

CUSTOMER BEHAVIOUR AND ENERGY USE IN EUROPEAN SHOPPING CENTRES

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Abstract

Society spends more and more time in shopping centres; shopping, working, relaxing and socialising. Shopping centres are complex physical structures which require large amounts of resources in their day-to-day activities. There is an urgent need to reduce energy use - in 2007, in Europe alone, there were 5700 shopping malls - and to provide stakeholders with the tools to develop the next generation of sustainable shopping centres. The intention here is to identify how the user behaviour among customers influence energy performance in European shopping centres. The user behaviour influences whether actions to reduce energy use are implemented and how effective the actions are.

To gain a European-wide understanding of the technical, functional and social situation in shopping centres today, a survey was carried out amongst customers in European countries. The survey gathered information about energy efficiency, facilities, functions, management, ergonomics, safety and logistics within shopping centres today, with focus on the reasons behind energy efficient upgrades or the lack of them, and expectations about what an upgrade would achieve.

Keywords. *shopping centres, sustainability, retail architecture, user behaviour, energy efficiency*

1. Introduction

Policies and research often focus on technology and buildings and not on social aspects associated with future developments. There are many reasons for this, and one of the most pertinent may be that behaviour is both difficult to control and to predict and that the technological solutions that are introduced are perceived as part of a purely technical system. The ambition to identify the systemic inefficiencies of shopping centres requires a more holistic systems view, which cannot be achieved by simply studying isolated parts or individuals in the shopping centre.

While occupant's behavior on energy use in residential buildings is focus of many research publications (Keyvanfar et al.,2014) publicly available documentation on energy use reduction focusing on shopping centres is still very limited. While some studies take a broader view on commercial buildings (Staniaszek, 2013), other focus on measurement and evaluation of thermal comfort (Haberl and Komor, 1989; Lam et al., 2001; Yan et al., 2013). However, it is necessary to study the system of shopping centers and customers as an interrelated whole. Shopping centres as systems consist of many relevant factors. In order to ensure a holistic view throughout the analysis of the shopping centres the study aims for a socio-technical systems approach. In a socio-technical system, the user(s) are parts of the system itself making it a socio-technical system rather than a purely technical one (Ingelstam (ed), 1996). Is there a conflict between customer satisfaction and energy efficiency in shopping centers? It is hypothesized that customer satisfaction is not achieved by shopping in a sustainable shopping centre. There might be other influential factors and challenges to become more sustainable. What is the role of the customer in achieving more energy efficient sustainable shopping centres? What are the roles of other stakeholders like owners, managers and tenants in relation to customers themselves?

A socio-technical systems approach is more likely to be able to point out inefficiencies associated with both components and users. The overview of the total system increases the chances of identifying and providing possibilities for how to solve the inefficiencies rather than if these actors and factors were handled separately. In addition, a socio-technical systems approach increases the chances of identifying inefficiencies that are not only affecting isolated parts or members of the system, but those having a negative influence on the system as a whole, so called systemic inefficiencies.

2. Objectives

To gain a European-wide understanding of the technical, functional and social situation in shopping malls today, a survey was carried out amongst customers of shopping malls. The intention was to identify how user behaviour influences the energy performance of shopping malls. Customer satisfaction is what defines shopping centres. However, it is here postulated that customer satisfaction is not achieved by shopping in a sustainable shopping centre. The aim of these questions was to find out the influence of energy saving aspects and environmental profile on the customers' choices. It also, for instance, asked for information on the customers' acceptance of possible energy saving measures.

2.1. QUESTIONNAIRES

The survey has a cross-methodical approach (Cresswell, 2009). Questionnaires are the primary method applied, one for each group was sent to five European countries; Norway, Spain, Italy, Germany and Austria. The questionnaires were supported by information gathered through interviews and site visits. The customer questionnaire asked questions related to the customers' preferences when choosing shopping centre (approximate time to finish it was 5 to 10 minutes).

When working with questionnaires it is common to approach a randomly selected group. Random selection is considered important because it reflects a commitment to the production of findings which may be generalized beyond the confines of those who participate in the study. However it is rarely possible to gain contact with all parts of the population, which means a survey usually ends up with a sample of contacts. Within this project the approach to achieve a sample group within the three stakeholder groups varied according to participating country.

2.2. INVITATIONS TO PARTICIPATE

Getting in touch with both customers has its challenges. Customers belong to the "general public" and are not necessarily associated with shopping centres and the retail industry. Shopping is for convenience and leisure and there is no automatic link between a customer and a shopping centre; customers choose the type of shopping centre according to retail needs, location, weather conditions, habit or impulse (Haase et al., 2015). Therefore, getting in contact with customers requires being on site in a shopping centre and approaching customers as they enter or leave the shopping centre. Alternatively a digital survey which sends the questionnaire to customer clubs or shopping clubs associated with shopping centres may be used. Both these methods were used in this survey. However, the choice of methods meant that the physical and social range of the survey activity was limited to one or two shopping centres. The use of a digital survey through customer clubs was also limited because not all shopping centres have a customer club.

Table 1 – Response to the customer's questionnaire

<i>Country</i>	<i>Number of respondents Answered</i>
Germany	8
Italy	481
Norway	232
Other	13

Three demo-cases were the main focus of the customer survey, and two main methods were used to get in touch with customers.

- In Norway the majority of response was achieved through sending an invitation and link to the questionnaire by email. The shopping centre management in Norway provided a random selection of 2000 addresses from its customer club address list. The shopping centre representative indicated that we could expect a low response from customers, and the final result of 232 was considered a good result from both the project group and the shopping centre representative. Customers were informed about the survey through the shopping centres' facebook-page, and only one customer club member complained about the use of their email address for the survey.
- In the Spanish shopping centre there was no customer club and an internet survey was therefore not an option. Representatives from the Spanish partners collected some questionnaires, but the number of responses was low (4 respondents). Some interviews were also done in Germany.
- The Italian partners were able to include the questions from the questionnaire in another customer survey that they were currently working on. This survey was carried out outside the Italian shopping centre and resulted in 481 responses. The results from this survey were included in the results of the Italian customer survey.

3. Results

Customers were asked a wide range of questions relating to sustainability in shopping centres. Energy efficiency and the building fabric were not the only factors considered. Customer's habits and preferences were also considered, in relation to for example transport, merchandise, thermal comfort, accessibility and architectural quality.

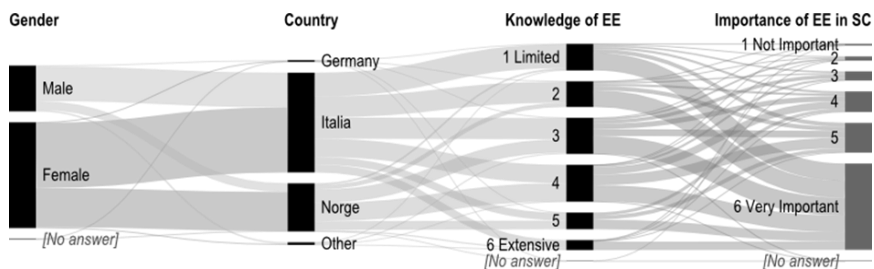


Figure 1 – Visual mapping of customers by countries, knowledge of energy efficiency (1-6) and opinion on the importance of energy efficiency in shopping centres (1-6).

3.1. CUSTOMER KNOWLEDGE

70% of respondents to the customer questionnaire were female. This is related to the factor that women dominate global spending and are in the majority amongst shopping centre customers. The survey shows that female respondents claimed to have limited knowledge about energy efficiency, and it also shows that men claim to have more extensive knowledge. In addition, the data suggests that female Norwegian respondents have more knowledge about energy use in shopping centres than female respondents in Italy. It is difficult to generalise about the reasons for the differences in perceived knowledge about energy and sustainability issues amongst men and women, and from country to country, without conducting a separate survey since there is a danger of introducing old and outworn stereotypes. However, it is important to note that the main customer group in shopping centres considers themselves to have limited knowledge about energy efficiency. Customers are not one homogenous group, campaigns aiming at increasing customer knowledge and interest in energy issues should therefore be tailored towards the needs and interests of different customer groups, such as teenagers, seniors, women and men.

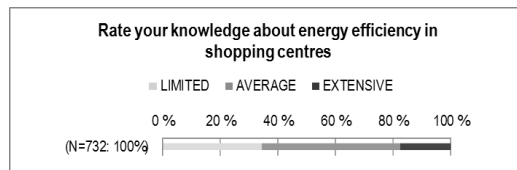


Figure 2 – Customer questionnaire. Answers to the question "How would you rate your knowledge about energy efficiency in shopping centres?"

Representatives from a large British retail company, which has stores all over the UK, told us that sustainability issues were very important for the company. This was because "Customers want to be associated with brands that are deemed to be sustainable and are looking after the environment." They believe that they have to improve the energy use in stores because of customer awareness and that there are signs of increasing interest in sustainability issues in the retail market. However, the customer survey shows that in general customers do not have extensive knowledge about energy efficiency. Two main questions arise from this, is the limited interest amongst owners and managers and particularly among tenants to retrofitting shopping centres to be more energy efficient influenced by the lack of knowledge amongst customers? And are stakeholder groups interested in changing this factor? Amongst informants interviewed, only John Lewis claimed to be influenced by customer interest in sustainability. Data from the

questionnaires and interviews will therefore be used to discuss these inefficiencies associated with stakeholder knowledge and actions.

3.2. CUSTOMER CHOICE

In the questionnaires, the customers were asked how important it was for them that a shopping centre is energy efficient. The customers were also presented with an extensive list of factors that can influence a customer's choice of shopping centre, and were asked to choose the five most important influencing factors for them. The factors listed ranged from location to energy efficiency, architecture, prices and so on. Customers were asked to answer "yes" or "no" to whether they were willing to accept measures like higher prices or lower indoor temperature in winters to increase energy efficiency. They were asked about the importance of product origin, the transparency and availability of "organic/bio" and "fair trade" products. Furthermore, customers were asked to rate specific shopping centres according to a long list of factors, many of which were the same as list of factors influencing choice of centre. Customers were asked what they would improve in the specific centre. Finally, customers were asked by which means of transport they usually travel to the shopping centre.

Most customers thought that energy efficiency was important, but few of them let it influence their choice of shopping centre. Interestingly, there was a distinct discrepancy between the customers rating of the importance of energy efficiency in shopping centres (Figure 3), and how much energy efficiency actually influenced their choice of shopping centre. On a scale from 1 (not important) to 6 (very important), nearly 80% of the customers rated energy efficiency in shopping centres as highly important (5-6). However, when asked to pick the five factors that most influenced their choice of shopping centre, less than 5% added energy efficiency to their list (Figure 4).



Figure 3 – Customers questionnaire. Answers to the question "How important is to you that a shopping centre is energy efficient?"

3.2.1 Location, transport and shopping preference

Location had most influence on the customer's choice of shopping centre. Over 60% of customers agreed that the location of the shopping centre influenced their choice (Figure 4).

All factors in the list associated with location and transport scored relatively high in the customer's selection of the five most influential. Free car parking and good access to public transport were chosen by many.

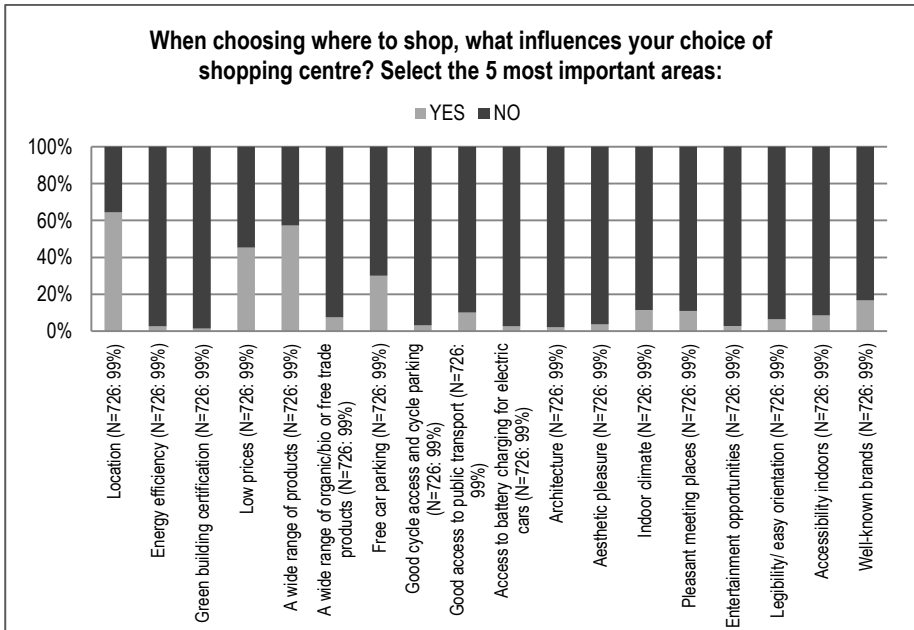


Figure 4 – Customers questionnaire. Answers to the question "When choosing where to shop, what influences your choice of shopping centre?"

Norwegian customers in particular rated free car parking as factor that influenced their choice of shopping centre. When asked how they usually travel to shopping centres, over 70% answered "car/motorbike" (Figure 5). The answers to the questions related to cycle access and cycle parking suggests that this area is not so important to the customers, and very few used bicycles as their main means of transport.

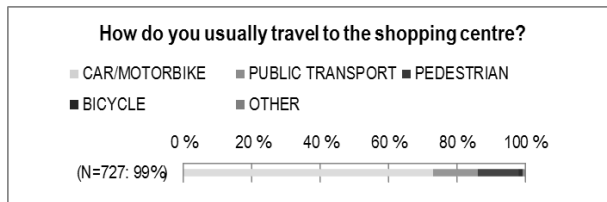


Figure 5 – Customers questionnaire. Answers to the question "How do you usually travel to the shopping centre?"

There are some differences between countries. Over 80 % of Norwegian respondents said that location was the most important. 53 % of Italian respondents replied that location was important. Although location was the most important factor for Italian customers, it is not as important as it is to Norwegian customers. The Norwegian customer survey was carried out by members of the customer club. The Norwegian demo case is a suburban shopping centre which serves a broad catchment area. Shopping is primarily car based and there is free parking. There is bicycle parking which serves the local community, but the majority of customers drive to the centre and this is supported by the results from the survey.

The customer survey in Italy was carried out outside two shopping centres in suburban areas outside Genova and car based travel is also important. Customers are looking for locations which are easily accessible, particularly by car. A town centre survey would potentially have gathered a different response with regard to the means of travel, however we may surmise from its dominance within the existing survey, that location would still be an important factor.

3.2.2 Product availability and price

Close to 60 % of the customers agreed that a wide range of products influenced them in their choice of shopping centre (Figure 4). Norwegian and Italian customers both rated this as having a high importance, almost 50 % of Italians and close to 60 % of Norwegians. Again the use of the Norwegian case for the customer survey influences the response to the questions. The demo case is popular amongst its customers because it allows an one-stop shopping (Woods, 2012). A wide range of products from food and clothing to hardware and pharmacy products, and veterinary services are available to the customer during one shopping trip.

The importance of product availability was also supported by the fact that almost 20% of the costumers answered that well-known brands were among

the five most important for their choice of shopping centre. A store manager in the UK suggested that customers are more interested in the price of goods, than they are in energy issues, but that they are also becoming more aware of product origins. However despite the suggested interest in the UK, few customers in Norway and Italy put the availability of organic/bio and fair trade products on the list of five most influential factors for choice of shopping centre. The response in Italy and Norway was similar, under 10 % in both countries. However when asked in a later question about the importance of access to bio/organic products and product origins when doing their shopping in the shopping centre, both aspects rated much higher and, 40% answered "very important" (Figure 6).

The response to this question was different in Norway and Italy. More than 50% of Italian respondents rated availability of bio/organic products as very important (in Norway less than 20 % rated it as very important) and more than 90 % suggested that product origins were important (less than 50 % said this in Norway). The sale of organic products has struggled on the Norwegian market, although the Norwegian Ministry of Agriculture and Food has an on-going focus upon increasing the availability of organic products and their share of the market (Gibalova, et al., 2010) .

The third most popular factor on the list of five influential factors, were "low prices". When asked if they would accept a higher price for a product sold in an energy efficient store, 21% of the Norwegian customers and 45% of the Italian customers answered "yes". Price has traditionally influenced our shopping habits, but consumer response to price is based on an evaluation of the products benefit or utility, which also corresponds to their notion of value (Kyoung-Non & Schumann, 2001). Price is therefore not the only factor which influences shopping habits and the value placed on purchases, and this therefore allows for the possibility of paying more for a product sold in an energy efficient store.

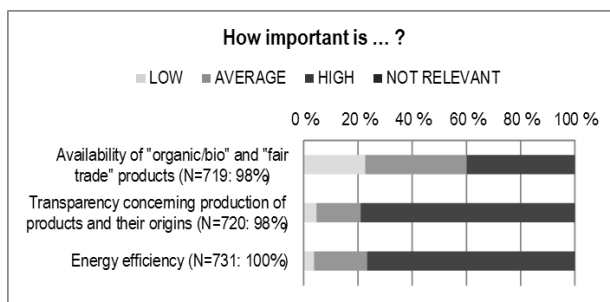


Figure 6 – Customers questionnaire. Answers to the question "How important is...?"

3.2.3 The role of the physical environment

Customer response to the physical environment is important when considering an energy efficient upgrade, because although management systems such as BEMS are important in an upgrade, changes to the physical environment may be expected and this may have implications for eventual customer satisfaction.

Customers were asked to rate the existing shopping centre in terms of a number of physical and environmental aspects, lighting, acoustic comfort, thermal comfort, user friendly design (ergonomics and logistics), meeting places, architecture and design, and aesthetic quality (Figure 7).

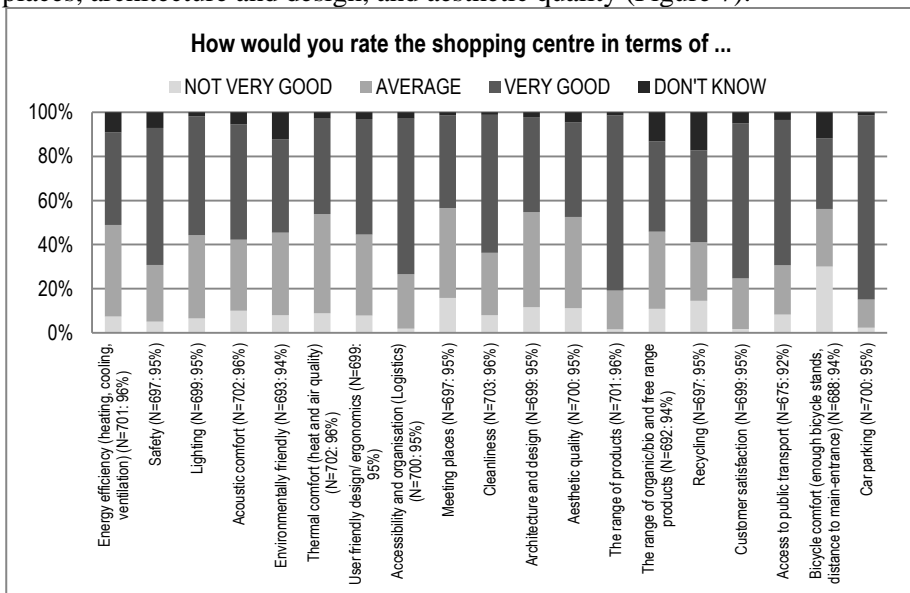


Figure 7 – Customers questionnaire. Answers to the question "How would you rate the shopping centre in terms of ...?"

The results show that only accessibility and organisation (logistics) score high amongst respondents. Customers were least content with the thermal comfort and meeting places, less than 50 % stating that the shopping centres were very good. Although only under half were dissatisfied, the response does point to a pressing need for improvement in these areas. In general customers in both Norway and Italy were satisfied with the physical environment associated with the three shopping centres who participated in the survey. As mentioned earlier car parking and the range of products are critical factors. Improving energy efficiency in shopping centres has

implications for the physical environment; therefore increasing customer awareness/ expectations about the physical environment in shopping centres is relevant. Satisfying shopping centre customers has the potential to be about satisfying their sustainability requirements.

3.2.4 Thermal comfort

When considering energy efficiency in shopping centres, there is a greater willingness amongst customers to accept lower temperature in winters and higher temperatures in summer than to accept higher prices (Figure 8). In fact, 87 % of the customers would accept lower temperature in winters, and many also suggested this in their comments, stating that they would wear their outdoor clothing inside the shopping centre.

66 % of the customers state that they would also accept higher indoor temperatures in the summer, but in this case a significant difference can be noticed between the countries (respectively 79 % in Italy and 43 % Norway).

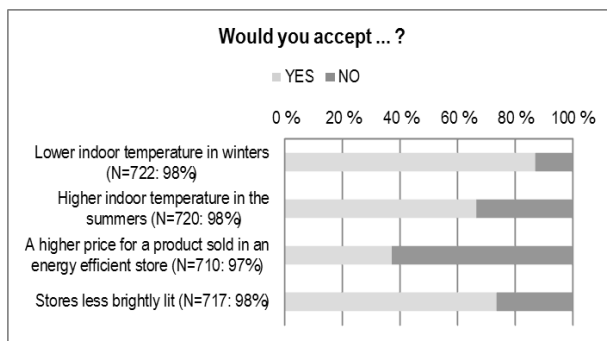


Figure 8 – Customer questionnaire. Four questions relating to lighting, indoor temperature and product price

It is unclear why there is such a difference in the response between the two countries, but it is suggested here that Italian customers are going into shopping centres from a warmer outdoor environment and this affects their indoor expectations.

The use of lighting in stores and shopping centres also has implications for customer satisfaction. The willingness amongst customers to shop in stores less brightly lit is high (73 %), and in this case Norwegians were slightly more inclined (85 %). Lighting was an issue which harvested the greatest number of personal comments during the gathering of questionnaire data. Customers would prefer stores to be less brightly lit for two main reasons, firstly they believe it would help to reduce the in-store temperature, secondly they suggest that a reduction would improve visual comfort.

Although they were less keen on the idea of paying more for goods that were sold in energy efficient stores. Customers are therefore not interested in paying for the cost of upgrading lighting systems in shopping centres. Under 40 % said yes to this.

4. Discussion

The customer survey established that there are three main areas where inefficiencies connected to user behaviour on energy efficiency in shopping centres may be found. These are customer knowledge, customer choice and the role of the physical environment.

Customer knowledge or lack of knowledge is an important factor to be dealt with if shopping centres are to gain approval for actions associated with energy efficiency issues, or if customers are themselves going to demand energy efficient shopping centres. A representative from John Lewis suggested that customer engagement and staff awareness were the most important factors when aiming for in-store reductions in energy use, "You need to tell people what you are doing, if you are going to get them to buy into it. Otherwise they are just going to think that it is very dark and cold (in the store)". It is unclear how customers could actually reduce energy use when visiting a shopping centre, but their interest in energy use and sustainability issues has the potential to influence owners, managers and tenants. Without a customer demand there will be less interest in investing in energy retrofits in shopping centres. However, as with many other retail factors, it is the market, in this case shopping centres which creates the demand. Therefore when working towards energy efficient shopping centres owners managers and tenants should also work at increasing customer focus on these issues.

Customer choice - transport and shopping preference, product availability and price. Energy efficiency does not influence customer choice of shopping centre. Location is the most importance factor influencing customer choice of shopping centre. This is closely associated with the importance customers place on car-parking. Customer's in the survey shop primarily at suburban shopping centres which are convenient to reach by car. However car dependence does not support sustainable shopping, and this may be understood as an inefficiency associated with user behaviour, it is not directly associated with the retrofitting of the physical structure of shopping centre which is the primary focus of the research, but it should considered when working with a broader issue of sustainable shopping centres.

A wide range of products and the price of products also influenced a customer's choice of shopping centre. Customers are less focused on the availability of organic/ bio and free trade products. They do believe that

these are important factors when aiming to achieve a sustainable retail environment, but it did not significantly influence their choice of shopping centre. As with car-based shopping, this aspect does not directly relate to retrofitting the physical structure of the shopping centre, but it does point to the level of interest amongst shopping centre customers about sustainable shopping, which in turn has the potential to influence those making the decisions in shopping centres.

The role of the physical environment - thermal comfort. Customers are in general satisfied with physical environment in the shopping centres where the surveys took place. They were not exceptionally critical of, for example the aesthetic quality, meeting places or acoustic comfort. Where the physical framework directly encroaches on their physical comfort or the perceived functionality of the place, customers were more critical and were more aware of inefficiencies in the physical environment. In addition customers were willing to accept changes to the heating and lighting systems in order to save energy, even though these measures would have a negative influence on their physical comfort. They were positive to the suggestion that temperatures could be changed (lower in winter, higher in summer) and that lighting levels could be reduced. Answers from tenants suggest that energy efficiencies will be more easily achieved if there is acceptance on three stakeholder levels.

5. Conclusions

In general customers are satisfied with the shopping centres where the surveys took place. Besides customer satisfaction; safety, logistics, the range of products, access to public transport and car parking received the highest ratings. Most of these aforementioned qualities are also highly appreciated by customers when choosing where to shop. When it comes to architecture and design related considerations, including aesthetic quality, meeting places and thermal comfort (heat and air quality), reception is slightly more mixed, with ratings on the average (3-4) in the same magnitude as very good (5-6). Some customers (at least 10 %) were also less impressed with the current bicycle comfort, recycling and the range of organic/bio and free trade products at the shopping centres. In addition to the general environmental friendliness of the shopping centre, these also stand out as areas, which customers find difficult to assess (meaning at least 10 % chose "don't know" when asked for an assessment). This result implies that a shopping centre is more than what is directly perceivable to each customer and that a fair judgement of i.e. recycling, energy efficiency or environmental friendliness requires more insight in the day to day operation of the centre and behind the scenes management. It also suggests that an environmental friendly profile is

not being communicated to the customers. The results show that customers are generally satisfied with the centres which were included in the survey and do not necessarily see a need for improvements, but at the same time they are also keen to improve the energy efficiency of the shopping centres and that this is one of the aspects where they saw the greatest possibility for improvement.

Customer satisfaction is what defines shopping. However customer satisfaction is not achieved by shopping in a sustainable shopping centre. Location and the range of goods are the most influential factors. The shopping centre industry is therefore not being challenged by its main source of income to become more sustainable. Store owner such as John Lewis in the UK do believe that shoppers will in the future become more aware of sustainability issues and demand more sustainable places to shop. However achieving a change in what provides customer satisfaction requires that tenants, owners and managers provide more energy efficient sustainable shopping centres. The change will depend on owners, managers and tenants rather than on customers themselves.

6. Acknowledgements

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