

Adaptive reuse of offices

Residential conversions in Sydney

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Abstract

The built environment contributes 40% to total global greenhouse gas emissions and 87% of the buildings we will have in 2050 are already built. If predicted climate changes are correct we need to adapt existing stock sustainably. Reuse is an inherently sustainable option, which reduces the amount of waste going to landfill. Inevitably settlements and areas undergo change, whereby land uses become obsolete and buildings vacant. At this stage, the options are either to demolish or to convert to another use. In central business districts (CBDs) outside of Australia there is a long history of office to residential conversion. Although these types of conversions are few in number in the Sydney CBD, a trend is emerging in conversion. Some 102,000m² of office space is earmarked for residential conversion in Sydney as demand for central residential property grows and low interest rates create good conditions. Coupled with this, is a stock of ageing offices and a population projected to increase by 4% to 2031 requiring 45000 new homes. With the Sydney market about to be flooded with the Barangaroo office supply in 2017, the conditions for residential conversion are better than ever.

Based on the foregoing, this paper aims at answering the questions: (a) *which drivers encourage residential conversions in Sydney?* And, (b) *what are the barriers for successful conversions?* This paper investigates the nature and extent of residential conversion in Sydney, as well as the drivers and barriers to successful conversion. Through an extensive literature study, the paper identifies the key lessons from international residential conversion projects. Subsequently, expert interviews are held with developers in the Sydney market. This paper explores the potential of delivering sustainability to the Sydney CBD through residential conversion.

Keywords: office buildings, user preferences, vacancy, obsolescence, adaptive reuse, residential conversion

Introduction

The built environment contributes 40% to total global greenhouse gas (GHG) emissions and to achieve international agreed aims of sustainable development, building related GHG emissions must be reduced (UNEP, 2009). Construction of new, sustainable buildings is most commonly perceived as the best way of achieving these aims. However, 87% of the buildings we will need in 2050 are already built (Kelly, 2008). Adaptive reuse is an inherently sustainable option, which reduces the amount of waste going to landfill, and focuses development in the existing built environment, thereby reducing land take for new buildings and infrastructure.

Worldwide, demographic and economic changes drive changes in urban settlements and areas, whereby land uses become obsolete and buildings vacant. In some regions demographic and economic decline cause obsolescence and vacancy, whereas other regions experience a spatial shift, with high demands in specific markets and change of land use as a result. The options for managing existing real estate

are, either to demolish or, to convert to another use. In central business districts (CBDs) and city centres outside of Australia there is a long history of office to residential conversion. In the Sydney CBD, few residential conversions have taken place. However, office supply grows, the functioning of the office market is facing change. The increasing demand for housing in Sydney has led to withdrawals of non-CBD office stock for residential conversion (CBRE, 2015). Moreover, the demand for city centre housing grows (City of Sydney, 2010). To cope with these emerging trends, lessons can be learned from international development. This paper investigates the market opportunities, drivers and barriers of residential conversion in Sydney, based on literature, initial interviews with Sydney real estate experts, and finally some examples in the Sydney CBD are explored.

Research Question, aims and objectives

Former studies show the potential of delivering sustainability in urban areas by up building adaptation, upgrading the environmental performance of existing office buildings (Wilkinson & Reed, 2009), and the potential of adaptive reuse to enhance social sustainability in urban areas blighted by vacancy by introducing new functions (Heath, 2001; Koppels, Remøy, & El Messlaki, 2011). This paper explores the potential of conversion in Sydney, based on the political, economic, social, environmental and technological drivers and barriers to successful conversion. This research aims to answer the following question (a) *which drivers encourage residential conversions in Sydney? And, (b) what are the barriers for successful conversions?*

Research method

The research is qualitative, sharing the three basic assumptions identified by Patton (2002) of being naturalistic, holistic and inductive. Naturalism involves seeing the phenomenon in its naturally occurring state, in this case; by visiting Sydney to interview practitioners and visiting sites to observe what has taken place. The holistic aspect involves looking at the whole problem to develop a more complete understanding of the influencing factors and variables which determine what the most important drivers and barriers for conversion adaptation in Sydney are; and, to how these can be influenced to increase conversion potential. The inductive approach is derived from the literature review whereby a picture of the problems and issues emerge as the researchers become more familiar with the topic area. The literature review identified which areas needed to be addressed and enabled the researchers to compare whether practice and theory followed closely.

A literature review ascertained the drivers and barriers of office to residential conversion. Data on the Sydney office and housing markets were collected from online retrievable sources. Thereafter, data was collected via semi-structured interviews as it allowed the researchers to collect identical data from each interviewee, in a reasonably relaxed atmosphere (Moser and Kalton, 1979. Bell, 1995). A formal structured interview was too restrictive and would not allow the interviewers to investigate interesting areas, which arose during the interview. The unstructured interview was rejected as they can generate data, which does not relate to other cases and is impossible to analyse (Robson, 2011). The interviewers started with factual questions to put interviewees at ease. The questions became increasingly complex as the interview progressed and finished with some questions, which allowed the interviewee to express personal ideas to generate 'richer' deeper information (Moser and Kalton, 1979). Each interview took an hour, the optimum time for useful data collection without overtiring participants. Following Moser and Kalton (1979) long multiple confusing questions were avoided and jargon was eliminated because of the international aspect of the study. There were no leading or biased questions in the interview and the interviewers expressed no views during the interviews to lead or encourage interviewees in any way.

Drivers for conversion

Conversion is defined as a change of use adaptation and is a form of adaptive reuse that usually requires major changes of the building. Conversion as such contributes to the continued use of beloved historical cities and buildings, an example is the canal-houses in Amsterdam, originally constructed in the 17th century. In the course of 400 years, the uses of the buildings have changed numerous times, from warehouse to housing to offices and back to housing and shops, inflicting many changes to the buildings (Leupen, 2006; Remøy, 2010). Several authors (Barlow & Gann, 1993; Beauregard, 2005; Bullen & Love, 2010; Coupland & Marsh, 1998; Heath, 2001; Langston, Wong, Hui, & Shen, 2008; Tiesdell et al,

1996; Wilkinson et al, 2009) describe similar conversions of vacant office buildings in obsolete urban areas or downtown locations.

Heath (2001) describes office to residential conversions as a successful strategy for inner city redevelopment in London and Toronto. During the 1990s, the Toronto city core was a mono-functional office district, which was depopulated after six o'clock in the evening. Office construction booms in the late-1980s and an economic recession in the early 1990s resulted in high vacancy rates, rent reductions and tenants moving to newer accommodation with comparable rents (Barlow & Gann, 1995). Whereas the London planning authority was supportive though not proactive: conversions were mainly market led, the Toronto municipality introduced a planning policy to stimulate redevelopments. In Toronto, conversion and redevelopment contributed to adding 9000 dwellings to the downtown in the 1990s. By 2000 the office vacancy had fallen back to acceptable rates and the buildings most suitable for residential use had been converted. Drivers for conversions in Toronto and London included demographics and household compositions with changing attitudes and housing demand, and increased popularity of city-centre living. In addition, new use was needed to activate obsolete offices. A third and most important driver was the rent-gap between offices and housing: in some situations the return on housing was estimated to be 90% higher than for commercial property (Barlow & Gann, 1993).

Between 1992 and 1995 the New York Downtown vacancy rate was 20%, caused by economic downturn (Barlow & Gann, 1995). Reacting to this development, the New York City government initiated the Lower Manhattan Revitalisation Plan to enable and subsidise residential conversion (Beauregard, 2005). Subsidies were given for conversion of office buildings constructed before 1975. The government encouraged conversions into studios and small apartments, targeting first-time renters. The low rents made the apartments popular for other groups as well, although the area lacked basic services and facilities. The most important drivers for conversions were the tight housing market, a high supply of obsolete office buildings, and governmental policy. From 1995 to 2005 more than 60 office buildings were converted, and the number of inhabitants in the area grew.

In Tokyo, the office market collapse in 2002-2003, oversupply and economic decline were the drivers for conversion. Older offices in secondary locations became obsolete and were converted (Ogawa et al., 2007). As tenancy perspectives for new, large office buildings were still good, redevelopment was generally a more interesting option than conversion. The local government had little control over the urban developments, though recent focus on urban conservation might enhance conversion potential in the future (Minami, 2007).

In Australia, although sustainability is a key driver for building adaptation, economic considerations are also very important. Upgrading the existing building stock to improve sustainability and reduce CO₂ emissions before 2020 is a target for the City of Melbourne (Wilkinson & Remøy, 2011). The aim is shared by Perth in Western Australia, where high office vacancy and increased residential construction activity has been another driver for building conversion in the last decade (Bullen, 2007). The governing authorities in many Australian cities seek to encourage sustainability in adaptations to deliver emission reduction targets.

In the described cases, sustainability aims, urban policy, office obsolescence and a tight housing market were the most important conversion drivers. These relate to political, economic, social, technological, legal and environmental drivers. Political, economic and social drivers consider residential conversion as a strategy to introduce housing in central business districts that have historically been mono-functional office locations. Moreover, residential conversion in central urban areas is seen as a possibility for realising affordable housing in city centres. In large cities, housing affordability in central areas has become problematic for lower income groups and for the middle classes. Technological and economic drivers are most important in cities where the value of residential property is higher than the value of offices. Due to technological and economic changes, and quantitative and qualitative mismatches in demand and supply, several cities have struggled with high office vacancy and obsolete office locations. In these cases, residential conversions are driven by market forces; conversion is less expensive and faster than demolition and new-build, and existing obsolete office buildings occupy central locations. Changes in building acts or legislation can lead to legal obsolescence and is another driver for converting offices into new use. Changes in floor heights and fire escape demand, and increased Energy Performance Certificate (EPC) norms are examples that lead to legal obsolescence. Within use

adaptation is a possibility, but conversion for new use is often chosen, especially in locations with a high market demand for housing. Finally, environmental drivers are increasingly important. Office users demand sustainable offices, and older property is left vacant and obsolete. Major adaptation or conversion is needed to accommodate new use.

Barriers for conversion

The barriers are categorised as political, economic, environmental, social, technological/physical and legal. One of the obstacles for conversions is the specialised nature of the work and the competence of the actors in the real estate market. Developers, and investors work within their own areas of expertise, and have little understanding of related disciplines (Remøy & Van der Voordt, 2007b). Moreover, the market is sectorial; office investors do not invest in housing and vice versa, and moving from the office to the housing sector is therefore difficult. Socially the infrastructure to support residential land use may not exist in a former, or predominantly, commercial area (Heath, 2001).

Legislation in the form of zoning plans and building laws are important conversion barriers. In most countries the building laws for offices are stricter than for housing, especially for fire escape, daylight admittance and energy efficiency (Remøy & Van der Voordt, 2007b). Regulations can require structural alterations that lead to high costs or make conversion physically unfeasible (Bullen, 2007). In existing buildings deleterious materials, such as asbestos, is a barrier where removal follows strict safety-rules as well as incurring high costs (Remøy & Van der Voordt, 2007a).

Another issue arises when the original construction drawings of older office buildings are not always correct, although this is not a technical barrier as such, it makes thorough inspection of the structure vital (Remøy & Van der Voordt, 2007a). The main structure or fabric of older buildings may be aged and experiencing decay, for instance the concrete may be deteriorating. Repairs can be costly, and secondary construction may be required. Physically, apartments require more vertical shafts for electricity, water and plumbing services than offices (Remøy & Van der Voordt, 2007a). In newer European construction pre-stressed concrete is commonly used, which loses strength when the steel is cut and thus forming voids for services shafts is problematic (Remøy & Van der Voordt, 2007a). Overall most barriers are technical and threaten the economic performance of the building and the financial feasibility of the project.

Adaptive reuse potential

The adaptive reuse potential of offices to housing has been established by research (Geraedts and van der Voordt, 2007. Remøy, 2010. Wilkinson et al, 2014) and is described by market, location and building characteristics.

The office market

Sydney has Australia's biggest office market and the CBD has the biggest share, with 4,961,728 m² (m3property, 2015). Office space is categorised using the Property Council Australia's (PCA) categories. The demand for office space in Sydney in general is high, and specifically in the Sydney CBD. After the great financial crisis in 2008, the market showed growth with vacancy decreasing lightly to 9% in 2015, from 10% in 2011 (CBRE, 2015). The demand for premium sustainable office buildings is high, and shows a higher value and lower vacancy rates for rated green buildings (Newell et al, 2011). As the Sydney office market is performing well with decreasing vacancy and yields, and increasing absorption and values, the addition to the office market is also increasing.

In 2014, the CBD supply pipeline was 460 000 m², 9.27% of the current stock. A big part of this, approximately 250 000m², is part of the Barangaroo development. It is unusual to get such a large amount of stock coming to market in a relatively short space of time. As such the Barangaroo supply, which will come onto CBD office market in 2016 and 2017, is set to lead to movement of existing tenants in the CBD in prime stock (Premium and A Grade) into the new stock (CBRE, 2015). In turn, tenants in existing mid grade CBD office properties are predicted to move into vacated premium stock. A replacement market develops. There will be increased vacancies in mid and lower grade stock as a result (Investa, 2014.Savills, 2015), and relative obsolescence develops.

The housing market

The housing market in Australia is very heated in 2015 and there are some predicting that the 'bubble will burst'. Overall conditions are low interest rates and reasonable employment conditions. In major Australian cities such as Melbourne, Sydney and Brisbane there has been high demand by foreign investors for apartments in the CBDs (EC Harris, 2014. CBRE, 2015). Many of the investors are Chinese, seeking to invest their money in markets which are perceived as stable and safe. Many investment apartments purchased by Chinese buyers remain unlet as it is considered unlucky for Chinese people to occupy buildings, which have been already occupied. Having these properties unlet, further exacerbates housing affordability problems for many young Australians. The pension or superannuation, system in Australia also encourages citizens to buy investment properties for an income in retirements. This is a further factor which drives up prices and excludes first time buyers.

In recent history residential supply in the CBDs have been very low, and the stock has been restricted to office use predominantly; or monofunctional (JLL, 2015). However in the last decade or so, the prevailing trend from urban planners is to reintroduce vitality and mixed use into CBDs, by allowing more residential land use. The provision of new apartments with amenities such as gyms and pools, and easy access to work, retail facilities and entertainment, are very attractive to buyers and investors.

The combination of low interest rates, demand from foreign investors, wealthy immigrants, and urbanisation is driving housing prices up at high rates and this creates economic viability to convert older, vacant or partially vacant office stock into residential land use. This is coupled with migration of office tenants into newer stock and increasing vacancy rates in lower grade stock.

Location

There are a number of variables which influence the adaptive reuse potential of buildings (Wilkinson et al, 2014). One is the prevailing property market conditions which is described above. The location of the property is also significant in terms of accessibility and public transport, access to amenities such as food retailing, other retailing and entertainment. Access to services such as healthcare, childcare and education is also important for residential stock (Wilkinson et al, 2015).

Building

Opportunities and risks of adaptive reuse are closely related to the physical characteristics of the existing buildings (Remøy & van der Voordt, 2014, Wilkinson & Remøy 2015). To use information from ex-post cases to scan the possibilities for new adaptive reuse, Remøy and de Jonge (2007) defined the building type characteristics that influence the adaptive reuse potential, e.g. structure and floors, facade, floor lay-out and the length and depth of the building, and the number and situation of stairs and elevators.

The main load bearing structure in standard office buildings typically has a high conversion potential characterised by a wide span or bay width, few columns, high floors and high load bearing capacity. Low acoustic insulation, high beams and (in older properties) a dense structural grid reduce conversion capacity. Interventions in the facade represent substantial costs and reduce the conversion potential. Cantilevering floors with curtain walls reduces the possibility to add balconies and subdivide the facade to fit interior walls. Well maintained facades in technically good state and with a dense grid increase the conversion potential. Large floor plates and building depth increase the conversion potential of office buildings. The location of elevators and staircases has a high impact on the lay-out, and moving stairs and elevators have a high impact on building costs. A high number of elevators in offices adds to a high conversion potential. Elevator shafts can be reused as shafts for HVAC, water supplies and sewer.

Table 1: Summarising typological characteristics that affect conversion capacity.

	Positive	Negative
Structure and floors	<ul style="list-style-type: none">• Large floor spans• Columns; free plans• Constructed for heavy carriage	<ul style="list-style-type: none">• Dense grids• Low ceilings under existing beams• Thin floors: acoustic insulation insufficient

Facade	<ul style="list-style-type: none"> • Small grid • Good technical state 	<ul style="list-style-type: none"> • Inadequate technical state, no attachment-points for interior walls • Cantilevering floors: complicates adding balconies
Floor lay-out, length and depth	<ul style="list-style-type: none"> • Deep buildings 	<ul style="list-style-type: none"> • Location of elevators and staircases
Stairs and elevators	<ul style="list-style-type: none"> • Excess number of elevators 	<ul style="list-style-type: none"> • Insufficient number of escape routes • Excessive space occupied by cores

Interviews with Sydney stakeholders on residential conversion

Interviews were held in February 2015 with experienced developers and agents in Sydney with respect to the drivers and barriers in residential conversion in the city. The interviewees had experience of working in Europe and Australia, and each had over 15 years work experience. The variables found in the literature regarding the technical, physical, legal, social, economic and environmental variables of conversion adaptation are all considerations to greater or lesser extents.

From the developers perspective everything is 'market driven' and therefore the potential economic risks or gains influence their decisions the most. For example, developers decide what the market is after and look for suitable sites, which may or may not have existing buildings on them. The developers and the valuer agreed that the level of amenities on or surrounding a site is important, such as retail and transport facilities. When a potentially suitable site is found, developers do a physical and economic appraisal regarding the potential gains or costs of retaining some, or all, of the buildings. The economic cycle is vital, and can impact greatly on profitability. The GFC had a very considerable impact on viability of projects commenced in 2007, where values changed significantly during project lifecycles. Currently existing buildings are retained only in high value areas, such as the CBD, 'where you have to'. Financially, development risks are greater in adaptation projects than new build.

The Valuer /Agent agreed that economic variables were crucial to conversion adaptation in the Sydney market, which is experiencing increasing rates of activity. This reuse is happening with 'secondary commercial buildings in Sydney or, certainly it's proposed'. With many of the valuations that the agent saw, buildings have been bought on a proposed redevelopment basis. Significantly the investment flows are coming often from Asia and 'there's obviously drivers outside of the real estate for that'; for example; Sydney is perceived as a safe market to 'park' money. It is encouraged, as currently Australia offers residential visas to people with \$5M of cash to bring into the country. Looking at the people who are trying to invest outside of Asia, they are looking for security for their cash flow and it 'doesn't really matter to them whether the building yields 5%, 6%, 7% plus'. Sydney agents advertise the buildings in China to a very high profile and there is a lot of money that comes offshore from China, and this is significantly heating the commercial property market here. Further there is an appetite in Asia to convert and take a little bit more risk exposure than people might do in Australia. The current Greenland development in the CBD is a prime example of this. The agent noted the imminent supply in Barangaroo would result in oversupply in the lower B and C grade office stock in 2016 and 2017. He concurred with the developers that Highest and Best Use is what determines the use and that, hotels are popular office conversion projects in the CBD, which has high visitor numbers and the major tourist destinations of the Harbour Bridge and Opera House within walking distance. The biggest risk perceived by the valuer / agent is timing the market cycle, so that your project is ready at a time when demand is high and gave example of buildings which hit the market during the GFC and had to accept much lower rents and purchase prices than estimated 2 to 3 years earlier.

With regulatory issues such as planning and heritage, the developers felt there is considerable variation in approach and context from council to council which is hard to account for. Changes to the procedures and more uniformity would help to encourage more conversion adaptation. Shortening planning procedures, would help as heritage building projects are very protracted currently. Overall heritage was perceived as an emotional area to deal with which could be positive or negative for developers with

potentially higher exposure to risk. One interesting debate was whether heritage is a societal responsibility or an individual one? Developers perceived that businesses want to maximise their returns so if that means demolition then a building will be demolished, whereas if society values the building, and there was a fund to offset the lower profit resulting from retention, that might work.

Both developers and the valuer, felt that social and environmental variables are not as important in this market as economic and legal ones. As the developers stated although people feel good about sustainability, they will not pay extra for it. As embodied carbon in Sydney is not factored into environmental assessments, the argument regarding retention of existing buildings is not so strong as it could be. The agent agreed embodied carbon is not discussed. There is a perception that every developer 'green washes' their developments which implies a superficial weak sustainability is achieved at best, and that ironically the argument for retained embodied carbon within the existing structure is being missed in this market. Significantly the developers we spoke to acknowledged that inter-generational equity is important. However the current Australian government does not regard sustainability as important, and the developers felt there has to be a push from the population for sustainability to be valued. The valuer also noted sustainability is not high on buyers agendas in CBD residential.

Technically, plan shape, and the location and number of columns affects ability to accommodate residential units in office conversion projects. The agent noted high construction costs currently due to under supply and high demand in the market. He also noted that older building typically pre 1980 have asbestos in them, which adds further to costs and time delays. The valuer thought the location of the service core was important as it can affect the number and size of apartments in a conversion project which again comes back to economics and profits. Table 2 summarises the perceived drivers and barriers to conversion adaptation in Sydney.

Table 2 Drivers and barriers to office conversion adaptation in Sydney

Drivers	Barriers
<ol style="list-style-type: none"> 1. Councils may give developers a better hearing where buildings are retained 2. Sometimes zoning makes conversion the only option 3. Technical ease of reconfiguration / change of use 4. Could provide incentives to conversions to encourage more. 5. Perceived 'character' can drive up sales and interest 	<ol style="list-style-type: none"> 1. Costs associated with some designs require additional expense to render the building attractive to residential investors/buyers. 2. Appearances of most offices typically do not lend themselves to conversion without changes to facades. 3. Chinese buyers/investors do not necessarily want to invest / buy into converted property – preference is for new build. 4. Perception most people would prefer new build. 5. Unknown costs can escalate prices considerably – floor slab 6. Contamination potential 7. Always some compromise on space planning with existing buildings

Conclusions

Based on the foregoing, this paper aims at answering the questions: (a) *which drivers encourage residential conversions in Sydney?* And, (b) *what are the barriers for successful conversions?* This paper investigates the nature and extent of residential conversion in Sydney, as well as the drivers and barriers to successful conversion. Through an extensive literature study, the paper identifies the key lessons from international residential conversion projects. Subsequently, expert interviews are held with

developers in the Sydney market. This paper explores the potential of delivering sustainability to the Sydney CBD through residential conversion.

It has been shown that conversion adaptation is well established in some countries outside of Australia. A variety of physical, economic, environmental, legal / regulatory, social and political factors influence and impact the degree of conversion adaptation. In answer to the question; *which drivers encourage residential conversions in Sydney?* The lessons learned from other studies are applicable to a large degree in the Sydney market, although the level of activity here is much lower and less developed than in some European cities for example. The drivers for the Sydney market vary in scope and degree, for example investment from China is having a major influence currently. To a lesser extent planning and regulations are also driving residential conversion. Interestingly there is view that some buildings lend themselves easily to conversion and this is a driver. The second question asked, *what are the barriers for successful conversions?* The results show that financial considerations and risks are the biggest barrier, along with aesthetics, planning, contamination and technical issues and concerns. In closing it is worth noting that the Sydney CBD is a strong market within Australia, however it is likely that different degrees of residential conversion, drivers and barriers exist in other regional cities in New South Wales and, other major State capitals within Australia.

References

- Barlow, J., & Gann, D. (1993). *Offices into flats*. York: Joseph Rowntree Foundation.
- Barlow, J., & Gann, D. (1995). Flexible Planning And Flexible Buildings: Reusing Redundant Office Space. *Journal of Urban Affairs*, 17(3), 263-276.
- Beauregard, R. A. (2005). The Textures of Property Markets: Downtown Housing and Office conversions in New York City. *Urban Studies*, 42(13), 2431-2445.
- Bell, J. (1995) *Doing your research project*. (2nd Edition) Open University Press, Buckingham.
- Bullen, P. A. (2007). Adaptive reuse and sustainability of commercial buildings. *Facilities*, 25(1/2), 20-31.
- Bullen, P. A., & Love, P. E. D. (2010). The rhetoric of adaptive reuse or reality of demolition: views from the field. *Cities*, 27(4), 215-224.
- CBRE. (2015)
- Coupland, A., & Marsh, C. (1998). The Cutting Edge 1998; The conversion of redundant office space to residential use. In RICS Research (Ed.): University of Westminster.
- City of Sydney, 2010 Sydney Growth Centres Strategic Assessment Program Report. www.environment.gov.au/.../sydney-growth-centres-program-report.pdf, Retrieved 19th January 2015.
- EC Harris. (2014). Office to Residential Convert or Redevelop? Retrieved on 30th January 2015 from http://www.echarris.com/pdf/8502_Office%20to%20Residential%20Report_Final.pdf
- Heath, T. (2001). Adaptive re-use of offices for residential use The experiences of London and Toronto. *Cities*, 18(3), 173-184.
- Investa, 2014. Investa Quarterly Office Report, Q1 2014. Retrieved on February 19th 2015 from www
- JLL 2014. Sydney CBD Office Conversions: Manhattan –a template for Sydney? Retrieved on February 19th 2015 from <http://www.jll.com.au/australia/en-au/Research/Pulse%20-%20Sydney%20Office%20Conversions%20May%202014.pdf>
- Kelly, M. (2008). Britain's building stock—a carbon challenge: Presentation.
- Koppels, P. W., Remøy, H., & El Messlaki, S. (2011, June 15-18, 2011). *The negative externalities of structurally vacant offices: An exploration of externalities in the built environment using hedonic price analysis*. Paper presented at the ERES 2011, 18th Annual European Real Estate Society Conference, Eindhoven.
- Langston, C., Wong, F. K. W., Hui, E., & Shen, L. Y. (2008). Strategic assessment of building adaptive reuse opportunities in Hong Kong. *Building and Environment*, 43(10), 1709-1718.
- Leupen, B. (2006). *Frame and generic space*. Rotterdam: 010 Publishers.
- Minami, K. (2007). *A study of the Urban Tissue Design for Reorganizing Urban Environments*. Paper presented at the BSA 2007, Tokyo.
- Moser, C. & Kalton, G. 1979. Survey Methods in Social Investigation. Gower,

- Ogawa, H., Kobayashi, K., Sunaga, N., Mitamura, T., Kinoshita, A., Sawada, S., & Matsumoto, S. (2007). *A study on the architectural conversion from office to residential facilities through three case studies in Tokyo*. Paper presented at the Building Stock Activation 2007, Tokyo.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks: Sage.
- Remøy, H. (2010). *Out of office, a study of the cause of office vacancy and transformation as a means to cope and prevent*. Amsterdam: IOS.
- Remøy, H., & Van der Voordt, D. J. M. (2007a). *Conversion of office buildings; a cross-case analysis*. Paper presented at the BSA 2007, Tokyo.
- Remøy, H., & Van der Voordt, D. J. M. (2007b). A new life - conversion of vacant office buildings into housing. *Facilities*, 25(3/4), 88-103.
- Robson, C. 2011. 3rd ed. Real World Research. Chichester John Wiley & Sons
- Savills, 2015. Sydney Office Quarter Times. Retrieved on 24th May 2015 from <http://pdf.savills.asia/asia-pacific-research/australian-research/australia-office-/savillsresearch-quarter-times-sydney-office-q1-2015.pdf>
- Savills, 2015. Spotlight Sydney Residential January 2015. Retrieved on 24th January 2015 from <http://www.savills.com.au/research/australian-research/residential-market.aspx>
- Tiesdell, S., Oc, T., & Heath, T. (1996). *Revitalizing historic urban quarters*. Oxford: Architectural Press.
- Saminather, N. 2014. Sydney Office Turn Into Housing Avoiding Shakeout: Real Estate. Retrieved on 30th January 2015 from www.blomberg.com/news/articles/2014-03-17/sydney-office-turn-into-housing-avoiding-shakeout-real-estate
- United Nations Environment Program (UNEP). 2009. Buildings and Climate Change. Summary for Decision-Makers. Retrieved from <http://www.unep.org/sbci/pdfs/SBCI-BCCSummary.pdf> on 1st April 2015.
- Wilkinson, S. J., James, K., & Reed, R. (2009). Using building adaptation to deliver sustainability in Australia. *Structural Survey*, 27(1), 46-61.
- Wilkinson, S. J., & Remøy, H. (2011). *Sustainability and within use office building adaptations: A comparison of Dutch and Australian practices*. Paper presented at the Pacific Rim Real Estate Society, Gold Coast.
- Wilkinson, S. J., Remøy, H. & Langston, C. (2014). Sustainable Building Adaptation. Wiley.
- Yin, R. K. (1989). *Case study research; design and methods* (2nd ed.). London: Sage.