BUILDING REFURBISHMENT: HOLISTIC EVALUATION OF BARRIERS AND OPPORTUNITIES

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With the significant reduction in the number of construction projects due to the economic meltdown in the last three years, which is feared, may continue well into this second decade, the refurbishment of old and existing buildings may be perceived as a strategic avenue through which property owners could secure value for money. It is common knowledge that aged buildings are constantly growing in number with a concomitant growing pressure to maintain their utilitarian values in the face of changing technology, legislation and sustainability issues. Indeed, the majority of buildings in the UK pre-date the emergence of the modern concepts of sustainable development. Wholesale demolition of these buildings can be quite unhealthy from an environmental protection perspective as it causes heavy pollution as well as placing more demand upon depleting resources. Nevertheless, the demand for sustainable, energy efficient buildings from both regulators and occupiers is increasing despite the recession. However, is the inclination to refurbish rather than demolition and new-build becoming stronger? This paper explores the barriers and opportunities for building refurbishment schemes as an economically motivated activity through which the performance and value of a property can be enhanced. It is based on comprehensive literature review as part of on-going doctoral research programme on risk structure in building refurbishment schemes. It concluded that refurbishment is substantially cheaper than demolition and new-build and that a refurbished building can be as functionally efficient as new-build.

Keywords: existing buildings, refurbishment schemes, sustainable development

INTRODUCTION

The global economic meltdown in the last three years, which is feared, may well continue into this second decade, has resulted in arguably, the worst downturn experienced by the UK commercial property market since the second world war (GVAGrimley, 2010; Construction Industry Council-CIC (2009), resulting in lack of development finance which has consequently led to significant reduction in the number of construction projects (CIC, 2009). The office of the Deputy Prime Minister-ODPM (2005) and National Refurbishment Council-NRC (2010) reported that the UK has some of the oldest building stock in Europe, with almost a quarter of

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buildings in England built before 1919. These buildings pre-date the emergence of modern concepts of sustainable development. The implication is that, there is increasing demand for sustainable energy efficient buildings from both regulators and occupiers (NRC, 2010; GVAGrimley, 2010; Gorse and Highfield, 2009). Moreover, from the public sector perspective, there is a concomitant growing pressure to meet current government's targets for carbon reduction in buildings. Indeed, in 2008, the UK Government passed the Climate Change Act to help combat rising carbon dioxide levels. This Act implemented a carbon emission reduction target of eighty per cent, with at least twenty-six per cent by 2020 set against the 1990 baseline. According to the Committee on Climate Change -CCC (2010), the UK was the first country in the world to implement such legally binding framework. The Department of Energy and Climate Change –DECC (2006) spearheaded the Climate Change Act which covers all aspects of carbon emitting sources such as energy consumption, transport, agriculture and domestic and non-domestic buildings.

It comes as no surprise that it is the DECC (2006) initiative that created the propensity for the Committee on Climate Change (2010) to send a clarion message to all sectors of the construction industry stating that in the UK, energy consumption in buildings is responsible for forty five per cent of carbon dioxide emissions. Of this, twenty-seven per cent comes from domestic buildings and the rest (eighteen per cent) from non-domestic buildings. For instance, in the domestic sector alone, seventy-three per cent of emissions come directly from space and water heating, and yet eighty per cent of these - heating systems - are fuelled by gas, the biggest source of emissions (DCLG, 2006). Therefore, by improving energy efficiency in buildings, the amount of carbon emissions emitted can be significantly reduced. However, there also exists a general apprehension about spiralling levels of disrepair such that most of the existing building stocks are easily discounted as outdated and inefficient with poor energy performance (Roberts, 2008), thus, unable to deliver the best returns on investment. While there might be some merits in such concerns, what Roberts (2008) ignored to observe is the mere fact articulated by the UK Green Building Council-UKGBC (2008) that existing buildings still have an important role to play as nearly eighty per cent of the buildings that will be inhabited in 2050 are those already standing. This clearly emphasises the significance of refurbishing and retrofitting existing buildings up to standard not only to meet carbon emission targets, but also to improve the general living conditions fit for the occupants and therefore tomorrow's generation. It follows therefore, that the scale of this challenge and the magnitude of the increase in number of aged buildings coupled with the decline in development finance have incontrovertibly led to the search for cost-effective alternatives to demolition and new-build.

While building refurbishment is a well-established alternative to demolition and new-build for many years, it is now more widely recognised that it makes far greater sense to retain and refurbish buildings in preference to demolishing and new-build (Corus, 2010; Gorse and Highfield, 2009; Marsh, 1983). From an environmental protection perspective, recycling of buildings through refurbishment and retrofitting is ideal whereas wholesale demolition of buildings can be quite unhealthy as it causes heavy pollution as well as placing more demand upon depleting resources (Zavadskas *et al.* 1998). Corus (2010) reported that refurbishment presents a means of improving the value and performance of existing buildings without the economic and environmental costs associated with new-build construction. Thus, it is widely accepted (Corus, 2010; GVAGrimley, 2010; Mansfield, 2009; Gorse and Highfield, 2009; Marsh, 1983)

that a refurbished building can be as functionally efficient and can attain the same environmental sustainability as new-build. Corroborating these views, Marsh (1983) argued that tearing down every building that became older than 30 years is a sheer waste of economic resources. Furthermore, through reuse of old and aged buildings, less construction waste is generated and less material resources are required (Edward and Turret, 2000), and therefore beneficial to the environment.

Compelling as refurbishment and retrofitting may be, there is nevertheless a widespread view among investors that new buildings are the most sustainable buildings. Even more so, from the sustainability perspective which has become an area for concern in recent years, and one that will continue to increase in importance, it is believed that new buildings will have better energy performance and less environmental impact when compared to refurbishment (Baker, 2009; NRC, 2010; GVAGrimley, 2010). This implies that in some cases demolition and rebuild will likely be considered as a preferred alternative to refurbishment. However, Kangwa and Olubodun (2006) have been quick to warn that due to the inevitability of entropy all new buildings will physically deteriorate over time, and at some stage it will become necessary to consider whether to refurbish or completely redevelop. If the cost of refurbishment is higher than the cost of new-build, it will be unwise to opt for refurbishment unless overriding reasons exist as in the case of listed buildings (Gorse and Highfield, 2009).

Despite such significance of refurbishment, it is still not certain whether the inclination to refurbish rather than demolition and new-build is becoming stronger? Indeed, the suggestions that large-scale and accelerated demolition would help achieve the energy and climate change targets is debatable and yet to be substantiated. This paper, presents some of the issues facing refurbishment as a strategic avenue through which the value and performance of a property can be enhanced. The Objective of the paper is: To evaluate the opportunities for, and barriers to effective building refurbishment schemes.

IS REFURBISHMENT THE GENERIC TERM?

The overall purpose of refurbishment as reported by Markus (1979) is to extend the beneficial use of an existing building by providing a cost-effective alternative to redevelopment. However, this definition is debatable as it implies that refurbishment is a cost-effective alternative when the economic life of a building is almost over. Although, this may be true but not always the case as Aikivouri (1996) suggests that refurbishment may be as a result of profound damage that has occurred to physical structure or planned in advance in relation to rate of deterioration. This means that the extent of deterioration of a building will, in some cases influence the type of refurbishment work to be undertaken, not necessarily at the end of a buildings lifespan. Although, this view contradicts with CIRIA (1994) who reported that refurbishment is not restricted to buildings whose physical condition has deteriorated to the detriment of their original purpose or earning capacity.

Refurbishment therefore, has become an important part of the entire building and construction process. Notwithstanding its importance, it is also complex to define as there are different terms used to describe the improvements from actual state of a building to acceptable standards. For instance, Mansfield (2001) argued that many of the terms are used as if they are interchangeable. Indeed, refurbishment can be viewed from different perspectives and these may include but not limited to economic, legislation, functional, technical, and legal as well as the sustainability.

According to Marsh (1983) refurbishment is making use of what is usable in the ageing building stock; the skilful adaptation of a building shell to a new, or an updated version (in other words modernisation) of its existing use. This definition does not make reference to conversion and alteration therefore, limiting its scope to updating to modern standards although mentioned the skills requirement in executing the works. However, CIOB (1987) described refurbishment as a process which allows the alteration of an existing building to improve the facilities and rearrange internal space and/or the structural life span without changing the original function. Unlike the definition by Marsh (1983), this definition however, includes alteration and the original function of the building is maintained. Egbu (1996) perceived refurbishment to encompass renovation, rehabilitation, extension, improvement, conversion, modernisation, fitting out and repair which is undertaken on an existing building to permit its reuse for various specified purposes. This definition differs from that of Marsh (1983) and CIOB (1987) in that Egbu (1996) provided a wider and holistic perspective to refurbishment. However, all the three definitions have one thing in common; the building exists, and requires upgrading for new use. Therefore, refurbishment is multi-faceted and can be regarded as a generic or umbrella term which requires collaborative efforts to overcome the physical challenges. Some construction activities relating to existing building refurbishment are summarised in figure 1.

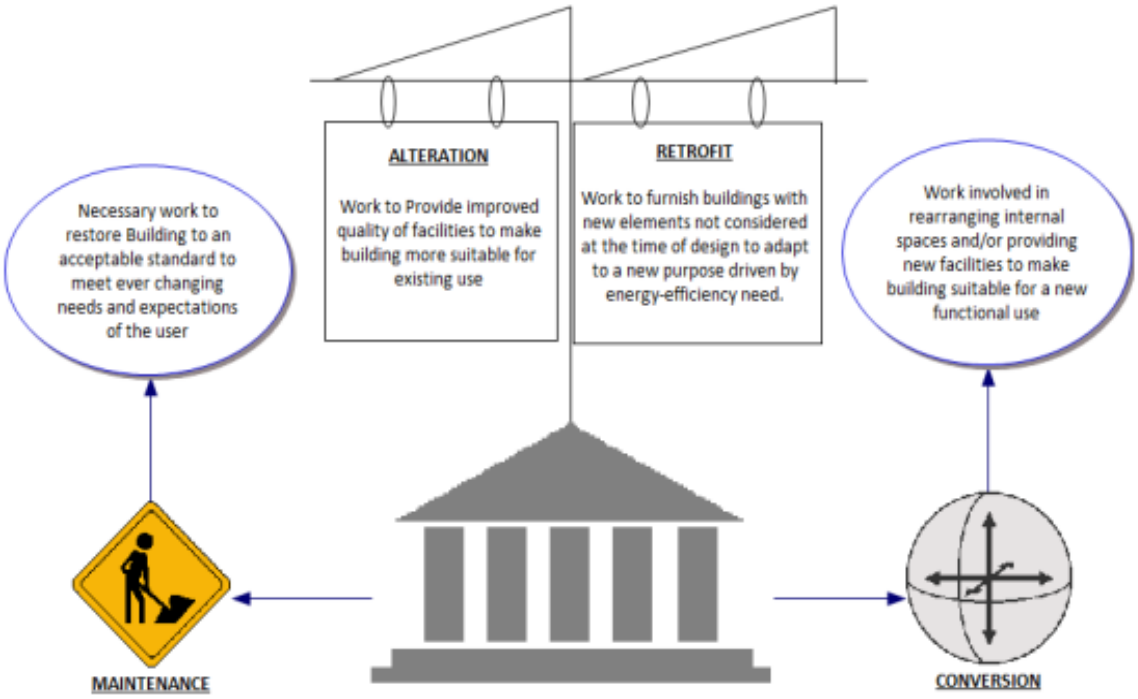

Figure 1: Construction activities relating to existing building refurbishment

OVERVIEW OF THE UK REFURBISHMENT SECTOR

The UK Construction Industry remains an important part of the economy with Seventeen per cent (17%) of all jobs created in the economy (RICS, 2008). The Office for National Statistics (ONS) categorises construction output as 'new work' or 'repair and maintenance'. Indeed, refurbishment is as a generic term is broadly categorised as repair and maintenance by the UK government mainly for statistical purposes (Gorse and Highfield, 2009) as there are no official statistics specific to refurbishment in the UK (Rahmat and Ali, 2010).

However, it appears that this lack of specific data have prompted the use of repair and maintenance statistics to represent the trends in the refurbishment sector. A review of literature suggests that refurbishment has been ever-present element of construction workload, and one that becomes more important in the downturn. This would appear to corroborate with CIRIA (1994) who maintain that refurbishment is one of the most important sectors of the national construction programme. Thus, the UK refurbishment sector is claimed to have grown rapidly, and has become an important economic driver (CIRIA, 1994) and it has been expanding in comparison to new development, hence, Kherun *et al.* (2002), CCCIS (2005) and Gorse and Highfield (2009) claimed that almost 50% of the constructions activities undertaken in the UK were mainly maintenance and refurbishment. Indeed, UKGBC (2008) emphasised that nearly eighty per cent of the buildings that will be inhabited in 2050 are those already standing thus, indicating a clear opportunity for the refurbishment sector, which invariably means that refurbishment will continue to be a significant part of building activity for the foreseeable future.

ASSOCIATED RISKS AS BARRIER TO BUILDING REFURBISHMENT SCHEMES

Mansfield (2009) is of the opinion that risk and uncertainty exist in all projects, irrespective of type, size or location. Accordingly, in his opinion, risk can be considered to be the possibility of a forecast variable (for example, refurbishment cost) being different from that at completion. However, from review of literature it was clear that through a systematic strategy called risk management (RM), it is possible to minimise risks and uncertainties associated with development projects. Hillson (2003) has argued that RM is recognised as an essential tool to tackle the inevitable uncertainty and risk associated with projects, leading to an acceptable and manageable level of risk. He goes on to suggest that projects still fail to meet their objectives and expected benefits, despite the theoretical principle that RM should contribute to project success.

Nevertheless, on the basis of uncertain nature of refurbishment, which in some cases hinders the achievement of desired outcomes, effective risk management process will still be required in order to manage the schemes. For instance, CIRIA (1994) reported that 'not only do refurbishment projects involve all the normal problems of a building, often in an aggravated form; they can also present special problems. Elsewhere, Reyers and Mansfield (2000), Rawlinson and Wilkes (2008) and GVAGrimley (2010) claimed that dealing with an existing building introduces many sources of uncertainties, substantial risks and technical challenges which can affect the scope of work, the total cost and the time or schedules.

Indeed, managing refurbishment projects is faced with some unique problems in dealing with people, the environment and the project itself (Lam *et al.* 2010). Quite a number of remarkable studies on refurbishment highlighted that refurbishment projects generally contains high risk than new build (CIRIA, 1994; Reyers and Mansfield, 2001; Mansfield, 2008; Lam *et al.* 2010; Rahmat and Ali, 2010), due in part to the extent of deterioration which is hardly obvious at the outset of the project. They are also considered to be more difficult (CIRIA, 1994; Zavadskas *et al.* 1998; Rahmat and Ali, 2010), requires experience and capability (CIRIA, 1994; Zavadskas *et al.* 1998; Corus, 2010), more technical and economic uncertainties (Ali *et al.* 2010; Mansfield, 2008; Reyers and Mansfield, 2001; CIRIA, 1994), requires collaboration (CIRIA, 1994), fragmented and uncoordinated (Lam *et al.* 2010), thus, the

complications experienced on new building projects doubles in refurbishment (Marsh, 1983; Abd Karim *et al.* 2007). For example, repairing or reinforcing works of an existing building involves risk that need to be minimised or eliminated. Hence, the management of risks is essential in refurbishment schemes as the design information such as specification, duration and costs are unclear at inception (Abd Karim *et al.* 2007), thus, indicating a clear need for specialist expertise in dealing with the schemes effectively.

In considering how complex and uncertain refurbishment can be, CIRIA (1994) reported that the uncertainty may extend well into construction stages, with a high likelihood that unforeseen events will occur from site discovery. Thus, the most common areas of risks were identified as lack of information about original designs (CIRIA, 1994), issues on neighbouring buildings/party walls (Rawlinson and Wilkes, 2008; CIRIA, 1994), effects of demolition including disposal (Corus, 2010; Rawlinson and Wilkes, 2008), specialist expertise (CIRIA, 1994), the condition of existing structure (Rawlinson and Wilkes, 2008; GVAGrimley, 2010), building occupancy (CIRIA, 1994), health and safety issues (Corus, 2010; GVAGrimley, 2010; Highfield, 2000; Egbu *et al.* 1996; CIRIA, 1994), contingency requirement and procurement strategy (GVAGrimley, 2010), as well as the need to comply with statutory requirements (CIRIA, 1994; Highfield, 2000).

Restriction on Extent of Works as Barrier to Refurbishment Schemes

Apart from the presence of risks and uncertainties associated with refurbishment projects, there are certain cases where developers have to come to terms with the extent of work that will be allowed on a building. This is especially the case where a listed building is acquired (a building of special Architectural or Historic Interest). Being of historical importance, CIRIA (1994) reported that listed buildings generally require a statutory approval usually referred to as 'listed building consent' in addition to planning permission. CIRIA (1994) goes on to suggest that there may be restrictions on demolition or alteration of certain parts of the building and may require the use of non-contemporary materials or techniques. Corroborating this view, Gorse and Highfield (2009) opined that where a building is listed, it is an offence under the provisions of the act, to carryout works of complete or partial demolition, alteration or extension without obtaining listed building consent. Indeed, it is on this basis that most developers find refurbishment of listed building to be difficult, with limited options in terms of refurbishing such buildings.

OPPORTUNITIES FOR BUILDING REFURBISHMENT

Buildings are considered a significant asset and their importance is such that it is required for generations to come as a means of providing shelter as well as producing goods and services. Indeed, it is almost impossible for buildings to complete its lifespan in good condition. As a consequence, due to changing standards of comfort, legislation and technological changes, buildings become obsolete and thus will require substantial improvement to meet current standard and regulation. It also appears almost impossible to demolish all aged buildings for new ones even after the life expectancy period thus, existing buildings below the required standards (in terms of energy and space requirements) will increasingly need to be refurbished in other to remain attractive to both occupiers and investors (GVAGrimley, 2010). However, aged buildings should be investigated to ascertain the extent of deterioration before any informed decision can be made whether they are worth refurbishing (Zavadskas *et al.* 1998). Elsewhere, Gorse and Highfield (2009) suggests that the decision to

refurbish and upgrade existing buildings in preference to new-build can be attributed to the potential economic advantages. Although this is not always the case as legislative constraints such as concerns about listed buildings and their alteration restrictions as well as difficulties with gaining planning approval for new build may force developers to opt for refurbishment.

Being essential from both economic and environmental perspectives (Marsh, 1983), opined that refurbishment is a quicker and lower cost means of extending the lifespan of existing buildings as well as reintroducing a building back into the market (GVAGrimley, 2010; Gorse and Highfield, 2009) as it is substantially cheaper than demolition and new-build. This action is usually motivated by a number of reasons some of which were identified as follows:

- The need to rearrange or organise space to new uses (Baker, 2009);
- The need to increase the value of the property (Corus, 2010);
- The need to improve quality (Baker, 2009; Gorse and Highfield, 2009);
- The need to replace degraded finishes and components (Baker, 2009);
- The need to increase rental income (Corus, 2010);
- The need to improve aesthetics (Corus, 2010);
- The need to make buildings more energy efficient (Caleb, 2009);
- The need to replace damaged building envelope (Corus, 2010; Marsh, 1983).

Corus (2010) suggests that buildings are refurbished as a result of change in ownership or use while CIRIA (1994) suggests that refurbishment may be considered on any existing building in good working conditions to accommodate new technology. However, whatever the reasons for refurbishment, there are numerous benefits and cost-saving opportunities. Indeed, Gorse and Highfield (2009) reported that in majority of cases, the completion of the building in a much shorter time is one of the proverbial advantages of refurbishing existing buildings over demolition and new-build. They further highlighted some of the financial benefits as follows:

- The shorter contract duration reduces the effects of inflation on building costs;
- The shorter overall development period reduces the cost of financing the scheme;
- The building is completed sooner, which often means that the client begins to earn revenue early.

Benefits associated with Building Refurbishment

There is a consensus among researchers that numerous cost saving opportunities exist in refurbishment schemes. Indeed, there are many instances where refurbishment offers a practical alternative to demolition and new-build. In majority of cases, opting for refurbishment can provide a finished building in only half to three-quarters of the time needed for demolition and new-build (Gorse and Highfield, 2009), thus providing considerable benefits in three areas as summarised below:

- Economic Benefits: The overall cost of refurbishment is considerably lower than the cost of demolition and new-build, as many of the building elements are already constructed (Gorse and Highfield, 2009), with subsequent savings in time and money (Corus, 2009).
- Social Benefits: When compared to demolition and new-build, refurbishment minimises disruption and offers sociological advantages from the social housing perspectives, demolition and rebuild of substandard housing usually

displaces established communities (Gorse and Highfield, 2009). With refurbishment however, improvements to aesthetics and the entire building envelop can be achieved thereby retaining established communities.

- Environmental Benefits: From the sustainable development perspective, it is believed that energy consumption in buildings has adverse implications. However, it is often believed that one of the many ways to minimise this and maximise environmental benefits of refurbishment is through re-use and/or recycling of existing material resources rather than replacing them (Gorse and Highfield, 2009). This would appear to corroborate with Baker (2009) who claimed that demolition and subsequent waste disposal creates carbon emission. On this basis, Zavadskas *et al.* (1998) were of the opinion that refurbishment supports excellent opportunities to reduce energy consumption in buildings. Indeed, re-use option of most functional parts of a building minimises the impact on the environment from both production and transportation.

CONCLUSIONS

Refurbishment can be regarded as a generic or umbrella term as it strands all activities associated with improving buildings from actual state to the acceptable standards. It has become part of the total building activity due to increasing need for improvement of existing buildings, lack of development finance as well as lack of undeveloped sites in many city centre locations which constraints the supply of new buildings.

To decide whether or not to refurbish and re-use existing buildings depends on the potential advantages. Overall balance of evidence suggests that, most often it makes economic sense to the owner and the environment if refurbishment is considered. A review of literature also suggests that when a building is recycled through refurbishment, a considerable amount of energy is saved by avoiding the need to extract raw materials for replacement. Furthermore, the ability to refurbish aged buildings to modern standards also represents a significant preservation of national asset as well as huge contribution towards sustainability agenda.

Although, demolition may be an option however; available evidence suggests that subsequent waste disposal creates carbon emission. Therefore, demolition should be considered where the cost of refurbishment is higher than the cost of demolition and new-build and/or where overriding reasons exist as in the case of listed buildings.

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