

DESIGN EDUCATION FOR ADAPTIVE REUSE

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Abstract

Builtform is subject to various types of obsolescences in the course of time. Among these functional obsolescences, taking place as an outcome of ever changing modes of production and consumption, are of crucial importance so far as their fate of existing urban fabric is concerned. Defunct buildings become derelict and often subject to demolition which amounts to the eradication of the collective memory. In this connection the process of adaptive reuse can be defined as the task of adjusting functionally obsolete buildings for new program requirements through building conversion. Adaptive reuse projects entail not only alterations within the boundaries of an existing building envelope but also radical changes/transformations in the space configuration so as to accommodate the new set of functional requirements. Therefore, the development of an architectural design scheme in the light of potentials offered and the constraints imposed by an existing architectural entity is essential. Although adaptive reuse projects require case specific approaches depending on the peculiarities of the original structure three main areas of concern can be discerned during the elaboration of the design scheme. These areas of concerns are the space configuration, tectonic aspects of the context within which the project will be realized. The paper addresses itself to the elucidation of these concern areas and the interrelations with the final scheme.

Keywords

Obsolescence, adaptive reuse, space configuration, tectonics, context.

Introduction

Adaptive reuse in architecture denotes the process of building conversion so as to accommodate new functional requirements. Since the whole process is shaped within the possibilities of an already architected structure the term adaptive reuse is labelled as 're-architecture' by Cantacuzino. The process involves, in the first place, the preparation of an architectural design project/scheme according to the possibilities/potentialities offered and the constraints imposed by an existing building which is often of historical importance. And in the second place the necessary alterations/conversions are to take place, generally, within the boundaries defined by the building envelope and in line with the new project. In some cases the process of adaptive reuse may exceed the boundaries of the existing structure, or it may even necessitate the construction of an annex building depending on the peculiarities of the project.

The idea of adaptive reuse of buildings in order to produce space for new functional requirements is neither something new or contemporary nor is it limited to architecture. It has been applied to almost all types of artefacts since centuries. It has been preferred to demolition and rebuilding in various parts of the world and a plethora of old and defunct structures have been adapted to other utilizations since time immemorial. There are numerous examples of military buildings adapted as schools; jails as luxury hotels; palaces as cultural buildings like museums and art galleries; theater scenes as palaces; and industrial buildings for almost all types of functional requirements.

Moreover, it goes without saying that adaptive reuse is not also an area of concern which is oriented to only to buildings with historical importance or to buildings with reach architectural features. The process addresses itself to all types of buildings and is conceived as a panacea for all types of obsolescences be it functional, economical or even physical. In other words the applicability of the process of adaptive reuse is closely related with the obsolescences of buildings and economical feasibility of the project.

Built form is subject to mainly to three types of obsolescences namely: physical, functional and economical. Although building obsolescences are due to a variety of factors it can be generalized that they are all the natural outcome of the changing modes of production and consumption triggered primarily by the consequences of technological changes and transformations. Least hazardous among the three types of obsolescences is the physical one, in that, it can easily be remedied and put to its original state provided that the required

funds are available. Whereas functional and economical obsolescences, more often than not occur in tandem, and are the main causes of derelictions and building demolitions, which in turn reflect themselves as the unavoidable transformations of land-use patterns; as the changes in the character of urban fabric; and most alarming of them all as the eradication of layers of history of most cities. On the other hand most building types known to have relatively shorter functional lives compared to their physical durabilities become obsolete as a result of the transformations taking place in the urban land-use patterns. Among these industrial buildings and plants are in the forefront. Obsolescence, as far as adaptive reuse is concerned is important because it paves the way for adaptive reuse. Furthermore, the type of obsolescence gives valuable clues for the development of a conceptual framework of a design problem to be dealt with in the studio.

In addition to the above, it is accepted by one and all that built form plays the most vital role during the formation, accumulation, and dissemination of collective memory of a culture. Therefore heritage value of most historical buildings/settings prevail over their functional viability. This also holds true for the piece of land they occupy too. As it has been stated in the previous paragraph, the physical durability of the majority of historical buildings exceeds their functional life paving the way for economical obsolescence and eventually for demolition so as to make space for new building. In order to overcome these demolitions and prevent the disappearance/loss of collective memory adaptive reuse is a viable strategy/approach to resort to.

Areas of Concern in the Design Studio

Among the several areas of concern an architectural design studio aimed at developing projects for adaptive reuse implementations three main issues come to the forefront namely: the space configuration, building and tectonic properties and the context within which the development is taking place. These three area of concern will be elucidated in the following paragraphs in relation to adaptive reuse projects.

Space Configuration

Architecture is defined in the dictionary as: an "art or or science of building'. Whether an

art or a science or even a practice, the main objective of architecture is the production of space for human activities, in that, space is the unavoidable requirement of man involving processes. Therefore, a revised definition of architecture can be formulated as: the art of building so as to produce space for human activities. Buildings help shape, define, house, shelter, divide or unite spaces.

Space, in architectural parlance, can best be defined as: a perceived portion of the physical environment which accomodates a set of activities. Or in other words, it is a perceived milieu within the perceptual boundaries of which human activities are performed The perception



Figure 1: Coexistence of Old and New Components in the Same Building: Museum of Rahmi Koç, İstanbul (Source: Authors).



Figure 2: Coexistence of Old and New Components in the Same Building: Museum of Rahmi Koç, İstanbul (Source: Authors).

of space is not to be limited with visual faculty only. All senses play important role in the formation of the architectural space. No space can exist in isolation as an independent entity. It has to have connection with at least one another space. In this regard buildings can be taken as amalgam of interrelated/interconnected spaces. "This idea can best be captured by Hillier's notion of configuration_a set of relationships among things all of which interdepend in an overall structure of some kind." Space configuration covers the totality of interspatial relationships/interactions. It is closely related with the indoor-outdoor interaction of spaces and their corresponding modes of enclosures and exposures.

The purpose of adaptive reuse projects is the utilization of an existing building for a new set of functional requirements. It is obvious that there is little chance for an existing building to conform to a new program. A new program and new functional requirements to be fulfilled within the boundaries of an existing building will, definitely, entail a new space ordering which in turn will necessitate substantial amount of changes/transformations to take place in the space configuration of the original structure. At this point of the study there are two main points that one has to make an issue of debate. The first point is concerned with the new space configuration of the adapted building; the second is related

with clues that the existing configuration will dictate. Both points are also closely related with the morphological properties of the original building that will be taken up in the next part of this paper.

The above is the most crucial phase of the all adaptive reuse processes, in that, it has a determining role on the overall success of the whole project. In order to overcome this important phase of the process a morphological analysis/study of the original building is essential. "The morphological study is based on the notion of interrelatedness of parts, or the structural relationships of parts to other parts and to a whole." This phase is to be taken as a turning point of the whole sequence of an adaptive reuse design studio.

A new space configuration in accordance with the adaptive reuse project may involve not only the complete rearrangement of floor plans but also may dictate radical changes in floor heights and circulation systems. Moreover, the proposed space configuration may well be based on a new mode of indoor-outdoor interaction pattern which in turn may necessitate the adoption of a totally different concept of enclosure and exposures of the indoor spaces.

Building Aspects and Tectonic Properties

It is obvious that accommodating a new program according to a new space configuration in an existing structure will dictate a number of building alterations reflecting themselves on the architecture of the original building. The debate on the binary relation between form and function has always been on the agenda of architectural discourse. It has been claimed by many a scholars that there exists no proof of a direct

relation between form and function. Although the propriety of the form to functional requirements is undebatable for good architecture it can be stated that no function dictates a specific building form. Similarly no building type is limited to predetermined geometrical properties. That is to say that the form properties of buildings do not constitute sharp restrictions for adaptive reuse attempts.

Although most building types lend themselves for conversion to new uses, defunct industrial facilities have a special place in adaptive reuse implementations. Defunct industrial buildings like factories, warehouses, power plants, shipyards and etc., besides the surface area they occupy have large volumes enclosed by large wall surfaces. As it has been mentioned by Cantacuzino: "industrial buildings have large occupying volumes enclosed by brickwall, frequently whole city block." Industrial buildings are large span buildings, that is, their floor surfaces are not obstructed by structural elements. They also lend themselves suitable for additional slabs and mezzanine floors. Their external wall surfaces can be converted to a wide variety of solid-void organization schemes in line with the requirements of the adaptive reuse project design.

Not all adaptive reuse projects are so lucky as it is the case with industrial buildings. Industrial buildings with their large enclosed volumes offer a wide variety of possibilities for reconfiguring the spatial organization of the original building. The opposite also holds true in some cases, that is, imposition of the space configuration of original structure through building limitations. A jail building or a school building converted to a hotel building with the limitations of their previous

space subdivision limitations are good examples for this situation.

In architectural discourse the term 'tectonic' denotes the art of assembly of building parts. It points out the artful relations of the elements of form to each other and to the whole so as to achieve a system of order, balance and unity in an architectural ensemble. It also signifies, in architectural parlance, the artful continuity between form and construction; between construction and the structural system it is based on. Moreover, it is the reflection of the notion of space as a form of structure and construction.

In connection with the adaptive reuse projects the sensitivity to be shown to the tectonic properties of a piece of architecture is indispensable, in that, built form is the reflection of the social, cultural, and economical conditions of a culture or of an era to the physical environment. Built past is the symbol that embody collective values which includes patterns of thought of a society. The liaison between architectural tenets and systems of thoughts can best be preserved through buildings.

The vast majority of buildings subject to adaptive reuse are historically noteworthy buildings. Even the industrial buildings, notably those built during 19th Century, possess remarkable architectural features and tectonic excellences that the project designers must be sensitive to. This sensitivity includes primarily the determination of tectonic properties and also the atectonic features of the original structure. An important part of the message to be conveyed by the original building and genealogical clues may well be dormant in atectonic features. It is interesting to notice that in the majority of the

industrial buildings, notably those built during Ottoman Era, the structural issues do not prevail over architectural concerns. On the contrary, majority of these buildings possess distinguishably rich stylistic ornamentations each of which conveying important messages about the past.

The preceding paragraph clearly dictates that prior to the development of the main concept for an adaptive reuse project a careful reading an deciphering of not only of the space configuration of the original building but also of its architectural features is essential.

The handling of building tectonics as an area of concern of the design studio for adaptive reuse is largely a case specific issue, depending on the architectural properties and peculiarities of the building to be adapted. It also depends on the courses of action of the individual designer/design team. The debatable question to be answered here is: whether a new space configuration can be housed within the tectonic properties of an existing building or does it require completely new tectonic properties.

One possible answer to the above stated question is to keep intact the tectonic properties of the existing building and to realized the spatial requirements of the new function with completely new materials and techniques independent of the original structure. This is something like one building inside the other, or in other words the new inside the old. One such design solution to adaptive reuse is seen in Rahmi Koç Industry Museum in Istanbul. In this project a 19th century Ottoman Shipyard and an old Ottoman Foundry have successfully been converted to an Industry Museum where the stone load bearing structural properties of two historical buildings are very well preserved and the new spatial requirements are



Figure 3: Museum of Rahmi Koç in Lengerhane (1613, Istanbul (Source: Authors).

solved with additional steel structural elements sensitively placed inside original buildings. In these project the old and new co-exist as representatives of two different architectural/cultural era.

Another possibility, which is valid for especially for historically important buildings, is to abide by the constraints imposed by the original structure without resorting to major alterations. This can be interpreted as the exploitation of the potentials of the original building an tailoring the new space program accordingly.

Context as an Area of Concern in the Studio

The term 'context' comes etymologically from Latin 'contextus', meaning connection. Among

the dictionary definitions the one which best relates with architectural discourse is stated as follows: "the interrelated conditions in which something exists or occurs." As it is implied by this definition the term 'context' is richer in meaning/coverage compared to 'environment' or 'surrounding'. The meaning of 'context' in architectural discourse expands over a vast area of interpretations ranging from a simple single feature to such interrelated conditions like social, cultural, economic, and environmental factors. Therefore, 'context' concerns itself not only with relationships between built forms and natural and man made environment but also with the determinant factors of these

relations.(social,cultural, economical and etc..) It sometimes plays a very crucial role that it may become a parametrical determinant of the design. Nevertheless, this importance is not in the list of priorities of most projects.This is best expressed by Mark Alan Hewitt who writes: "Despite theoretical turns towards contextualism during the past twenty years, most buildings still designed as singular, abstract objects, bearing tangential and largely formal relationships to the surrounding environment."

Context does not only include tangibles like man made and natural elements. It also includes social and economical determinants which do not have physical presence but strongly felt as determinants of the context.

Concerning the existing built form the views of two scholars are of importance. According to Hewitt: "Major theories of design have been operated during much of the 20th century: the so called stylistic unit theory, originally associated with Viollet le Duc in the Victorian period; and the dialectical modernist theory of disjunction, which stipulates absolute contrast (or at least clear distinction) between old and new. Both of these theories depend upon the reading of the historical piece as an object. The former (conjunctive theory) assumes that the building will be restored to a state of completeness which may never existed during its time. The latter (disjunctive theory) that it will be rendered complete and frozen as of the moment of the new intervention and will be set apart forever by the clear break between the parts"

Concerning the role of the context in the shaping of an adaptive reuse project the palimpsest analogy resorted to by many as scholars

in connection with refunctioning and rebuilding of the built environment is worth mentioning here. A palimpsest is: "a parchment or other surface on which writing has been applied over earlier writing which has been erased " The term is derived from "Greeek 'palin': again+'peustos':rubbed smooth." An interpretation of the term which can be applied to the study of the built environments is as follows: "something reused or altered but still bearing visible traces of an earlier form." An extended usage of the term can be found in the following quotation from Wendy L. Butter who writes: "Several historians are beginning to use the term as a description of the way people experience times, that is, as a layering of present experiences over faded past. The palimpsest analogy for architecture is a powerful tool to point out the importance of the built past for the collection of urban memories. As it has been expressed by Mark Crinson "urban memorycommonly indicates the city as physical landscape and collection of objects and practices that enables recollection of the past and that embody the past through traces of the city's sequential building and rebuilding." "

To ensure the continuity with the past, without discarding the requirements of the contemporary spatial standards, is one of the most important aims of the adaptive reuse projects. Over and above, revitalization of defunct, dilapidated and derelict building stock will enhance the visual quality of the built past.

Conclusion

First of all it has to be stated that adaptive reuse, as a means to extend the life of defunct building gives a large array of architectural design possibilities. Since its field of operation is not

limited with historically important building it also gives the possibility of rearchitecture of derelict buildings. There exist neither a clearly stated design method nor established and accepted procedures as a source of guidance when approaching to the development of adaptive reuse projects. They are all case specific design problems so far as a studio task is concerned. In other words each design problem for adaptive reuse defines its own process of development .

1. Cantacuzino,S., "Re-Architecture: Old Buildings/ New Uses", New York, 1989, p:8 .
2. Merrian-Webster Dictionary.
3. Psarra,P., "Architecture and Narrative: The Formation of Space and Cultural Meaning",Routledge, London and New York, 2009, p:5(quoted from Bill Hillier, "Space is the Machine",Cambridge University Press,1966, p:33)
4. Psarra, P., "Architecture and Narrative:The Formation of Space and Cultural Meaning",London and New York, 2009, p:5.
5. Bahl, V., "Ethics of Adaptive Reuse",Architecture Week, on line, (June 22, 2005), available at http://www.architectureweek.com/2005/0518building_1-2.html.
6. Adorno,T.W., "Functionalism Today",in Rethinking Architecture,edited by Neil Leach, London, Routledge, 1997, p:7.
7. Cantacuzino, s., "Re-Architecture: Old Buildings/ New Uses", New York, Abewille Press, 1989, p:8.
8. . Mark Alan Hewitt, "Architecture for a Contingent Environment", Journal of Architectural Education, Vol.47, No.4(May1994,pp.197-209).
9. ibid
10. Oxford English Dictionary,<http://www.oxfordjournals.org/lookup/entry?ref=defn1&entry=architecture-for-adaptive-reuse>

11. ibid

12. <http://wikipedia.org/wiki/palimpsest>

13. Wendy L. Butter, "The Cultural Landscape of a Site in Old Montreal:Reflections oon Urban Memory Montreal as Palimpsest; Architecture, Community, Change", 2008 Conference on the Hi,story of Architecture (quoted from Mark Crinson, "An Introduction in Urban Memory: History and Amnesia in the Modern City, London and New York, Routledge, 2005,p:4.

References

Bahl, V. (2005, June 22). Ethics of Adaptive Reuse. Architecture Week. Page B1.2 . 18 May 2005 Retrieved from http://www.architectureweek.com/2005/0518/building_1-2.html (For further reading: Adorno,T.W. (1997). Functionalism Today in Rethinking Architecture. Leach, N. (Ed.). London: Routledge).

Butler, W. L. (2008). The Cultural Landscape of a Site in Old Montreal: Reflections on Urban Memory Montreal as Palimpsest; Architecture, Community, Change. Conference on the History of Architecture. April 18,2008.(quoted from Crinson, Mark. (2005). An Introduction in Urban Memory: History and Amnesia in the Modern City. New York, NY. : Routledge, p:4) Retrieved January 20, 2010 from http://art-history.concordia.ca/institute_site/conf08_palimpsest/en/palimpsest_papers.html

Cantacuzino, S. (1989). Re-Architecture: Old Buildings/New Uses. New York, NY: Abbeville Press.

Hight, C., Hensel, M. & Menges, A. (2009). En Route: Towards a Discourse on Heterogeneous Space beyond Modernist Space-Time and Post-Modernist Social Geography. In Hight, C.,

Hensel, M. & Menges, A. (Eds.) Space Reader : Heterogeneous Space in Architecture.(pp.9-37). West Sussex :John Wiley and Sons.

Hewitt, Mark Alan. (1994 May). Architecture for a

Contingent Environment. *Journal of Architectural Education*.47(4), 197-209.

Picon, Antoine. (2004). *The Freestanding Column in Eighteenth-Century Religious Architecture*. In Daston, L.(Ed.) *Things That Talk: Object Lessons from Art and Science*. (pp.67-99). New York, NY. : Zone Books.

Psarra,P. (2009). *Architecture and Narrative: The Formation of Space and Cultural Meaning*. New York, NY : Routledge (quoted from Hillier, B. (1966) *Space is the Machine*. Cambridge: Cambridge University Press. p:33).

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