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# **An Integrated System to convert an existing Building with Architecture Style to a Contemporary Office Building**

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## منظومة متكاملة لتحويل مبنى قائم ذو طابع معماري إلي مبنى إداري معاصر



Faculty of engineering  
Architecture Department

# **An Integrated System to convert an existing Building with Architecture Style to a Contemporary Office Building**

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## **A Thesis**

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وَقُلْ رَبِّ زِدْنِي عِلْمًا

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*To my  
Mom and Dad  
for all your Support  
and  
Unconditional love*

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## **Summary**

Paris, London, Athens, Cairo and many other cities are rich with their history, history that is reflected in many aspects of life all around them, one of these aspects is the valuable buildings that decorate their townscape and give a feeling of originality when walking among their streets. Preserving these buildings helps to preserve their history as they carry with them emotional values beside their architectural values, however through time these buildings may become obsolete and deteriorated for many reasons one of them may be improper maintenance or the use that they were designed is no longer needed. These buildings are protected by the laws of preservation that forbids their demolishing. These laws set out a system for protecting these buildings, these systems vary from country to another. The Egyptian law of preservation is the law number 144 for year 2006, the law sets out a system for preservation, this system is compared with the system determined by the laws of preservation in England because their system is one of the most successful systems of preservation among the world as they have 500 000 buildings listed against demolishing.

Listing these buildings against demolishing is not the end of the systems of preservation it is only the start because some of these buildings are not functioning properly, these buildings have to be adapted to accept the new needs and systems of the contemporary buildings. The research focuses on the office buildings as a possible use because it is one of the most demanded buildings in the world, office buildings come in the 3<sup>rd</sup> place after the residential use and retail use.

Adaptation as a theme has different points of view, some experts think that buildings should be returned to its original condition other experts accept few alterations when needed and other experts accept alterations in interior only because the exterior affects the townscape and the interior does not and others go farther and accept a modern addition to the facades. Adaptation also has many types which are: change in function, change in capacity or change in performance. The general objectives of any adaptation are code compliance, Environmental enhancement, spatial modifications, Structure and fabric upgrading. Adaptation has many advantages and disadvantages that have to be studied carefully before taking a decision to adapt.

The Structure system and construction materials of relatively older buildings vary from the materials and systems used nowadays because the materials that were used in construction carried compression and were kind of bulky. These differences have to be taken in consideration so as not to affect the safety of these buildings,

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Any building has different systems that define it, these systems are envelope, services, interior, structure and site systems, the research defines these systems and discusses which systems are most probably to be changed and developed during adaptation process and which systems that are hard to adapt and which systems can't be altered or changed, then the scale of work that is going to be done to adapt the building is classified into four types each of them have its effect on the cost and time that is needed to adapt the building

Office buildings as a use is then discussed, firstly by demonstrating its progress through time then by defining the elements that have great influence on the design of the building like the core, the floor plate shape and depth, the floor to floor height, the envelope, the vertical transportations, code conformance, parking spaces, area schedule and the cost then the services needed in an office building and the different types of spaces in the office building and their needs.

Many buildings among the world have been adapted as office buildings, some of these successful experiments are demonstrated and they are classified according to the scale of work that has been done to adapt these buildings, the main classification is: interior system and services development, structure alteration, building extensions and façade retention. each one of the previous degrees have its effect on the cost and time needed to adapt the building so the scale of work needed to adapt the building have to be known before going through with any adaptation theme.

The research based on the previous information gathered a checklist that has to be filled after getting to know the needs of the future office buildings, this checklist measures the acceptability of the building to accept the needs and the systems of the future office buildings and it determines whether the adaptation process is possible or not and if it is possible is the building considered a flexible building and will provide these needs without massive alterations or it's inflexible and needs lots of alterations to provide these needs. The checklist determines certain points, every point has its own weight in the adaptation theme as there are basic, important and secondary points if the building fails to provide the basic points then it can't be adapted but if it succeeds in the basic points and fails in the important points then the building can be adapted but it is inflexible and will need lots of alterations to be adapted and if it succeeds in the basic and the important points and fails in some of the secondary points then the building has high flexibility to accept the needs and systems of the future office building.



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## **Abstract**

the rate of progress in technology, communications and services has become very fast, modern inventions take their way to application in just few years changing our life style and needs , even though our buildings are designed to survive for very long times it can reach to 300 years or more , some of these buildings have become obsolete and redundant through years because they can't cope with the modern needs or support the services that are now essential to modern uses and people , some of this building play a major role in forming the townscape of the city and its streets and shouldn't be demolished, on the contrary they should be updated and adapted to enhance them to perform new and modern uses through their unique and valuable style.

Any building that is not properly maintained and updated will fall in the circle of deterioration or it can be an obsolete building if for example its original use is no longer needed, if this building is valuable then it can't be demolished and have to be adapted to be properly reused. The research discusses the process of adaptation, its types, advantages and disadvantages and suggests reusing these buildings as office buildings because it is a use that is very demanded and needed among the world.

The research also discusses office buildings, their progress, needs and most of the aspects that should be taken in consideration during the process of adaptation and displays number of examples of buildings that have been adapted and reused as office buildings, these examples vary in the scale of work that have been done to adapt the buildings.

Finally the research proposes a checklist that determines all the aspects that should be considered during adaptation in order to determine the flexibility and the capability of the building to provide needs and accept the various systems needed by the proposed office building.

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## **Key words**

- Adaptation
- Renovation
- Rehabilitation
- Preservation
- Code compliance
- Demolish
- Obsolete
- Obsolesces
- Obsolescence
- deterioration
- Deteriorated
- Vacant
- Buildings systems
- Structural alteration
- Façade retention
- Office buildings
- Work space

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## **Research objectives**

Research objective can be explained in the following points:-

### **Objective 1:-**

Developing a system that determines the degree of flexibility of the building to adapt to the needs of the future office building noting that office building have many different types, scales and needs.

### **Objective 2:-**

Defining all the aspects related to the procedure of adapting an updating the buildings to cope with the future use

## **Research hypothesis**

In order to convert an existing building with architectural style into an office building certain features have to exist in the building and other features have to be modified or even introduced to accept the requirements of the future office building.

## **Methodology**

The methodology of the study will follow the following;

- Induction from the previous analytical parts to form the final checklist the will determine whether the adapted building is suitable for the future use or not.
- Analytical comparative between the laws of preservation in Egypt and England.
- Analytical review on the process of adaptation and reuse
- Analytical review to find out needs of the contemporary office buildings

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## **The Research problem**

Historic buildings provide a tangible link to our past. This link allows us to establish a sense of orientation about our place in time. We can learn from the past and through it we can continue to benefit from the accomplishments of our ancestors.

Though these buildings can represent a major problem because as the time passes the materials tend to deteriorate and new technologies and sciences are developed introducing new construction materials and new systems and facilities so unless these building are regularly maintained and updated they will fall in the circle of abandonment or redundancy.

This becomes one of the major problems emerging in the historical cities that have an architectural heritage because the number of these building might pass several thousands and these buildings can't all be demolished because some of them have architectural styles that represents the character and the identity of the city , its streets a, squares and also carries in its character the heritage and the events that passed by the city and they have emotional and sentimental importance because most of these buildings go way back to the start of the 20<sup>th</sup> century, 19<sup>th</sup> century and sometimes 18<sup>th</sup> and 17<sup>th</sup> century. ,so these worthy buildings should be preserved and listed against demolishing

The size of the problem can be clearly seen if we know that there are 2904 listed building in Cairo, 500000 listed building in Great Britain , these buildings are protected and can't be demolished some of them are valuable in their exterior only and some are valuable in both its interior and exterior

On the other hand most of the large corporations and firms may seek to make use of these building due to its location or many other factors that will be discussed later in the thesis. Office buildings as a use comes in the third place when measured by the quantity as it comes after housing and retail, in USA for example there were more than 700,000 offices building in the United States in 1995. by year 2000 there were 50 million office workers that occupy around 1 billion m<sup>2</sup> representing around 10000 billion \$, in the united kingdom alone there are over 10 million office workers that occupy 200 million m<sup>2</sup> and representing about 200 billion \$, in England

Adaptation is the language spoken now in the old cities because maintaining these historic areas is what separates these cities from the newly emerging cities which have no past and we can build new modern buildings in other places.

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## **Research Structure**

The thesis mainly consists of: -

**Chapter1** : listed buildings against demolishing and adaptation

**Chapter2** : technical aspects in the process of adaptation

**Chapter3** : contemporary office buildings design

**Chapter4** : examples of buildings adapted as office buildings

**Chapter5** : proposed checklist for the process of adapting

## Table of Contents

Table of Contents.....	VI
Table of tables .....	V
Table of figures.....	V
Introduction .....	1
1 Chapter 1 Listed buildings against demolishing and adaptation process.....	3
Introduction .....	5
1.1. Old buildings why are they so worthy .....	6
1.2. Typical life cycle of a building .....	8
1.3. Building obsolescence and redundancy and deterioration.....	9
1.3.1. Obsolescence.....	10
1.3.2. deterioration .....	12
1.4. Responses to building obsolescence .....	14
1.4.1. Minimizing obsolescence.....	14
1.4.2. Correctable obsolescence .....	14
1.4.3. Non-correctable obsolescence.....	15
1.5. Vacant buildings .....	16
1.5.1. Reasons why buildings become vacant	16
1.6. Laws concerning preservation .....	17
1.6.1. Law of preservation in Egypt :- ...	17
1.6.2. Laws of preservation in England .	18
1.7. adaptation .....	24
1.7.1. The range of intervention .....	24

1.7.2. What is The Difference between maintenance refurbishment and adaptation? .....	25
1.8. Adaptation process .....	27
1.8.1. Participants in the process.....	28
1.8.2. The criteria for viability .....	28
1.8.3. Identifying generic characteristics	29
1.8.4. Influences on adaptation versus redevelopment Background.....	30
1.8.5. The acceptability of adaptation as a means of architectural conservation .....	33
1.8.1. Spab Committee Recommendations	35
1.8.2. What are the general objectives of adaptation ?	37
1.8.3. Reasons for adapting a building...	39
1.8.4. Advantages.....	41
1.8.5. Disadvantages .....	43
1.8.1. Advantages of historic buildings adaptation	44
1.8.2. Problems with adapting buildings	46
1.8.3. Kinds of adaptation .....	51
1.9. Summary.....	53
2. Chapter 2 Technical Aspects of Adaptation	55
Introduction .....	57
2.1. The difference between old structures and new structures.....	58
2.1.1. Calculation of stresses in historic buildings	58
2.2. Building Systems .....	61
2.2.1. ENVELOPE SYSTEMS .....	61