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Article title

Sustainability assessment of buildings and corporate real estate management – the risk management perspective

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Since January 2011, Susanne Geissler has been director of ÖGNB Österreichische Gesellschaft für Nachhaltiges Bauen. ÖGNB provides and maintains the Austrian building assessment tool TQB and offers a platform for innovations in the construction sector and associated industries. Before, she worked with the Austrian Institute of Technology and the Austrian Energy Agency. Since 2009 she has been active with her own engineering firm SERA energy & resources in the field of energy efficiency, renewable energy and natural resources. She is university lecturer with the Universities of Applied Sciences Technikum Wien and FH Wien.

Structured Abstract:

Purpose

Sustainability assessments of buildings are well known to result in certificates, which are mainly used for marketing purposes. This conference contribution does not tackle the marketing perspective but focuses on the sustainability assessment of buildings as a risk management tool for corporate real estate management.

Approach

Building assessment schemes provide a full range of decision-making criteria to consider all building related risk aspects, which are already on the rise or might become important in the near future.

Findings

Buildings have a long life span, and it is important to ensure a stable performance of the property during several decades. Regarding market demand, the building location is undoubtedly a very high ranked criterion when it comes to making the decision to buy or rent a building or building unit or not. Nevertheless, building specific quality characteristics such as energy efficiency characteristics related with the building envelope and the HVAC system, characteristics related with the indoor air quality, and quality characteristics from the facility management perspective to reduce running costs have been gaining in importance. In fact, all these aspects are finally cost-related factors, which might affect the saleability of a property.

Originality

This conference contribution uses the ÖGNB sustainability building assessment scheme to demonstrate the relation between sustainability building assessment and risk assessment.

Keywords:

Risk management, energy efficiency, sustainable buildings, green buildings, living buildings, property value, real estate

Article Classification:

Viewpoint

Full paper:

1. Introduction

Sustainability assessments of buildings are well known to result in certificates, which are mainly used for marketing purposes. This conference contribution does not tackle the marketing perspective but focuses on the sustainability assessment of buildings as a risk management tool for corporate real estate management. Buildings have a long life span, and it is important to ensure a stable performance of the property during several decades. Regarding market demand, the building location is undoubtedly a very high ranked criterion when it comes to making the decision to buy or rent a building or building unit or not. Nevertheless, building specific quality characteristics such as energy efficiency characteristics related with the building envelope and the HVAC system, characteristics related with the indoor air quality, and quality characteristics from the facility management perspective to reduce running costs have been gaining in importance, due to the following exemplary reasons: (1) Energy: Even if clients seldom demand for energy efficiency, this topic is definitely on the rise due the legal framework conditions such as the EPBD (Energy Performance of Buildings Directive) and the EED (Energy Efficiency Directive); if a building is not fit to be able to comply with the requirements to come, upgrading might be more expensive than taking energy efficiency into account from the beginning. (2) Indoor climate: Productivity depends on social aspects, but also on building related aspects such as air quality, summer and winter comfort, quality of light, and noise level; this area is more a subject of competition on the market than energy, because of the impact on people's health and productivity. (3) Materials: The type of façade and choice of materials in general has a strong influence on running costs; a wise choice results in a reduction of cleaning costs. All these aspects are finally cost-related factors, which might affect the saleability of a property. Assessment schemes for assessing the sustainability of buildings provide a full range of decision-making criteria to consider all building related risk aspects, which are already on the rise or might become important in the near future. However, it is the responsibility of the informed expert to decide between options. This conference contribution uses the ÖGNB sustainability building assessment scheme to demonstrate the relation between building assessment and risk assessment. Energy is dealt with in detail with a focus on the relevant European Directives and their national implementation.

2. Sustainability assessment of buildings

In Europe, the building sector accounts for more than one-third of energy consumption and material flows. Building assessment schemes have been important drivers for increasing building quality and reducing impacts on the environment at the same time. In Austria, the Total Quality assessment scheme was developed in co-operation with the international initiative *Green Building Challenge* and after a testing phase went into operation in 2003. [1] It was decided to elaborate a national assessment scheme, based on international experience, but adjusted to the Austrian planning and construction practice, in order to avoid high transaction costs. In Austria, small and medium-sized companies are in the majority, and it was the objective to provide a cost-efficient tool for widespread application. In 2009 the system was revised based on lessons learnt and renamed as Total Quality Building (TQB) assessment scheme. Since 2009 ÖGNB has provided and maintained this free of charge building assessment tool via the website www.oegnb.net.

3. Elements of building assessment schemes, assessment criteria and data collection report

All building assessment schemes consist of the following elements: [2]

(1) Assessment system

- Criteria: which kind of information is needed for assessment (e.g. heating energy consumption)
- Indicators: how to describe the performance of the defined criteria (e.g. kilowatt hours per square meter heated gross area and year)
- Assessment scale: defines which performance is good and which one is bad by allocation of scores (e.g. heating energy consumption less than 15 kilowatt hours per square meter heated gross area and year receives the highest score)
- Weighting: which criteria are more important than others, and by how much (e.g. more points are allocated to energy related criteria than to material related criteria)

(2) Assessment procedure

- Data collection
- Check of data
- Awarding of points based on the data provided
- Awarding the certificate based on the assessment result

The assessment result contains two parts:

- Compilation of quantitative data and qualitative information about the building.
- Assessment result for market communication, in order to tell consumers how good the performance of the building is.

Data collection and data assessment should be well separated, to make use of the data apart from the sustainability assessment scheme. While the data compilation as such remains the same, the interpretation may change, depending on the assessment scheme applied. The data collection report contains objective information about the building, which is very useful for other purposes, among others for the operation of the building but also to assess future risks in terms saleability.

The following table presents an overview about the criteria framework and thus about the information presented in a data collection report. Criteria reflect those aspects, which are considered important by building owners, customers and the public administration. Especially the legal framework and its future development are crucial, due to the long lifespan of buildings. It might be more cost efficient to take into account future building quality requirements today than to adapt the building later on or accept a lower price when selling or renting a building.

Table 1: TQB-Assessment categories and criteria (overview residential buildings, category and first level criteria, version 2.2, december 2010) [3]

| | Category and criteria (German original) | English translation |
|----------|---|--|
| A | Standort und Ausstattung | Location and amenities |
| A.1 | Infrastruktur | Infrastructure |
| A.2 | Standortsicherheit und Baulandqualität | Security |
| A.3 | Ausstattungsqualität | Amenities |
| A.4 | Barrierefreiheit | Accessibility |
| B | Wirtschaftlich und technische Qualität | Economical and technical quality |
| B.1 | Wirtschaftlichkeit im Lebenszyklus | Life cycle cost assessment |
| B.2 | Baustellenabwicklung | Construction site management |
| B.3 | Flexibilität und Dauerhaftigkeit | Flexibility and longevity |
| B.4 | Brandschutz | Fire prevention |
| C | Energie und Versorgung | Energy and water |
| C.1 | Energiebedarf | Energy consumption |
| C.2 | Energieaufbringung | Energy production |
| C.3 | Wasserbedarf und Wasserqualität | Water consumption and water quality |
| D | Gesundheit und Komfort | Health and comfort |
| D.1 | Thermischer Komfort | Thermal comfort |
| D.2 | Raumluftqualität | Indoor air quality |
| D.3 | Schallschutz | Noise protection |
| D.4 | Tageslicht und Besonnung | Daylight and sun |
| E | Ressourceneffizienz | Resource efficiency |
| E.1 | Vermeidung kritischer Stoffe | Avoidance of harmful substances |
| E.2 | Regionalität, Recyclinganteil, zertifizierte Produkte | Quality of products (local production, recycling material, certified products) |
| E.3 | Ökoeffizienz des Gesamtgebäudes | Eco-efficiency of the entire building |
| E.4 | Entsorgung | Demolition and disposal |

4. The relation between building quality and saleability

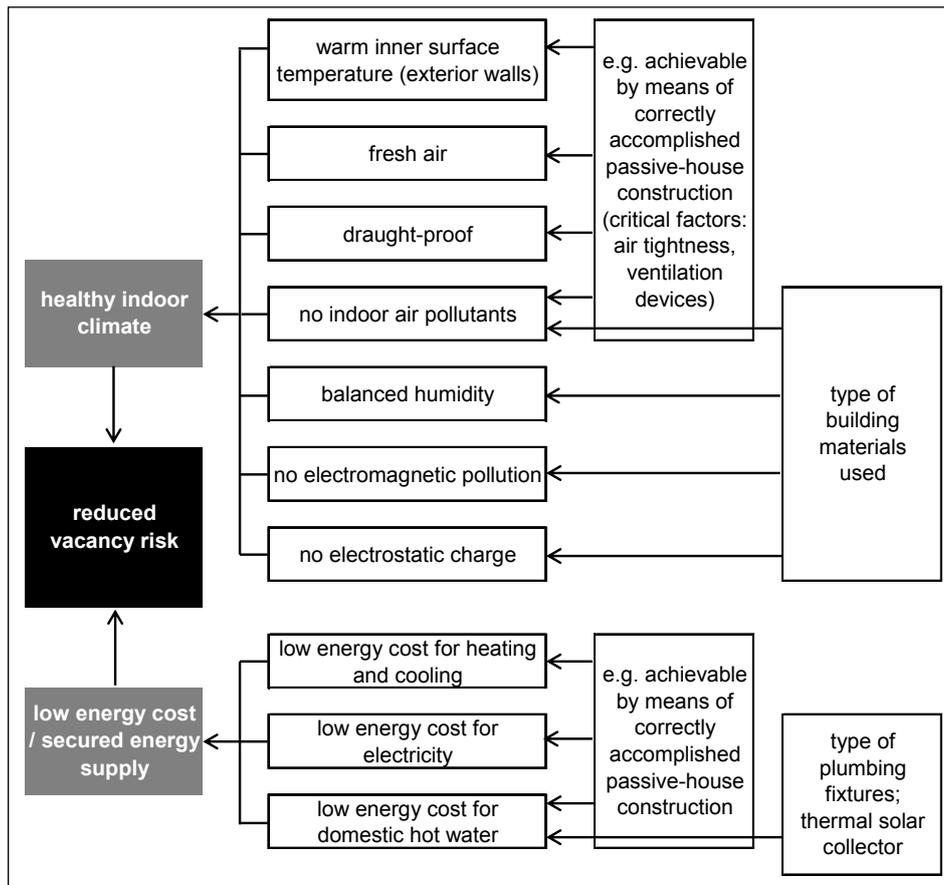
Sustainable buildings are equipped with innovative technologies and materials, which have an impact on operation costs and future risks. Differences regarding operation, maintenance and durability compared with buildings equipped with conventional technologies and materials are not reflected in guiding values based on conventional buildings. There are positive aspects such as better indoor climate and better energy-related building quality, but also imaginable negative aspects such as a potential increase in life-cycle costs due to a building services concept, which seems to be superior but is not well elaborated, thus causing unnecessary costs in construction and operation.

The following figure shows the relation between building quality aspects and economically important factors, such as the vacancy risk, which is an input parameter for property valuation estimations.

Usually, vacancy risk is estimated a percentage of the annual gross yield, irrespective of the building quality. Often, building specific data are not available or are cumbersome to collect, and even if they are available, there is the question whether economic experts will be in the position to assess technical building quality effectively and accurately, and to relate technical building quality aspects to economic calculation parameters. Buildings are becoming more and more complex and technologies are rapidly changing.

Here, sustainable building assessment systems come in: they have the potential to play an important role because they provide detailed building related data such as data about energy consumption, materials, and comfort.

Figure 1: Relation between building quality aspects and vacancy risk [4]



The following table provides an overview about energy-related building performance assessment criteria and relevant building information in the data collection report in relation to the legal framework, complemented by comments in terms of risk assessment.

Table 2: Energy-related TQB-Assessment criteria (version 2010) and relevant building information in the assessment report in relation to the legal framework [own source]

| TQB categories and criteria | Information provided by the data collection report | Relevant legal framework | Comments on reasons for a better sales potential of buildings with very good energy performance in terms of energy efficiency and renewable energy use |
|-----------------------------|--|--|---|
| Energy consumption | Heating energy consumption (represents the quality of the building envelope, basic energy efficiency indicator) Efficiency of the heating and cooling system Primary energy demand (represents the overall efficiency) | (1) Energy Performance of Buildings Directive (Directive 2010/31/EU) (2) Ecodesign Directive (Directive 2009/125/EC) (3) Renewable Energy Sources Directive (Directive 2009/28/EC) | (1) The recast of the Directive 2002/91/EC was adopted with extensions to cost optimality and requirements regarding Nearly Zero Energy Buildings: energy efficiency becomes even more important as well as building integrated renewable energy technologies. (2) The recast of the Directive 2005/32/EC was adopted with an extension to energy related products. Labelling of products (e.g. pumps and fans) will lead to a fast development of energy efficiency standards, comparable with the development, which has taken place in the field of household appliances. (3) A defined share of renewable energy supply has to be achieved and building integrated technologies play an important role. |
| Energy production | Renewable energy technologies on site: e.g. photovoltaic plant for electricity production e.g. solar-thermal plant for domestic hot water production | (4) Energy Efficiency Directive (Directive 2012/27/EU) | (4) Energy efficiency targets have to be achieved and there are specific policy instruments addressing the building sector. The public administration leads by example and through commitment to build or rent only buildings, which comply with ambitious energy standards. |

5. Extended building assessment report

Data collection reports and assessment reports generated during the sustainability assessment of a building provides a useful basis for assessing future risks which might affect the saleability of a building. Based on this assumption, an applied research project took place 2008-2010, aimed at the development of a guideline on how to deal with energy efficiency and other sustainability aspects in real estate valuation. The project was initiated by the Austrian Energy Agency, and a team consisting of real estate experts and experts in the field of sustainable construction joined forces in this project. In addition to the core project team, a group of experts representing all stakeholder groups from the real estate valuation sector participated in workshops to discuss crucial issues and ensure that project results will be useful for practicing appraisers.

The group agreed to focus on the role of energy at first, because there was an existing legal basis for this aspect exclusively, represented by the EPBD (EU Directive 2002/91/EC). Other sustainability aspects covered by voluntary assessment schemes were seen as less important, because the number of buildings endowed with a certificate was still low. Furthermore there was the insight that, in contrast to energy, it would be much more difficult to describe other sustainability aspects in monetary terms, such as use of daylight and healthy indoor air quality which result in increased wellbeing and greater productivity when dealing with office buildings. However, the group also came to the conclusion that, apart from the assessment result, building assessment schemes generate a lot of objective information about a building, for instance on daylight, materials, indoor air pollution, flexibility, noise, safety and security, which can be very useful to assess possible future risks if appropriate for the property under assessment. Among others, the project resulted in the strong recommendation to extend the building assessment report and include a risk assessment based on the data collection report generated during the building assessment procedure, which is easy to understand for non-technical real estate experts. [5]

6. Conclusion

Sustainability assessments of buildings are carried out voluntarily, only if the client requires the assessment. Currently, developers, architects and engineers use TQB mainly as internal quality control system and other assessment systems such as LEED and DGNB for marketing purposes. However, sustainability assessment schemes provide building specific information about exactly those aspects which will influence a building's saleability: income from rent, operating costs and future risks, depending on the quality of indoor climate, the level of energy consumption and security of energy supply as well as the amount of whole life costs. This potential has not been exploited so far and leaves room for future co-operation between technical experts and real estate experts to come up with feasible suggestions how to make use of building specific data collection reports generated in the course of a building assessment procedure.

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