Payback of movement classifications in Dynamic Architecture on Interior Design

Prof. Abeer Hamed Swidan

Professor of design basics and head of interior design and furniture department, Faculty of Applied Arts, Damietta University

abeerswidan@yahoo.com

Assist. Prof. Dr. Elamir Ahmed Shawqy

Assistant Professor, interior design and Furniture Department, Faculty of Applied Arts, Damietta University

amirior@gmail.com

Lect. Esraa Elsaid Ali

Demonstrator, interior design and Furniture Department, Faculty of Applied Arts, Benha University

desesraa93@gmail.com

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Technological development is a fundamental pillar of the development of societies and has significantly and effectively influenced architecture and interior design. Dynamism is one of the cosmic phenomena created by God Almighty. Humans noticed the cyclical change in the movement of the universe, sun, and moon. The earth rotates around the sun and around itself, forming the four seasons and the succession of night and day, and the rotation of the moon around the Earth. Architects tried to respond to constantly changing human needs by using many design techniques and technologies. Technological progress has taken many forms, which allowed some architects to take advantage of the possibilities provided by this progress in realizing their visions and reaching an architecture that reflects the needs of the era. The concept of dynamism is a concept that adds life to the design by controlling the dynamic strength of fixed elements and guiding the user's eye in the project in an infinite experiment. This search will discuss the classifications of movement in dynamic architecture and its reflection on interior design. The problem of the research has been limited to the following:

The possibility of achieving environmental compatibility in dynamic architecture through the study of different methods of movement

The concept of offset: expresses the change in the location of the object in a specific direction, and in physics expresses the offset as the distance between two different points, represented by the amount and direction, as the displacement has affected the intellectual levels of design in architecture and interior design. One of the most important works in which the concept of displacement is illustrated is the Clyde Convention and Exhibition Center.

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Pic (1) The Clyde Convention and Exhibition Centre are known as armadillo near the River Clyde in Glasgow, Scotland, that was inspired by the Armadillo.

Dynamic in architecture and interior design

It is a new architectural vision that follows the rhythms of nature. It is based on the dynamics of movement, dealing with time as a fourth dimension in the design process. Dynamic Architecture is divided into two types: static dynamic – actual dynamic.

Classification of Dynamic in Architecture:

- **Static dynamic:** It is a mental movement in the process of perception "The latent dynamism". It is the movement by inspiring through the arrangements of the elements, lines, basic forms, and levels of the building to give the sense with the movement.

- **Actual dynamic:** It is an objective movement in the visual field "The movement dynamism", it includes two types of buildings, one changing its location and the other changing its dimensions.

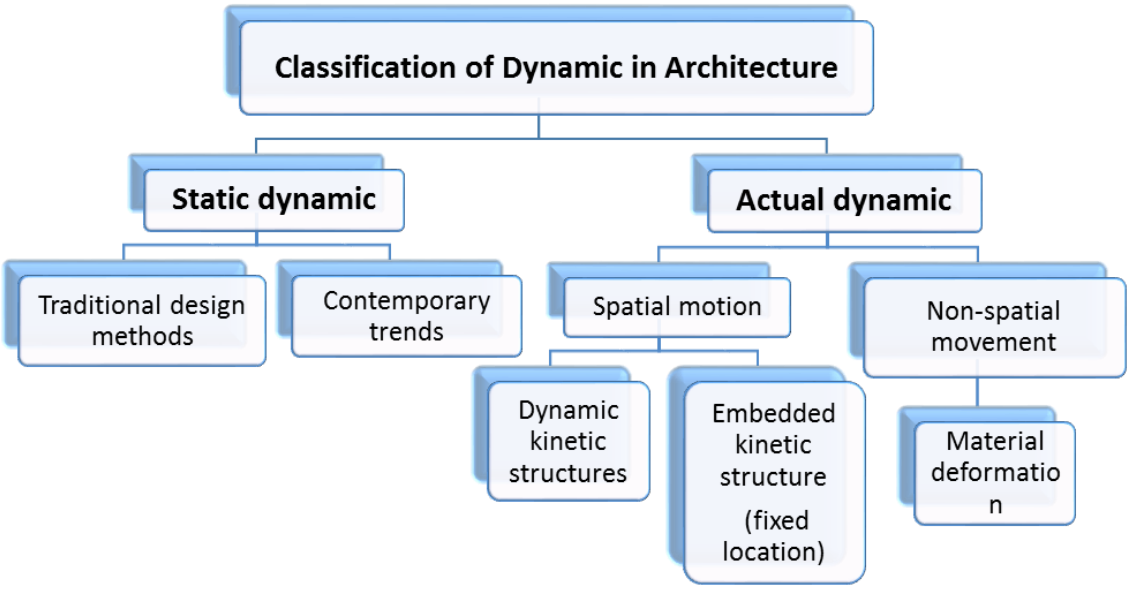


Fig. (1) Classification of Dynamic in Architecture

Classification of movement

According to shape in the space:

Plane motion – Space motion

According to pattern configuration (path):

Linear configuration: This type depends on an axis (straight or curved), it consists of a series of modules (kinetic devices) that are linked by their edges or their vertices to transmit the movement from one to the next.

Centric configuration: This type depends on a center point as a focal point of the space, and there are two typological patterns in this configuration.

According to the relation of the change in distance to time:

Classification of movement according to the relation of change in distance to time: regular movement - variable movement.

According to the type of movement:

Classification of movement according to the type of movement:

Pivotal - Rotating- Folding- Sliding- Extension - Pull & Push

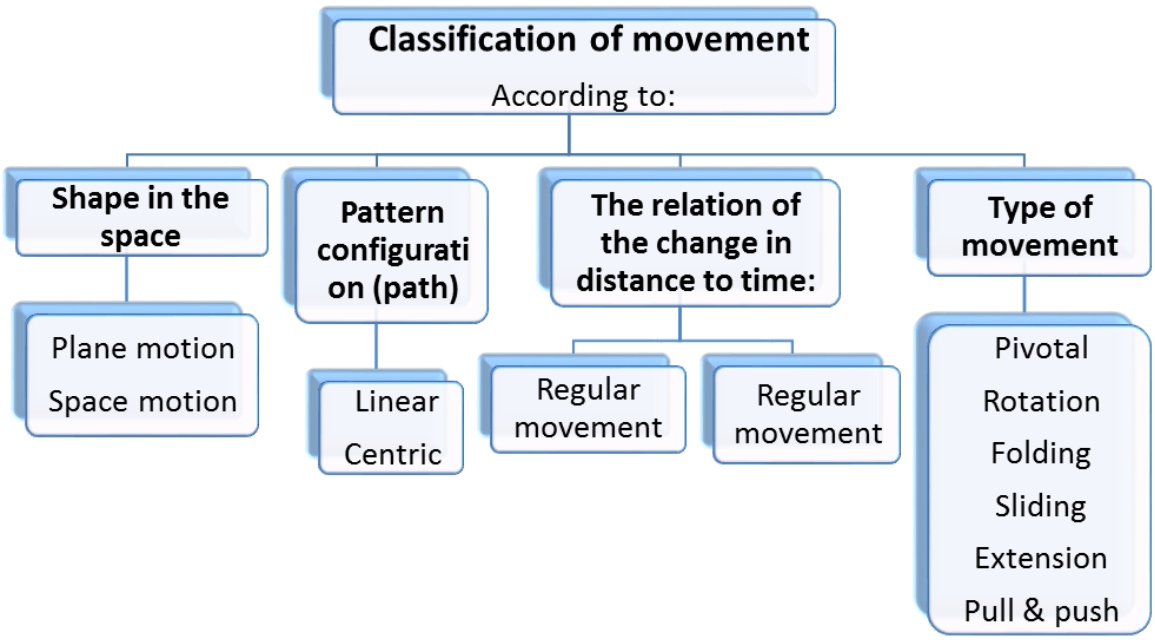
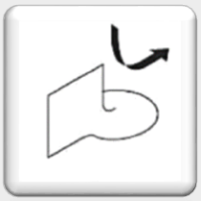
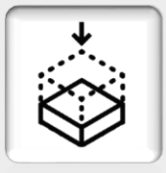


Fig. (2) classification of movement

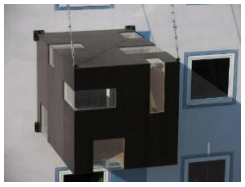
<table>
<tr><th colspan="2">Type of movement</th><th colspan="2">Examples</th></tr>
<tr><td rowspan="2">Pivotal
  </td><td>It is organized from a main supporting element (pivot) in the center of the form.
The movement of rotation around requires an axis of mechanical devices and external force to stimulate the movement.</td><td colspan="2"> 
Pic. (2) Rotating Tower in Dubai - United Arab Emirates</td></tr>
<tr><td>Each floor can rotate independently from the others allowing the building to change its shape continuously.
It is industrially produced being made of prefabricated modules, then assembled on site.</td><td>Architect / Office:
David Fisher</td><td>:Building activity
Residential - administrative - political</td></tr>
<tr><td rowspan="2">Rotation
  </td><td>It is the rotation of a shape in a certain direction (with or against the clock) around a certain point representing the center of rotation, at a certain angle of rotation.</td><td colspan="2"> 
Pic (3) Sharifi-Ha House Tahran – Iran (2013-2014)</td></tr>
<tr><td>Sharifi-Ha House:
This house consists of features of three rooms that can be rotated 90 degrees to adapt to Iran's fluctuating temperatures by opening up rooms in summer or turning them inwards during winter.</td><td>Architect / Office:
Tehran studio (Next Office)</td><td>Building Type: House</td></tr>
<tr><td>Folding</td><td>It is the process of draping one layer over another, as a repetition of the shape, it is theoretically a subjective process since no component elements of the shape are deleted or added.</td><td colspan="2">  
Pic (4) Shifting House</td></tr>
</table>

<table>
<tr><td rowspan="2">  </td><td>Shifting House:
It can change its shape seasonally, the Building is fully dynamic following the direction of the sun throughout the day, the building is flexible as the rooms fold on the rails.</td><td>Architect / Office:
& Woolfson Grünberg</td><td>Building Type: House</td></tr>
<tr><td rowspan="2">Sliding
  </td><td>To move over a surface whil e
Maintaining smooth continu ous
contact.</td><td colspan="2"> 
 
Pic (5) Sliding House (2009) - Location: America</td></tr>
<tr><td>Sliding House:
It is a retirement and eco-friendly residence; the building consists of three buildings centered by an internal courtyard, namely the guest suite and the main living house, located on the same axis.</td><td>Architect /Office:
DRMM</td><td>Building Type: House</td></tr>
<tr><td rowspan="2">Extension
  </td><td>Extension in architecture is the increase in the space of origin by adding a block either internally or externally in horizontal or vertical directions, including internal extension (implicit increase) - external extension (actual increase).</td><td colspan="2" rowspan="2"> 
  </td></tr>
<tr><td>Mobius studio model for humanity
In a prefabricated unit, a movable internal ladder can</td></tr>
</table>

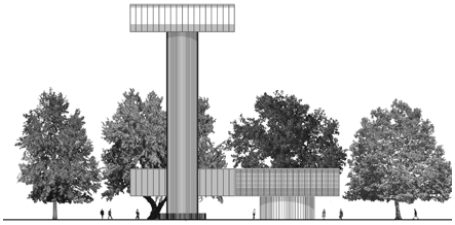
<table>
<tr><td></td><td>be added if the extension is made vertically, the internal division of the rooms is made according to a scale that determines the area of each room and its relation to the adjacent rooms.</td><td colspan="2">Pic (6) Mobius studio model designed in 2009
Pic (7) possibility of adding and transferring in a studio model</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td>Movable extension</td><td>Fixed extension</td></tr>
<tr><td>The extension may be in both directions depending on the design and functionality of the extension.

Types of external extension
Movable extension: means the ability and reducibility of the building and the possibility of moving the added part from one place to another, they are separate prefabricated units.

Fixed extension: means the ability and reducibility of the building with the added Part not being able to move from one place to another, and the separate units are prefabricated.</td><td>The "Pucksack House": is a cube-shaped house that resembles a backpack and is intended to be an additional room, the wooden box is suspended in one of the architectural openings overlooking the external facade with steel cables mounted on the ceiling.

 
Pic. (8) the bag House of the German sculptor "Stefan Eberstadt", designed the dwelling to receive the sun through its glass windows.</td><td>The building of the nursing home in the Netherlands " Wozaco":
The walls are joined by boxes made of wood connected to the main structure by beams, and the facades are based on a curtain wall system.

 
Pic. (9): the building of the nursing home in the Netherlands "Wozaco".</td></tr>
<tr><td></td><td>Architects used to achieve sustainability in buildings, including push and pull movements:
Pull-up, push-down, pull-out, and push-in.</td><td colspan="2"></td></tr>
</table>

Pull & Push 	**Villa Hush hush** The building is divided into four rectangular areas, two of which can be raised depending on the internal arrangement and the requirements of the client, it takes about five minutes to reach its full height, and about three minutes to descend, and the support columns are hidden underground.	  **Pic. (10) Villa Hush hush** **Fig. (3) Elevation of Villa Hush hush**

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