



Quality Assessment of Shopping Mall Design Regarding Humanitarian Needs

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ABSTRACT

Malls play a crucial role in the economic development of society and have evolved in design in the 21st century to become multifunctional spaces known as “lifestyle centers.” These facilities serve as multifunctional spaces that not only provide shopping opportunities but also cater to various recreational, social, cultural, and other pursuits. It is essential to understand the needs of users and design the components of the mall in a way that accommodates all age groups to maximize economic returns. Given the significance of open assembly spaces as recreational areas within malls, this research aimed to develop a model for evaluating their performance based on human needs. The study focused on understanding user needs, examining design principles for open assembly spaces, and determining their relative importance. This would be applied to the design of assembly spaces in global and regional trading centers to serve as a benchmark for comparison with Egypt’s modern trading centers. The goal is to determine how well the mall meets user needs, identify shortcomings in the application of design principles, and inform the design of future malls to increase their economic efficiency.

1. Introduction

The emergence of commercial centers dates back to the establishment of agriculture and the creation of villages as places of residence, which led to the need for trade between them. Over time, trade has taken various forms and evolved. Commercial centers have become vital to the recent social and cultural revival [1].

The concept and function of malls have changed from being solely commercial centers to including a range of spaces and activities to meet the changing needs of users, particularly with the rise of e-commerce and easy access to products without the

need to visit the mall physically. With an increase in the number of commercial centers and the resulting competition, the success of one center over another depends on the design of the spaces and their ability to meet the needs of different age groups and social levels [2].

Human needs are driven by internal motivation and the interaction between individuals and their surroundings, whether natural or artificial [3]. Given that commercial centers are frequently used for shopping and leisure, the design of the spaces within them must take human needs and the impact of these spaces on human behavior and society as a whole into account [4].

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1.1. Research problem

The research problem addressed in the study is the lack of implementation of design principles in open public spaces and the existence of some design shortcomings. Despite the widespread use of e-commerce and online shopping, the design of commercial centers and public spaces has not kept pace with this trend. No new design principles are in place to compensate for this loss in shopping experiences. The rapid technological advancements in the field of commerce have changed the concept of commercial centers, and public spaces have become inadequate in meeting the needs of users due to the absence of some principles and dimensions and the lack of alternatives to attract shoppers and meet human needs.

1.2. Research objective

This research aimed to study the changes in the concept of quality and design of open public spaces in commercial centers. This was performed by studying design principles and user needs and applying these principles to open public spaces in commercial centers globally and regionally, thereby determining the relative weights of the design principles for public spaces. The design principles were compared to those of recently established commercial centers in Egypt (Mall of Egypt, Cairo Festival City Mall), and the relative weights were determined through observation and analysis of the current situation of public spaces in local commercial centers. This is to understand the design quality of the spaces inside commercial centers and reach recommendations for improving their design.

2. Users' humanitarian needs

2.1. Functional needs

The design of spaces in commercial centers should be based on function and activity. For example, the design of a play area would differ from that of a cinema or a food area. However, some activities, such as a gym and a restaurant, need to be linked. On the other hand, some activities need to be separated, such as a gaming area from cinemas. Therefore, it is crucial to understand the performance of space in terms of its intended function [5]. The following points highlight the significance of functional needs in the design of open assembly spaces:

- Open assembly spaces have a significant functional role in creating mental images that help ease navigation and accessibility within the mall and can be considered landmarks.
- The spaces that offer a variety of recreational, cultural, or service activities enhance the range of services the mall provides. This increases the number of visitors and users, whether for shopping or leisure, leading to an increase in the mall's economic return [6].

2.2. Security and safety needs

- Provide surveillance cameras and engage security companies to reduce theft.
- Ensure proper means of escape in case of emergencies or disasters.
- Implement fire safety measures and fire control systems.
- Install smoke control systems and other necessary safety measures [7].

2.3. Social needs

The design of a space has a significant impact on human activity patterns and social life within it. Social interactions and relationships are established in commercial center clusters. As a result, assembly spaces within malls must be designed considering the various needs of different user groups and cultures, considering age, culture, and customs.

Different societies have varying needs, customs, and traditions that must be considered when designing to meet the social needs of the Egyptian user. These needs differ from the global uses and interests of each culture and principle. To address these differences, the following measures should be considered in the design process:

- The provision of leisure spaces for different age groups of users
- Creating coordinating elements within the spaces strengthens the relationship between the environment and human beings.

The significance of coordinating elements is highlighted in using natural elements, such as water and plants, to create a psychologically comfortable climate that encourages users to spend more time in the space. By doing so, the design will consider the social needs of the Egyptian user and meet their cultural and societal principle [8].

2.4. Aesthetic and visual needs

- Easy understanding and navigation of the mall are essential for creating a mental image and a sense of familiarity, making it easier for users to move around the spaces and perceive their components.
- The elements of the mall should be linked through spaces, including movement paths and assembly spaces, to form a strong mental impression retained in memory.
- The use of blank spaces helps create a visually appealing indoor environment that enhances the element of surprise when transitioning from the outside to the inside, generating a sense of suspense and amazement.
- Adding natural elements, such as water and plants, can provide an aesthetic touch and a connection to nature [9].

2.5. Environmental needs

- Providing thermal comfort on multiple factors: temperature, humidity and wind, For the convenience of users, central air conditioning systems are used, and water and plant elements are used to moderate heat and humidity within the internal space of the mall.
- Providing acoustic comfort by addressing acoustic problems by using curved surfaces to prevent sound reflection, because it works to form reflection foci.
- Putting guiding boards and advertisements that prevent the sound from echoing because it obstructs the path of sound.
 - Separate activities that need calm and relaxation from activities that result in noise. Trees can be planted on the side of the noise source because they absorb noise.
 - Provide a healthy indoor climate environment that helps people enjoy and spend a long time inside the mall.
 - Provide natural ventilation instead of artificial ventilation by using large openings and designing most open-air spaces in areas that are friendly to the climate.
 - The coordination of plant and aquatic elements plays a significant role in providing a healthy and airy environment, moderating heat, reducing pollution, and spreading aromatherapy through the use of aromatic plants [10].

3. Design foundations of the cantonment branch within the malls

3.1. Appropriate location of spaces within the mall and their relationships

- Spaces of public assembly: When designing these spaces, they must be located in a central area, preferably in the middle of the mall's horizontal projection. This location allows users to move easily within the mall, making it a structured tool for accessing shops, services, and recreational activities without feeling anxious and confused.
- Activities: These spaces are characterized by high congestion and noise levels. The separation of activities must be considered when designing them to avoid hindering movement within them. Therefore, soundproofing measures must be implemented to prevent noise from affecting the rest of the mall.
- Service Spaces: They must be present throughout the mall and be easily accessible and visible.
- Separation of Entrances: The entrances for visitors, workers, and goods must be separated to avoid overlap in their use [11].

3.2. Percentage of assembly spaces in relation to the mall area

Since these spaces are attractive to users, the ratio of assembly and recreational spaces to the mall's overall area must reflect their significance and accommodate the number of users they serve.

3.3. Design of communication elements and motion spaces

A clear and visually distinct connecting element is necessary when there are multiple open assembly spaces within the mall. This element should proportionally link the different elements of the mall to facilitate user movement. It should be noticeable and make it easy for users to move from one place to another in different roles. Additionally, the ease of movement and safety of people with special needs and children must be considered.

3.4. Design of compilation spaces

These *spaces* enhance the mall's efficiency, especially when they are visually distinct and exciting. To achieve this, the following points must be considered:

- The development of attractions for different user categories: attractions should be created to cater to

the needs of different age groups and social groups.

- The distinctiveness of each space: each space should be distinguished from the others through landmarks or unique characteristics and colors.
- Provision of public services: essential public services, such as information desks, toilets, and charging stations, should be provided in each space.
- Space size appropriate for user numbers: The size of each space should be appropriate for the number of users to prevent overcrowding and ensure optimal enjoyment of the activities provided [12].

3.5. Design of recreational and cultural activities within the synthesis space

When designing these activities, there are several crucial considerations:

- No interference with movement or space function: The presence of recreational and cultural activities in the main synthesis spaces should not impede movement or interfere with the function of the space.
- Selection based on user needs and market research: The selection of activities within the mall should be based on research on user needs
- and a review of activities offered in other malls. This can help to create unique activities that differentiate the mall and increase its efficiency and financial return [13].

3.6. Environmental comfort within the assembly space

Environmental comfort within the assembly space can be achieved through the following:

- Rationalize energy consumption in assembly spaces within the mall.
- Meet the visual needs of users.
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- Meet the visual needs of users.
- Provide appropriate lighting in the assembly space within the mall.
- Utilize environmentally friendly materials.
- Pay attention to the air quality within the mall.
- Achieve thermal comfort for users.
- Achieve acoustic comfort for users.[14]

4. Relative weights of the design foundations for the assembly space

The relative weights of indicators tailored to the needs of users were determined through the use of the binary numeral system data analysis method to analyze several successful shopping centers globally (Mall Serramar Parque Shopping, Brazil [M1], Mall Parc Central, China [M2], Mall Cross Country Shopping Center, New York [M3], and Mall La Cantera, USA [M4]) and regionally (Mall Packs, Doha [M5], Mall Villaggio, Qatar [M6], Mall Zorlu Center, Turkey [M7], and Mall Kanyon, Turkey [M8]), which have high foot traffic and open assembly spaces.

Through the analysis of these commercial centers and the extent to which they have met the previous design objectives for open assembly spaces, the usage ratios of the design indicators that contribute to the success of the spaces were calculated. Table 1 shows the derivation of the design objectives based on the needs of users and the relative weights of each indicator.

Table 1: Relative weights of design principles for open assembly spaces

| Humanitarian needs | Mall design foundations | Indicators | Global trading centers | | | | Regional trading centers | | | | Total Frequencies | Relative Weights |
|-------------------------|--------------------------------------|--|------------------------|-------|-------|-------|--------------------------|-------|-------|-------|-------------------|------------------|
| | | | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 | | |
| | Assembly space aggregate of the mall | Space ratio approximately | ≈ 12% | ≈ 20% | ≈ 10% | ≈ 15% | ≈ 25% | ≈ 10% | ≈ 20% | ≈ 30% | | |
| Functional requirements | Location | Open aggregate space site for the mall | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 8/325 = 0.025 |
| | | The multiplicity of aggregate spaces | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 3 | 3/325 = 0.009 |
| | | Proximity to services | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 8/325 = 0.025 |
| | Brush elements | Suitable materials used in the brush | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 7 | 7/325 = |

| | | | | | | | | | | | | |
|-----------------------------|---|---|---|---|---|---|---|---|---|---|-------|---------------|
| | | industry | | | | | | | | | | 0.022 |
| | | No obstruction of brush elements for movement | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8/325 = 0.025 |
| | | Enough brushless items | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7/325 = 0.022 |
| | | Mattress components match the overall character of the assembly space | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8/325 = 0.025 |
| | | Climate control for brushless items | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 4/325 = 0.012 |
| | | Availability of garbage bins | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8/325 = 0.025 |
| | | Availability of tablets | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8/325 = 0.025 |
| | | Presence of screens | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 3 | 3/325 = 0.009 |
| | | Design accommodation for special needs | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 5/325 = 0.015 |
| | Floor finishing | Color consistency with the character of the space | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8/325 = 0.025 |
| | | Use of appropriate finishing materials for the activity in the space | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 5/325 = 0.015 |
| | | The difference in floor design for various activities | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 7/325 = 0.022 |
| | | Use comfortable walking surfaces | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 4/325 = 0.012 |
| | | Appropriate floor finishes for various age groups | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 4/325 = 0.012 |
| | Shading elements | Availability of natural shading elements | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 6/325 = 0.018 |
| | | Availability of industrial elements for shading | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 6/325 = 0.018 |
| | | Adequate number of shading elements | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 4 | 4/325 = 0.012 |
| | Diversity of recreational activities within the space | Diversity of established activities | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 6/325 = 0.018 |
| | | Suitable activities for different age groups | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 6/325 = 0.018 |
| | | Availability of services for subsistence activities | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 5 | 5/325 = 0.015 |
| Subtotal | | | | | | | | | | | 0.424 | |
| Security and security needs | Safety availability | Availability of security cameras | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8/325 = 0.025 |
| | | Fire safety | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8/325 = 0.025 |
| | | Clear and well-illuminated signals and signs | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 7/325 = 0.022 |
| | | Use of fireproof materials | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 6/325 = 0.018 |
| | | Smoke control and egress | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 5/325 = 0.015 |
| Subtotal | | | | | | | | | | | 0.105 | |
| Social needs | Attractions | Availability of user attractions | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7/325 = 0.022 |

| | | | | | | | | | | | | | |
|-------------------------|-----------------------|--|---|---|---|---|---|---|---|---|-------|---------------|---------------|
| | | Landmark marks | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | $5/325=0.015$ | |
| | | Social interactions | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | $7/325=0.022$ |
| | Coordination elements | Availability of natural (water) elements | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | $7/325=0.022$ |
| | | Availability of natural (plant) elements | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ |
| Subtotal | | | | | | | | | | | 0.106 | | |
| Aesthetics visual needs | Visual Comfort | Avoid obstructing the user's line of sight | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 6 | $6/325=0.018$ | |
| | | Easily visualizable | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ | |
| | | Color consistency | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ | |
| | | Adequate natural lighting | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 6 | $6/325=0.018$ | |
| | | Adequate industrial lighting | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ | |
| | | Proper lighting for changes in ground level | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 7 | $7/325=0.022$ | |
| | | Designing the space with a similar aesthetic to the mall | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ | |
| | | Distinct design for the assembly space | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ | |
| | | Incorporation of sculptural works | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 4 | $4/325=0.012$ | |
| Subtotal | | | | | | | | | | | 0.195 | | |
| Environmental needs | Thermal comfort | Implementation of a water spray system in the shared space | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | $2/325=0.001$ | |
| | | Suitable temperature | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ | |
| | | Incorporation of natural materials to enhance the atmosphere | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ | |
| | Air quality | Provision of fresh air | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ | |
| | | Reduction of pollution | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | $8/325=0.025$ | |
| | | Use of aromatic plants | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 6 | $6/325=0.018$ | |
| | Acoustic Comfort | Incorporation of natural water | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 7 | $7/325=0.022$ | |
| | | Segregation of different activities in the shared space | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | $7/325=0.022$ | |
| | | Incorporation of anti-sound transmission finishing materials | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | $2/325=0.001$ | |
| Subtotal | | | | | | | | | | | 0.164 | | |
| Total | | | | | | | | | | | 325 | 1 | |

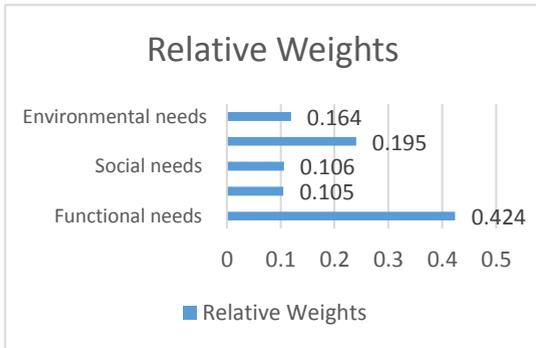


Figure 1. The relative weights of the humanitarian needs
From Table 1, you can refer to Figure 1.

Through the previous scheme, it is clear that:

- The functional requirements were achieved at a ratio of 0.424 by ensuring a suitable location, appropriate furnishings, suitable shading elements, and various activities within the space.
- The need for security was achieved at a ratio of 0.105 by ensuring safety.
- The social needs were met with a ratio of 0.106 through the availability of attractions and coordinating elements.
- The aesthetic and visual needs were met at a ratio of 0.24 by ensuring visual and acoustic comfort.
- The environmental needs were met at a ratio of 0.119 by ensuring thermal comfort and good air quality.

5. Analysis of the current situation in commercial centers in Egypt

The current situation of some assembly spaces in some commercial centers in Egypt was assessed, analyzed, and compared to the previous conclusions regarding the relative weights to determine the extent to which the design objectives in the commercial centers in Egypt were met, identify any shortcomings in the design of these spaces, and extract design principles for future application to meet the needs of users. Two centers were chosen for this study, the Mall of Egypt and the Mall of Cairo Festival, for several reasons, including the following:

- They have been open for the previous ten years.
- They feature an open assembly space.
- They have an area greater than 100,000 square meters.

- They are characterized by high foot traffic, various recreational activities, and a diverse range of spaces.

5.1. Mall of Egypt - 6th of October

5.1.1. About Mall of Egypt

- The center opened in March 2017 with a total area of 165,000 square meters.
- It offers a diverse range of recreational and assembly activities.
- The design concept involves dividing the building into three sections, known as the city, the valley, and the crystal, and the open assembly space has been situated in the latter section of the building.

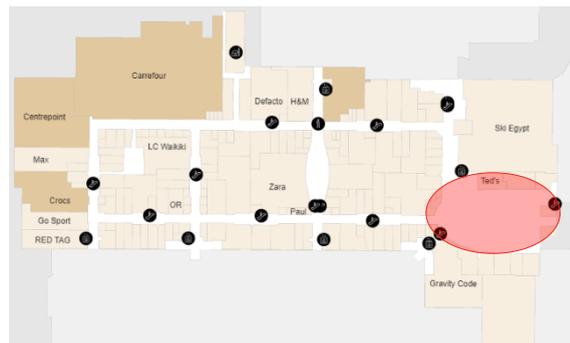


Figure 2. Ground Floor plan of Mall of Egypt

5.1.2. analysis of open assembly space

- Location: The assembly space is situated at one end of the mall and has its entrance and other entrances.
- Design: The oval-shaped space has been designed with separation from commercial areas to minimize noise. The surrounding recreational spaces are connected to the assembly space through glass walls. Wooden panels and stained glass panels have been used on the shaded facades overlooking the outdoor assembly space, which features a landscaped garden, seating areas, and a water feature.
- Features: The assembly space includes natural elements, such as plants and water, as well as various services to meet users' needs. Sculptural elements have been incorporated to distinguish the space and form a mental image for users. Large screens have been installed in the arena, focusing on the space as a gathering place to promote social interaction. The arena forms the main facade of the mall and serves as a welcoming entrance [16].

5.1.2. analysis of open assembly space

5.2. Cairo Festival City Mall (CFCM) - The fifth grouping

5.2.1. About the mall

- The mall, which was opened in March 2013, covers an area of 160,000 square meters [17].
- The highlight of its open assembly space is a dancing fountain, visible from more than 50 cafes and restaurants [18].
- Spectators can enjoy stunning water, music, and light shows from the 1,200-capacity Romanian theater surrounding the fountain, as well as from nearby indoor amusement parks such as Magic Planet and KidZania, a children’s play area [19].



- Glass walls and ceilings are treated with reflective, soundproof, and heat-resistant glass to lower indoor temperatures [14].
- The dancing fountain, which covers a large area, mitigates temperature through dilution [20].
- The mall employs the interplay of prominent blocks and covered terraces to provide shade and reduce thermal stress, serving as an environmental solution [21].

5.2.2. Analysis of open assembly space

- The Central Festival Chiang Mai Mall (CFCM) boasts a central space designed for musical performances, featuring a vibrant dancing water fountain that draws crowds and fosters social interaction with nearby restaurants and cafes [14].
- Launched in 2015, the 1,656-seat Marquee Theater enhances the entertainment offerings at the mall with an array of international performances and concerts.

6. Results analysis

By analyzing previous trading centers and evaluating their adherence to design principles compared to the relative weights previously determined for open assembly spaces, we have reached (Table 2).

Figure 3. Ground floor plan of the assembly space for the mall.

Table 2: Relative weights of the foundations for open assembly space design

| Humanitarian needs | Mall design foundations | Indicators | Relative Weights | Mall of Egypt | Relative weights | Cairo Festival City Mall | Relative weights |
|-------------------------|-------------------------|--|------------------|---------------|------------------|--------------------------|------------------|
| Functional requirements | Location | Open aggregate space site for the mall | 0.424 | 0 | 0.184 | 1 | 0.313 |
| | | The multiplicity of aggregate spaces | | 0 | | 0 | |
| | | Proximity to services | | 0 | | 1 | |
| | Brushless items | Suitable materials used in the brush industry | | 1 | | 1 | |
| | | No obstruction of brush elements for movement | | 1 | | 1 | |
| | | Enough brushless items | | 0 | | 1 | |
| | | Mattress elements fit the overall character of the aggregate space | | 0 | | 1 | |
| | | Climate Protection for Brushless Items | | 0 | | 0 | |
| | | Availability of garbage bins | | 1 | | 1 | |

| | | | | | | | |
|--|---|--|--------------|---|--------------|---|--------------|
| | | Availability of tablets | | 1 | | 1 | |
| | | Presence of screens | | 1 | | 1 | |
| | | Special design for special needs | | 0 | | 1 | |
| | Floor finishing | Color consistency with the character of the space | | 1 | | 1 | |
| | | Use of finishing materials suitable for the activity in it | | 1 | | 1 | |
| | | The difference in floor design for different activities | | 1 | | 1 | |
| | | Use of comfortable walking materials | | 0 | | 0 | |
| | | Suitable floor finishing for different age groups | | 0 | | 1 | |
| | Shading elements | Availability of natural shading elements | | 1 | | 0 | |
| | | Availability of industrial elements for shading | | 0 | | 0 | |
| | | Adequate number of shading elements | | 0 | | 0 | |
| | Diversity of recreational activities within the space | Diversity of established activities | | 0 | | 1 | |
| | | Suitable activities for different age groups | | 0 | | 1 | |
| Availability of services for each subsistence activity | | 1 | 1 | | | | |
| Safety and security needs | Safety availability | Availability of security cameras | 0.105 | 1 | 0.105 | 1 | 0.084 |
| | | Fire safety | | 1 | | 1 | |
| | | Clear and well-illuminated signals and signs | | 1 | | 1 | |
| | | Use of fireproof materials | | 1 | | 0 | |
| | | Smoke control and egress | | 1 | | 1 | |
| Social needs | Attractions | Availability of user attractions | 0.106 | 1 | 0.085 | 1 | 0.106 |
| | | Landmark marks | | 1 | | 1 | |
| | | Social interactions | | 0 | | 1 | |
| | Coordination elements | Availability of natural (water) elements | | 1 | | 1 | |
| | | Availability of natural (plant) elements | | 1 | | 1 | |
| Aesthetic and visual needs | Visual comfort | Do not hinder the user's line of sight | 0.195 | 1 | 0.195 | 1 | 0.173 |
| | | Easy to form a mental image | | 1 | | 1 | |
| | | Color Consistency | | 1 | | 1 | |
| | | Having suitable natural lighting | | 1 | | 1 | |
| | | Availability of suitable industrial lighting | | 1 | | 1 | |
| | | Use lighting when changing ground level | | 1 | | 1 | |

| | | | | | | | |
|---------------------|---------------------|---|-------|-------|-------|---|-------|
| | | Designing the space in the same Overall character as the mall | | 1 | | 1 | |
| | | The distinctive design of the assembly space | | 1 | | 1 | |
| | | Use of sculptural works | | 1 | | 0 | |
| Environmental needs | Thermal comfort and | Use of water spray in the aggregate space | 0.164 | 1 | 0.127 | 1 | 0.145 |
| | | Suitable temperature | | 1 | | 1 | |
| | | Incorporation of natural materials to enhance the atmosphere | | 1 | | 1 | |
| | Air quality | Provision of fresh air | | 1 | | 1 | |
| | | Reduction of pollution | | 1 | | 1 | |
| | | Use of aromatic plants | | 1 | | 1 | |
| | Acoustic comfort | Use of water elements | | 1 | | 1 | |
| | | Separation of different activities in the aggregate space | | 0 | | 1 | |
| | | Use of anti-sound transmission finishing materials | | 0 | | 0 | |
| Total | | 1 | 0.693 | 0.822 | | | |



Figure 4. Proportional weight ratios achieved for the design foundations of Mall of Egypt and Cairo Festival City Mall

6.1. Analysis of Results for the Mall of Egypt:

The functional requirements of the open assembly space were met to the extent of 0.184 due to several shortcomings. Site selection for the assembly space is deemed inappropriate, and essential services such as restrooms and chapels are limited. Furthermore, more user-friendly amenities, such as umbrellas, are required to meet the special needs of users with special needs. On the other hand, security needs were met to the extent of 0.105, as all design foundations were achieved. However, social needs were met to the extent of 0.085, falling short of promoting social interactions. Aesthetic and visual requirements were met to the extent of 0.195.

However, there needs to be more separation of activities within the space. The environmental requirements were met to 0.127, as all foundations were achieved.

According to the previous analysis, the Mall of Egypt achieved a 69% design base based on total weights.

6.2. Analysis of results for Cairo Festival City Mall

- The functional requirements were met to the extent of 0.313 because some required elements, such as shading (natural or industrial) and climate protection for bushes, were lacking.
- The security and safety requirements were met to a total of 0.084.
- The social needs were met to the extent of 0.106, with all design foundations achieved.
- The aesthetic and visual requirements were met to the extent of 0.173.
- Environmental needs were achieved by 0.145; all design foundations were achieved.

From the previous analysis, it is clear that Cairo Festival City Mall achieved design foundations at 82% of the total weight.

It has been concluded that the Cairo Festival City Mall is better than the Mall of Egypt. The design foundations achieved at Cairo Festival Mall are 82% compared to 69% at the Mall of Egypt (Figure 5).

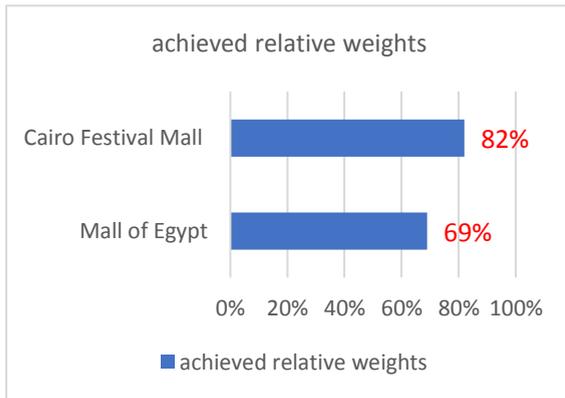


Figure 5. Comparison of relative weights for shopping malls (Mall of Egypt and Cairo Festival City Mall).

7. Conclusion

The mall became not only a trade center but also a hub of luxury. Open assembly space plays a crucial role in enhancing the success of a mall. However, several missing foundations in local malls need to be addressed, including:

- Increasing the proportion of recreational areas in the mall
- Paying more attention to open spaces and increasing their area compared to closed spaces
- Choosing a centrally located, conveniently accessible site close to public services
- Including a variety of activities within the open space to keep users from becoming tired
- Providing connectivity elements, such as elevators, escalators, and ramps, for easy movement and accessibility for those with special needs
- Including natural and plant elements in the open space
- Providing essential services, such as restrooms, a unisex chapel, and other necessary services
- Offering convenient seating spaces in an appropriate number to accommodate the number of users.
- Separating activities within the assembly space to minimize noise and preserve quiet areas

- Including sunscreen umbrellas and other treatments in open spaces to maintain an appropriate temperature and humidity
- Designing spaces specifically for families and activities suitable for them
- Using neutral colors in space design to avoid distraction and emphasize open spaces.

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