also contributing to the visual and atmospheric appeal.

Observational data well confirmed the behavioral patterns highlighted by mapping. Customers showed more relaxed seating positions and preferred areas near greenery and daylight. Even when other seating places were empty, some patrons waited for window-side tables to become free, justifying the value of nearness to natural light and outdoor views. On the other hand, some corners of the coffee shop are a little bit marginalized with low access to natural elements, typically used for short stays. Notably, even though outdoor seating was available, many customers preferred to sit indoors, especially near the large windows, which gave them the feeling of belonging, allowing them to enjoy the view while being protected from environmental discomforts such as noise, wind, or temperature variations. This preference demonstrated how well-designed indoor biophilic elements can replicate the benefits of the outside seating areas while offering increased comfort.

Interview responses from customers added depth to this research, with most patrons describing the coffee shop setting as serene and cosy, they also mentioned that the existence of plants and the amount of natural daylight made the environment feel more welcoming. Some even claimed that it feels like being outside when they sit close to the windows. The benefits of biophilic design for psychology are demonstrated by this sense of connectedness to nature, even indoors. Additionally, customers shared that they come not only for coffee drinking but also for relaxation, focused work, and emotional decompression, which is explained by the calming atmosphere created through biophilic design elements.

However, a few participants expressed preferences that highlight gaps in the current design. Specifically, some customers felt that the coffee shop was too open and lacked spaces that offered privacy or a sense of seclusion. These individuals expressed a desire for more intimate corners or enclosed seating areas that could support quiet, focused time without visual exposure to the entire space. This observation points to the limited presence of the biophilic design pattern known as "refuge," which describes spaces where users feel sheltered while maintaining some openness. In the current layout, refuge was only minimally implemented, and its absence may have affected the comfort of users who prioritize privacy or calm, especially in a socially active setting.

Furthermore, some interviewees noted that the space could become crowded during certain times of day, which affected their comfort. The increased noise levels were mentioned as factors that reduce the good atmosphere of the space. These answers imply that while the design effectively conveys a sense of aesthetic appeal and openness, adding more spatial changes, such as integrating partitions to create a bit isolated area, but still carefully refined, with biophilic design criteria, and using materials that absorb noise, could further improve customers' comfort, especially for those who prefer more secluded, quiet areas. The coffee shop would be able to provide a more balanced setting that allows for both privacy and openness. Incorporating these adjustments will also improve the comfort for a larger range of patrons.

The interaction of these findings provides clear answers to the study's second and third research questions. About the second research question, what are the most influential biophilic design elements in Cup of Joy Nişantaşı?

According to the results from behavioral mapping, observations, and interviews, the most impactful elements are natural light, outdoor views, and the plants. These features were repeatedly identified as contributing to a feeling of tranquility, comfort, and relationship with nature, making them central to customers' overall positive experiences in the space. Kellert (2008) supports these findings by pointing out that direct experiences of nature, like natural materials, daylight, and views, are important for promoting contentment and psychological well-being in the constructed environment (Kellert, 2008).

To answer the third research question, which is the main research question guiding this study: How does biophilic design affect customer comfort and well-being in a coffee shop environment?

As shown in the method's results, biophilic design patterns found in the coffee shop are essential to enhancing both customer comfort and mental well-being. Patrons described the environment as positively affecting their mood, calming, and visually pleasant. Most customers stay for extended periods, typically between two and four hours, which can justify their feelings of relaxation and reduced stress. Based on observational data, patrons demonstrated a constant preference for naturally enriched seating areas, where they sat more comfortably and engaged in quiet, focused activities. These behavioral and affective reactions indicate that the presence of biophilic features, such as natural light, greenery, creates a soothing and pleasant experience for customers.

Finally, the findings highlight the adaptable nature of biophilic design. While not all biophilic patterns were fully implemented, the thoughtful application of some natural elements, like plants, and the entrance of daylight had a major beneficial effect. This shows that biophilic design can be customized to accommodate functional limitations while greatly enhancing visitor experience and pleasure.

In summary, the discussion confirms that biophilic design significantly improves patron comfort, behavior, and well-being, shapes how space is used, and contributes to longer visits in a coffee shop setting. However, it becomes crucial to use design ideas that support reconnection with the natural world as urbanization rises and humans get farther from it. Integrating biophilic design components into the built environment, especially in commercial spaces like coffee shops, can help restore this connection and deliver proven benefits to human well-being.

5.6 RECOMMENDATIONS

This study highlights certain recommendations for enhancing customer well-being in coffee shops, especially by carefully incorporating biophilic principles into design. The results of this research provide insightful advice for interior designers, architects, as well as coffee shop owners who want to create environments that strengthen the relationship between

humans and nature, to let them feel themselves through experiencing their innate need for the natural world, which fosters their comfort, satisfaction, and mental health.

While some customers agree that Cup of Joy is calm, others comment that the space can become noisy at times. This is one significant challenge, which can lead to customer discomfort and increased stress levels, to address this issue, it is recommended to incorporate sound-absorbing materials throughout the coffee shop, better Natural materials such as cork, wool, and bamboo are highly effective for reducing noise and enhancing acoustic comfort.

These materials can be used to assist in absorbing sound and for a more tranquil, soothing ambience. They can be applied to ceilings, Walls, and furniture, like chairs, while there is a customer who said that the seating is not comfortable. so it would be a good solution, using natural materials in the seating, at the same time comfortable. Furthermore, incorporating a water feature can also enhance the acoustic environment, adding a small fountain or wall-mounted cascade, which helps reduce noise like conversations and espresso machines. and promote auditory comfort. Crucially, both sound-absorbing materials and water elements align with biophilic design principles, which contribute to a more harmonious atmosphere. Another essential biophilic design pattern to prioritize is refuge, which is one of the fourteen patterns of biophilic design not found successfully in Cup of Joy. This need is particularly relevant in coffee shops, where many customers seek an ideal for leisure, focused work, or meditation, offering respite from the noise and distractions common in public spaces (Sternberg, 2009; Ellard, 2015). To fulfill this need, it is recommended that café owners and designers create secluded corners or booth-style seating areas using natural dividers such as wooden screens, tall plants, or other organic barriers. These refuge spaces provide customers with a sense of security and privacy while maintaining visual and sensory connections to natural elements. Ensuring that these areas remain connected to the biophilic atmosphere supports both emotional comfort and privacy needs.

Furthermore, future coffee shop designs should continue to emphasize the integration of natural light, abundant plant life, and organic materials such as wood and stone. as demonstrated in this study, biophilic design promotes well-being by enhancing mood, reducing stress, and improving customer comfort. For example, large windows that let natural light enter the space, not only create an outdoor-like ambience but also offer views

of greenery while protecting customers from weather conditions. This exposure to nature significantly enriches the customer experience, making the space more inviting and conducive to longer visits.

In addition to these recommendations, this study encourages further research into the broader impacts of biophilic design across various public settings. While this research focused on a specific coffee shop, future studies could examine how different biophilic patterns influence customer behavior and satisfaction in diverse environments.



6. CONCLUSION

Coffee shops today have evolved into multifunctional public spaces that not only provide social interaction and consumption but also offer environments for relaxation, studying, as well as working. In this context, design quality plays a crucial role in shaping patrons' experiences. Biophilic design, which incorporates nature into architectural spaces, has emerged as a powerful strategy to foster well-being and comfort. This thesis examined the impact of biophilic design on customer comfort and well-being in a coffee shop environment, exploring which biophilic features are most effective and how they respond to them using Cup of Joy Nişantaşı as a case study.

The methodologies used in this study proved effective in achieving the objectives. This was achieved through a mixed-method approach, that included pattern evaluation, behavioral mapping, observations, and interviews. The study was able to capture both the spatial behavior of customers and their subjective experiences within the coffee shop environment. Behavioral mapping provided quantitative insights into user seating preferences, duration of stay, activities done, and their movement, while observational analysis helped document real-time use in relation to natural elements. These were complemented by qualitative data from interviews which revealed customers' perception.

Together, these methods formed a robust framework that combined objective spatial data with personal narratives, enabling a thorough knowledge of the link between design and user experience.

The findings revealed that biophilic design significantly enhances the customer experience, especially through elements such as daylight exposure, plants, and outdoor views. These features were strongly associated with user comfort and spatial preferences. Customers were consistently attracted to specific areas near windows and greenery, where they stayed longer and reported that they felt more relaxed. Behavioral mapping confirmed that such areas were most frequently occupied, suggesting a clear correlation between biophilic features and user behavior. However, the study also highlighted limitations in the current design, such as the lack of refuge areas for people who want semi-enclosed spaces where they feel private, which supports activities like working, studying, or quiet socializing. Additionally,

Crowding and noise emerged as sources of discomfort factors for some customers, indicating a need for design interventions that address both acoustic comfort and spatial privacy.

Beyond these findings, this research seeks to deepen awareness of the enduring relationship between the natural world and people. It highlights the role of nature as a lasting source of architectural inspiration and draws attention to the significance of using natural elements within building environments. By showing how nature positively influences perception and behavior, this thesis aims to encourage the broader adoption of biophilic strategies in coffee shops and everyday spaces.

The increasing amount of evidence in favour of biophilic design is strengthened by this study in commercial interiors, particularly in hospitality settings like coffee shops. It shows that even limited integration of biophilic principles can significantly improve customer satisfaction, emotional well-being, and spatial usage. The practical implications are clear: coffee shop operators can enhance the user experience by maximizing access to natural light, incorporating greenery, using natural materials, and offering varied seating arrangements that accommodate both social and private preferences. By doing so, these spaces become more engaging and psychologically supportive environments.

Moreover, this research reinforces the role of interior architecture as a bridge between natural systems everyday human life. In light of increasing urban stress, overstimulation, and mental health challenges, biophilic strategies provide an evidence-based response that supports emotional resilience and cognitive well-being. By fostering a stronger human nature connection in daily-use environments like coffee shops, this study emphasizes how thoughtful spatial design can serve as a quiet yet transformative force in promoting healthier, more human-centered spaces

Future research should build on these findings by examining a broader range of coffee shops across different cultural and spatial contexts. Comparative studies involving cafés with varying degrees of biophilic integration would help deepen our understanding of customer preferences and design effectiveness. There is also scope for exploring more advanced biophilic interventions, such as real-time environmental adaptation, seasonal variation, and digital-nature hybrids that simulate natural phenomena indoors.

In conclusion, this thesis affirms that biophilic design is a powerful strategy for enhancing customer experience in coffee shops. By integrating nature through light, materials, sound, and spatial layout, designers can transform everyday commercial environments into restorative, health-supportive places that foster emotional connection and well-being. As urban life becomes increasingly fast-paced and disconnected from nature, the thoughtful application of biophilic principles offers not just aesthetic value, but a meaningful path toward more inclusive and health-oriented public environments.



REFERENCES

- Abdel, H. (2024, April 18). Harudot by Nana Coffee Roasters / IDIN Architects. ArchDaily.
- Abdel, H. (2024, June 26). Tanatap Ring Garden Coffee Shop / RAD+ar (Research Artistic Design + architecture). ArchDaily.
- Adkins, R., & Adkins, L. (2023, July 6). Which Lloyd's is that? Exploring the many versions of 'Lloyd's'. Lloyd's Register Foundation.
- Afara, A., Amen, M. A., El Ayoubi, M., Ramadhan, D., & Alani, J. (2024). Arguing Faux Biophilia Concepts in F&B Interior Design: A Case Study Applied in Duhok City.
- Agarwal, R., Angst, C. M., & Magni, M. (2009). The performance effects of coaching: a multilevel analysis using hierarchical linear modeling. *The International Journal of Human Resource Management*, 20(10), 2110–2134.
- Aktaş, E., Çiçek, I., & Kıyak, M. (2011). The effect of organizational culture on organizational efficiency: The moderating role of organizational environment and CEO values. *Procedia-Social and Behavioral Sciences*, 24, 1560-1573.
- Alabor, O. Z., Anyanechi, H., & Onyekwere, W. C. (2024). The Impact of Green Building Design on Indoor Air Quality and Occupant Experience: A Case Study of Heritage Place, Ikoyi, Lagos State. *African Journal of Environmental Sciences and Renewable Energy*, 16(1), 203-215.
- Alvarsson, J. J., Wiens, S., & Nilsson, M. E. (2010). Stress recovery during exposure to nature sound and environmental noise. *International journal of environmental research and public health*, 7(3), 1036-1046.
- Appleton, J. (1977, 1996). *The Experience of Landscape*. Revised ed. London & New York: Wiley. pp.xiv, 282.
- Arens, E., Zhang, H., & Huizenga, C. (2006). Partial-and whole-body thermal sensation and comfort—Part II: Non-uniform environmental conditions. *Journal of thermal Biology*, 31(1-2), 60-66.

- Barbiero, G. (2024). Biophilic design reframed. The theoretical basis for experimental research. *Ri-Vista Research for Landscape Architecture*, 21(2), 80–91.
- Barton, J., & Pretty, J. (2010). What is the Best Dose of Nature and Green Exercise for Improving Mental Health? A Multi-Study Analysis. *Environmental Science & Technology*, 44(10), 3947–3955.
- Beauchamp, M. S., Lee, K. E., Haxby, J. V., & Martin, A. (2003). FMRI responses to video and point-light displays of moving humans and manipulable objects. *Journal of cognitive neuroscience*, 15(7), 991-1001.
- Biederman, I., & Vessel, E. A. (2006). Perceptual pleasure and the brain: A novel theory explains why the brain craves information and seeks it through the senses. *American scientist*, 94(3), 247-253.
- Blumer, H. (1969). *Symbolic interactionism: Perspective and methods*. Englewood Cliffs, NJ: Prentice Hall.
- Browning, W., Ryan, C., & Clancy, J. (2014). *14 Patterns of Biophilic Design: Improving Health and Well-Being in the Built Environment*. Terrapin Bright Green.
- Caballero, P. (2024, November 27). *Manire House / Martin Dulanto + Puna Estudio*.
- Caballero, P. (2025, January 14). *La Do Coffee / SPNG Architects + NTA-Architecture*.
- Cahill, M. (2023, November 19). *Butterfly Garden Changi Airport: a breathtaking oasis in a bustling hub*. *Travels With Missy*.
- Carabelli, G. (2020). House plants were our link with nature in lockdown - now they could change how we related to the natural world. *The Conversation*.
- Chadlos, K. (2005). The urban coffee shop. Pendergrast, M. (1999). *Uncommon grounds: the history of coffee and how it transformed our world*. *Choice Reviews Online*, 37(03), 37–1652.
- Cherry, K. (2023). What is naturalistic observation? *Verywell Mind*.

- Crick, A. P. (2011). New third places: Opportunities and challenges. In *Advances in culture, tourism and hospitality research* (pp. 63–77).
- Curaoğlu, F., Çobanlar, G. A., & Koyuncu, Ş. (2023). Interior design codes of coffee shops as the third place during the COVID-19 pandemic: Z-generation and distance concept. *Sanat ve Tasarım Dergisi*, 13(2), 350–367.
- Daily Sabah. (2018, July 20). Coffeehouses in Ottoman society. Daily Sabah.
- Diandra, S. (2025). Zhicang Coffee utilizes sustainable and eco-friendly design, celebrating nature, the Design Story.
- Ediz, İ. (2008). Osmanlı'dan Cumhuriyet'in ilk yıllarına kahvehaneler ve sosyal değişim.
- Ellard, Colin. *Places of the heart: The psychogeography of everyday life*. Bellevue Literary Press, 2015.
- Ellis, A. (1956). *The penny universities*. Secker & Warburg.
- Fessenden, M. (2015, August 5). He Designed the Sydney Opera House. . .But Wasn't Even Invited to its Opening. *Smithsonian Magazine*.
- Forge, K. (2024, April 26). The ultimate guide to Kew Gardens: Tickets, tips, and what to see. *Secret London*.
- Frame, D. (2024, November 14). Cozy Timber Frame Homes with Fireplaces. Davis Frame Company.
- Fromm, E. (1973). *The anatomy of human destructiveness*. New York: Holt, Rinehart and Winston.
- Fuller, R. A., Irvine, K. N., Devine-Wright, P., Warren, P. H., & Gaston, K. J. (2007). Psychological benefits of greenspace increase with biodiversity. *Biology letters*, 3(4), 390-394.
- Fuzi, A. (2015). Co-working spaces for promoting entrepreneurship in sparse regions: the case of South Wales. *Regional Studies Regional Science*, 2(1), 462–469.

- Goličnik, B., & Thompson, C. W. (2010). Emerging relationships between design and use of urban park spaces. *Landscape and urban planning*, 94(1), 38-53.
- Grahn, P., & Stigsdotter, U. K. (2010). The relation between perceived sensory dimensions of urban green space and stress restoration. *Landscape and urban planning*, 94(3-4), 264-275.
- Gray, T., & Birrell, C. (2014). Are biophilic-designed site office buildings linked to health benefits and high performing occupants?. *International journal of environmental research and public health*, 11(12), 12204-12222.
- Harper, D. (2000). The image in sociology: histories and issues. *Journal des anthropologues*. Association française des anthropologues, (80-81), 143-160.
- Harte, J. D., & Regrut, L. (2021). Programming Interior Environments: Human Experience, Health and Wellbeing. In *Programming for Health and Wellbeing in Architecture* (pp. 9-24). Routledge.
- Heerwagen, J. H. (2006). Investing in people: The social benefits of sustainable design. *Rethinking sustainable construction*. Sarasota, FL, 19, 22.
- Herzog, T. R., & Bryce, A. G. (2007). Mystery and preference in within-forest settings. *Environment and Behavior*, 39(6), 779-796.
- Hildebrand, G. (1991). *The Wright Space: Pattern & Meaning in Frank Lloyd Wright's Houses*. Seattle: university of Washington.
- Huizinga, J. (1950). *Homo Ludens: A Study of the Play-Element in Culture*.
- Hung, S. H., & Chang, C. Y. (2022). How do humans value urban nature? Developing the perceived biophilic design scale (PBDs) for preference and emotion. *Urban Forestry & Urban Greening*, 76, 127730.
- Hunter, M. D., Eickhoff, S. B., Pheasant, R. J., Douglas, M. J., Watts, G. R., Farrow, T. F., ... & Woodruff, P. W. (2010). The state of tranquility: Subjective perception is shaped by contextual modulation of auditory connectivity. *Neuroimage*, 53(2), 611-618.

- Hunter, P. G., Schellenberg, E. G., & Schimmack, U. (2010). Feelings and perceptions of happiness and sadness induced by music: similarities, differences, and mixed emotions. *Psychology of Aesthetics, Creativity, and the Arts*, 4(1), 47.
- Jacobson, M., Silverstein, M., & Winslow, B. (2002). *Patterns of home: The Ten Essentials of Enduring Design*. Taunton.
- Jaffar, F. (2020, November 3). The relationship between humans and nature throughout history. Medium.
- Jahncke, H., Hygge, S., Halin, N., Green, A. M., & Dimberg, K. (2011). Open-plan office noise: Cognitive performance and restoration. *Journal of Environmental Psychology*, 31(4), 373-382.
- Janesick, V. (2000). The choreography of qualitative research design. *Handbook of Qualitative Research* (2nd Ed.)
- Joye, Y. (2007). Architectural lessons from environmental psychology: The case of biophilic architecture. *Review of general psychology*, 11(4), 305-328.
- Kahve Dergisi. (2020, October 12). Kahve, lezzet ve mimari: “Cup of Joy Nişantaşı”. Kahve Dergisi.
- Kalyon Kültür. (2021, September 23). Kalyon Kültür Merkezi.
- Kandari, H. A., & Chaudry, A. S. (2019). Role of the third place in building communities and social capital: Contributions of coffee shops as third places in Kuwait. *International Journal of Knowledge Content Development & Technology*, 9(2), 51–72.
- Kandel, E. R., Schwartz, J. H., Jessell, T. M., Siegelbaum, S. A., & Hudspeth, A. J. (2012). *Principles of Neural Science*, Fifth Edition. McGraw Hill Professional.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge university press.

- Karmanov, D., & Hamel, R. (2008). Assessing the restorative potential of contemporary urban environment (s): Beyond the nature versus urban dichotomy. *Landscape and urban planning*, 86(2), 115-125.
- Kayıhan, K. S. (2018). Examination of Biophilia phenomenon in the context of Sustainable architecture. In *Lecture notes in civil engineering* (pp. 80–101).
- Kellert, S. (2016). Biophilic urbanism: the potential to transform. *Smart and Sustainable Built Environment*, 5(1).
- Kellert, S. R. (2005). *Building for Life: Designing and understanding the Human-Nature connection*.
- Kellert, S. R. (2008). Dimensions, elements, and attributes of biophilic design. *Biophilic design: the theory, science, and practice of bringing buildings to life*, 2008, 3-19.
- Kellert, S. R. (2018). *Nature by design: The practice of biophilic design*. Yale University Press.
- Kellert, S. R., & Wilson, E. O. (1993). The biophilia hypothesis. In *Island Press eBooks*.
- Kellert, S. R., Heerwagen, J., & Mador, M. (2011). *Biophilic design: The Theory, Science and Practice of Bringing Buildings to Life*. John Wiley & Sons.
- Kellert, S., & Calabrese, E. (2015). *The practice of biophilic design*. London: Terrapin Bright LLC, 3(21), 2021-09.
- Kim, S. Y., & Kim, J. J. (2007). The effect of fluctuating illuminance on visual sensation in a small office. *Indoor and Built Environment*, 16(4), 331-343.
- Koga, K., & Iwasaki, Y. (2013). Psychological and physiological effect in humans of touching plant foliage-using the semantic differential method and cerebral activity as indicators. *Journal of physiological anthropology*, 32, 1-9.
- Koshta, H. A. (2024, May 30). Thingamajiggy Coffee Roaster / Yangnar Studio. *ArchDaily*.
- Kotler, P. (1974). Atmospherics as a marketing tool. *Journal of Retailing*, 49, 48–64.

- Lefosse, D., van Timmeren, A., & Ratti, C. (2023). Biophilia upscaling: A systematic literature review based on a three-metric approach. *Sustainability*, 15(22), 15702.
- Li, W., Guo, Q., Jakubowski, M. K., & Kelly, M. (2012). A new method for segmenting individual trees from the lidar point cloud. *Photogrammetric Engineering & Remote Sensing*, 78(1), 75-84.
- Lichtenfeld, S., Elliot, A. J., Maier, M. A., & Pekrun, R. (2012). Fertile green: Green facilitates creative performance. *Personality and Social Psychology Bulletin*, 38(6), 784-797.
- Lohr, V. I., Pearson-Mims, C. H., Tarnai, J., & Dillman, D. A. (2004). How urban residents rate and rank the benefits and problems associated with trees in cities. *Arboriculture & Urban Forestry (AUF)*, 30(1), 28-35.
- Manzo, J. (2015). "Third-Wave" Coffeehouses as Venues for Sociality: On Encounters between Employees and Customers. *The Qualitative Report*, 20(6), 746-761.
- Maspul, K. A. (2023). Exploring the relationship between coffee shop visitors' coping strategies and Well-Being. *Jurnal Psikologi*, 1(2), 13.
- Memarovic, N., Fels, S., Anacleto, J., Calderon, R., Gobbo, F., & Carroll, J. M. (2014). Rethinking third places: contemporary design with technology. *The Journal of Community Informatics*, 10(3).
- Moghadam, D. M., Singh, J., Roselezam, W., & Yahya, W. (2015). A Brief Discussion on Human/Nature Relationship. *International Journal of Humanities and Social Science*.
- Nicklas, M. H., & Bailey, G. B. (1996). Analysis of the Performance of Students in Daylit Schools.
- Nicol, J. F., & Humphreys, M. A. (2002). Adaptive thermal comfort and sustainable thermal standards for buildings. *Energy and buildings*, 34(6), 563-572.
- Nurse Rainbolt, G., Benfield, J. A., & Loomis, R. J. (2012). Visitor self-report behavior mapping as a tool for recording exhibition circulation. *Visitor Studies*, 15(2), 203-216.

- Oldenburg, R. (1989). *The great good place*. New York: Marlowe & Company.
- Olsen, D., Carroll, J. P., & Brody, L. (1994). *Starbucks passion for coffee: A Starbucks coffee cookbook*. Sunset Books.
- Orians, G. H., & Heerwagen, J. H. (1992). Evolved responses to landscapes.
- Ortegón-Cortázar, L., & Royo-Vela, M. (2023). The Effects of the Biophilic Atmosphere on Hedonic Value, Utilitarian Value, and Customer Loyalty. *Sustainability*, 15(23), 16435.
- Quan, L., Kim, S. I., & Han, H. (2024). Relaxing in a cup of coffee: The complex interplay of nature-based physical environment, mental health, and connectedness-to-nature. *Journal of Travel & Tourism Marketing*, 41(5), 743-759.
- Rapee, R. M. (1997). Perceived threat and perceived control as predictors of the degree of fear in physical and social situations. *Journal of Anxiety Disorders*, 11(5), 455-461.
- Raturi, V., Biswal, A., Jose, A. K., Kumar, S., Singh, P., & Meshram, S. (2024). Green symbiosis: Exploring the nexus of indoor plants for comprehensive wellbeing. *Journal of Applied & Natural Science*, 16(3).
- Ruddell, E. J., & Hammitt, W. E. (1987). Prospect refuge theory: A psychological orientation for edge effect in recreation environments. *Journal of Leisure Research*, 19(4), 249-260.
- Ryan, C. O., Browning, W. D., Clancy, J. O., Andrews, S. L., & Kallianpurkar, N. B. (2014). Biophilic design patterns: emerging nature-based parameters for health and well-being in the built environment. *ArchNet-IJAR: International Journal of Architectural Research*, 8(2), 62.
- Salingaros, N. A. (2013). *Unified Architectural Theory: Form, Language, Complexity*.
- Salingaros, N. A., & Deering, W. (2012). Fractal Art and Architecture Reduce Physiological Stress. *Journal of Biourbanism*, 11(2).
- Seamon, D. (1979). *A geography of the lifeworld: movement, rest, and encounter*.

- Seidman, I. (1998). *Interviewing as Qualitative Research*. New York: Teachers College Press.
- Silva, V. (2024, December 3). Zhicang Coffee / MOS Wood & Stone Design. ArchDaily.
- Smith, B. (2022, September 13). The third place: What is it & how does it relate to coffee shops? Perfect Daily Grind.
- Soga, M., & Gaston, K. J. (2016). Extinction of experience: the loss of human–nature interactions. *Frontiers in Ecology and the Environment*, 14(2), 94-101.
- Sternberg, E. M. (2009). *Healing spaces: The science of place and well-being*. Harvard University Press.
- Tabassum, R. R., & Park, J. (2024). Development of a Building Evaluation Framework for Biophilic Design in Architecture. *Buildings*, 14(10), 3254.
- Theo, A. (2022, December 12). Discover the fascinating history of coffee shops and their role in shaping society. Ground Up Coffee Co.
- Tsunetsugu, Y., & Miyazaki, Y. (2005). Measurement of absolute hemoglobin concentrations of prefrontal region by Near-Infrared Time-Resolved Spectroscopy: Examples of experiments and prospects. *Journal of PHYSIOLOGICAL ANTHROPOLOGY and Applied Human Science*, 24(4), 469–472.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224(4647), 420–421.
- Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11(3), 201–230.
- Vaganova, E. N. (2024). Coffeehouse as a cultural symbol of Vienna.
- Verma, P. (2023). Qualitative benefit and enhancement in well being towards the biophilic design in office building. *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, 11(3), 29-37.

- Vessel, E. A. (2012). New York University Center for Brain Imaging. Personal communication with the authors, 82.
- Visit Mesa Verde. (n.d.). Cliff Palace.
- Waxman, L. K. (2004). More than coffee: an examination of people, place, and community with implications for design. The Florida State University.
- White, M., Smith, A., Humphryes, K., Pahl, S., Snelling, D., & Depledge, M. (2010). Blue space: The importance of water for preference, affect, and restorativeness ratings of natural and built scenes. *Journal of environmental psychology*, 30(4), 482-493.
- Wigö, H. (2005). Technique and human perception of intermittent air velocity variation (Doctoral dissertation, KTH Royal Institute of Technology).
- Wilson, E. O. (1984). *Biophilia*. Harvard University Press.
- Woldoff, R. A., Lozzi, D. M., & Dilks, L. M. (2013). The social transformation of coffee houses: The emergence of chain establishments and the private nature of usage. *Int'l J. Soc. Sci. Stud.*, 1, 205.
- Whyte, W. H. (1980). *The social life of small urban spaces*.

APPENDIX A

INTERVIEW QUESTIONS FOR CUSTOMERS

1	How often do you visit this coffee shop?
2	What do you like the most about this place?
3	How would you describe the atmosphere of the coffee shop?
4	Have you noticed any natural elements in the design of this space? If yes, what did you notice?
5	Do you feel connected to nature when you're in this coffee shop? Why or why not? Please rate it from 1 to 5
6	How much do you feel that natural light is important in coffee shop settings? Please rate it from 1 to 5
7	How much do the natural materials in the coffee shop influence the overall comfort? Please rate it from 1 to 5
8	How much do you feel the plants enhance this coffee shop's atmosphere? Please rate it from 1 to 5
9	How much do the sounds, smells, and textures in the coffee shop enhance your feeling of connection to nature? Please rate it from 1 to 5
10	Do the natural elements influence your experience or mood in the coffee shop? How? Please rate it from 1 to 5
11	Do you feel more relaxed or focused here compared to other coffee shops? Why? Please rate it from 1 to 5
12	Do you usually choose a specific area to sit in? What attracts you to that spot? Why?
13	Do you think incorporating nature into coffee shop spaces is important? Why?
14	Is there any problem, anything you would add or change in the design of this space?

APPENDIX B

ETHICAL APPROVAL LETTER

Evrak Tarih ve Sayısı: 29.05.2025-80247



T.C.
ALTINBAŞ ÜNİVERSİTESİ REKTÖRLÜĞÜ



Sayı : E-96136591-050.04-80247
Konu : Kararlar

29.05.2025

DAĞITIM YERLERİNE

Üniversitemiz Bilimsel Araştırma ve Yayın Etik Kurulu'nun 14.05.2025 tarihli ve 2025/11 sayılı sayılı toplantısında alınan kararlar ekte yer almakta olup, bilgilerini ve gereğini rica ederim.

Prof.Dr. Cemal İBİŞ
Rektör V.

Ek:ETİK ONAY 2025-11 (2 Sayfa)

Dağıtım:
Lisansüstü Eğitim Enstitüsü Müdürlüğüne
Dr.Öğr. Üyesi Merih KASAP
Dr. Burcu YUCE AKALIN

Bu belge, güvenli elektronik imza ile onaylanmıştır.

Belge Doğrulama Kodu: B543VNRYEZ

Belge Takip Adresi : <https://www.turkiye.gov.tr/altinbas-universitesi-ebys>

Adres: Malmırbey Dilmisler Caddesi, No.26, 34217 Bağcılar - İstanbul
Telefon: (0 212) 604 01 00 Faks: (0 212) 445 81 71
e-Posta: info@altinbas.edu.tr Web: <http://www.altinbas.edu.tr/>
Kep Adresi: altinbasuniversitesi@hs01.kep.tr

Bilgi için: Suni KILIÇ
Unvanı: Kurul Başkanı

Tel No: (0 212) 604 01 00



ALTINBAŞ ÜNİVERSİTESİ
BİLİMSEL ARAŞTIRMA VE YAYIN ETİK KURUL TOPLANTISI
KARAR TUTANAĞI

Toplantı No: 2025/11

Toplantı Tarihi: 14/05/2025

Toplantı Yeri: Çevirim içi

Kurul Başkan ve Üyeleri:

Prof. Dr. Saim KILIÇ -İşletme Fakültesi/Öğretim Üyesi- Başkan

Prof. Dr. Dilek ŞİRVANLI ÖZEN-İktisadi, İdari ve Sosyal Bilimler Fakültesi/Öğretim Üyesi- Üye

Prof. Dr. Nuray YILMAZ ALTINTAŞ- Dış Hekimliği Fakültesi/Öğretim Üyesi- Üye

Prof. Dr. Yasa EKŞİOĞLU ÖZOK- Mühendislik ve Mimarlık Fakültesi/Öğretim Üyesi- Üye

Doç. Dr. Muzaffer AYDEMİR -Uygulamalı Bilimler Fakültesi/Öğretim Üyesi -Üye

Dr. Öğr. Üyesi Yeşim YILMAZ-Hukuk Fakültesi/Öğretim Üyesi- Üye

Dr. Öğr. Üyesi Gaye HAFEZ -Eczacılık Fakültesi/Öğretim Üyesi- Üye

Dr. Öğr. Üyesi Yalda HEKMATSHOAR -Tıp Fakültesi/Öğretim Üyesi -Üye

Dr. Öğr. Üyesi Cansu KÖSEM IŞIK -İletişim Fakültesi/Öğretim Üyesi -Üye

Doç. Dr. Hakan KAYGUSUZ- Araştırma Dekanı/Dekan- Üye

Kararlar:

1. Mühendislik ve Mimarlık Fakültesi'nde görev yapmakta olan **Prof. Dr. Merih Kasap**'ın tez danışmanlığını yaptığı Mimarlık Yüksek Lisans Programı öğrencisi Siwar Sassi'nin "*The Impact of Biophilic Design in Coffee Shops: A Case Study Of Cup Of Joy Nişantaşı, İstanbul Kahve Dükkanlarında Biyofilik Tasarımın Etkisi: Cup Of Joy Nişantaşı, İstanbul Örneği*" adlı yüksek lisans tezi kapsamında yapılandırılmış mülakat yoluyla veri toplama önerisi görüşüldü. Araştırmanın bilimsel içeriği, metodolojisi, orijinalliği ve kaynakları etik onay kapsamı dışında olup, başvuru sahibinin sunduğu belgeler ışığında "belirtilen yöntemle veri toplamada ve araştırma yapmada herhangi bir sakınca bulunup bulunmadığı" hususıyla ilgili değerlendirme yapıldı. Bu yönüyle yapılan değerlendirmede, araştırma önerisinde etiğe aykırı bir unsur tespit edilmediğinden uygun bulunmasına ve Rektörlük Makamına arz edilmesine karar verildi.

e-imza

Prof. Dr. Saim KILIÇ
Başkan

e-imza

Prof. Dr. Dilek ŞİRVANLI ÖZEN
Üye

e-imza

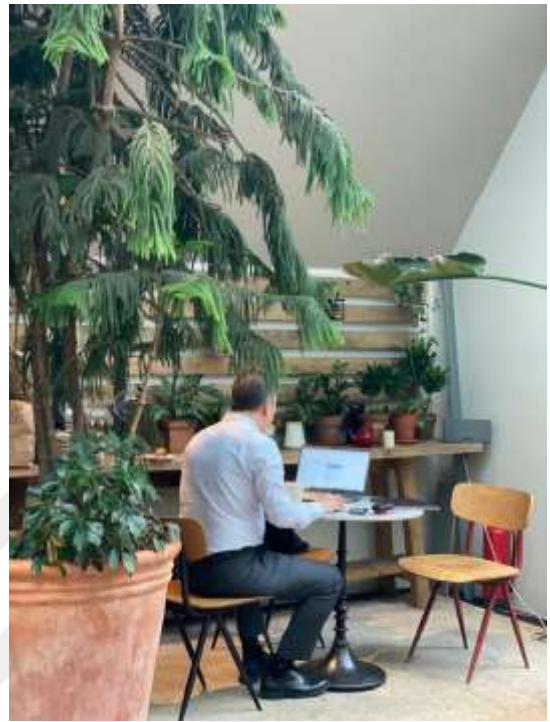
Prof. Dr. Nuray YILMAZ ALTINTAŞ
Üye

APPENDIX C

VISUAL DOCUMENTATION OF CUP OF JOY NİŞANTAŞI



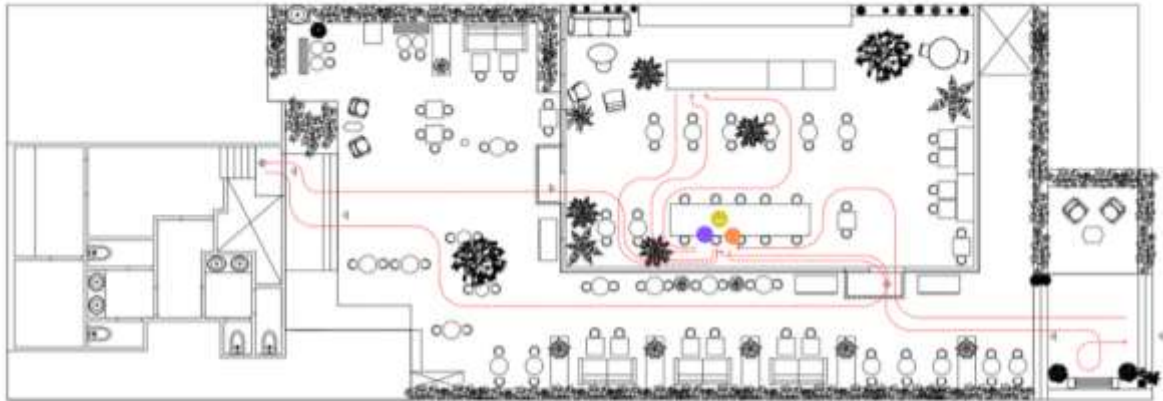




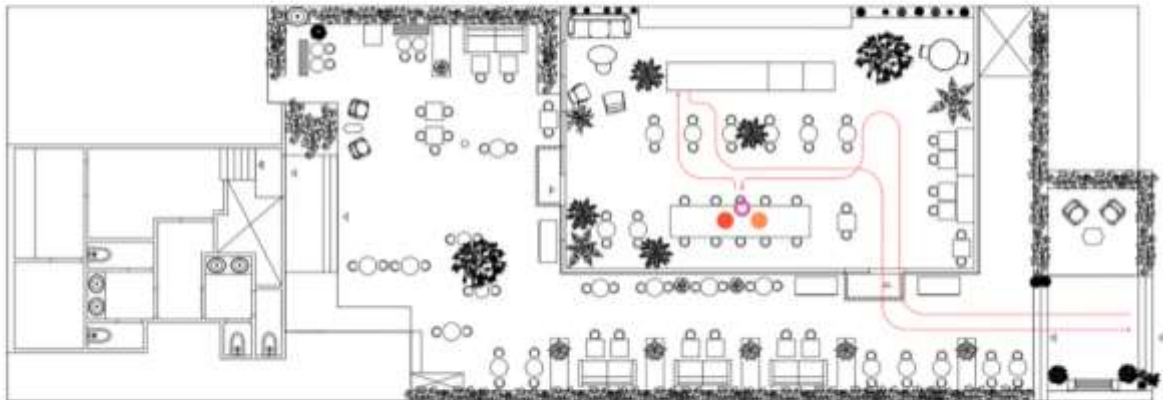
APPENDIX D

BEHAVIORAL MAPPING OF 20 CUSTOMERS

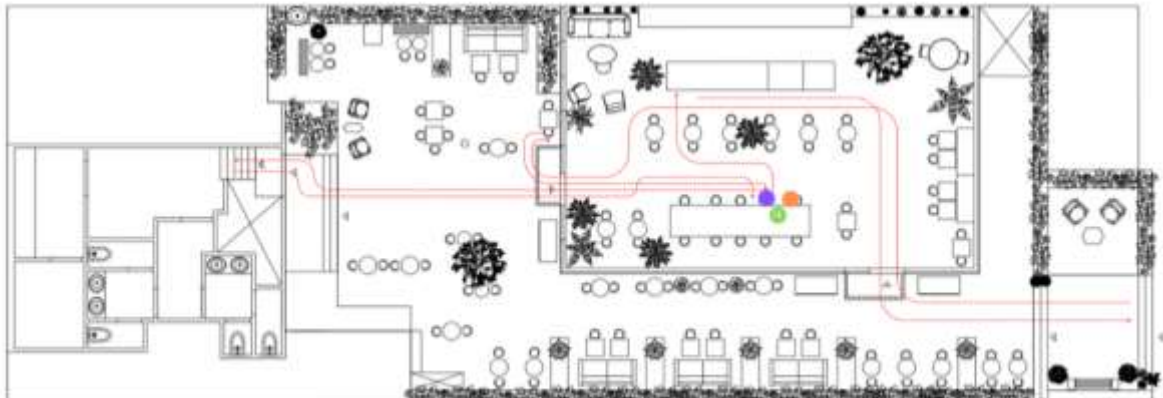
Customer N° 1



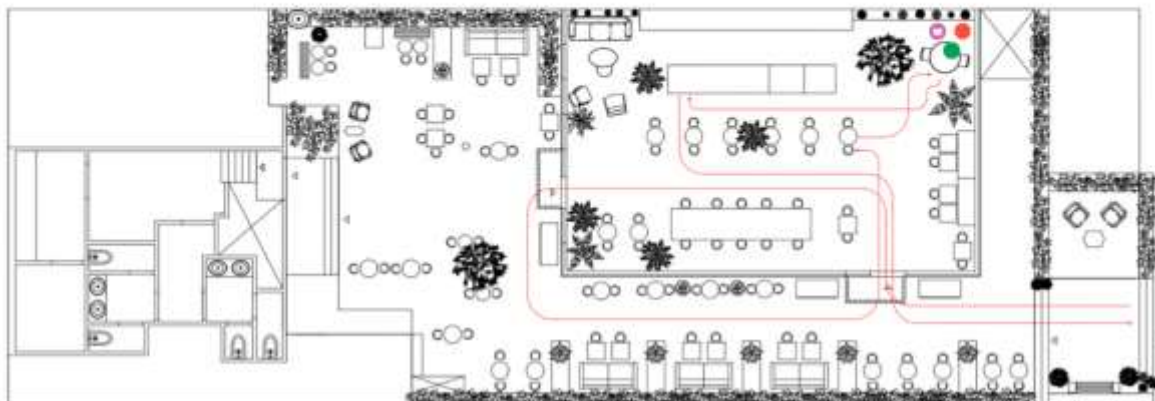
Customer N° 2



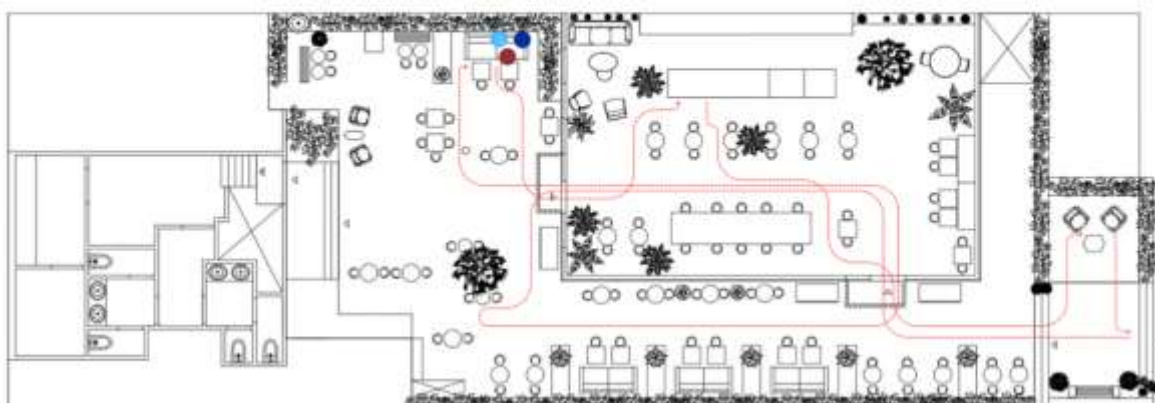
Customer N° 3



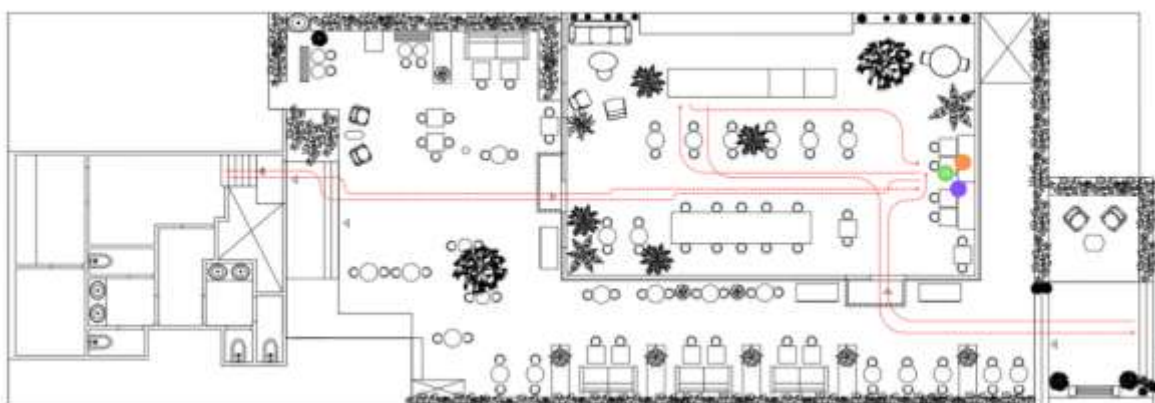
Customer N° 4



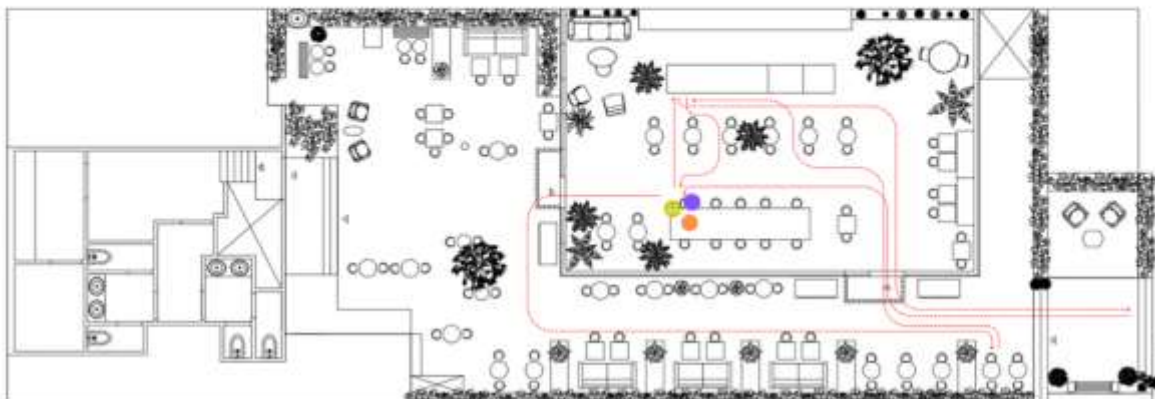
Customer N° 5



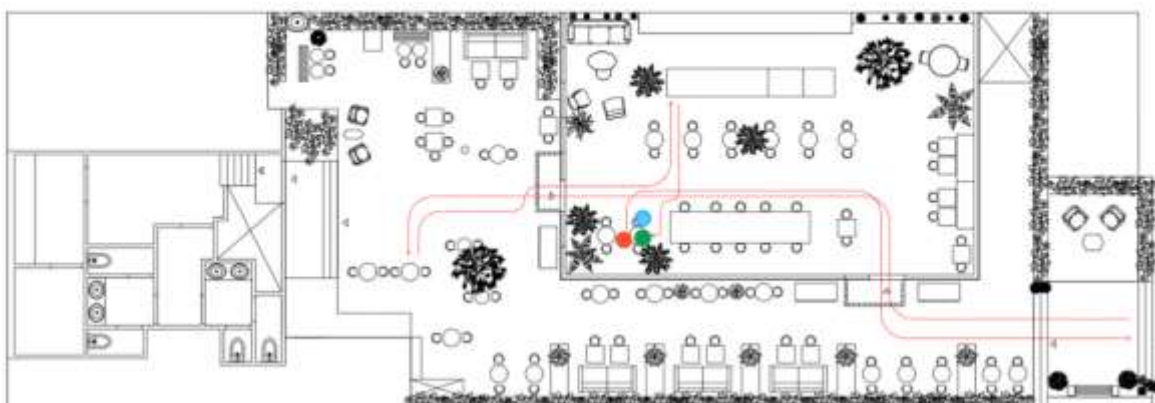
Customer N° 6



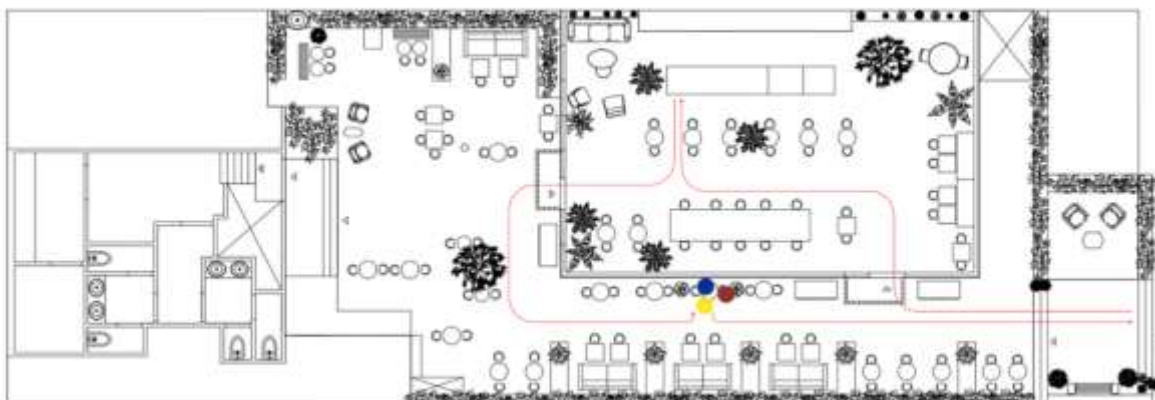
Customer N° 7



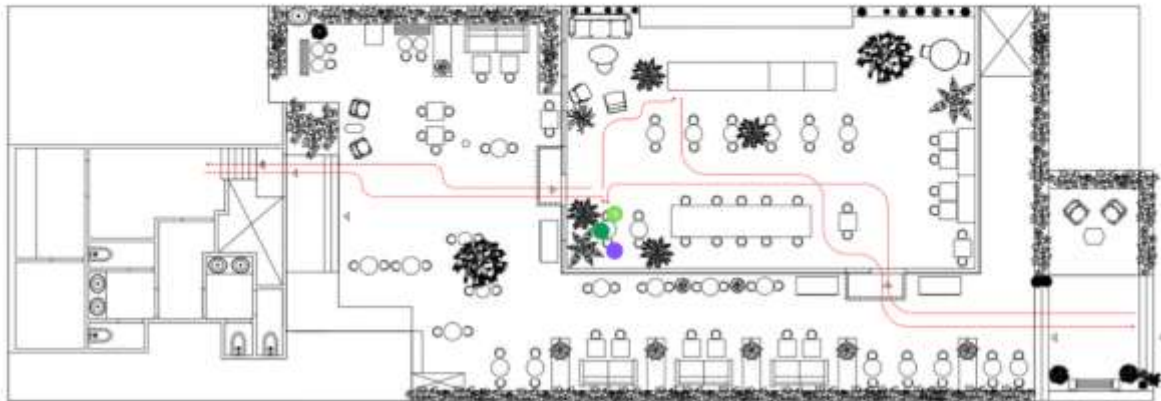
Customer N° 8



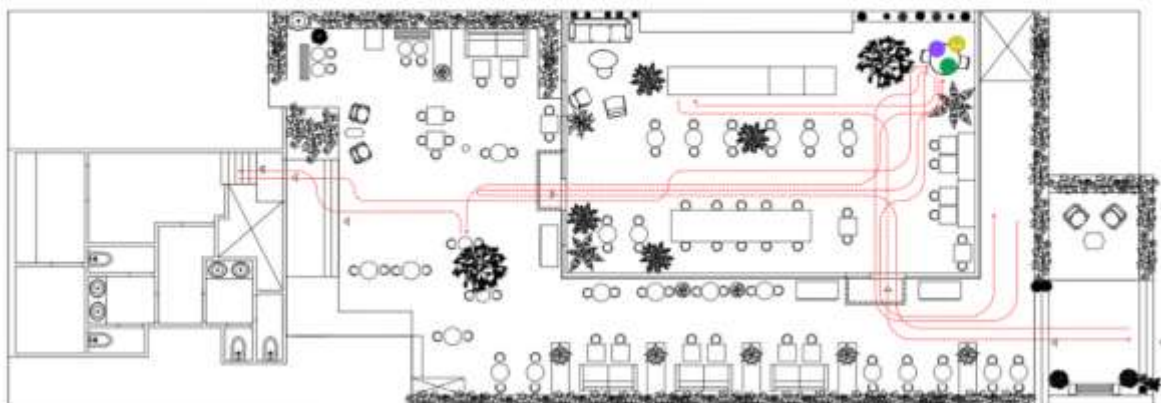
Customer N° 9



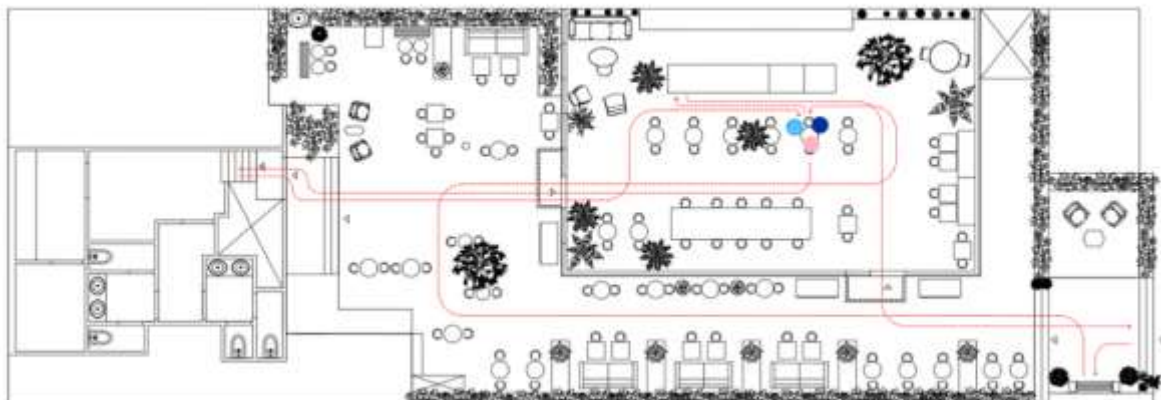
Customer N° 10



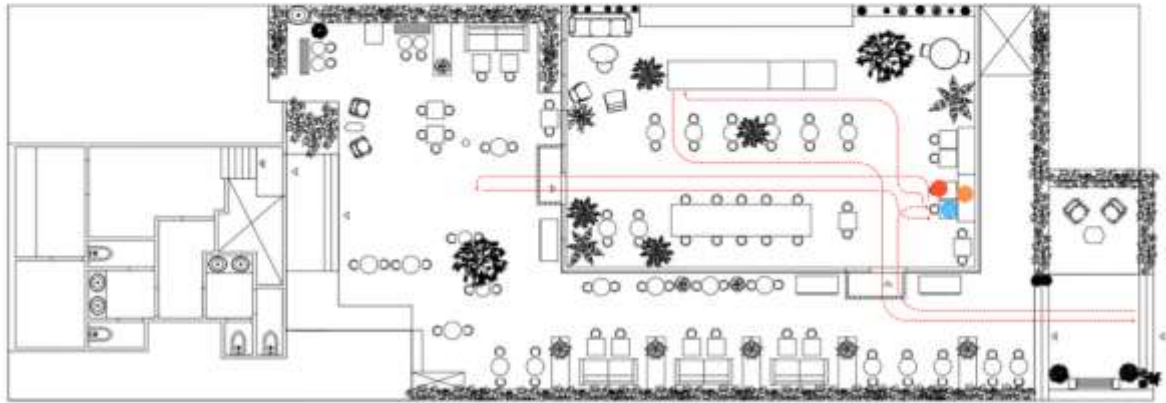
Customer N° 11



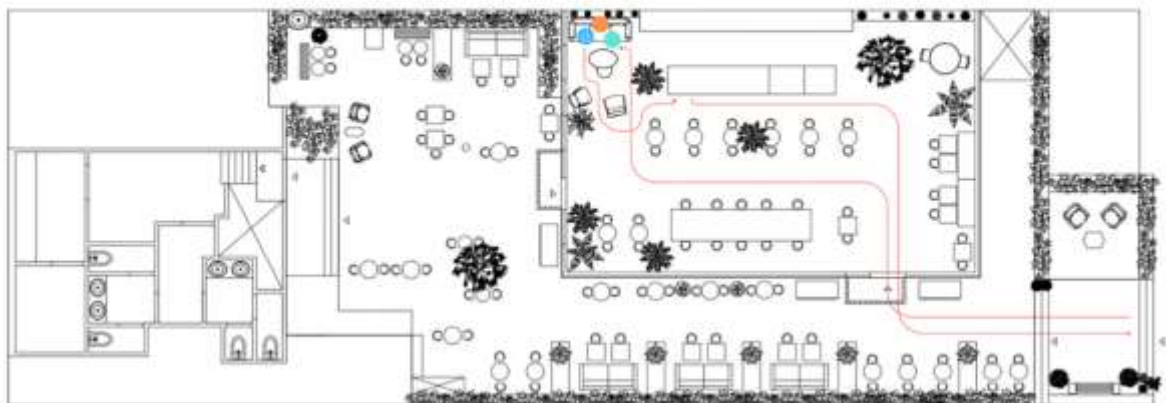
Customer N° 12



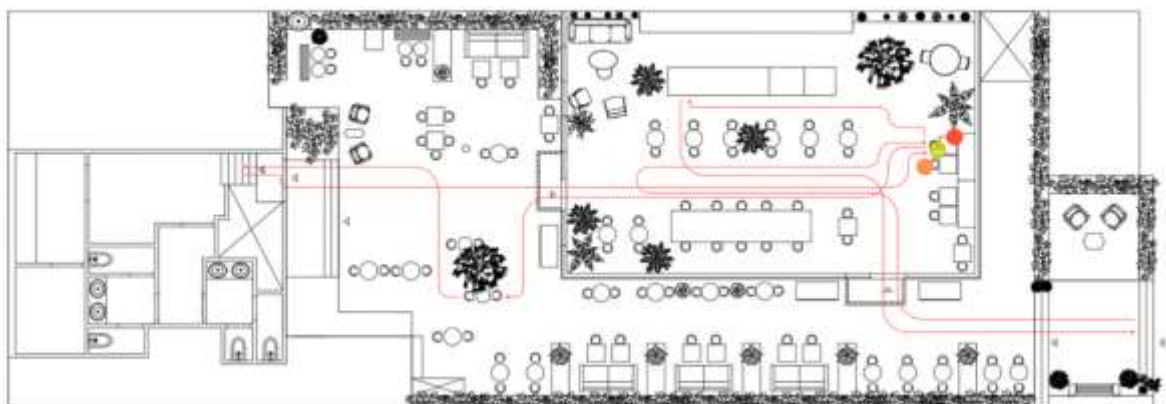
Customer N° 13



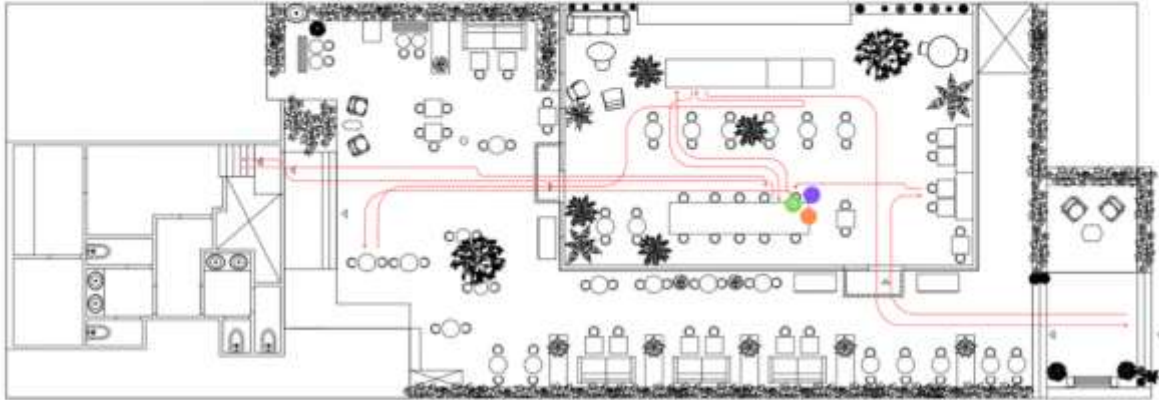
Customer N° 14



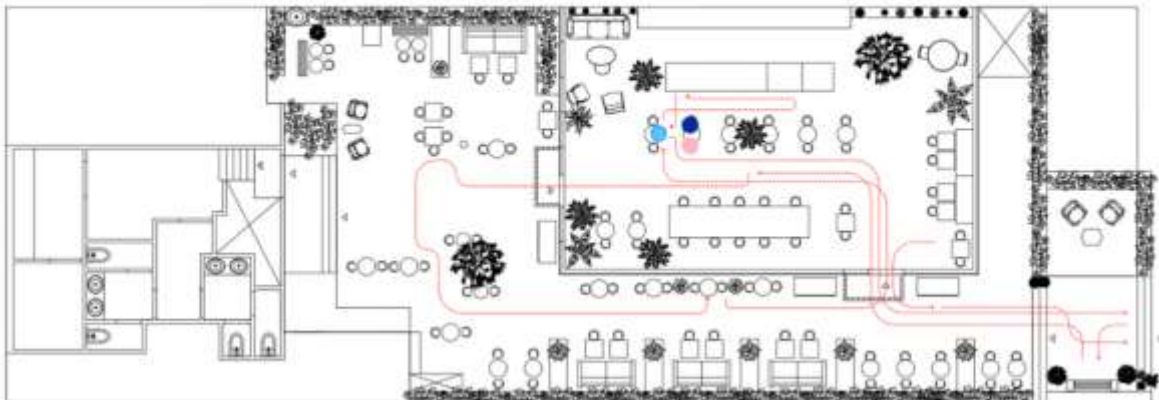
Customer N° 15



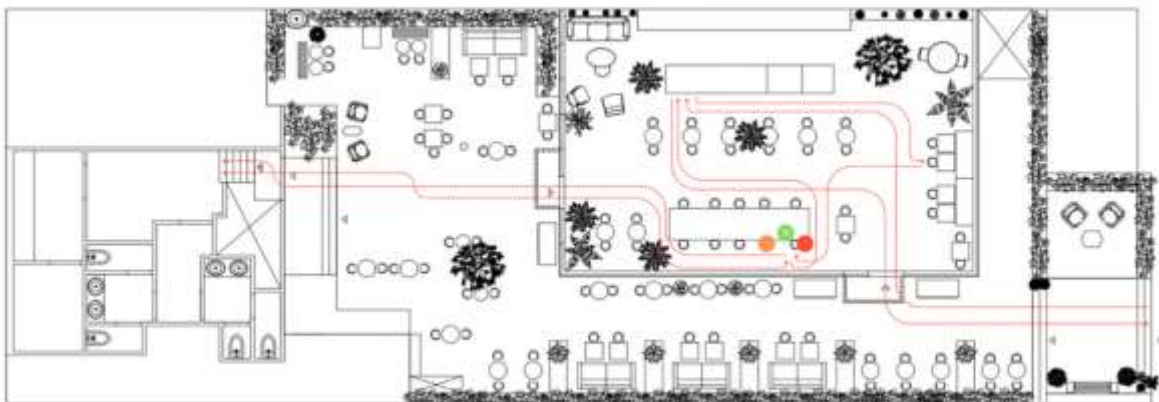
Customer N° 16



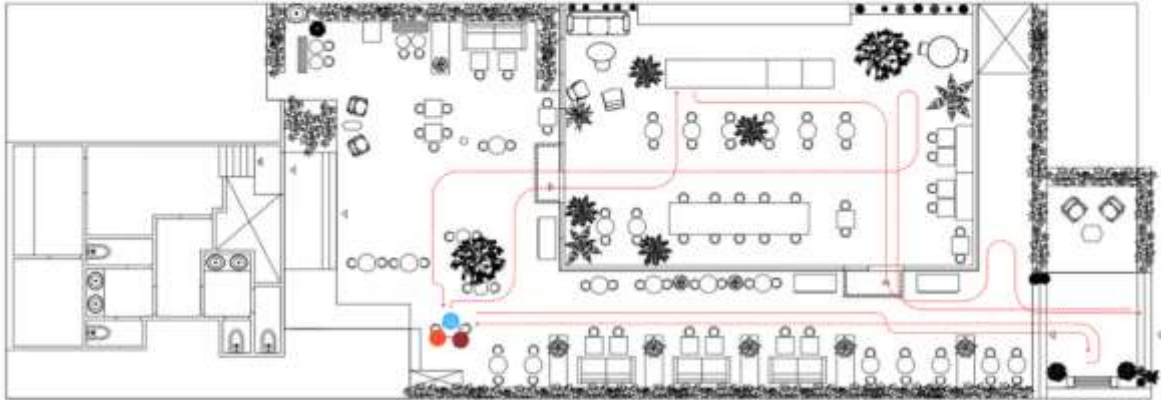
Customer N° 17



Customer N° 18



Customer N° 19



Customer N° 20

