ENVIRONMENTAL IMPLICATIONS OF A STRUCTURAL CHANGE IN THE COMMERCIAL PROPERTY SECTOR

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Abstract

Most buildings will exist 20 years from now (Persson 2002) and their operating phase accounts for 85 % of their environmental impact (Swedish Environmental Protection Agency 2003). Changes in property management may thus have large impact on environmental performance. A change is taking place in the commercial property sector in Sweden and elsewhere. From consisting of property owners and tenants, companies specialized in facility management have entered the sector. This leads to a more complex structure with some owners, only seeing properties as real assets, hiring facility-managing firms to manage both buildings and tenants. More actors in the sector lead to a more complex incentives situation. For example, arguments motivating investments that reduce environmental impact and cost with some financial pay-off time are often based on the traditional owner-tenant structure. These arguments are becoming invalid as the structure is changing.

This paper discusses environmental implications and obstacles to environmental improvement by comparing the two types of property management in commercial buildings. The study goes beyond environmental management systems and analyses how and to what extent the organizing of property management impacts environmental performance. The structural change on the property market is likely to stay and develop even further; the need for knowledge about environmental implications of such structural changes is therefore obvious.

Introduction

The environmental performance of buildings is often thought of as being the result of environmental management systems, investments for improvements or other environmental work. Other factors not directly linked to environmental issues can also play an important role for the environmental performance. Birgit Brunklaus established in her licentiate thesis (Brunklaus 2005) that the general management of buildings matters to the environmental performance of buildings. She is comparing four buildings, which were almost identical when first constructed, but over time for various reasons has been changed differently and now have divergent environmental impact. The changes in the buildings are different, this due to the different ways the companies managing the buildings have been organised.

The environmental impact from the properties plays an important role in society's overall impact, which implies that the management of them also has large impact on society's total environmental impact. The construction sector is accountable for a large part of society's total impact on the environment, 40 % of the total impact is a commonly used figure and 85 % of this impact is usually assigned to the use-phase of the building's life cycle (Adalberth 2000; IPCC 2001; Swedish Environmental Protection Agency 2003; Thormark 2001; UNEP 2003). The rate of new-construction is low, which means that most of the buildings existing in 20 years will be the ones existing today (Persson 2002) the importance of the management of current buildings is therefore important. Another reason to study management of buildings is that the commercial property sector has been identified as a sector with large potentials for environmental improvement (Koomey, Levine et al. 1997; Swedish Environmental Advisory Board 2004; The Swedish council

for Building Research 1996) and technology to construct and manage buildings environmentally efficiently exists and has already been used in prototype buildings on several occasions (Bakens 2003; Holm and Persson 1998; Nässén 2005).

The 40 % figure is based on the usage of energy, electricity and material and the generation of wastes. It shall also be noted that the 40 % figure for material use includes infrastructure constructions such as roads railways etc. The infrastructure constructions accounts for approximately 1/3 of the environmental impact in the sector, which leaves 2/3s of the impact from material use to buildings (The Ecocycle Council 2001). Both the 85 % and 40 % figures are sometimes questioned, especially when new more energy efficient types of buildings are discussed (Thormark 2001).

Environmental impact is often divided in to different categories. This is done since the priority of environmental issues differs between different stakeholders. These differences could depend on for example geographical, political or economical differences in interest. (Junilla 2004) shows which activity during an office building's life cycle contributes the most to which impact category. The impact from energy usage dominates the buildings contribution to climate change, acidification and eutrophication. The use of building material, in construction and maintenance, is the largest contributor to buildings' environmental impact in the summer smog and heavy metals categories. With the Kyoto protocol as a background the energy consumption in buildings has the main focus in the sector's environmental debate. The hazardous substances used in buildings have the second strongest focus. The energy use debate mainly concerns how to lower the green house gases emissions in order to meet the Kyoto protocol agreement (Productivity Commission 1999; The European Parliament and the council of the European Union 2002). The energy issue is also frequently discussed on lower levels than international forums, see for example (Baumann, Brunklaus et al. 2003; Björnbom 1999; Persson 2002). Both debaters and companies, active in the sector views the energy consumption as the most highly prioritised environmental issue in the sector.

Research about environmental performance related to the commercial property is generally done from either a technological, financial or social perspective. The technological section of the research is focused on the physical buildings and its installations. Studies about environmental performance of building parts are common, but studies about entire buildings also exist. Research that suggests or invents new technological solutions for example heat pumps which reduces energy consumption is common and can be sorted to this section. The financial part of the research is also the largest among institutions and companies in the sector and is usually the type of research that is meant when the word research is used in the sector. The financial research does not usually have any environmental focus. Surveys and analyses about rents, vacancy rates, both current and expected are common. This group of research also includes work about how the management of the organisations in the sector is structured. Social research in the property sector often regards how the users of the properties perceive the properties they use. Examples of social research are studies on work environment, architectural design and behaviour in relation to consumption and waste management.

The commercial property sector is accountable for a large portion of society's entire environmental impact, the sector is identified as having large potential for improvement, technology is available and the management of the buildings in the sector matters to their environmental performance. These different factors make the commercial property sector an interesting object to study.

This article focuses on a recent trend, where management of properties in the commercial property sector is being outsourced to an increasing extent. The possible implications to environmental improvements due to that trend are examined. The purpose is to lay a foundation for my future research. I will study the relations between the actors on the market, the organising

of their activities and the environmental performance of the commercial property sector and cases where environmental implications may occur will be more thoroughly examined. Fragments of the research fields described above will be combined and examined in a multi-disciplinary way.

Description of the trend

The Swedish property sector has over the past decade experienced a development towards outsourcing of management and maintenance of properties. A more complex market structure has developed with other types of actors and more complex power structures. This development has also changed the structures for investments in equipment, conditions for environmental management of buildings. This section explains the development and the change in the situation for incentives.

The other type of actors

The trend that more actors are involved in the property sector is valid for most of companies and organizations whose activities involve properties. The new types of actors on the property market are involved in most of the different sections of the sector, all the way from management consultancy and transaction advisors to maintenance and cleaning staff. I will illustrate the situation by using a shopkeeper and his shop as an example. The shopkeeper has managed and owned the building where his shop is located for some time. This is the traditional structure of the property sector. The many aspects and difficulties of being a facility manager were also included in keeping a shop. Businesses do operate this way today as well, but many firms have come to the conclusion that managing and operating buildings is not their expertise and are not able to perform these tasks as efficient as someone who is specialized in these tasks could. It is not part of the shopkeeper's core business and they have decided to outsource the management of the properties they operate in. Companies specialized in management of facilities started up and were introduced to the sector as a consequence of organizations and companies establishing a demand for outsourcing the management of their properties. The facility management companies' core business are just to manage facilities and provide the user of the property with the facilities with best possible service and facilities suited to their business. The services provided by facility managing firms could range from providing office space to supplying service staff to arrange and take care of the office workers' private errands while they work, so that they don't waste working time on private business.

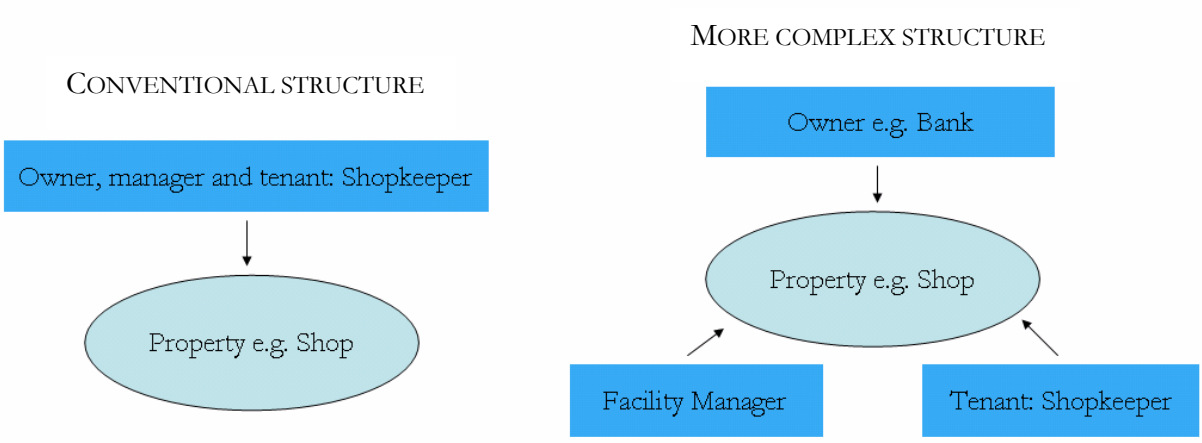

Figure 1 The two different structures of the property market is illustrated. The more complex situation to the right represents a structure where management of properties is outsourced and the property is owned by another actor than the user.

The facility managing business has been established in the USA since the early 1980's but did not become popular in Europe until the early 1990's when it was established in Germany, Netherlands

and the UK. The Swedish property market didn't open up to the FM-concept until the late 1990's (Grandin, Lindqvist et al. 2002). A main reason for the delay in the establishment for the facility managing business in Sweden was that the companies and the rest of the societal functions had rather large budgets for management of facilities and the cost efficiency was not highly prioritized. But during the 1990's the budgets were tightened and the expenditure for theses functions needed to decrease. Companies and organizations started to assess their costs for their facilities and the maintenance of them. Many realized that outsourcing of these functions would be a cost efficient alternative and started using these types of services. Facility managing companies took over large property owners entire managing functions or formed as new branches in existing companies and became established on the market in these ways[1] (Marthon and Roth 2005). Many of the companies were already established in Europe or North America. There are other reasons why the facility managing services became popular in Sweden during this period. The public service sector experienced a large growth in the politically socialistic Sweden during the 1960's and 70's. When a need for more and larger facilities appeared, the obvious choice was to build new and if the facility was too big it didn't really matter since the common belief was that the need for larger facilities would continue to grow and the new buildings would have a suitable size some time later. The public service sector is experiencing competition and demand for cost effectiveness today, so the situation is different from before. The awareness of the costs of facilities is much more present today in the public service sector. The planning, maintenance and management of the facilities became an important factor in the public sector. Higher competence, improved space planning and efficiency in staffing are some of the benefits the public sector has experienced from using facility managing companies. (Grandin, Lindqvist et al. 2002)

A main reason for the introduction and development of FM companies were the increasingly tougher demand on cost efficiency experienced during the 90's which lead to use of outsourcing[2] and downsizing[3] in other activities in companies and organizations (Grandin, Lindqvist et al. 2002). A survey of facilities managers and decision-makers in companies using facility managing services in Scandinavia shows that it is expected that the budgets for facility managing services will be tightened even more, which means that cost efficiency will play an even more important role in the sector, which in turn will make outsourcing an even more attractive option for companies (Kuchler 2005).

Now back to the shopkeeper, who has hired a facility managing company to provide the workers in the shop with all necessary service and facilities needed. To fully adapt to the other way of using the shop, a buyer is needed for the property he currently owns. The potential buyers are often banks, insurance companies and other financial institutions. By selling their properties, they free large funds, which can be used in investments more useful to the company's actual core business.

These types of owners do not have the same perspective as the classic conventional property owner. The conventional owner had the view of the properties as buildings, while this other kind of owner has a solely financial view of the properties. The buildings are seen as investments that are supposed to generate profit and increase in value until they are sold again. This might result in good maintenance and care for the building for it to generate maximum profit and increase in value. But the long term investments and management strategies might not be as common as when the shopkeeper himself had the responsibility to maintain and manage the property. This different type of owners who sees the property as a profit generator has to be ready to sell their properties when the time is right to make the maximum profit or to finance another property transaction. When the

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[1] Jones Lang LaSalle took over Skandia's entire facility managing function in 2000.
Aberdeen Property Investors were formed from the insurance company SPP's facility managing needs.

[2] Defined as *To use outside suppliers and manufacturers to produce goods and services* (Jones and George 2003).

[3] Defined as: *The planned elimination of positions or jobs* (Cascio 1993) and also as: *An intentionally instituted set of activities designed to improve organizational efficiency and performance which affect the size of the organization's workforce, costs and work processes* (Cameron, Freeman et al. 1991).

shopkeeper owned the property he would probably consider many different aspects of the building's character which a financial institute wouldn't before it is put on the market for sale. Selling the property was often the same thing as moving or closing down the business. The property can change owner rather often but still have the same tenant doing the same activities in the property with the more complex structure of the market.

The conventional structure of ownership and management is not in any way extinct, it is still common for the same actor to own and operate properties today. It is important to discuss and be aware of the more complex structure since more actors are present on the market. The different actors might have completely different reasons for being present on the market and with that comes differences in stakeholders' interests and driving forces as well.

Just a trend or a new structure?

It can rather safely be said that the more complex structure of outsourced management of properties is going to develop even further. The trend is rather new to Sweden but has been going on for a longer time in other parts of the world. USA and Japan have the longest experience of outsourced management of properties. UK together with the Netherlands and Germany were the pioneers in Europe. The concept was introduced in the mid 1980's in Europe. Since the facilities management trend has started later in Sweden is the expansion towards this trend as the dominant still to come. The largest international organization representing facility managers is IFMA (International Facility Management Association) which was founded in USA in 1980 and took their current name in 1982. The organization is today representing 17 600 members in 54 different countries and has 126 so called chapters, which are sections of the main organization. IFMA is certifying facility managers, conduct research and holds courses in the field. The Swedish chapter was founded in 1994. (IFMA 2005)

A survey of a number of facilities managers and their clients shows that the trend towards more outsourcing of the facilities management services will continue with a similar increase over the next three years as it has done over three previous years (Kuchler 2005). Since the continued development is expected from both the facilities managers and their clients there is a dual interest in continuing the activities towards a structure of the sector where outsourcing becomes an increasingly larger behavior and a natural part of the business.

Another sign of the facilities management being a profession and market segment to count on for the future is the introduction and establishment of facilities management as a field for research and teaching in Scandinavia. Institutes in other parts of the world has been operating these types of activities for a longer time, which is logic, since the facility management concept has been present for a longer time in these countries. The field is comparatively new to Scandinavian universities and colleges.

Possible environmental implications of the structural change

As stated before the more complex structure have a larger number of actors on than the conventional structure, these actors' characteristics may vary widely. This section aims to identify and examine a number of situations where the differences in interests of the actors could have implications on the environmental impact from the buildings. The section is intended to raise awareness about this issue, not to in any way present exact data how large the impact or influences from the different actors are. That is something that may be results from my future research. Note that this section is a generalized overview of how different actors may act in the property sector. The actors are assumed to be acting with a short term financial perspective and with no particular interest in improving the environmental performance in the buildings they own, operate in or manage.

This section examines two examples of situations where the sector's structural change might play a role. The first is in the case where financial incentives are used as arguments for environmental investments. The second case discusses actor's different perceptions of obsolescence in buildings. Other cases which could be examined in a similar way are for example: How or if environmental management systems affect the environmental performance of buildings, how preventive actions against vandalism can have environmental effects, how encouragement of social interaction between actors in the properties could have environmental effects or how staff's competence could affect the environmental performance of properties.

Investments for improvement in environmental performance

When environmental improvement in buildings is done, improvement can be done just by tuning the existing equipment in the building, but this can only be done to some extent. Sooner or later some kind of investment is needed to improve the environmental performance of buildings. These investments could be replacing parts of the building during a planned renovation or replacement of some poorly performing parts.

Equipment, material and machinery performing better environmentally often have a higher initial investment cost. Advocates for the environmental alternative often use either of the pay-off or life cycle cost (LCC) concepts as arguments for these products. The pay-off concept is based on the reasoning that an investment will pay it self off within a certain time by reducing operating costs compared to the previous situation. LCC builds on the idea that the costs over the entire life cycle shall be considered, which means that when investments are done, the total cost of the investment shall be accounted for instead of just the initial cost. Total cost includes costs for the initial investment, operating costs and costs for waste.

An example, replacing existing single glazed windows on a building with triple-glazed will incur an additional investment cost. As a result of the investment the insulation of the building will be improved and the costs for the energy consumed to heat and cool the building will decrease. After a certain time the savings in energy costs will be equal to the additional investment cost for the windows. This time is referred to as the pay-off time for the investment. After the pay-off time the investment is some times said to generate profit. Investments for decreased energy consumption, such as additional insulation, heat pumps, and solar panels are examples of occasions where pay-off and LCC arguments frequently are used. (Clift 2003; Lindgren 2005; Nordell and Hellström 2004; Warfvinge 2004; Wong, N. H., Cheong et al. 2003)

The pay-off and LCC arguments are often valid on the traditionally structured property market, but in the more complex structure these arguments might not be as logic, obvious and effective as before. In the more complex structure the different actors' interests may vary widely. The primary interests of the actors in the more complex structure could briefly be concluded as follow;

- The owners main interest is to own the buildings to generate profit from them. The profit could be either in income from rents or from sales of the property or sections of it to a higher price than it was purchased for.
- The tenant's primary interest is to rent a property that fulfills the current needs for the activities undertaken in the property to for them an affordable cost.
- The facility manager's main interest is to please their customers, which are both the property owner, whom has hired the facility manager to manage their properties, and the tenant who expects good service and a building that meet their needs.

The differences of priority in combination with the contractual arrangements between the actors might cause invalidity in the LCC and pay-off arguments. The LCC and pay-off concepts are good and work well in theory, but one thing that not is included in LCC and pay-off is who the money

belong to. What which actor is paying for and which actor is benefiting form the investments is neglected. Let's say a major renovation is to be financed by the property owner in the schematic model in figure 2, I will describe some of the complications to improvements in environmental impact from the building that may occur when such investments shall be done.

The argument that the more costly investment will pay itself off by lower use costs and actually provide the investor with a profit after a certain time automatically implies that the same owner is going to own the property for the entire pay-off time. This causes a decreased flexibility in the ownership of the property. The investment costs could sometimes be substantial and the investments could generate more profit elsewhere. Some argue that the value of the property increases with such investments, it is though questionable whether the outstanding investment will be reimbursed if the property is sold before the pay off time has elapsed. A problem here is the locking of the property ownership for the pay off time plus more, which might cause a decreased interest for costly environmental performance improving investments from the owner, since the pay-off time and the ownership lock-in will be extended.

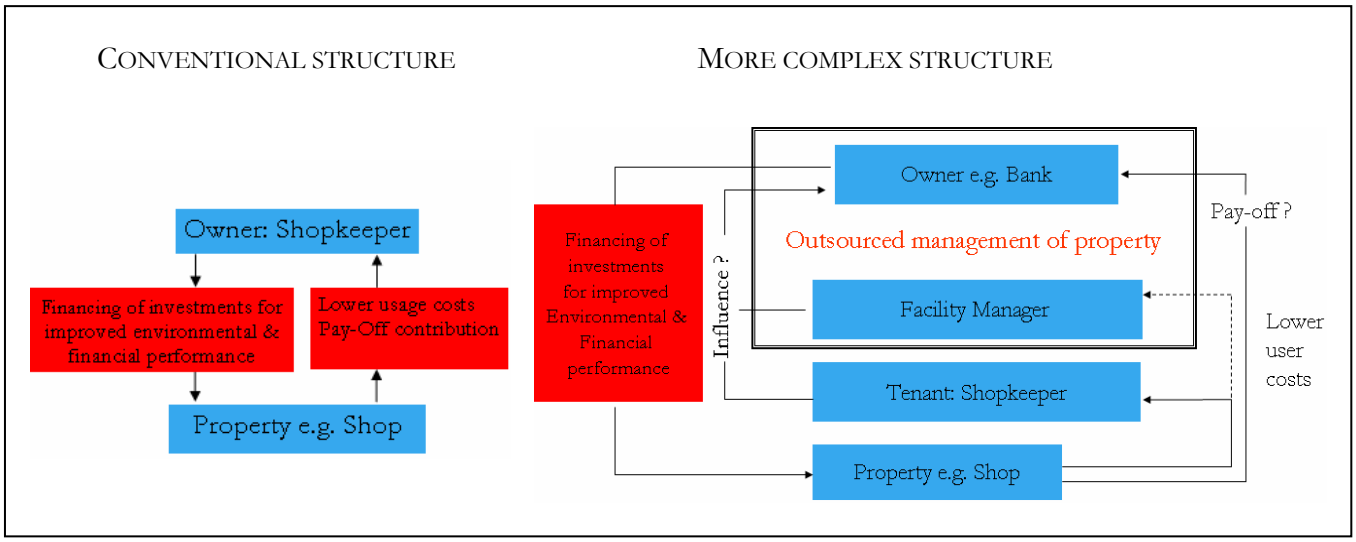

Figure 2 Schematic model of the conventional and the more complex market structure of the property sector. The environmental improving investments and the obstacles to these investments are illustrated.

The contractual agreements of how the energy bill is paid may vary from case to case. But however the arrangements are this may cause implications in the incentives situation for investments. If the entire energy cost is paid by the owner, the LCC and pay off arguments may be quite valid. The investments done might incur higher rents since the actual investment needs to be funded in some way other than by using the pay-off method. This will not be a popular action among tenants since they won't benefit from the investment. If the rents aren't increased the locking of the ownership problem described above is valid. If the energy bill is paid by the tenants, the only driving force for the owner to finance such investments would be influence from the tenants or their own environmental conscience, which I in this section have defined as non-existing. Another arrangement for the payment of the energy cost is a division between the tenant and the owner, this arrangement lengthens the pay-off times. Again, the classic financial argumentation for these types of investments does not take into account which actor can benefit from the long term positive financial outcome from the investments.

The ways for tenants to influence what investments should be done in the more complex structure is rather restricted. There are no incentives for tenants to invest in a property they don't own. The way tenants could make investments come true is by requesting them from the owner of the properties. It is questionable if the environmental performance improving investments have the highest priority for the tenants. At the same time are owners or facility manager often encouraging the user of the

property to decrease the media[4] consumption in the property to lower costs and environmental impact from the building. So the property user's power has been radically decreased, from being the owner and user, having the total control and power of the building, to in the more complex structure being a tool for reducing media consumption with no actual influence on the decisions made about the property and it's features.

The facility manager is in a situation where the customers are both the owners and the tenants. In many cases does the facility manager function as an advisor to the property owners, whom in many cases don't have specialist competence about property management. The owner's competence is often focused on financial issues. Since the facility manager is an advisor they have the opportunity to inform the owners about available environmental alternatives for the upcoming investments. Even though the owner makes the ultimate decision, the facility manager would have some influence on the decisions since they are hired as experts and strategic decisions are one of their expertises.

The concluding remarks from this section is that the decision-making process in the more complex structure also is more complex, with more actors who might have different opinions about what is good for the property. At the same time has the knowledge in the process has increased since there now is experts acting in the sector. In the conventional structure it was common for actors with main expertise, interest and core business other than management of properties to make strategic decisions about the management of properties, which could increase the quality of decisions made in the sector. The impact on the environment might be that the strategy somewhat could hinder the environmentally good investments since it makes some financial incentive argument for resource saving investments invalid on occasions. There might although be some potential for environmental improvements in the sector with the introduction of these experts concentrating on the management of properties. The management of properties might have been somewhat neglected in companies and organizations with a completely different core business. If the improvement potential should be realized it is essential that the facility management experts have expertise in the environmental effects and impacts from the facilities they are managing and also what environmental impact the decisions and recommendations they do may have.

Obsolescence in buildings

The more complex structure of the property market might have effects on many aspects of the market. Most of the effects might not be directly linked to environmental issues, but could cause environmental effects anyway. An example of such a situation will be explained in this section.

The obsolescence and ageing of buildings are the factors deciding when and what to renovate. The perception of when a building is outdated might vary between different actors with different interests. The technical life-time of a material is rarely reached before the material is replaced for other reasons than technical failure. In studies about environmental effects from buildings, the assumed lifetime is often 50 years or more. (Junilla 2004). Although that might be the theoretical technical lifetime for buildings other factors makes the real lifetime substantially shorter. It is in general financially beneficial to renovate a commercial property before the technical lifetime is reached. (Wong, K. C. and Norman 1994) sets up a financial model for the optimal time to renovate a shopping center for a maximal net rent income and to keep the value of the shopping centre at a high level. In the numerical example presented in their article is the optimal interval for renovations estimated to 5 years but can vary from 4 to 12 years depending on outer circumstances such as interest rate and renovation cost to rent income ratio. This time frame is very different from the ones often used in studies about environmental impact from commercial buildings. The obsolescence is defined in (Lemer 1996) as when the facility no longer provides satisfactory service

[4] Frequently used term in the Swedish housing management and property management, which means supply of energy, water as well as the management of wastewater and waste, (Brunklaus 2005)

level. Lemer also states that the service level can be measured in many different ways by several different parameters as measures depending on what the facility's purpose. The shopping mall model builds on the mechanism that a newly renovated property is more attractive and can generate higher rent incomes. Renovating with frequent intervals is a method to keep the properties updated and attractive, the rent levels will be kept on a high level, in accordance with figure 3.

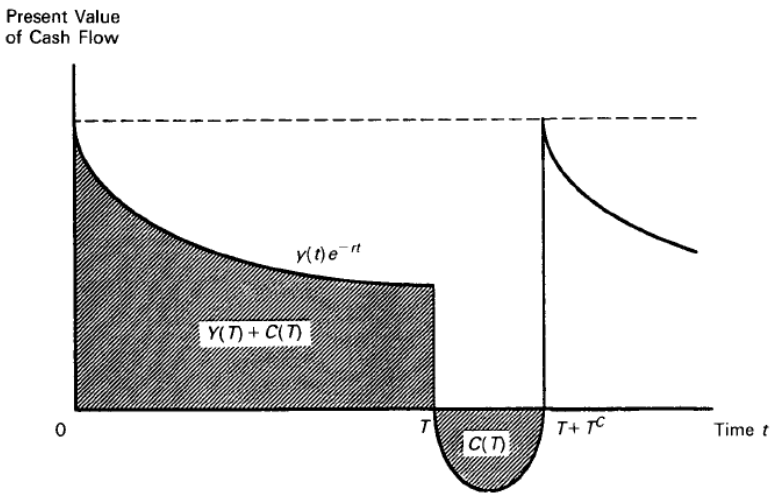

Figure 3 Principal model of cash flow in a mall property from (Wong, K. C. and Norman 1994) where the shaded fields represent the present market value of the shopping centre.

The perception of what obsolescence is and when a facility actually is aged enough so that renovation is required might differ between the different actors in the more complex structure of the sector. The updated owner might want to follow the financial model and renovate with rather frequent intervals for example every 5 years, while another owner might want to keep the investment costs down and don't want to renovate as frequent, the buildings do after all function satisfactory to their standard and the strategy keeps the costs down.

The tenants might have the same division of preference of renovation intervals. Some have high demands on their property when it comes to being modern and of high standard. Sometimes the property is used to create an image and to market the company's products and services. In other cases isn't the standard of the property as high priority for the tenant.

The environmental effects of renovation can be large. The replacement of technically functioning material and machinery contributes to the consumption in the world. The term over-consumption is often used when material goods are replaced before they are technically worn out. Over-consumption is often pointed out as an important factor or cause to many of the environmental problems in the world. The over-consumption concept builds on the fact that more material, energy and other resources are used and more waste is generated than necessary in society, since goods aren't used for their full potential lifetime. On the other hand is a property that not is occupied a complete waste of resources, renovations are definitely needed in the property sector.

The difference between the conventional and the more complex structure of the sector is that more opinions are present in the more complex structure about what a satisfactory service level is. Which actor that is proposing what in this case is not necessarily important. But since this different owner structure makes the property sector more flexible when it comes to relocation of offices and shops since the users of the properties don't own their premises anymore. A move to another property with different ownership is easier than in the conventional structure where the user of the property also owned the property and had to arrange to lease the property to someone or sell the property. Since the property market now is more flexible and the vacancy rates in Gothenburg, as an example, almost are reaching 15 % (Jones Lang Lasalle 2005) the owners and facility managers has a task to keep their properties at a good standard to keep their tenants as customers. The importance of keeping the properties at a high standard causes frequent renovations to adapt to the tenants needs, which in turn increases the rate of over-consumption.

The ageing of buildings is obviously unavoidable and will always have an environmental impact. The impact differs between buildings, since the preferences of the actors with interests in the building

differ. One of the interesting things about the differences in the preferences is that it has an effect both on the environmental performance of the property as well as the way the organizing of the actors with interest in the property. This dual effect is interesting to study as an application of how different preferences among the actors in the sector effects the way the sector and the individual actors are organized at the same time as the environmental performance changes as a result of the differences.

Priority of environmental work in the sector

Although the environmental issues often are identified as a prioritised area for improvements in the construction sector it is rarely discussed by facility managing companies, researchers or even in relation to facility management. The facility managing companies usually focus their discussions and marketing on delivery of services, the quality of their services or financial aspects of the sector. The environmental effects are usually discussed by researchers in relation either to the actual construction of buildings, the usage in buildings often the media used by the tenants or the user of the building. The management might be discussed in terms of renovation strategies, but then it is often done within the framework of some of the environmental building programmes[5]. Discussions in terms aimed at facility managers are rather rare. The British Institute of Facilities Management conducted a survey of 207 facility managers and 43 clients. The survey is called Rethinking Facilities Management and concerns different aspects of the sector, one section asked about the current top prioritised issues and what will be the focus issues in the future. (British Institute of Facilities Management 2004) The future was defined as year 2009, five years in to the future from the time the survey was conducted. When the current issues in the business was ranked by importance the environmental and sustainability issues were ranked as the 17th and 18th most important issues by the facilities managers and clients respectively. While a large increase in importance was predicted for these issues in the future, the facilities managers ranked the issues as the 5th most important issue in 2009, the clients ranking was 7th most important. The ranking is obviously dependent on the other issues ranked or suggested by the questionnaires, the percentages of how many of the respondents answered that the issues had current importance or will have importance in the future might also be of interest. The percentages and rankings are presented in table 1.

Environmental issues/sustainability	Ranking & Percentage 2004	Ranking & Percentage 2009
Facilities Manager	17th – 60 %	18th – 52 %
Client	5th – 88 %	7th – 87 %

Table 1 Ranking of the importance of environmental and sustainability issues among facilities managers and their clients. The percentage represents the portion of respondents who find these issues important.

The sustainability and environmental issues are not prioritised at the present and but are expected to get a significant increase in priority and more attention in the future, both from the facilities managers and their clients. This outcome from the survey is in correlation with the previously discussed, that outsourcing management of facilities is still being introduced in Europe and in Scandinavia in particular.

At the present are the environmental issues of rather low priority, both the larger facility managing companies[6] and the major organisations for FM[7] have research departments which publish reports quite frequently, very few reports about environmental issues are to be found in their publication

[5] For example the British BREAM: (Building Research Establishment Environmental Assessment Method) and the American LEED (Leadership in Energy and Environmental Design) Green building rating system.

[6] For example: Jones Lag Lasalle, Datscha, Newsec, Aberdeen Property Investors

[7] IFMA (International Facilities Management Association) FMLink, BiFM, NordicFM

lists. It is also very rare to find environmental policies and marketing words in the presentations of facilities management companies.

Discussion

Many are the voices raised about the size of the environmental impact from buildings, the technological solutions that will solve many parts of the problem exists. At the same time does the environmental impact from the buildings not seem to decrease with any significance. Some things must exist that are hindering the progress of the environmental work in this sector. The structure where outsourcing of one or many services in buildings is common is driven by smaller maintenance budgets, which gives higher demands on cost-efficiency. The tougher competition on the outsourced market might also provide an even more short term planning and thinking in management and maintenance strategies for buildings, which might lead to property owners to refrain from larger investments for lowering their media consumption costs. The complex situation with many actors on the market with different primary interests and with the environmental issues far down on their list of priorities, gives a market situation where the environmental issues are put in the backseat. The driving forces for environmental work apart from the fact that it is good for the environment are not obvious. The financial benefits that have been present earlier are not as clear as they were before. Someone will save money in some end of the media consumption saving investments, but it is no more for sure that it is the same actor that will benefit from the investments that made the initial investment.

The more complex structure on the property market has implications on the arguments where the concept of lifecycle cost is used. It is questionable whether this type of argument ever has been valid for the property sector, it may be valid for building parts, machines and so on, but might not be for a entire building. The failure of the life cycle cost argumentation is that it builds on what is invested at some early point in the product can be beneficial later in the products life. This implies that the actor who makes the investment in the early stage still have a presence in the property when the time for the investment to be financially beneficial comes. Since a property has a long lifetime for being a product it is fairly rare that all actors active when the building was constructed would be present when the building actually is demolished, i.e. from cradle to grave. This situation is very rare in the more complex structure of the sector and is also rare in the conventional structure where different actors has an interest during different phases of the buildings lifecycle e.g. construction, maintenance and renovation (Nässén 2005). Whether the pay-off argument has been completely valid for entire buildings or not is questionable. The incentives situation for the types of argumentation where a long term investment will pay the investments back in some time not are as straight forward as they first appear to be. The argumentation and does not take the complexity of the property market in to account, this type of arguments might be very valid in other product areas where the roles and the actors in the sector are more straight-forward and more clearly defined. These types of arguments might be rather relevant in the private housing sector, where the owner and user are very closely related, often same person, and their investments and benefits clearly are shown. The arguments needs to be updated and changed to adapt to the actual organisational structure or the property market to have any power or relevance for motivating environmental improvements in this sector.

It is relevant to study the relation between the actors and their relations more closely to establish to what extent the improvements in the environmental performance of the property sector are being hindered by the structural change. The structural change might not automatically imply a hinder to environmental improvements, whether or it does or not is going to be investigated in future research. As explained before, when introducing facilities managing firms in the sector, experts in managing facilities are also introduced in the sector. It is yet to be investigated if the introduction of this expertise is beneficial for the environment or not. My previous research has so far discovered that only a few facility managing firms have clear environmental policies or clearly

stated environmental work in on their agendas. It could also be interesting to investigate how and in what way financial incentives can be constructed for the more complex structure of the property market. The focus of my research will although be on the way the actors in the sector organise themselves and how the decisions made about their organising effects the environmental performance of the buildings in their possession.

Research within this project will link present technological solutions, financial change, organisational matters, human behaviour and environmental performance in the commercial property sector. It will be done by studying properties and their stakeholders in case studies, but also with one of the stakeholders as the starting point to examine the differences in stakeholder interests in different projects, depending on their stakeholders' interests.

Conclusion

The property sector is an interesting example where technology meets financial interests to provide a product expected to meet social and environmental demands. This sector has undergone a structural change, which has caused a more varied set up in the sector. The sector did not have a very developed environmental work in the conventional structure, the incentives for environmental work and investments have been changed and the classic motivating arguments such as for environmental improvements have somewhat changed and there is potential for the change to be lasting and outsourcing to be a natural part of the business's

The relation between the human, physical, financial, technical and environmental entities in the sector is interesting to investigate since they appear to be closely inter-related and the majority of the research done in the field is focused on either one or two of the entities. It is also of interest to study the differences in environmental impact that appear due to changes and decisions made over time. The decisions that are interesting to study are often made without consideration that it actually can have impact on the environmental performance and are therefore even more interesting. It is interesting to study how these activities affects one property during a period of time but also how the environmental impact from two similar properties change over time.

The need for more complex investigations of environmental performance is explained in this paper. The current more simplistic view of factors influencing environmental performance is to be revised in my future research. The property sector is an interesting example of a sector which currently is undergoing a structural change and is therefore a useful example to study. The experiences of conducting more complex environmental impact studies will be transferred to other sectors where similar situations are present.

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