

# Management and Post Occupancy Evaluation of Buildings

Raoufeh Toosi

Master of Architecture, Faculty Member of Amol institute of higher education (non-governmental, non-profit),

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## ABSTRACT

The traditional model of the life cycle, linear process consists of four stages of design, construction, operation and maintenance, and destruction of buildings and the "management" covers all these steps. In the meantime, the issue of "management and post occupancy evaluation of buildings" Despite its importance, has been largely ignored. In this article, "management and post occupancy evaluation" as an essential part of the process of building management is evaluated. For this purpose, after the expression of basic concepts in the field, the steps of implementation of post occupancy evaluation and the timing of its implementation and also its purposes is stated. Then issues raised in the management and post occupancy evaluation in two different context, will be presented. Methods used to answer the questions posed in this study, is library research that has been done using written sources and electronics.

**KEY WORDS:** Management, Post Occupancy Evaluation, Performance Evaluation.

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## 1. INTRODUCTION

"Darkrooms should be dark" was the observation of a teacher reviewing school photographic facilities in a Post Occupancy Evaluation conducted by Chris Watson. In this case, glazing in outer doors compromised the light seal of the darkroom lobby. Such gross errors in building production are relatively rare, but they serve a useful reminder of the importance of systematic review to reduce the likelihood of repetition and ensure their correction [1].

With this introduction, "manage and post occupancy evaluation of buildings" is a well-known method to reflect the performance of the project, from initial concept to operation phase. In fact, the assessment after the operation provide the ability to identify and clarify the potential and limitations, with empower different groups using the building as certified experts to discussion of issues concerning the efficiency and performance of various sectors and at the same time observing the behavior of them in space.

## 2. MATERIALS AND METHODS

This article attempts to answer the following questions:

- What are the steps of post occupancy evaluation of buildings?
- When should the post occupancy evaluation of buildings done?
- What are the variety of methods of post occupancy evaluation of buildings?
- What are the Parameters and the topics that should be considered in post occupancy evaluation of buildings?
- What are the objectives of the management and post occupancy evaluation of buildings?

Methods used to answer the questions posed in this study, is library research that has been done using written sources and electronics.

## 3. RESULTS AND DISCUSSION

### 3010 Steps of post occupancy evaluation of buildings

In an instruction provided by the University of Westminster in London, the steps of post occupancy evaluation of buildings can be followed in the seven sections as follows; [2]

- Step One: Identify evaluation strategy (identify facilities, spaces and parts needed evaluation)
- Step Two: Identify the features that need to be addressed in the evaluation. (Issues and priorities, timing, methods, depth of reviews, etc.)
- Step Three: identify the objectives of the evaluation
- Step Four: Preparation evaluation (specifying the time of evaluation, prepare questionnaires, preparing places of discussion and evaluation and also identify the variety of groups including residents, visitors, crew, staff, etc., depending on the type of building performance, etc.)
- Step five: evaluation with using of various techniques (including questionnaires, interviews, observational studies, etc.)
- Step six: Preparation of reports (including documents and written comments of respondents and presented suggestions with respect to logical structure and transparent order to show any thread)

- Step Seven: Using of evaluation (Reference of information to academic policies and future projects)

**3020 The timing of post occupancy evaluation of buildings**

Evaluation can occur at any stage of the life of a building. For example, in one example, to the assessment of an important building, took place two months before the official opening. But generally, according to the different goals of short-term, medium-term and long-term of evaluations, three time are considered to assess the operation of buildings that to be mentioned below: [2]

- The first phase (Operational review): three to six months after the operation to assess the performance of the building and the immediate problems and defects and small adjustments and meet the needs of consumers.
- The second phase (Project review): Twelve to eighteen months after the operation (at least one year after the operation, after a full seasonal cycle and review of projects under different conditions) to assess the technical and functional parameters of building and Current costs.
- The third phase (Strategic review): three to five years after the operation, to assess the extent to which the building is responsive for short-term and medium-term needs and has the potential of future changes.

**3030 Objectives of post occupancy evaluation of buildings**

Objective assessment of the operation of buildings can be considered in two parts that one part of the objectives is in order to better respond to the needs of the existing building and the other part is to improve the planning and construction of future projects which ultimately will result economic savings in the lifecycle of the building. In general, it can be said that assessment of the buildings have the following objectives; [1]

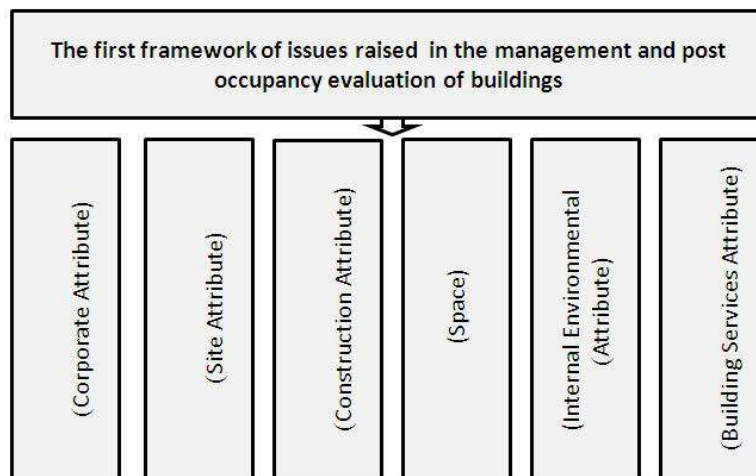
- Identify and investigate the quality of the building to meet the needs of project
- Identify problems and shortcomings in order to reduce it as much as possible
- Identify successful aspects to replicate and implementation in future projects
- Identify the unnecessary and impractical parts to remove them from the design of the future
- Organizing buildings constructed and renovated and refurbished existing buildings

**3040 Examine the issues raised in the management and post occupancy evaluation of buildings**

Parameters in the management and evaluation of the operation of buildings can be divided in different frameworks. Since, checking all divisions is not possible in this article, two different framework in this area will be presented for example.

**3040 10The first framework of issues raised in the management and post occupancy evaluation of buildings**

Executive Research Center of building provides a list of affecting factors in evaluation of the performance of buildings that in the broadest level, has reviews the issues raised in the evaluation in six part of "corporate attribute, site attribute, construction attribute, space, internal environmental attribute and building services attribute"[3]. Each of these issues will be mentioned with the relevant parameters. (Figure 1) It should be noted that the checklist provided is not intended to be prescriptive and adding, reducing and changes on them have been proposed according to different situations and performance requirements of people and institutions.



**Fig. 1.** The first framework of issues raised in the management and post occupancy evaluation of buildings

**3040 1010 Corporate attribute**

In examining the "Corporate attribute", parameters will be evaluated such as management objectives (management's intentions, expectations of the building and any other intervention in the decisions of building), Compliance with laws (in regard to national legislation, governmental and regional programs, with due to additional costs and later delays In case of lack of information on laws in the initial decision in relation to the building), the initial cost (cost of land and

construction, equipment and relocation expenses in rental cases), the life cycle cost (initial cost, annual income, annual expenditures, restructuring costs and the amount of credit of cost estimate), the functional cost of building (energy costs, ongoing maintenance costs, the cost of service management and the costs of insurance and financial services) and security (energy, water, food, emergency services in buildings with significant performance at the time of probable accident) [3].

#### **3040 1020 Site attribute**

This is to evaluate parameters such access (access to the site for all user groups, access to the customer parking, the proximity to public transport stations, taxi, train, distance from key locations, etc.), the built environment (the impact of the built environment, including high-rise buildings in the neighborhood and the effects of future zoning), microclimate (the sunrise and the sunset, radiation status on the building, results of wind test and the effect of the wind on the building and also the sources of noise pollution and air pollution in the vicinity of traffic, factories, etc.), local services (the vicinity of site with shopping, recreation and sports centers, service centers, etc.) and the ground status (surface waters status, conditions of the Subsidence, earthquake, access to water, electricity and gas, etc on respect the role of these factors in the proper functioning of the building on the site)[3].

#### **3040 1030 Construction attribute**

This section examines the parameters such as structural safety (structural state of the building in relation to the foundation, structure and operation of structures to absorb and respond to a variety of forces, including the earthquake, wind, live loads, etc.), the adaptability of structures (the adaptability and Structural adjustment against future reforms), the geometry of the building shell (influence of shell geometry and shape of the building, the exterior form, orientation of buildings, surfaces and volumes and the areas of windows and walls on the current performance and potentials of buildings), Structure (the influence of position of shear walls and interior load-bearing walls, the dimensions of the modules in interior spaces, the position of central cores and supports in building efficiency, etc.) and the finish and final coatings (the impact of the material used in making the final coating and impact of symptoms of water leakage, air infiltration, etc on the performance of the buildings and maintenance costs)[3].

#### **3040 1040 Space**

This section evaluate parameters such as the zoning of space (to provide large areas for functions with the need to extensive and wide spaces, etc.), circulation spaces (circulation between different areas, their relationship with elevators and staircases, width and length of corridors in various parts based on the size of equipment, the situation of traffic bottlenecks and its impact on building performance), the effects of space on social issues (impact of building on interpersonal relations due to the connections between different areas of the building, communal areas, visual stretches between areas...), orientation (the ease of access to the main entrance and orientation in the building, the quality of available signs, easy access to parking, etc), flexibility and quality of space (the flexibility of interior structure, flexibility of partitions and the ability to combining and integrating the modular unit, the possibility of different organizing of activities in the available spatial areas and the possibility to organizing different spatial areas within the building) and Transferable spaces (excess spaces in the building and the desirability of them, areas of excess spaces for rent, access to them and their facilities)[3].

#### **3040 1050 Internal environmental attribute**

This section evaluate parameters such as air quality (amount of internal and external pollutants, performance of ventilation systems to prevent re-entry of exhaust air, air movement inside the building and between spaces, etc.), natural and synthetic ventilation conditions (natural ventilation conditions by checking the openings of windows, Position of the windows against the wind, Position of mechanical ventilation by investigating air-conditioning units, Possibility of control in different areas, the amount of noise pollution of the systems, adjust the volume and direction of air ...), thermal comfort conditions (amount of air temperatures the radiant temperature, amount of air humidity, the situation of air ventilation channels at the end of directions and in Floors), noise pollution (environmental noise pollution, sources of interior noise pollution, Period of reflection and echo, Situation of the sound-absorbing surfaces, Situation of sound crossing from partitions, walls, floors and ceilings and its impact on building performance), Lighting Situation (effects of natural light including the type and Positions of windows, the amount of light distribution, light glare and reflections from nearby buildings and also the effects of artificial light such as the position and type of light, brightness of light, color of light, light distribution, direct light effects, emergency lighting on internal environment) and finally the atmosphere of space (the Impact of view and perspective, appearance of the walls and floors, joinery, the skylights, size and height of windows, room dimensions and ceiling height on created atmosphere, including depression, excitement, relaxation, boredom, etc in interior spaces)[3].

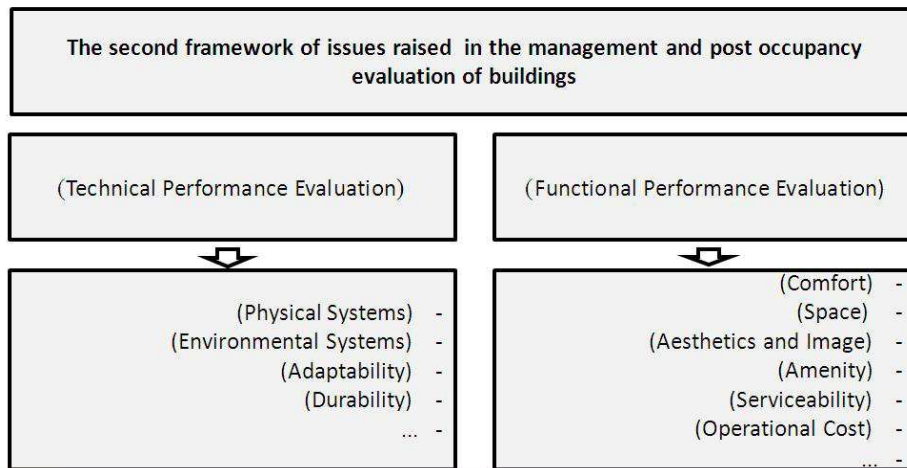
#### **3040 1060 Building services attribute**

The last issues considered in this context are building facilities that evaluate parameters such as capacity, flexibility and conditions of maintenance of facilities (locations of machines, capacity of the system and its capabilities for configuration, adaptability to possible changes, maintenance and access to machines, resistance of systems against risks and duration of working without interruption), the situation of electrical installations (the ability to store electrical energy, state of emergency lighting systems, generators, possibility of future changes), the air conditioning installations (heating,

ventilation and air conditioning (HVAC), the compatibility of controlled areas with the shape of buildings and environmental impact, the distribution of heat and cold and the air movement inside and around the building with regard to the terms of fans and pumps, areas of branch, conditions of access and maintenance of ducts, duct cleaning, the space for possible additive ducts, etc.), IT (the flexibility of Information lines, the ability to expand the network, the considered spaces for the cable in the floor and ceiling and access to them due to the increasing use of information technology and the need for access to communication systems between different parts of the building and the outside world), position of vertical Communications (number of elevators and escalators and the maximum distance from them, their location in relation to clients, maximum portability of cargo elevators if necessary, etc.), Protection against fire (access to fire equipment, location of emergency exits, fire doors, the geyser systems, the position of fire extinguishers, the position of flammable material and manufacturers of fires including smoke, heat ...) and the cost of utilities (the cost of fuel, cost of equipment and the cost of future performance and costs of electricity tariffs, etc)[3].

#### **3040 20The second framework of issues raised in the management and post occupancy evaluation of buildings**

In another context, the assessment of the operation of buildings can be divided into two parts: Functional Performance Evaluation and Technical Performance Evaluation (Figure 2) that the topics covered in each section are as follows; [2].



**Fig. 2.** The second framework of issues raised in the management and post occupancy evaluation of buildings

#### **3040 2010 Functional Performance Evaluation**

This section evaluate parameters such as User comfort (the physical and mental welfare of people), space (in terms of dimensions according to the performance and conditions of users, space communications, legibility and adaptability of spaces with different functions throughout the lifecycle of the building and possible changes in the future), aesthetic issues (including harmony, conflict, markings, etc.), facilities and equipment building (in terms of location, capacity, access and flexibility for reform and long-term changes), issues related to service (cleaning and routine maintenance of buildings) and operational costs (costs related to energy, water, Price of cleaning affairs, rent and insurance)[2].

#### **3040 2020 Technical Performance Evaluation**

Technical efficiency of buildings will be examined through the evaluation of installation systems (including heating, lighting, ventilation and acoustics), environmental systems (Energy, Water, Materials and co2 output in relation to the technical systems), adaptability of systems (compatible changes of technical systems to reform and expand in the future) and the durability and strength of operation of systems [2].

## **40 CONCLUSIONS**

In a general conclusion, we can say that buildings are adaptive solutions to answer the physical and psychological needs of human beings and post occupancy Evaluation of buildings is a tool to check the amount of accountability of planning and design of buildings to these needs. these evaluations are possible by quantitative and qualitative parameters. in fact, post occupancy Evaluation of buildings is important because the analysis of evaluations leads to beneficial results for all groups that are associated with the building, including;

- those using the building as the main audience by eliminating the defects and shortcomings of the building and reconstruction it
- designers by understanding of the strengths and weaknesses and improving the conditions in the similar designs of future
- finally as a guide for owners of facilities for the optimized development of equipment and available facilities In the future, according to the needs and demands of employers

However, it should be noted that the methods of assessments need to be more practical and provide the easier access to solutions and results. It is hoped that the results of the methods of post occupancy Evaluation of buildings be existed faster and cheaper to be joined to the existing organization and instruction and to be used.

#### REFERENCES

- [1]. Watson, Chris, 2009. Review of Building Quality Using Post Occupancy Evaluation. p. 1-4.
- [2]. AUDE, Guide to Post Occupancy Evaluation, 2006, University of Westminster, HEFCE. p. 6-8.
- [3]. George, Baird, Building Evaluation Techniques, 1996, McGraw-Hill. p. 141-159.
- [4]. Allen, Edward, How Building Work, The Natural Order of Architecture, 2005, Third Edition, OXFORD.
- [5]. Nelson, Charles, Managing Quality in Architecture, A Handbook for Creators of the Built Environment, ALA, FRAIA.
- [6]. Preiser, Wolfgang E.F and Vischer, Jacqueline C., Assessing Building Performance, 2005, ELSEVIER Butterworth-Heinemann.
- [7]. Watson, Gill, Post Occupancy Evaluation Guidance, 2007.