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# Feminine Space: A Study of Physical Environmental Factors Encouraging Women Presence in Privately Owned Public Places

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Privately owned public places such as commercial areas are regarded as the main arena for social interaction and leisure activities. Rising income among women in Malaysia resulted in a higher demand for an equal social and leisure space, particularly within commercial public places. However, some parts of the public place do not effectively accommodate women's needs such as lack of women's safety design that expose women to sexual harassment and negative emotions from the environment. These negative factors within the environment allow the formation of gendered space within public places. As a reaction, the idea of feminine principles in architecture and planning prioritizing female values and preferences emerged in the 70s. These feminine principles may effectively reduce the generation of gendered spaces by understanding the physical environmental factor attributed to the principles. This study aims to identify the physical environmental factors that promote women's presence within privately owned public spaces. Through the adoption of qualitative approach using observation as the tool, behavior of women in the public spaces within a commercial complex is mapped in two case studies that were identified carrying values of feminine space. Behavioural mapping was used to identify the behavioural setting of women's activities within these spaces. These behavioural settings were analysed to identify the physical environmental factors that encourage women to engage in social activities within these spaces. The findings of this study suggest the parameters of the physical environmental factors that will improve the presence of women within public places.

**Keywords**: Public places, feminine space, gendered space, physical environmental factors.

## 1. INTRODUCTION

Public places such as recreational parks, retail spaces, as well as streets and verges, are the domain that allows individuals to assemble and engage in face-to-face encounters and interactions. A good public place must be accommodative towards every layer of the community, including the marginal group (Badshah, 1996). Thus, public places should be regarded as places where women can gather and establish social interactions outside their own domestic sphere. Their rights to be present and engage in activities within a public place should not be forbidden with limited access (Brady, 2005). Women's exposure to sexual harassment and negative emotions from the environment are several significant concerns facing women in public places, both in urban and rural settings. Creating a gender-equal public place is critical in creating an inclusive, safe and resilient city, as stated within the Sustainable Development Goals No. 11 by the United Nations (SDG, 2018).

However, in Malaysia, achieving these goals is seen to have several challenges. Although women's participation in economic activities has increased rapidly over the years, access to the

public realm has not been appropriately addressed to allow women's freedom of movement and activities (Latiff, 2011). Rising income among women in Malaysia resulted in a higher demand for an equal social and leisure space, particularly within publicly owned public places. However, some parts of the public place do not effectively accommodate the women's needs as there are several limitations such as high safety risk, negative emotions from the environment, and social and cultural norms are present within these spaces, resulting to accessibility issues or uncomfortable engagement of social or leisure activities within these spaces.

The design of the 'man-made' environment based on the men's needs rather than women's are factors causing the lack of women participation within public places. Public places dominated by male activities and male values resulted in the disparity between the built environment and women's social and psychological needs. Distinguishing the difference between the 'male and female principle in architecture' allows a better understanding of women's existing problems within the built environment. According to Kennedy (1980), the gradual difference between male and female principles shows a different design prioritization. Feminine principles showcase preferences towards user-centric design, focusing on an organically designed with functional and flexible environment adapted to women needs. These feminine principles may effectively reduce gendered spaces' generation by understanding the physical environmental factor attributed to the principles. Understanding the physical environmental factors affecting the presence of women within public places in Malaysia is critical in providing an equitable space for women engagement and social activities.

This study aims to identify the physical environmental factors that encourage women's presence within public places, specifically in commercial public places. The study concentrates on two case studies with a sizable presence of women activities in Klang Valley, the Tamarind Square, Cyberjaya and the Ardence Lab in Setia Alam. Through behavioural mapping, the study managed to identify the behavioural setting and the physical environmental factor encouraging this behaviour among women. A parameter of the design was proposed based on the findings of these observations.

## 2. LITERATURE

This section focusses on feminism and architecture with the aim of identifying elements that encourage women's presence within the public space.

### 2.1 Feminism and Architecture

Feminism, in general, shares a belief that justice requires freedom and equality for women (Day, 2011). Feminists sought to achieve equality within the social construct and within the architectural environment itself. Feminism in architecture first emerged during the early 1970s, with the discussion mainly concerned with the relationship between gender and space. This movement has significantly progressed, providing a gendered analysis of architecture and its multiple forms of representation. According to Rendell (2012), some feminist approaches could be considered to follow the principles of 'equality' while others prefer principles of 'difference' in identifying the feminine architecture. Although there are several differences within these principles, both are aimed to address the spatial marginalisation and gender inequality faced by women within the built environment.

#### 2.1.1 Patriarchy

Debates surrounding the nature of patriarchy is a major discussion within feminist academics - concerning its definition that ranges through patriarchy as an expression of men's control over women's sexuality or as a description of the institutional structure of male domination (Kramarae, 1985). Peake (1993) has outlined how patriarchy has been analysed in relation to the city, questioning the patriarchal structuring in urban social space. This ideology has played out according to the traditional view where the public realm is the domain of men, while women belong within the domestic realm. Women's responsibility within domestic labour restricts their mobility, as access to transportation, job, services, and facilities compared to men. Women's restricted use of public places results from fear of male violence and other contributing

factors. The patriarchy issue within the existing urban social space resulted in gendered spaces, where women's presence becomes limited (Garmanikow, 1978; Harman, 1983).

The lack of understanding of women needs and priorities within the built environment are also frequently discussed. According to Weisman (1992), women have different priorities in designing built spaces several feminist designers, focusing on aspects of the enclosure - exploring the relationship between the inside and outside through openings, hollows and gaps (Rendel, 2012). Different values are needed to engage women socialisation within the built environment, such as inclusiveness, an ethics of care, and complexity and flexibility in design that foster flexibility required by women's social roles. (Franck, 1989).

### 2.1.2 Gendered Space and its Impact on Gender Inequality

Gendered spaces are usually defined directly as the term itself. In these spaces, particular genders of people are welcome or appropriate, while other spaces are unwelcome and inappropriate for a specific gender. Gendered space is not particularly assigned to men or women. Instead, it's usually defined as a form of masculinity or femininity, which holds regard to any society and space irrespective of their location (Mohammadi & Rafiee, 2018).

Gendered space is ultimately formed due to women's limited access to space and their limited presence within spaces where they are permitted (Brady, 2005; Datta 2011). Datta (2011) further elaborates that this division of spaces within the built environment has negatively impacted the users, where women's presence within the 'wrong' spaces are subjected to punishment, varying heavily from teasing to physical violence. This limited mobility and limited social engagement spaces enforced by the gendering of spaces impact the ability of women to access various spaces and activities they can perform.

### 2.1.3 Factors Limiting Women Presence in Public Places

Women bodily experiences of public places are also distinctive, as they are frequently exposed to harassment, ranging from sexual remarks and touching to rape. For many women, fear for safety constrains their activities in public places (Franck, 1989). Gendered social norms further limit women public space participation, as women are forced to restrict their behaviours to conform to the desirable femininity qualities (Gardiner, 1989). This produces negative emotions within these spaces such as stress and fear, resulting in the production of gendered space within public places. Day (2000) stated limitations to these spaces could be traced back into four main categories, 1) resources limitation such as limited mobility, time limitation and limited social interaction; 2) negative emotions within these spaces such as stress and fear; 3) responsibility of a person such as housework and child care and 4) social and cultural norms that restricts women's use of public space. These findings are further supported by Mohammadi (2018), stating the excessive presence of men, fear and insecurity within the public place and domestic responsibility limits the women presence within a public place. Tehran Municipality (2015) stated that ignoring women's public transportation needs and ignoring women needs in urban planning also contributed to this decline.

According to Mohammadi (2018), the physical factors of the setting influence the production of gendered space itself. According to the study, visual quality, such as a desirable façade and variation in landscape and vegetation, are the most crucial factors impacting women's presence. The functional quality of a setting such as a poorly-lit environment, unsafe corners, and improper sidewalks limits women's mobility and comfort level. The level of enclosure within a space is also critical, as visibility to the surroundings provide a layer of safety. Physical features associated with women's fear within public places can also include the presence of a hiding place, limited vistas and low potential of escape from the setting (Fisher and Nasar, 1992). Women fears are especially heightened at night time, as inadequate lighting, poorly maintained and dense vegetation contributed to this factor.

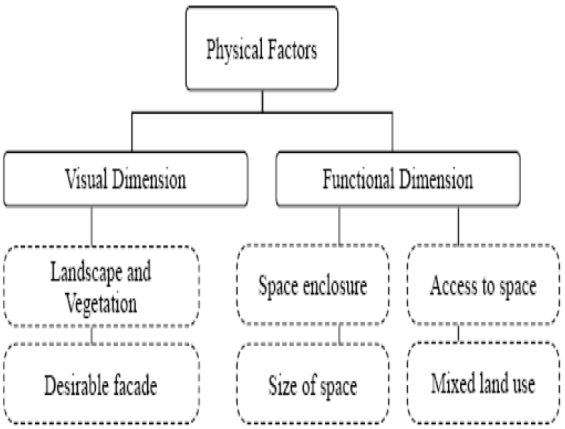



Figure 1: Physical factors related to responsive space among women (Mohammadei, 2018)

The gendering of public spaces can be avoided through several actions as mentioned by Toronto City Planning (2011), which includes providing enclosed spaces, the security and safety of spaces, accessibility to the site, and the presence of others. Physical and visual improvement is critical in creating a womanly space that provides a context for social interaction among women in public places (Mohammadi, 2018). Improvement through mixed land use, increase in quality sidewalks, and a well-lit environment is among the physical factor that could encourage women responsiveness in public.

### 2.2 Understanding Femininity and Feminine Principles in Architecture

A common misconception while understanding feminism and architecture was intersecting architectural form with feminism. Feminism within architecture is the criticism and the interpretation of architecture, which does not define it as feminist architecture. Hayden (1986), for instance, was heavily involved in the feminist movement, criticizing certain features of man-made environments that discriminate against women, such as inhospitable streets, unsafe public spaces and sexist symbolism. Matrix (1984), a London-based feminist architecture, also pointed out several concerns over the problems faced by women within the man-made environment, suggesting improved aspects of safety and accessibility in the public and domestic realm as a top priority. This criticism of the existing man-made environment provided the outline of the spatial properties of a feminine space based on the woman needs.

Feminist movement and criticism of the existing built environment highlighted the different priorities between men and women in architecture. The underlying categorization of a 'male and female' architecture are impossible to define clearly and exclusively within the architectural field. Thus, the identification of feminine values through the building shape that responds to female priorities and values cannot be described with certainty. There are, however, several studies identifying the different choices in design between the male and female counterparts. This difference in design choices is observed by Pignatelli (1979), showcasing that women tend to design from the inside out, prioritizing the function of the building and later the form, opposite to the male counterparts. The differences in focus, particularly in design choices that favour a user-oriented approach rather than form, are critical in identifying the feminine principles.

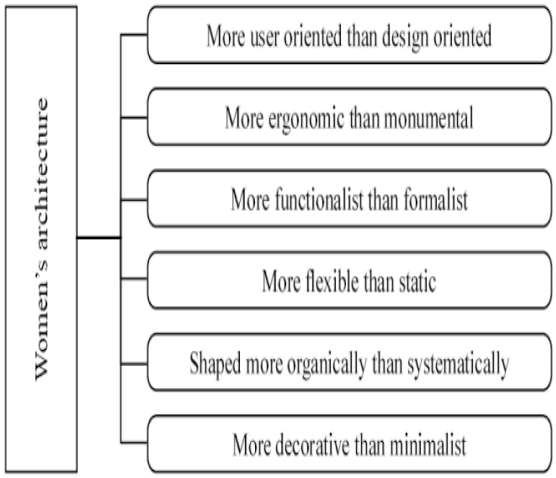



Figure 2: Feminine principles in architecture (Kennedy, 1980)

### 2.3 Identification of Feminine Principle Through Behavioral Setting

The feminine principles set by Kennedy are loosely defined as they prioritize in showcasing the gradual difference in preference of design between males and females within the built environment. The physical environmental factor of a particular setting such as glass walls that do

not provide visual privacy, could potentially encourage or prohibit the presence of women. These elements that divide and connect in-between spaces allow for a behavioural relationship between the particular setting and its impact on the behaviour conducted. Understanding the physical factors of a particular setting is critical in identifying the potential setting's use and option it provides towards the participants (Gans, 1968).

### 2.3.1 Behavioral Setting and Spatial Behaviours

Behavioural setting is defined as the collective action of people and its relationship to the physical environment (Barker, 1968). It involves the relationship between a particular layout of the environment and the recurring activity conducted within the space (Lang, 1987). The setting's purpose, in terms of what kind of location it is and what kinds of actions are suitable, is determined by the perceived harmonious relationship between the setting's features and its behaviour. However, the physical factor of a space can also encourages or discourage the behavioural potential of a particular group. This is an important tool to better understand the effect of behavioural setting on women's presence.

### 2.3.2 Physical Environmental Factors Associated with Spatial Behaviors

Physical environmental factors are the elements of a particular setting that impacts spatial behaviours. According to Zeisel (1984), the physical, ecological factor of a built environment associated with spatial behaviours can be categorized into two categories; barriers and fields.

1. Barrier: Wall, Screen, Object and Symbols

Wall - the positioning of a wall may impact the ability of people to be connected in-between space. Walls are primarily used to separate people in places, with a variety of thickness, consistency and material influences the quality of separation. For example, planning a public place that provides minimal wall usage offers a minimal amount of audial and visual seclusion in-between spaces, affecting the potential activities within these spaces

Screen - Different screen materials and designs can provide distinct separation and connectivity levels more selectively than a complete wall. Screens such as glass enable a tactile separation with a visual connection in-between space. Usage of natural elements such as hedges and shrubs can also act as a screen, providing a semi-visual link while having full audial opportunities. The combination of materials can provide a different degree of connection and separation that can be designed to give control to the user.

Object - Object within a space can be a form of a barrier as well as a physical object as a tool for activities or attraction. Objects as a form of barrier are physical elements that act as a space divider or connectors in-between a public place. Objects such as a tree in a garden or a column at the centre of a room help people to divide space perceptually. An object such as a chair or painting on the wall implies a prominent option for use and attraction to the area, where the effect on the user potential behaviour is limited only by the user's capability.

Symbols - Another form of barrier can also be derived through symbols such as the change of material of the floor, design of a façade or overt signs. For example, changes in the material in a particular space can cause users to consider the space to be separated perceptually. The variation of these symbols can also act as a form of attraction, where the variation of design may encourage a diverse type of activity within a particular setting

2. Fields: Shape and size, Orientation and Environmental Condition

Fields are the physical elements in the environment that perceptually separate or join people together by altering the physical context in which perceptual relationship occurs (Zeisel, 1984). Fields characteristics do not stand in-between peoples like a barrier, instead of adjusting the physical context where the visual, aural, tactile and perceptual relationships are affected. The field's category includes factors such as their size and shape, orientation and the environmental condition of a physical setting.

Shape and size - The shape and size of a particular setting can have an adverse impact on the potential behaviour of the setting. The shape of a setting can perceptually separate or join people in a place. For example, corners of a square shape can readily be perceived as distinct, whereas round shapes that connect people cannot. On the other hand, the size of a setting can allows people to adjust their interpersonal distance or limit their possibilities for separation. A large space, for example, will enable people to distance themselves from others, whereas a small space prevents them from doing so.

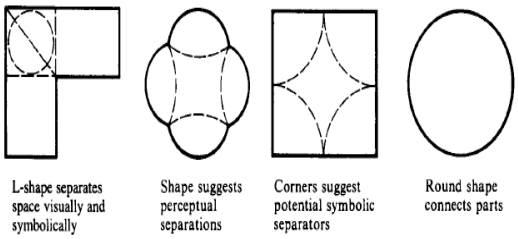



Figure 3: Shape of a setting and the perceptual separation (Zeisel, 1968)

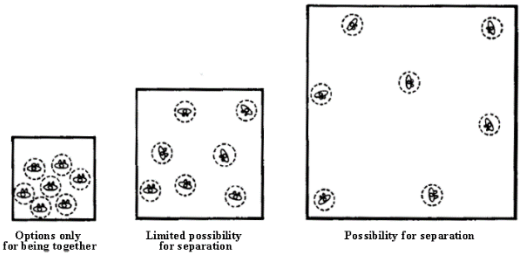



Figure 4: Degree of Setting size (Zeisel, 1968)

Orientation - Positioning within a space, or the orientation of one place to another, influences the behavioural potential of people in them. According to Festinger et al. (1950), two places that are oriented so that people using them have a higher chance of casually meeting one another may be considered 'functionally' closer. The change in orientation between the two places impacts the potential engagement between its users according to its functional distances within each other.

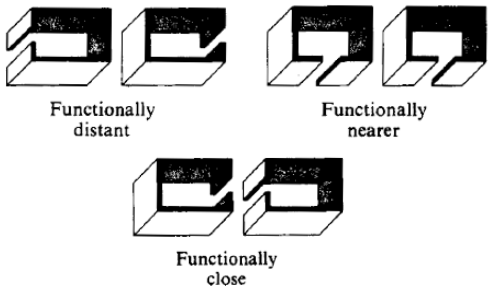



Figure 5: Degree of functional distances (Festinger, 1950)

Environmental Condition - environmental factors such as loudness, light intensity, and airflow perceptually separate or connect people by aiding or limiting their capacity to see, smell, and hear other people and their activities in space (. For instance, shades provided by a tree within an open space perceptually separate the space from the surroundings. The intensity of lighting can also impact the behavioural potential of a setting. For instance, a poorly lit environment discourages activity within the space as factors such as safety are a concern.

## 2.4 Feminine Principles and the Physical Environmental Factor Encouraging Women Presence

Public places are undoubtedly the most important and necessary spaces for women, where they can be present to their responsibilities as well as a space for social and leisure activities. Understanding the physical factors of the setting are among the important variables in creating a womanly space (Mohammadi, 2018). Thus, defining the feminine principles through the physical environmental factors are critical in creating an equitable public space for women.

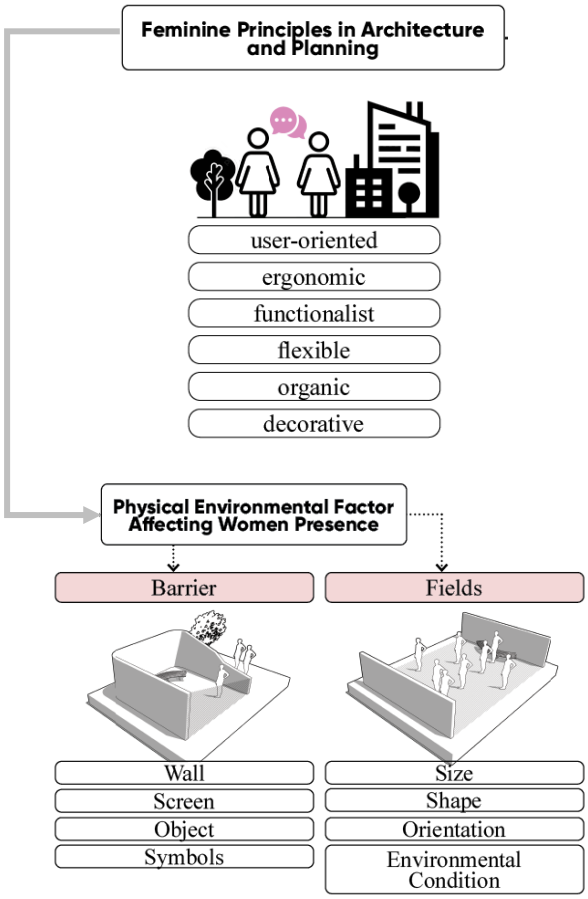



Figure 6: Relationship between feminine principles and the physical factors

## 3. METHODOLOGY

### 3.1 Research Design: Case Study

In order to achieve the study objective, two samples of case studies were selected to analyze the physical environmental factor encouraging women presence properly. Field observation was done using behavioural mapping and visual documentation of case study. The method was chosen to properly identify the behavioral setting that showcase ample women activity and the relationship with the physical environmental factors. Identification of the case studies was chosen based on the principles of feminine architecture and planning stated in the literature review, as there is a limited definition of a feminine space within the Malaysian context and culture. The case study chosen displayed a different typology of commercial public places. Tamarind Square is a commercial public place designed for the workplace environment. Ardence Lab, on the other hand, is an open outdoor retail space combined with the recreational park. Identification of the behavioural setting as well as the physical environmental factors were conducted. Comparison between the two distinct case studies may provide an insight to the similarities in the approach that attract women presence within public place

### Variables

The study is set to identify the physical environmental factor that encourages women presence within two case studies of commercial public places. According to Zeisel (2006), the physical environmental factor of a setting can be categorized into two categories; barrier and fields. Observation of the two physical elements may provide insight into the impact of the physical factor on the behavioural potential toward women presence. The barrier factor aims to identify the physical elements that impact the user's ability to be apart or join together within a public place. On the other hand, fields factor is the charactheristics of the setting that can alter user's ability to be together or apart. Identification of both factor is critical in understanding the importance of physical factor towards potential behaviour among women.

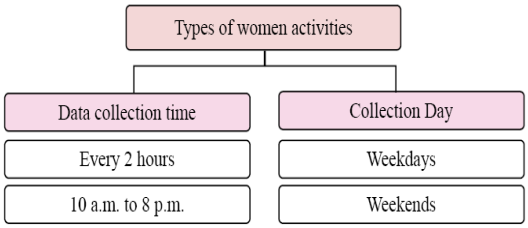
### Measurement Instrument

To achieve the aim of this research, the study used the behavioural mapping methodology to identify the frequency of women presence and the type of activity performed within these public places. The observation involves case studies in two commercial public places located in Selangor, Malaysia. The two case studies include the Tamarind Square, Cyberjaya and the Ardence Lab, Setia Alam. Behavioural mapping was used to record the users' activities and the behavioural setting. A visual documentation through pictures and sketches were also conducted to obtain the physical properties of the settings.

### Data Collection Method

An initial observation of the case study was conducted to identify the frequency women presence within site and the validity of the case study based on the feminine principle stated earlier. Layout drawings of the case studies were then rechecked to identify the setting's drawing

errors and potential observation spots during behavioural mapping.



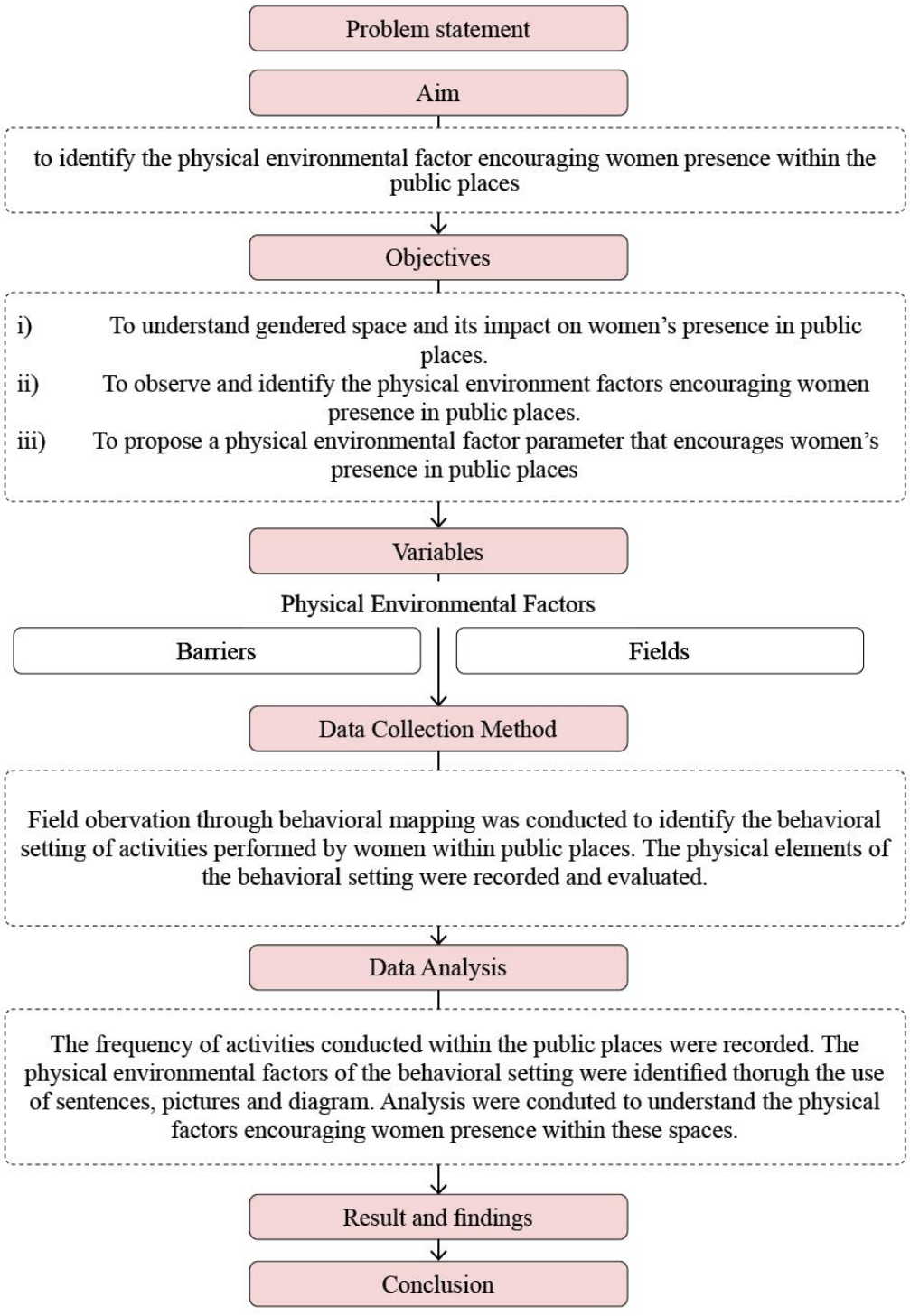

Behavioural mapping was conducted for three days for each case study, two weekdays and one weekend to fully understand the activity occurring within these vicinities. Data were collected within 2 hours intervals, starting at 10 am and ending at 8 pm. Visual documentation of the setting were also recorded using sketches and pictures. These data were then adequately digitalized and analyzed.

## Data Analysis

Data collected provided through these two methods allowed the spaces to be evaluated and interpreted effectively. In this study, to properly analyze the data, the behaviors mapping data are analyzed using the barriers and fields parameters as set in the literature review to properly understand the physical elements encouraging woman presence in public places.

Data obtained from the initial observation were analyzed and tabulated into an activity frequency table. The behavioural setting of activities conducted by women within the case studies was identified from this initial data. Analysis of the behavioural setting was done to identify the physical environmental factors encouraging women presence and activity within these spaces.

## 3.2 **Research Framework**



## 4. FINDING

### 4.1 Case Study Behavioural Setting

Two case studies are selected for this paper: the Tamarind Square in Cyberjaya and the Eco Ardence in Setia Alam. These commercial spaces are selected as they boast innovative designs and are integrated with open public places.

### Case Study 1: Tamarind Square, Cyberjaya

Tamarind Square is a commercial development intended to promote a tropical retail and office experience. Most of the retail's spaces are located at the first level, while other spaces are occupied with offices. A housing apartment is connected to the commercial space at the south court, providing access to recreational space and banquet hall. The merge of office space and housing block with the commercial space creates a diverse user group and activities conducted within the space itself. The commercial space was designed with an internal courtyard filled with lush greeneries and semi-covered pocket spaces. This sort of design approach allows the internal public spaces within the building to be transparent while promoting privacy and intimacy for its users. There are two internal court within the Tamarind Square as seen in Figure 4, where one serves as a commercial spot for visitors and the other is dedicated towards events and ceremony spaces.

This study is focused only on the North Court of the site due to the lack of commercial activity within the South Court. The North Court is a three-storey commercial space surrounding a garden at the center. There are two levels of garden within the internal courtyard, with multi-level retail shop accessible to the public intertwined with the tropical garden itself. The garden is filled with pockets of tropical trees, water features, several open seating area and pocket spaces. Multiple observation was conducted within these internal gardens to analyze the behavioural setting and physical elements of the site.

The internal courtyard layout can be divided in to 4 medium sized zone. The randomized layout of the garden provides variety of spaces size and volumes, creating multiple pocket spaces for social and leisure activities. Several open outdoor shop and cafes are also presence with outdoor seating spaces for cafes are provided. There are also several staircase leading to other multi-level cafes with several seating spot provided. There is also open outdoor space with roofing, heavily relying on tropical trees as shading device and a semi-covered space with a large roof clearance of 3m-6m varying between spaces

### Tamarind Square, Cyberjaya: Activities & Behavioral Setting

Information obtained from the behavioural mapping was tabulated into a table according to the behavioural setting. Spaces are categorized into several types of behavioural settings, displaying similar physical properties within the space itself. The behaviour observed within the Tamarind Square showcase several recurring activities within a particular setting. Women's social activities such as chatting and discussion are primarily conducted within the seating spot surrounding the internal garden itself. However, the extended social conversation is usually held within a specific space either within a pocket space or at the outdoor café. These spaces are usually separated from the main circulation route of the garden, where it provides semi-visual seclusion and minimizes the auditory distraction from the surroundings. Brief social activities occur throughout multiple areas where seating spots are present. However, the lack of refuge from the surrounding environment shortens the duration of the activity.

Single mothers and families' activities are usually concentrated surrounding the water elements. The natural elements instilled within the site act as an attraction for families, providing a temporary distraction for kids to engage and interact. The water elements also create a relaxation spot for both families and single women. Photography activities are also a main attraction to the site, as most of the activity occurs within the central open areas of the garden and along the outdoor staircase.

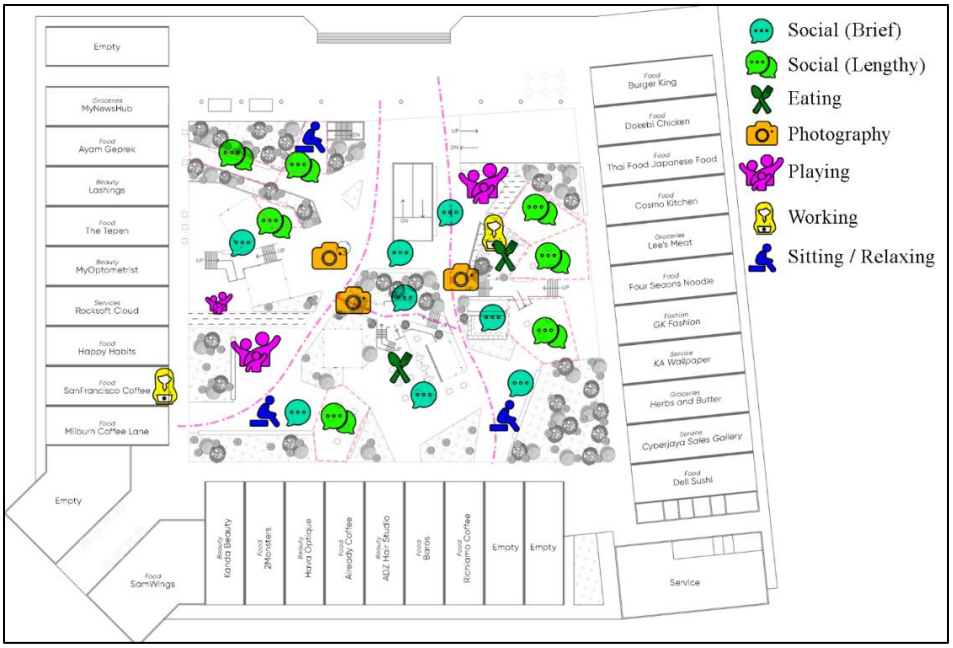



Figure 7: Tamarind Square Behavioural Setting

These open spaces displayed the unique design elements and the natural environment exhibited within the garden itself. The Tamarind Square's outdoor open retail environment also attracts single women to engage in multiple activities within the site itself. Observation shows there are ample presence of single women strolling or relaxing throughout the garden itself. Some of them are observed conducting work on their laptops within the outdoor retail space, signally a comfortable environment for women to engage in leisure or work even when alone.

Although the distribution of activities varies across the behavioural setting within the internal garden, a constant presence of women throughout the site could be seen based on the observation. The physical environmental factors of these behavioural settings were further analyzed to understand the factors encouraging women presence within these vicinities.

## Case Study 2: Eco Ardence, Setia Alam

Located in Setia Alam, Selangor, Ardence Lab is a lakeside commercial public space integrated with children's playground, greeneries, an edible greenhouse and connection to the 8-acre lake with jogging path. The development focusses on creating an open outdoor community retail space, allocating 28 lots of retail shops that ranging from 290 sqft to 2,000 sqft. Presence of large grocery retailer at the site also acts as a catalyst in encouraging women presence towards the site itself. The open layout design allows for multiple access point for pedestrian from the main road or from the waterfront itself. Ardence Lab is a clustered development with linear circulation, allowing the retails to be closely arranged within Fusion Street. Greeneries, as well as playground, are present in between the retail spaces, creating a pocket space for social activities. Retail space within the garden is designed with the use of freight containers, creating a distinct identity of the space. Although there are two levels of retail space in Ardence Lab, only the retail spaces at the ground level are operating due to Covid-19 restriction during the time of observation.

Activities within the Eco Ardence can be divided into three areas: 1 – children's playground space, 2 – linear retail space, and 3 – waterfront retail public space. Area 1 is an open outdoor area bordered with an irregular greeneries layout, creating pocket seating spaces in-between the retail and playground. Area 2 is a major attraction, which hoses the bulk of the retail shops and services under a covered roof. The central lane is populated with several seating and dining space as well as greeneries spot along the street. Lastly, Area 3 is an open retail area overlooking the waterfront. There are a staircase and ramps

leading towards the waterfronts and viewing deck, populated with trees and shrubberies along the jogging track.

## Eco Ardence, Setia Alam: Activities & behavioral setting

According to the behavioural setting, information obtained from the behavioural mapping was tabulated into a table. Spaces are categorized into several behavioural settings, displaying similar physical properties within the space itself. Designed with a recreational park adjacent to the retail space, several recurring behaviours can be observed within this vicinity. Strolling around the retail space and the recreational area is an everyday activity. Women can be seen comfortable enjoying bicycle rides around the retail space as well as walking around alone due to the well-lit open environment.

The centralized retail space provides a seating spot in-between Fusion Street, creating a hangout space for women to engage in social activities. However, the open retail area was exposed to a high level of auditory distraction due to the passers-by along the street. Social interaction within these spaces was brief as a result.

Extended social activities, however, frequently occurred within pocket seating space. These spaces are secluded from the main retail areas, providing a refuge space with reduced audial distraction from the crowd. Women can also be seen enjoying extended conversation in-between the waterfront staircase, where the interval hedges create a visual barrier when seating.

The unique design or the Ardence Lab can also be seen as a attraction to the site, as women observed frequently engaging in photographic activities along Fusion Street. The colorful retail and several installations throughout the retail space helps to increase the value image of the site. However, families and single mother activities are mainly concentrated around the recreational area and kids' playground. The positioning of the playground functionally close to the retail space helps create a safe environment for kids to play under surrounding surveillance.

Based on the field observation, the distribution of activities varies across the open retail space based on the physical factor of the setting. Women's constant presence within the retail space can be observed throughout the day, with activities peaking around the evening. The physical environmental factors of these behavioural settings were further analyzed to understand the factors encouraging women presence within these vicinities.


Figure 8: Eco Ardence Behavioral Setting

## 5. **Analysis and Comparison**

### 5.1 **Barrier**

Table 1: Observed physical elements within the barrier's parameter

| No | Physical Environment Parameter | | Observed Physical Elements | |
|---|---|---|---|---|
| | | | Tamarind Square | Eco Ardence |
| 1 | Wall | Layout Configuration | 1. Clustered garden layout<br>2. Internal courtyard with open garden | 1. Clustered layout with linear circulation<br>2. Pocket spaces surround the clustered retail |
| | | Barrier | 1. Floor-to-ceiling glass wall<br>2. Openings and/or absence of wall<br>3. Greeneries as semi-physical wall | 1. Glass openings facing outdoor spaces |
| 2 | Screen | Barrier | 1. Floor-to-ceiling glass wall<br>2. Steel meshes as semi-physical screen<br>3. Greeneries such as shrubs as screen between pocket space | 1. Glass opening between indoor retail space and outdoor<br>2. Greeneries such as shrubs used to separate retail space and external circulation |
| 3 | Object | Barrier | *No usage of objects as barriers* | 1. Planter box and trees were used to create a minimal barrier between space |
| | | Seating | 1. Permanent seating spot within garden pocket space<br>2. Outdoor table and seating in semi-open areas | 1. Permanent seating spot within garden pocket space<br>2. Open outdoor seating in-between retail |
| 4 | Symbols | Building Design | 1. Complex multi-level retail space with variation of façade details | 1. Variation of colours used among retail space<br>2. Freight container used as a design feature |
| | | Greeneries | 1. Contrast in greenery with use of shrubs and variation of tree height<br>2. Water elements as barrier and point of attraction | 1. Variation of greeneries used in-between spaces<br>2. Connection to waterfront act as a point of attraction |

### 5.2 **Fields**

Table 2: Observed physical elements within the field's parameters

| No | Physical Environment Parameter | | Observed Physical Elements | |
|---|---|---|---|---|
| | | | Tamarind Square | Eco Ardence |
| 1 | Size and shape | Layout Configuration | 1. Complex layout with small to medium space<br>2. Clustered | 1. Clustered layout with linear circulation<br>2. Pocket spaces surround the clustered retail |
| | | Level and Volume | 1. 3m to 6m of ceiling height<br>2. Multi-level retail space within the garden | 1. Glass openings at facing outdoor spaces<br>2. Absence of other hard-barrier in-between space |
| 2 | Orientation | Visual Distances | 1. Seating spots within pocket spaces are visually visible to the parameter retails | 1. Seating spots are visible from the centre retail space |
| | | Functional Distances | 1. Retail space is functionally close to parameter retails, separated only by greeneries | 1. Retail spaces are functionally close, facing each other at the centre |
| 3 | Environmental Condition | Lighting and shading | 1. Open area covered with concrete roofing or greeneries as shadings | 1. Retail space is covered with a transparent roof to allow sunlight penetration<br>2. The well-lit environment during nighttime |

## 6. **DISCUSSION**

This study managed to identify the physical environmental factor of a feminine space that encourages women's presence in public places. Through these comparisons, different approaches is seen utilized between the two case studies, resulting in various activities conducted at various spaces or behaviour settings. This provided the possibility of understanding the similarities in the physical properties that encourage women's presence within these spaces. For instance, pocket spaces that offer a semi-visual barrier are associated with a higher level of social activities among women. Design elements comprising barriers and fields show that they can significantly impact women's behaviour and presence in an open outdoor commercial space, as shown in the findings.

The consistency in women's activity within each behavioural setting concerning specific spatial elements reinforced these findings. As observed in the findings, effective use of barrier and field design elements promotes the creation of smaller, intimate spaces that encourage women activities without auditory or visual distraction from others. Other physical elements such as variation in design and use of greeneries act as an attraction towards the site itself. The findings of this study can be summarised and be implemented to improve the current limitation faced by women in public places, as explained below.

### 6.1 **Barrier**

**Walls** - Planning of open public places needs to provide a sense of security and privacy to create a space for women to socialize and interact. A large open space is usually avoided by women, who prefer to socialize within pocket spaces semi-secluded from the general public. The effective planning of barriers such as walls avoids the creation of large open spaces instead of promoting a more intimate pocket space between the buildings and a higher degree of separation. This creates a sense of refuge in an open space without sacrificing the women's safety and comfort. The optimal use of soft barriers is also needed as they provide a sense of security and inclusivity in-between the space. The use of glass walls, louvres or greeneries can provide different levels of visual

connectivity and audial visibility. The application of these physical factors was demonstrated to encourage extended social interaction among women within these spaces.

**Screen** - Optimizing screens in-between spaces can also provide a sense of security and a sense of refuge from the surroundings themselves. Different use of screens such as glass can provide visibility with audial seclusion. In contrast, hedges can provide a more flexible approach, where it provides visual seclusion when seating and audial visibility with the surroundings. In turn, the same separation facilitates a separate space for women to engage in verbal communication.

**Object -** Object such as planter boxes or tree spots can also become space separation tools. The utilization of objects allows open space to be broken up into smaller, flexible open spaces while serving as a decorative element. The separation of spaces minimizes visual distraction, providing a comfortable space for verbal communication. The provision of seating spots within these spaces allows the space to become more ergonomic rather than monumental, providing a refuge space that encourages social activities among women.

**Symbols -** Another factor within the barrier parameter itself is the use of symbols dictating the attraction of a space. Symbols such as façade design and natural elements can dictate the attraction towards an outdoor space. Variation in façade design and colour encourages activities such as photography among women, which attracts the outdoor environment. The diverse use of greeneries and water elements can act as a physical barrier in-between space, providing a visually exclusive environment without sacrificing security. These natural elements also act as an attraction towards the area, providing playing areas for single mothers and families and providing comfort within outdoor spaces.

### 6.2 Fields

**Size and shape -** The size and shape of a setting can affect the visual perception of a space. As the feminine qualities suggest, a space shaped more organically with diverse sizes and shapes through the use of barriers encourages women activities rather than an ample open space. Smaller pocket spaces provide a refuge within an outdoor environment that encourages extended social interaction within these spaces. Levelling also creates a different field without a barrier.

**Orientation** - Orientation of a setting is critical in providing a safe engagement space for women within an outdoor environment. The activities in each space are preferably within visual distances from others, either visually or audibly inclusive to other spaces and activities. Orientation of openings and access of each space is critical, with the creation of functionally tight spaces providing comfort and visual accessibility throughout the outdoor retail space.

**Environmental Condition -** Comfort within an outdoor commercial public place cannot be imagined without good microclimate conditions. Shading within these spaces is critical with the use of roofing or greeneries to induce comfort while providing a well-lit environment during the day. During the nighttime, providing a well-lit environment with artificial lighting is critical in encouraging women's presence as the lack of lighting may impact women's safety and comfort.

## 7 CONCLUSION

The women's spatial needs within public places are usually disregarded while designing a building. The injection of feminine qualities within public places is vital in providing an equitable space for men and women. The information obtained from this study demonstrated that the physical environmental factors comprising of barriers and fields could be incorporated within the future design to encourage women presence within the commercial, public places. The use of organic planning, effective use of soft barriers and appropriate application of field's elements could afford women's needs to engage in social and leisure activities within these public places.

Using a behavioural mapping approach to identify the behavioural setting of women's activities, this study investigated the relationship between the physical environmental factors and women's behaviour and presence within public places. The study has demonstrated that physical factors significantly influence women's presence within these spaces. Although architecture for women was discussed for a long time, there is limited empirical research identifying the physical factors influencing women's behaviours. The data obtained from this study should be

helpful for designers when planning a public place. However, the research was conducted through specific case studies and open areas, and the findings may not be generalised to all open outdoor spaces. Similar research could be conducted in the future, identifying the physical factors in other types of public places. The outcomes of the research may be compared to achieve a general finding.

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