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CHARACTERISTICS THAT ENHANCE VALUE FOR USERS OF OFFICES—FOCUS ON BUILDINGS AND STAKEHOLDERS

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ABSTRACT

The Norwegian research project OSCAR acknowledges a clear connection between how buildings are designed and operated and which values the business that uses these areas can produce (Bjørberg et al., 2015). This paper addresses what value is for end users of office buildings and how value creation can be optimized from as early on as the predesign phase.

The research is based on a literature review, a case study of an office building, and interviews with two key actors within BREEAM in Norway. The case study includes a questionnaire that had 270 respondents and 8 semi-structured, in-depth interviews.

The design of office buildings has an important impact on the health and productivity of people who work in offices. The study investigates which factors seem to be of most value to end users of office buildings. There are several tools and methods within the project management field that can be used in the predesign phase in order to enhance value for users. The focus in this paper will be on user involvement and sustainability-rating assessment tools. The research addresses why users should be involved in the predesign phase and what to be aware of when involving users.

KEYWORDS

Value, collaboration, sustainability, office buildings, predesign.

INTRODUCTION

According to the literature, office buildings that promote physical, functional, and psychological comfort can contribute to both increased well-being and productivity of employees (Feige et al., 2013, Haynes, 2008). Poorly performing office environments can reduce the value creation of the business because of factors such as lost work hours due to sickness, decreased productivity, a demoralized workforce, and increased staff

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turnover (Clements-Croome, 2015). While Lean Construction has mainly focused on on-site production processes, literature on the topic of Lean Construction argues that the concept of value should cover the whole life cycle of the building (Emmitt et al., 2005, Rooke et al., 2010).

The Norwegian research project OSCAR acknowledges a clear connection between how buildings are designed and operated and which values the business that uses these areas can produce (Bjørberg et al., 2015). This paper addresses what value is for end users of office buildings and how value creation can be optimized from as early on as the predesign phase. In this paper, the terms users and end users refer to employees. Definitions of the terms value and predesign will be discussed as a basis to further answer the following research questions:

1. What characterizes office buildings that create value for end users?
2. How can users be involved in the predesign phase to enhance value creation?

RESEARCH METHODOLOGY

The paper is based on both qualitative and quantitative research. A literature review of relevant themes was conducted in accordance with the procedures described by Blumberg et al. (2014). A case study of an office building was carried out, consisting of a questionnaire that had 270 respondents (response rate of 57%) and in-depth, semi-structured interviews with 8 key actors. The purpose of the questionnaire was to identify how end users perceive value-creating elements in office buildings and how they evaluate these elements in relation to the building they work in. In addition to the case study interviews, two in-depth, semi-structured interviews with key actors within BREEAM in Norway were conducted. All the interviews focused on project management elements such as user involvement and maintaining strategic goals from the predesign phase to enhance value creation for users. The interview procedures were in line with Yin's (2014) recommendations. The interviews were recorded and then transcribed, coded, and analyzed later by the author.

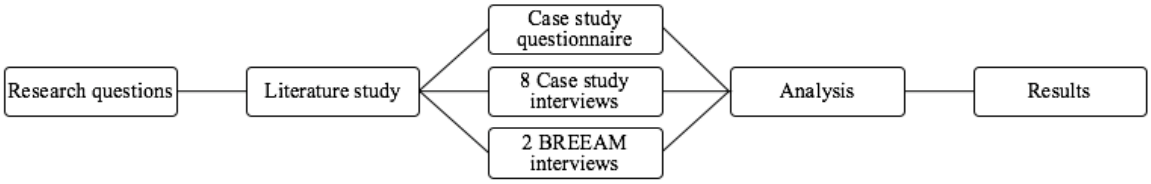

Figure 1: The research process.

THEORETICAL FRAMEWORK

In the following sections, a theory of value creation for users will be presented. There are several tools and methods within the project management field that can be used in the predesign phase in order to enhance value for users. The focus in this paper will be on user involvement and sustainability-rating assessment tools (SRAT). SRAT have been chosen on the basis of the results from the preliminary studies. These results indicated a gap between users' perception of SRAT and the common acknowledgment of the importance of environmental issues.

Drevland and Lohne (2015) acknowledge that value is a complex term that lacks a commonly agreed-upon definition. They refer to Womack and Jones's definition of value in Lean Construction. Womack and Jones (1996) suggest that only the ultimate customer can decide what value is, and value is about meeting the customers' needs at a specific price and at a specific time. Drevland and Lohne (2015) expand on this definition, stating that value judgment is subjective and temporal.

A physical environment that corresponds to the employees' needs and work processes can positively affect their performance, health, and well-being (Haynes, 2008, Feige et al., 2013). On the other hand, a poorly performing office environment can negatively affect the employees' health and productivity (Clements-Croome, 2015).

It is clear from studying lists of qualities that are of value to users that most employees highly value the possibility of doing focused work (individually and in groups) without many distractions. Informal, unplanned meetings are also important (Leesman Lmi, 2015, Brill et al., 2001). According to van der Voordt and van Meel (2000), one of the main challenges in office innovation is finding a balance between privacy and interaction. While distractions are often referred to as the factor that has the greatest negative influence on self-assessed productivity, interaction is often perceived as having the greatest positive impact (Haynes, 2007). Environmental conditions, such as temperature, air quality, noise levels, lighting, and access to daylight, are also of great value to users. Other factors that seem to be important are having information and communication technologies equipment and enough individual space for storage (Leesman Lmi, 2015, Brill et al., 2001).

According to Samset (2010), the predesign phase can be defined as all activities that occur from when the idea of a building is first conceived until a decision to invest in the project has been made. Samset points out that a construction project is at its most flexible in the predesign phase in terms of making changes and that changes made during that time cost less than if they are made at a later stage. He further distinguishes between tactical and strategic performance in construction projects. Tactical performance concerns delivering the agreed project outputs on time and within cost. Strategic performance includes longer-term perspectives, such as relevance, effect, and sustainability. According to Arge and Hjelmbrekke (2012), strategic performance should be strived for in order to enhance value for the project owner and users. They also say that strategic performance includes usability.

By involving users in the predesign phase, professionals can identify their needs and achieve good cooperation (Storvang and Clarke, 2014). The level of user involvement may also have an impact on the users' perceived satisfaction with the result (Baird, 2014). As stated by Hjelmbrekke et al. (2015), one out of three of the main perspectives on why construction projects seem to fail is that user requirements rarely prevail. However, stakeholder involvement is a source of uncertainty, as their motives and actions can affect the project (Ward and Chapman, 2008). Poor stakeholder management may cause cost overruns and time delays (Yang et al., 2009).

Besides involving users in the predesign phase, the use of SRAT, such as LEED and BREEAM, has the potential to contribute positively to users' health and job satisfaction (Baird, 2014). BREEAM and LEED are two equivalent SRAT. Both tools are widely

recognized around the world. BREEAM is mostly used in Europe, while the USA, Canada, China, and India use LEED. They provide a broad-ranging assessment of a building's environmental impact and lead to a rating of the building (Reed et al., 2009). Based on their review of literature, Smith and Pitt (2011) list several factors that contribute to productivity among employees, notably personal control, privacy, interior planting, personalization, color, windows, and lighting. They recognize that many of these factors can be linked to considerations in, for example, the BREEAM manuals. Results from a study conducted by Baird (2014) indicate that the overall user perception of sustainable buildings is better than that of conventional buildings, especially when it comes to health and productivity.

RESEARCH FINDINGS

The following sections present the results of the case study and interviews. For the case study questionnaire, 22 factors that could be of interest in the office context were determined. The employees in the case study company were asked to rate the qualities by importance and perception on a 4-point Likert scale. A total of 270 employees responded to the questionnaire (response rate of 57%). The case study interviewees have experience as users, with the predesign phase of refurbishment projects within the case study building, and with the predesign phase of construction projects in general. During initial work conducted as part of the research, it was found that BREEAM was not important to office employees. The interviewees asked about SRAT are among the leading actors within the development and adaption of BREEAM and BREEAM In-Use in Norway.

Table 1 shows the 22 qualities rated by the employees of the case study company.

Table 1: Qualities rated in the questionnaire

Number	Quality	Number	Quality
1	Areas suitable for formal meetings	12	Accessibility and universal design
2	Areas suitable for informal meetings	13	Access to locker room/shower
3	Areas suitable for individual work	14	Facilitation of physical activity
4	Exterior, architectural quality (including outdoor areas)	15	Individual control of shading, lighting, temperature, and ventilation
5	User-friendliness, sense of direction (finding one's way, signage)	16	Arrangements for effective waste management, recycling
6	Workplace design that enables flexible working	17	Indoor climate and comfort (noise, air quality and temperature)
7	Flexibility (possibility of changing area/floor plan)	18	Environmentally friendly, energy-efficient building
8	Modern, forward-looking solutions	19	Interior qualities that promote well-being and orderliness

9	Parking facilities for cars	20	Contributes to pride in the workplace
10	Parking facilities for bicycles	21	Safety and security
11	Availability of public transport	22	Contribution to knowledge sharing and collaboration

The graph in Figure 2 shows how employees in the case study rated the qualities in Table 1 according to how important they are to them and how well they perceive the qualities to be fulfilled in their office building. Based on the mean values, the most important quality to the employees is the availability of public transport. The indoor climate and indoor comfort (noise, air quality and temperature) is the second most important factor, closely followed by areas being suitable for individual work. Also among the most important qualities is having areas that are suitable for formal and informal meetings. Having areas suitable for flexible working is also mentioned as an important quality, but this has a relatively high standard deviation.

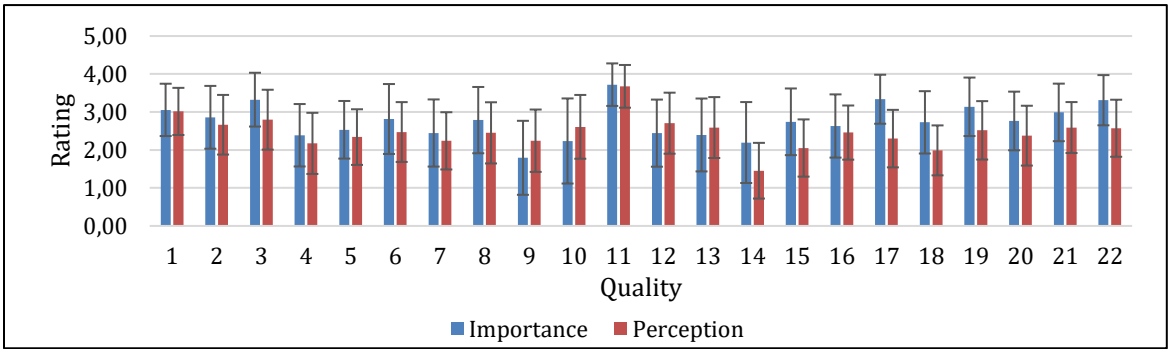

Figure 2: Average ± standard deviation of the qualities listed in the questionnaire.

The case study company rents five floors of an office building in central Oslo. The 1st floor was recently refurbished and has an open-plan layout with a mix of assigned and free seating. The layout is to some extent activity based. The 2nd floor has small, open landscapes with six to eight employees in each room, while the 3rd to 5th floors generally have individual cell offices.

There are several qualities of the office building that the users on the 1st floor, compared to those on the other floors, perceive to be better. These elements are areas suitable for formal meetings, areas suitable for informal meetings, workplace design that enables flexible working, flexibility, modern, forward-looking solutions, and contribution to knowledge sharing and collaboration. Two qualities that are perceived to be better by the employees on the 3rd to 5th floors are areas suitable for individual work and individual control of shading, lighting, temperature, and ventilation. See Figure 3.

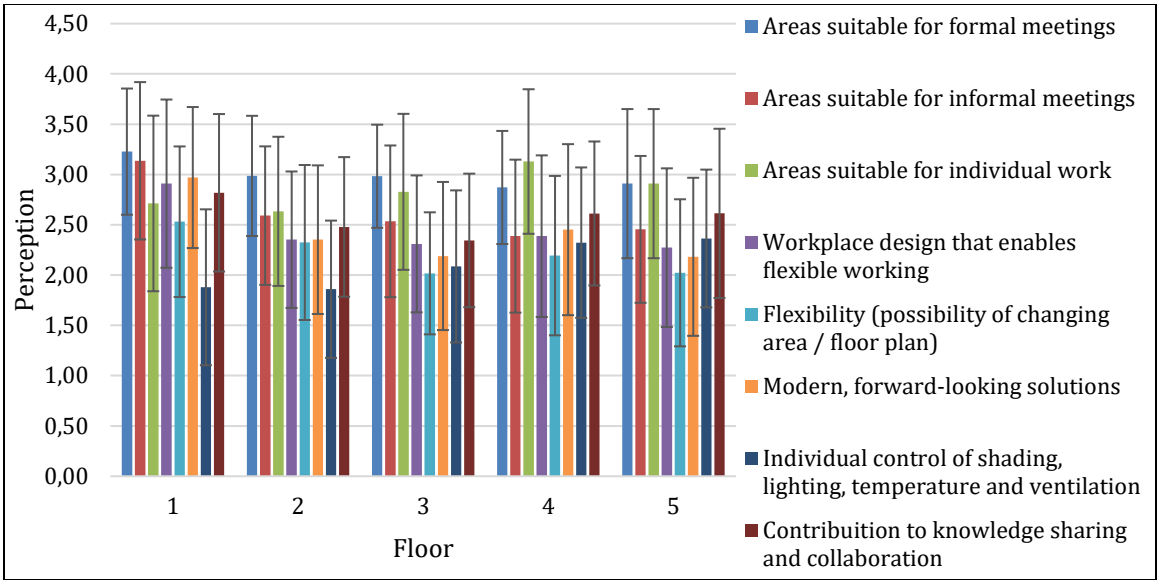

Figure 3: Average ± standard deviation of perception of qualities 1, 2, 3, 6, 7, 8, 15, 22.

The employees were asked to list three things they would like to improve or change. While 6 of the 13 negative comments concerned the indoor environment, those from employees on the 1st floor focused on noise, while negative comments from the 3rd to 5th floors mainly focused on air quality and temperature.

User involvement can be difficult, as users constitute a multifaceted group and have different objectives. However, the interviewees agree that users should be involved if their workplace is to be moved or substantially changed. Understanding the company and the users who will occupy the building is important in order to find solutions that facilitate the core business. Table 3 explains what interviewees consider to be the benefits of involving users in the predesign phase and what the design team should be aware of during the process.

The interviewees agree that it is also wise to involve the company management in the predesign phase, so that they can set strategic goals for the project and communicate these to the employees. This can help motivate the employees and contribute to increased knowledge about what they can expect from the project. Some of the interviewees strongly suggest that certain decisions, such as what kind of office layout will be used, should be made by the organization's management before the users are involved. In that way, some principles appropriate to the management's strategy can be decided first and can be adapted to the users' needs later.

Table 3: Why users should be involved in the predesign phase and factors to be aware of

Why users should be involved	What to be aware of
They feel that they have been involved in the process and that their needs have been taken into account. This gives them a sense of ownership of the office building.	It is important that the users know their role, when they can express their needs/wants, what has already been decided, what they can affect, the criteria for being heard, and to what extent their input will be considered. If they do not, they might be disappointed about what they did not get from the process and the project outcome, instead of being satisfied with what they did get.
Users can have good and/or innovative ideas. They also often know their needs best.	Users often want everything they currently have, and find it difficult to visualize new solutions.
There is often uncertainty and fear associated with change of the office space, so by enhancing the users' knowledge about different solutions they can make better decisions. They understand more of what is happening, and why.	Users often want more than they can have, and it is therefore important to distinguish between general and special needs and wants. Some input can come from few people who speak the most assertively, and vice versa.
Development of new office buildings or office solutions is a maturation process, so it can be an advantage that more people in the organization than management alone talk about such a project.	It is usually sufficient to involve user representatives. However, they should be selected carefully, as it is difficult to satisfy all users' needs by asking only a few of them.
Positive users can promote and assist in the conversation about the project.	If users are involved someone should be there to guide them.
Users who are critical of change can present their views early on. In this way, changes later in the project can be avoided. Involving and informing critical users can also make them be more constructive and feel more satisfied.	People often think that they are special and that general findings from research do not apply to them. There are some variations between employees, but these are rarely so large that they affect the outcome of floor plans.

The interviews reveal that there is a certain degree of user involvement in BREEAM, such as requirements to discuss the needs of end users, identifying and consulting stakeholders, and providing user guides to general users. The interviewees also underline that several of the categories in the BREEAM manual, such as health, well-being, and transport, ensure qualities that can be of value to the end users. When criteria are chosen for buildings that are to be BREEAM certified, it is probably easier to make sure that these are met than when one is dealing with conventional buildings. By reducing qualities, one risks not achieving the required BREEAM score.

DISCUSSION

The findings from the literature review and the research are compared and discussed in the following sections, which are followed by the conclusion, in order to answer the following research questions:

1. What characterizes office buildings that create value for end users?
2. How can users be involved in the predesign phase to enhance value creation?

Both the literature review and the case study indicate that office buildings should support the users' needs relating to well-being and productivity. The case study questionnaire reveals that the most important factors that can enhance value for the employees are basic qualities such as good environmental conditions and areas being suitable for individual work, formal meetings, informal meetings, and flexible working. The literature also mentions technical solutions that support the execution of the work tasks and having enough space allocated for personal storage. For the employees in the case study, the availability of public transport was rated as the most important factor. This might be because the office building is situated in the heart of Oslo and the employees are used to, and see the value of, having good access to public transport. It could also be because their work requires them to travel frequently.

The questionnaire results indicate that several qualities are perceived to be better by the employees who sit in a partly activity-based open-plan space compared to the employees who have individual cell offices. One of the qualities mentioned is the suitability of the open-plan space for informal meetings. However, users who have their own cell office are more pleased with its suitability for individual work. Their concerns with the indoor environment seem to be mostly related to air quality and temperature, while people working in the open-plan space have more complaints about noise. This substantiates the challenge of finding a balance between privacy and interaction mentioned in the literature.

The literature states that strategic performance should be strived for in order to enhance value for the project owner and users. The results from the case study interviews indicate that the company management should be involved in the predesign phase. The management has knowledge of the general needs of the company. Involving them means that they can make certain fundamental decisions before the users are involved and can communicate the project goals to the users. This may help in the facilitation of user involvement, as the users know the purpose of the project and might be more positive about change.

Both the literature and the case study interviewees express the importance of user involvement. It can be challenging to involve users as they are a multifaceted group who might be reluctant to change and have divergent opinions. However, the employees are the people who will use the building. Therefore, if the users' perspective are not included, the project may be unsuccessful in a long-term.

Involving the users may lead to several benefits, such as understanding the users' needs, discovering new solutions, increasing the users' knowledge, and making them more positive about change and the project's outcome. However, as users are a multifaceted group whose motives can affect the project, proper stakeholder management is necessary to avoid time and cost overruns, as well as inflexible solutions that only fulfill certain users' needs. To achieve a successful process for user involvement, it is important to be clear about what the users can affect and when.

The findings from the literature and the interviews with key actors from within BREEAM in Norway indicate that certain qualities that enhance value for users can be ensured by using SRAT. However, which values are covered by the rating tools depends on what qualities and scores the project aims to achieve. The users' needs could therefore be considered when choosing the criteria for the project. The interviewees mention that the use of BREEAM ensures some user involvement. This involvement could be used to help decide the rating criteria.

CONCLUSION

The results from the literature and the case study underpin the idea that finding the right balance between interactions and privacy is a challenge in relation to offices. While there seem to be several benefits of having open-plan and activity-based solutions, cell offices are perceived by the questionnaire respondents as slightly more suitable for individual work that requires concentration. This might be culturally dependent. Qualities that are important to users include having access to areas suitable for different work tasks, a good indoor climate, comfort, information and communication technologies equipment, and space for personal storage.

In order to enhance value creation for end users, this paper recommends involving the business's management and employees in the predesign phase. Some of the case study interviewees suggest that the management should make certain fundamental decisions before the users are involved. The management should state their goals and communicate these to the employees. This can make the employees more positive toward change and contribute to clarification of the expectations for the project. It should also be clear to the users when they can be involved and what they can influence. As the literature recognizes, one of the reasons why projects seem to fail is that user requirements rarely prevail, so employees' needs should be mapped and taken into consideration. This might lead to a more successful project in a long-term, strategic perspective. However, good stakeholder management is necessary, as involving users entails uncertainties.

The literature and the findings from the interviews suggest that the use of SRAT can help ensure certain qualities of value to users, as well as user involvement. However, further research is needed to explore the extent to which SRAT can enhance value creation for end users.

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