



SPATIAL FLEXIBILITY IN MUSEUM BUILDINGS AND EXAMINATION OF CURRENT SAMPLES

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Abstract

In this article, the changes in the management of museum buildings and its effects on the developments in the museum design were examined. Firstly, types of museum buildings are classified and described chronologically. After that selected examples from Turkey and the world were analyzed in terms of the horizontal and vertical flexibility of interior space, new functions, space extensions, and museum morphology in chronological order. As a result, it was concluded that the developments in museum management changed in museum design. In the first museum samples by static museology concept, storing and exhibiting objects were essential. In today's museums, it is seen that temporary exhibitions, course spaces, stages and meeting places are added to the museum spaces. It is concluded that with these changes, museum types have become the meeting point of urban citizens by addition of cultural, social activities, temporary art exhibitions in the present time.

1. INTRODUCTION

Current developments are seen as a temporary museumification and actions varying periodically as well as constant museumification in museums. This change in the understanding of museology also changes the architectural design of museums. For this purpose, the concept of functional changes and flexibility in museums was examined in the study. Flexible spaces that contribute to the creation of more functional, more comfortable and temporary social areas appear in many designs. In the 20th century the importance of flexible space design has gradually begun to understand more. Common points about the solutions discussed at this point are

Sustainability, Flexibility, Changeability.

Assumptions in the study;

- It is observed that the concept of traditional museology has changed in museum design.
- With this change, new functions are added to museum buildings aiming to use the museum continuously by visitors.
- This understanding has revealed the concept of expandable, flexibility in architectural design of museums.

As a method of study, cronological samples of museums were collected as a result of literature review. These samples were analyzed under the headings of horizontal vertical flexibility and presence of additional spaces and their locations in and around museums.

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2. MUSEUM TYPOLOGY AND THE DEVELOPMENT OF MUSEUM TYPES




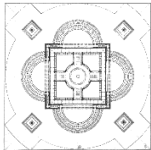
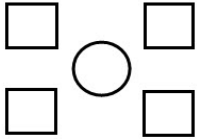
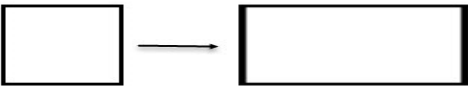
The museums, which have been created necessity of the collection, preservation and exhibition of precious objects and works of art have changed during the periods. Typology of museum buildings are discussed under three headings; collection types, architectural typology of museum buildings and museum planning types (New or transformed buildings).

2.1. MUSEUMS ACCORDING TO THE COLLECTION TYPES

It can be examined under the headings such as art museums such as painting and sculpture, history museums exhibiting ancient ruins, technology museums, ethnography museums, museums in the name of an important persons, nature museums and museums of science.

2.2. ARCHITECTURAL TYPOLOGY OF MUSEUM BUILDINGS

Museum buildings are classified under 5 titles as plan and design (Table 1).

Palace Museums		
The first museums were formed by going public of the palaces by the state administrators. Also, the art buildings followed by the palace museums and the big villas turned into museums. The museums on the table can be shown under the title of Palace Museums.		
Uffizi Museum (1560-1700)	Luxembourg Museum (1750)	Louvre Museum (1793)
		
Rotunda Museums		
In 1802, a project was designed that covering four squares separated from each other around the rotunda by N.L.Durand created a new museum plan type.		
Entienne-Louis Boulee		
		
Temple Museums		
The temple museums, which had a plan type starting with the design of Leo von Klenze in 1816 after Durand, are inspired by Neo-Classical Architecture and started to occur in Germany, England and America.		
		







National Gallery-1941		
		
Transparent Museums		
<p>In the 19th century, new exhibition spaces were created in the museum architecture. Such museums were inspired by the transparent buildings of Joseph Paxton's Crystal Palace in London in 1850-51. Examples of these museums are the Neue National Gallerie (1962-1968) in Berlin, Mies Van der Rohe and the Piano in Paris and Center Pompidou (1977), the architecture of Rogers.</p>		
Neo National Gallerie (1962-1968)		Center Pompidou (1977)
		
Flexible Museums		
<p>Flexible Museums: This idea which developed after the World War II, also affected museums and as a result of this new museums emerged. Thus, exhibitions which are affecting the society and attracts the local people to the museums, brought an exhibiting understanding and architectural design necessity with itself. The development of new museums accelerated after 1960s.</p>		
Museum of Modern art (MOMA)	Neue nationalgalerie (1962-1968)	Neue Pinakothelo (1974-1981)
		

Table 1. Plan and design typology of museum buildings

2.2.1. Design Criteria of Exhibition halls

The museum is a space for interaction between people and objects, so some design data should be considered in museum planning:

- Adjusting the exhibition areas according to the object to be exhibited
- Designing galleries according to principles, eg horizontally (with the same subject) or vertically (works of the same period)
- Separation of spaces by splitting coordinated with the objects.

The building should be flexible enough and expandable. Versatility and extensibility are the most important factors for changing the field function according to the needs of the future. It might be said that structure is sustainable if its development process does not damage the structure itself. The addition of new building is raised nondestructively with adhering to the basic design. A museum building can expand in two ways:

- Horizontal development; The exhibition areas are at the same level and its lighting can be possible from the ceiling.
- Vertical expansion; to use the space of the building economically and take advantage of other different perspectives.

2.2.2. Circulation in Exhibition halls

Museums have different circulating systems such as circular, linear, spiral, free, irregular and scallop. The movement in the exhibition areas of the museum must be one-way, in other words, the entrance should be directed to the exit after exhibition tour, because the unilateral movement causes the visitors to move slowly and unhurriedly. The most important advantage of such museums is to provide monitoring and control, only this type of visitor can be directed from a predetermined direction. The disadvantage is that the visitor is affected by other objects before reaching another object.

Circulation in Exhibition Halls			
Circulation around central area	In a straight line	Free and irregular spiral circulation	Scallop Form Design
Chain cycle design	As a whole	Star design with star shape	Designs in fan form

Free circulation in museums			

Table 2. Circulation in Exhibition Halls

Free Movement Direction plan types, one or a few entries and exits are available and the visitor does not have to move through a certain path and can move freely, in this respect, the visitor will not be able to travel all over the museum, they will have to go through the same point at different times.

2.2.3. Exhibition hall forms

Radial hall	Free-form halls	Different roaming within a single hall	Square-Rectangular form
Prevents the visitor from focusing.	Despite the fact that is not considered appropriate, there is a general view of the use of such forms in limited areas.	There is a need for an order for the visitor to move around. In this way, people will be allowed to walk in exhibition halls straightly.	The exhibition halls will still be perceived as superficial by the visitor, although it can be easily perceived.

Table 3. Forms Exhibition galleries

2.3. PLANNING TYPE OF MUSEUMS

The term of “Planning” in museum design is considered that building is designed for museum or turned from different function type. Museum planning are considered in two types.

1. New museum buildings
2. Buildings transformed into a museum (buildings transformed from monumental buildings, different structures)

<p>New museum buildings: The emergence of museums took place in the third century, however, the museums built according to the function of the museum began at the end of the 18th century. During this period, monuments-museums or palace-museums were formed. After this period, the design of museums started in a different perspective of the contemporary architecture.</p>	
<p>Guggenheim Museum - NewYork</p>	<p>Chandigarh Museum-le corbusier</p>

Table 4. New museum buildings

Buildings converted to museum building: Most of the museums in the years 1800-1950 have taken part in the historical buildings, such as the Louver Museum in Paris, the Ufozi Museum in Florence and the Prado Museum in Madrid. Turning palaces and historic buildings into museums is more difficult than repairing old museums because these buildings themselves are regarded as works of art. Historical changes should be taken into account in the exchange of these museums. In general, the interior of these spaces is not suitable at the point of light and moisture, and may damage some artworks.

Uffuzi Museum-Floransa	Prado Museum-Madrid	Louver Museum-Paris
		

Table 5. Buildings converted to museum buildings

3. FLEXIBILITY AND EXTENDTIBILITY IN ARCHITECTURE

Flexibility is defined as the ability to change or adapt to change in a short period of time with little cost and effort. In contemporary buildings, that concept is seen in order to convert function or extend capacity of buildings.

According to the findings of Sebastyen, flexibility is defined as the upper and changeability is defined as the lower level and this way he explains the meaning of flexibility:

- 1. Pre-flexibility (or interchangeability) allows the creation of different buildings in industrialized architecture.
- 2. Continuous architectural flexibility or continuous functional flexibility allows the industrialized structure to change the interior space and furniture of the building without changing the conveyor system.

According to Forty: Flexibility is divided into two periods:

- Flexibility before 1950 provides a change in the small and predetermined parts of the carrier elements.
- In the post-1950 buildings, the carrier becomes stationary and the inner compartments can be changed.

The new museum design is a modern space with a unique design and structure since the 19th century. When we look at the functions of museums today, the functions of museums vary according to their forms. According to the flexible approach, the designer must adjust the pattern of the project to meet the needs of the masses according to different and different needs. Some people think that, this means adding an addition to the building while others think that change of interior spaces and some changes in the function of the building and according to some ideas, creating multifunctional fields and using them as maximum space.

Flexible Buildings might be studied in two aspects:

1. From perspective of user
2. Innovator (yaratıcı-innovation)

There are four main topics in structure and design:

1. Building systems
2. Service areas
3. Architectural design
4. Equipment for field flexibility

One of the basic principles of flexible design is to avoid invariance (inflexibility). Building systems and service areas are considered permanent elements. In building systems, it is preferable that the walls do not carry loads, so that if the inner walls are removed, the outer walls can carry the loads. The rate of flexibility is the same in indoor and outdoor areas, we can distinguish the flexibility of buildings in large

and small scale. This issue has a direct effect on the interior quality of the building. Therefore this concept is very important (Table 6-7).



<p>Flexibility in Large Scale: Flexibility in large scale is that the entire building, or a large part of it, may be interchangeable. Hence, flexibility, makes the space (building) easier to use for various purposes in large scale.</p>	
	

Table 6. The old factory MASS MOCA converted into museum.




<p>Flexibility in small scale: Flexibility in small scale is considering changing the interior of the building according to different uses.</p>		
		

Table 7. International Space for Different Exhibitions, Guggenheim Museum

Flexible designs on a small scale are divided into two subjects:

- Pre-thought size and form of spaces.
- Designing the details of each space.

The types in these sections require multiple considerations.

- Soft / Hard
- Active / Passive

According to Schneider, it is defined as ‘soft’ if the areas can show flexibility and it is defined as ‘hard’ if the areas cannot show flexibility in architectural design. This approach is also considered as a method of analysis in the study.

There are such areas in the buildings that these areas are placed in the common space, eg elevators and ladders. These areas are located in the hard part of the building. Changing this section is very rare in buildings. Another way to obtain a flexible building is the form of the building. This form can be ‘hard’ or ‘soft. The rigid forms are designed specifically for flexibility, in other words their structures are designed deliberately flexible. In soft forms, the building is infinite in terms of form and area use. In the design of the New National Gallery in Berlin - Mies Van Der Rohe, the interiors were quite free and the interiors were arranged with movable compartments and objects.



Figure 3.1. National Gallery-Berlin, example of soft field

Generally, hard systems are applied to small buildings and soft systems to large areas. The buildings, which later turned into museums, such as the Louver Museum in Paris, are defined as hard forms. Additional buildings can be built in the outer areas (courtyard, facade...), just like Louver.

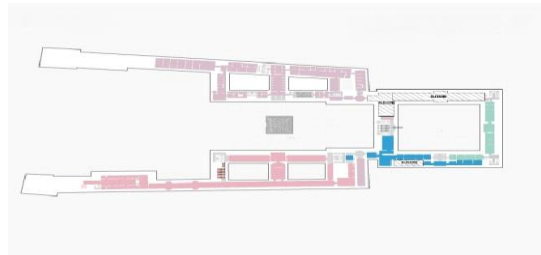


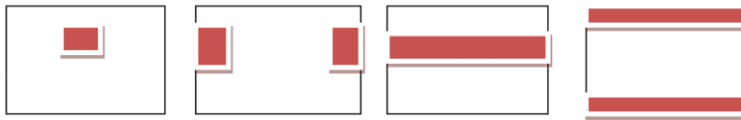
Figure 3.2. Louver Museum-museum plan in the hard field design

Active and Passive Sections

The most important factor in the efficiency of a department is the potential of the external spaces to flexibility and the activities that are around the building. It would be useful to extend the building outward for internal activities. If internal activities affect external activities, they are referred to as active departments.

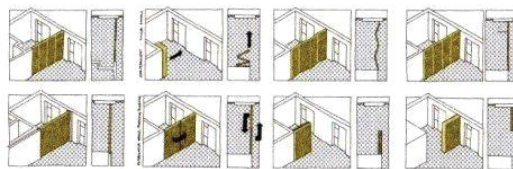
Service Areas

These are as should be considered and designed as a permanent system. Thus, when the service areas are located at one place, the net areas of the main and the primary areas appear.



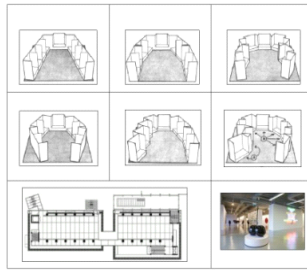
Şekil 3.3. The location of the service areas should be in a place that does not affect the design of the interior space.

The flexibility of architectural design must depend on the permanent elements of the building in order to meet the different demands of the user.








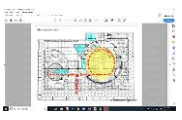
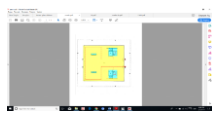



Şekil 3.4. Permanent elements of the building

The materials used in the partition wall have a very important effect on the construction of the area. Sliding, modified elements and folding walls are located in 'equipping for the space flexibility'. In another aspect, interior furniture can also be considered as a function.








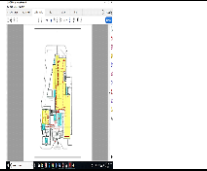









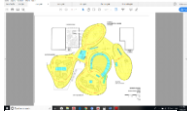

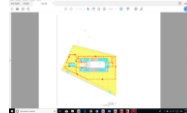

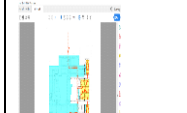
Şekil 3.5. Use of different compartments






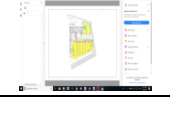




4. PLAN ANALYSIS OF MUSEUMS

	Guggenheim Museum	Neue National Gallery	Figge Museum of Art	Kimbell Museum of Art	Bauhaus Archive
					
					
Flexibility (plan ve section)					
Outdoor external annexes					
additional building					
Non - museum function					
Recreation (cafe)					

Tempor y exhibition area (inside, outside)					
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	Galata Sea Museum	The Nelson- Atkins Museum Of Art	Akron Art Museum	Museum of Contemporary Art	Museum of Islamic Art
					
					
Flexibility (plan ve section)					(plan)
Outdoor external annexes					
additional building					
Non - museum function					
Recreation (cafe)					
Tempor y exhibition area (inside, outside)					

	Ozeaneum Museum	Museum of Contemporary Art of Rome	New Akropol Museum	Can Framis Museum	Boston Museum of Fine Arts
					
					
Flexibility (plan ve section)					
Outdoor external annexes					
additional building					
Non - museum function					
Recreation (cafe)					
Temporary exhibition area(inside,outside)					

	Istanbul Maritime Museum	Revirside Museum	Stadel Museum	Maxxi Museum	Kimbell Art Museum - Piano Pavilion
					
					
Flexibility (plan ve section)			(plan)		(plan)
Outdoor external annexes					
additional building					
Non - museum function					
Recreation (cafe)					
Temporay exhibition					

area (inside, outside)					
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5. CONCLUSION

In this study, the changes in time in the operation of museum buildings and its developments in the museum architectural design are examined. First of all, the building types of the museum are classified and described, then selected examples from Turkey and the world were analyzed in the context of the, horizontal and vertical flexibility of indoor space, added new locations and configurations museum in chronological order. In this context, museum typology is divided into palace museums, rotunda museums, temple museums, transparent museums and flexible museums. When the examined samples are considered, it is seen that new places are added to static storage and exhibitions, and modern museums are transformed into cultural centers. The properties of the last period examples can be listed as follows::

- 1. Interior spaces of all museums can be rented for events(excluding exhibition), excluding fixed exhibition spaces.
- In addition to interior, social activities and events are carried out outside the interior space. (External flexibility) eg Arkon Art Museum and Museum of Islamic Art.
- The inclusion of additional collections of exhibitions for the needs of the museum leads to an increase in collections and the result is an increase in the number of visitors. For example, the Stadel Museum.
- Exhibitions in modern museums are also carried out as digital reflection. Building facades are also used for this purpose. For example, the Guggenhiem Museum
- Temporary exhibition areas are considered in all museums except permanent exhibitions.
- The exhibition areas of the new museums are designed as open plan, large and high ceilings.
- It is seen that new annexes are built to old museums. The concept of flexible museum is also seen in that buildings.
- Among the buildings converted into museum, we see that factories allow more flexibility than other buildings. For example, Can Framis Museum and Contemporary Power Plant Museum, Ankara Cer Modern
- It is observed that the concept of traditional museology has changed in museum design.
- With this change, new functions are added to the museum buildings aiming at the continuous use of the museum.
- This concept has revealed flexible, expandable, constricted flexibility concept in museum architectural design.

It is concluded that in the old meaning of the museums changes and it becomes the meeting point of the cultural center, social center, art gallery and the city. Transparent museums can be seen as the beginning of the current and flexible museums. In the current museum designs, flexible design gains importance. In addition to exhibiting, collecting, protecting and training, flexible museums turn into culture and entertainment place for people. Accordingly, it is aimed that people will be interested in museums and visitors will increase. As a result, it was concluded that the developments in museum management changed the museum design.

6. REFERENCES

(2017, 01 18). 01 18, 2017 <http://www.sanatokulu.com>.

(2018, 12 05). 12 05, 2018 tarihinde www.metmuseum.org.

(2018, 04 05). www.louvre.fr.

Atagök, T. (1999). *Yeniden Müzeliciği Düşünmek*. İstanbul: Yıldız Trknik Üniversitesi Basın yayınevi.

Ching, F. (2005). *Architecture: Form, Space and Order*. (Z. Gharaghoyounlou, Çev.) Tahran, İran: Tahran University.

De Chiara, J., & Callender, J. (1987). *Time Server Standards For Building, 1980:340*. Singapore: McGRAW-HILL İNTERNATIONAL EDITIONS.

Geoff. (2007, 11 15). *the way we live*. thewaywelive.wordpress.com: thewaywelive.wordpress.com/2007/11/15/flexibility-in-architecture

Khanizad, s. (2012). *Museum design in İran and in the world (architectural and interior design pricipals and basic)*. İran: Honar-e Memari-e Qarn.

Neufert, E., & Neufert, P. (2004). *Neufert Architects' Data*. (M. Mozayyeni, Çev.) Tahran, İran: Azadeh Publishing House.

Razma, M.-e. M.-e. (2016). *Müze Binaları*. İran: Mohandesin-e Moshaver-e Razma.

Smith, G., McGlynn, S., Murrain, P., Alcock, A., & Bently, I. (2008). *Responsive environments: a manual for designers*,. (third, Dü., & M. Behzadfar, Çev.) Tahran, İran: Elmo Sanat university Publishing Center.

Staatliche Museen zu Berlin. (2018, 07 25). 07 25, 2018 tarihinde <http://www.smb.museum>. Yürekli, F. (1983). *Mimari Tasarımında Belirsizlik; Esneklik/Uyabilirlik İhtiyacının Kaynakları ve Çözümü Üzerine Bir Araştırma*. Doçentlik Tezi. İstanbul, Türkiye: İTÜ Mimarlık Fakültesi Baskı Atölyesi.

Zandieh, M., Seyyed Rahman , E., & Hessari, P. (2011, 11 05). *Esnek konut tasarım yöntemleri*. Article. Tahran, İran. <https://www.sid.ir/En/Journal/>