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# DELIVERING SUSTAINABLE BUILDINGS IN RETAIL CONSTRUCTION

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The demand for high performance 'green' or 'sustainable' buildings is becoming increasingly important in the retail industry. Large construction companies in this sector have started to show leadership by working with their customers and supply chains towards sustainability in both products and operations. However, it remains unclear how clients' benefits from achieving sustainability can be maximised and the associated risks be minimised, in order to add value and differentiate the output of retail construction. This paper reviews the practice of sustainable buildings within the context of retail construction, and also explores how the UK mainstream retail sector is currently addressing the challenges of sustainable retail buildings. The arguments are informed by a combination of literature review, a desk study of sustainability strategies of large client organisations and construction companies, and a case study with a leading construction company in the UK. The results demonstrate that businesses can benefit from embracing a sustainable approach while they need to adapt their business models to the rapidly changing environment. A demand-driven sustainability agenda is called for in the UK retail sector. The results also provide the basis for an in-depth, longitudinal case study to develop a framework to optimize process, energy and carbon efficiency in retail construction using sustainable technology. Such a framework should provide a sustainable technology model for retail customers to realize the full benefits of sustainable buildings and also assist construction companies and their professional advisors deliver green buildings more efficiently in the future.

Keywords: green buildings, low carbon, sustainable retail construction.

## INTRODUCTION

The business of retailing contributes to global warming, waste, carbon emissions, landfill and pollution (Sinha 2011). 'Sustainable' or 'green' buildings are designed and constructed with emphasis given to environmental, social, and economic priorities (Lapinski *et al.* 2006). Sustainable development provides the potential for meeting current needs whilst safeguarding the ability of future generations to meet their own needs (WCED 1987). Buildings use about 40% of global energy; they offer the greatest potential for reducing cost and energy consumption by 30-80% using proven and commercially available technologies (UNEP 2012). Carbon emissions from energy use in non-domestic buildings account for around 18% of total emissions in the UK of which 18% is from retail (Carbon Trust 2009). The British Retail Consortium

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estimates that retail accounts for around 3.5% of UK greenhouse gas emissions with shopping centres contributing close to three million tonnes of carbon dioxide (CO<sub>2</sub>) to the UK's total emissions each year; equivalent to the emissions of nearly half a million homes (BCSC 2012). It is therefore necessary to reduce the overall footprint of the retail sector's operations to create sustainable retail buildings (BRC 2012). In 'Securing the Future' (HM Government 2005) the Government emphasised that 'Retailers both shape the sustainability of their supply chains and determine the range of products and services available to consumers and also have a role to play in cutting down on energy, water use and waste in their own operations', the retail industry plays a crucial role in achieving sustainable retail buildings.

The 2011 annual report by Retail Forum (2011) highlights sustainability as having an increasing impact on retailers due to burgeoning levels of legislation and a growing awareness among consumers. Retailers are responding to regulatory and voluntary commitments made by Government; however, sustainable buildings are not something that can be achieved by the retail operator alone but involve the collaboration of an integrated, multidisciplinary design team (Retail Forum 2011).

The project addresses an on-going research project which aims to optimise process, energy and carbon efficiency in retail construction by capitalising on sustainable technology, with an overarching research question: "How can energy and carbon be reduced for retail construction in a commercially-viable way?" It remains unclear how clients' benefits from achieving sustainability can be maximised.

The research objectives underlying this paper are:

- Review the practice of sustainable buildings within the context of retail construction
- Identify the drivers, barriers and opportunities for sustainable retail buildings
- Explore how the UK mainstream retail sector addresses the challenges of sustainable retail buildings.

### **Sustainable buildings and the retail sector**

Green retailing presents a very real opportunity for retailers in virtually all aspects of their business but due to its newness still lacks the benefit (RILA 2012). Kilsour *et al.* (2009) conducted a survey of retailers' attitudes about green initiatives to gauge their understanding of the challenges, risks and rewards of employing more environmentally sustainable practices. The report reveals that retailers have integrated environmentally sustainable practices into their businesses and in so doing have achieved significant cost savings in operations as well as benefits to brand image. An overwhelming number of respondents view a reduction in energy consumption at the store level (92%) and throughout the supply chain (88%) as a key opportunity to realise additional cost savings. A study by Carbon Trust (2010) highlights that with a full energy retrofit, retail stores can reduce their energy use by 30%; savings of 40% can be achieved by adding doors to refrigeration cabinets and 25%-50% of lighting energy can be reduced by using new fittings and having a well-designed lighting scheme with effective controls.

### **Practice of retailers in delivering sustainable buildings**

Even in a challenging economy, retailers are committed to sustainability and expanding their sustainability platforms as a result of cost savings and optimised performance (Aberdeen Group 2008). They are reducing their environmental impact and building resilient supply chains by innovating, investing in sustainable initiatives

and working together. Leading retailers recognise that they must embrace sustainable business practices if they are to continue to be competitive and are transforming their operations in a drive towards sustainable retail (BRC 2012).

'A Better Retailing Climate' was launched in April 2008 setting out the sector's collective environmental ambitions with leading retailers signing up to the voluntary initiative. Since 2008, all major retailers have had an environmental or ethical strategy to deal with operational costs and systems, informing customers and trying to influence their suppliers. Declarations and targets from two retailers' website and online corporate social responsibility (CSR) report have been used to provide the background to the study.

As part of its 2020 sustainability plan (Sainsbury's 2012), Sainsbury's is committed to reducing absolute operational carbon emissions by 30% by 2020. The company has trialled a range of renewable technologies in stores and is the first retailer globally to use on-site geothermal energy, having installed geothermal technology in nine stores. Sainsbury's is also the first retailer to install LED lighting in their store with LED lighting solutions for freezer cabinets, saving around 75% of energy compared to conventional lighting. The Sainsbury's flagship environmental store in Dartmouth features environmentally friendly measures such as solar powered fans, wind turbines to power the checkouts and rainwater used to flush toilets. By using renewable energy, the store consumes 50% less energy from the national grid and is targeting 40% less carbon emissions than a conventional outlet. The frame of the store was built using 200 trees; 400 were planted to replace them. Sainsbury's completed a carbon-negative extension to its Durham store in 2010, with 50% more space although the store now requires 10% less energy than before. This was achieved using on-site renewable power generation and new refrigeration technology. Sainsbury's is currently trialling other features, such as bee hotels and electric car charge points.

Tesco aims for all of its new buildings to emit, on average, 50% less CO<sub>2</sub> by 2020 than an equivalent site in 2006 (Tesco 2012). For all stores, Tesco aims to include features such as timber frames instead of metal, the use of natural light, better ventilation, reduced energy and water consumption (through a metering system), energy self-sufficiency (combined cooling, heat and power (CHP) plants to generate their own electricity), eco-friendly fridges and more recyclable fixtures. Tesco's store in Ramsey, Cambridgeshire, opened in December 2009 and is the retailer's first zero carbon outlet. It uses timber construction, sun-pipe lighting and collects rainwater to flush the toilets and run the car wash. It also sells surplus energy, generated by an on-site CHP plant, back to the National Grid. Tesco was the fourth best company in the world on carbon disclosure, and was also named the top retailer in the world for their work on climate change. The ranking demonstrates the leading role of UK retailers in reducing carbon emissions (BRC 2012).

### **Drivers, barriers and challenges for sustainable retail**

Consumers and retailers are becoming increasingly conscious of sustainability. They are conscious of where and how products are produced, the amount of energy used, the resources and materials consumed during production and distribution, and the energy efficiency of retail outlets in which the goods are sold (BRC 2012). Sustainability is increasingly being utilised as a marketing tool by retailers (Fieldson and Rai 2009) concerned with understanding and disseminating the whole life impact of buildings. They focus on declaration of greenhouse gas (GHG), carbon footprint or business CO<sub>2</sub> emissions, waste reduction and recycling to achieve the ambitious

targets set by Government. The need to lower total costs of operations and compete for customer loyalty is driving an increasing number of retailers to adopt green initiatives that include the retail supply chain, store, and overall brand image. Compliance with legislation is increasingly a driver for companies in the retail sector to establish clear corporate goals followed through with practical actions to reduce carbon emissions (Hogg *et al.* 2011).

According to research which surveyed 100 retailers (Aberdeen Group 2008), the top five pressures driving green retail enterprise were competitive advantage (57%), rising cost of energy (38%), need to increase brand value/equity (34%), need for innovation (31%) and present/expected compliance mandate (30%). The research classified retailers into three groups; best-in-class (top industry performance), industry average and laggards (below average performance). The best-in-class businesses included active energy management as a core activity with the greatest decrease in energy costs of 20%. Industry average businesses had a 4% decrease in energy costs while the laggards had a 39% increase in energy costs. A study by BBP (2010) identified five key barriers to retrofit in UK commercial property:

- Commercial – lack of business case for investment in retrofit and the split incentive between owners and occupiers;
- Roles and processes – no designated role within an organisation with the responsibility of delivering energy saving and carbon reduction interventions;
- Financial – lack of availability of capital funds;
- Technology – skills shortage, immature technologies, supply chain failure, building and operational constraints, lengthy pay back periods;
- Policy – lack of regulation or incentives for action and insufficient focus by policy makers on existing building stock compared to new build.

Previous studies highlight many barriers to sustainable design, construction and facilities management in retail environments. However, Fieldson and Rai (2009) mentions retailers could reap great benefits from using sustainability as a marketing tool; as it offers an opportunity to achieve efficiency savings while adding value to the clients.

## **METHODOLOGY**

The research included a critical literature review and an exploratory study. Qualitative data was gathered using focus group discussions with professionals in the retail industry and a preliminary case study with a leading retail construction company in the UK. Semi-structured interviews were carried out with ten senior managers in the company predominantly involved in sustainability and retail construction. The interviews were all conducted face-to-face, lasted 20 minutes each and added significantly rich data. Field research was used to study the case study company (which is referred to as Company A). This is a form of qualitative research that lends itself well to studies of dynamic or rapidly changing situations (Singleton & Straits 2005) and consisted of formal meetings, informal discussions and observation and document analysis reviewing company documents, reports and electronic databases.

A focus group of 12 participants was used, consisting of six retailers and six construction professionals with experience in retail construction. The researcher was interested in the ways in which individuals discuss a certain issue as members of a group rather than individuals (Bryman 2012; Fern 1982).

The aim of the study was to understand the key issues that retailers are concerned with related to sustainable retail and identifying the drivers, barriers and opportunities for green retail buildings. Triangulation of sources helps ensure credibility of arguments; hence the triangulation approach was used to ascertain whether the themes identified within the literature review were perceived to be the same by professionals working in the retail industry today. These themes included the drivers, barriers and opportunities for sustainable buildings. Using triangulation from different methods therefore allows this study to build a more robust evidence basis for the argument (Bryman 2012).

### **Organisational Case Study**

Company A is a family owned business working, principally, in housing, retail and other construction (and re-fit), interiors and land development. Key clients include Hammerson, Seagrove, Land Securities, M&S & housing associations. The company currently has more than 2,000 employees and 12 offices across the UK with an annual turnover of approximately £1.5bn. The company is committed to protecting the environment and undertaking all operations in an environmentally responsible manner. It anticipates that understanding and planning to manage climate change liabilities will help to strategically direct the business, whilst also providing short term performance improvements, cost savings and providing opportunities for new service offerings. The company has implemented numerous sustainable initiatives including low carbon housing, research around low energy site cabins and developing and testing sustainable construction materials and technologies. The company delivered the first stand-alone M&S 'store of the future' (an eco-learning store) in Sheffield. This store is a flagship for M&S and includes the use of third generation refrigeration technology. Designed to BREEAM excellent standards, this £5.5m project is a 12,000sq. ft. carbon-neutral building incorporating a range of sustainable technologies including timber frame, reclaimed bricks, 100% LED lighting, and rainwater harvesting and 99.4% of site waste was recycled. With a major focus on developing and learning about sustainable solutions, in line with M&S's 'Plan A' ambitions, the trial store features a 'living roof' and a green wall to support wildlife.

### **RESULTS AND DISCUSSION**

The data collected was coded and analysed using content analysis, in which a set of categories were established and the number of instances falling into each category were counted (Bryman 2012). A preliminary coding exercise utilising Nvivo software was used and the following themes emerged as drivers, barriers and opportunities as illustrated in figure 1 and discussed.

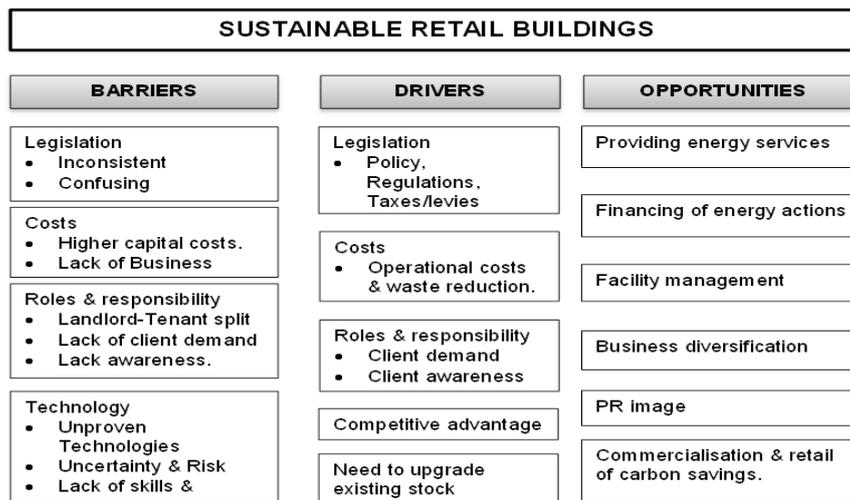


Figure 1: Drivers, barriers and opportunities for sustainable retail buildings

### Legislation

The participants considered legislation as both a driver and a barrier. It was perceived as the main driver for both retailers and construction professionals to provide green retail buildings. However, the UK energy policy is considered as uncoordinated, inconsistent and confusing for both construction professionals and retailers. There exist a lot of applicable incentives and policies such as CRC, carbon heat incentive, green deal and feed-in-tariff. Retailers lack an understanding of what is applicable, or how to maximise the opportunity or minimise cost impact. They require a simple and consistent policy framework that provides the confidence to invest in reducing emissions. However legislation was also considered a barrier due to the uncertainty about government policies. Changes to the CRC energy efficiency scheme (removal of the financial recycling payments from the scheme has reduced the incentive for business to reduce carbon emissions) and FITs in late 2011 have damaged business confidence in the reliability of government policy and reduced investment. A more co-ordinated and consistent policy framework that will enable legislation to be a driver rather than a barrier is demanded by retailers and construction professionals.

### Cost

The participants considered cost as both a driver and a barrier. This was perceived as a driver for retailers keen to reduce operational running cost; the participants favoured technologies with short pay back periods. However, the newness of the technologies; lack of substantial evidence of cost benefits; the potentially higher (capital) costs of energy efficient products and the impact on sales result in cost being considered more a barrier. There was a similar view from the construction professionals that the cost for a sustainable building is considered a barrier for retailers anxious to pursue sustainability in capital projects. Previous research also shows clients are concerned with higher risk. However, Kats *et al.* (2003) report that the costs and financial benefits of green sustainable buildings have a cost premium of only 2%. This investment can be reasonably anticipated to return ten-fold over the life of the building through the anticipated savings from reduced energy consumption, water use and waste. Thus, there was a general perception that sustainability costs more. This is often not the case unless a decision is taken to follow an exemplar route or where the issues are addressed late in the design process leading to expensive sustainability additions (Yates 2003). To overcome this barrier, Hakkinen *et al.* (2011) suggest that financial incentives and innovative fiscal arrangements should be available so that the

extra costs could be accommodated with the help of financing arrangements. Construction professionals would have to use their knowledge and expertise to educate retailers, and provide advice to assist them in making decisions which suit their demands.

Reducing waste was considered as a driver which has an effect on the cost by both retailers and construction professionals. All participants in the focus group highlighted the issue of only leasing a store for ten years, and fixtures only being designed to last for that long; there was a desire for greater longevity for store fixtures by retailers. The issue of the circular economy was discussed, whereby retailers would lease FF&E as opposed to ownership. This would encourage manufacturers to build to last, as well as offering refurbished items rather than a business model built on selling new products. Retailers promoted the idea of a circular economy in which waste is treated as a resource, reducing costs to buy new. Managing reusable equipment to avoid landfill would be sustainable if organised centrally.

### **Roles and responsibility**

This was perceived as both a driver and a barrier. The landlord-tenant split was considered a barrier by both retailers and construction professionals. For the construction professionals, it was seen as a barrier as the landlord is reluctant to invest in technologies to improve building efficiency and reduce operating costs that will be beneficial to the tenant while the tenant has no control in making such decisions as he is not the owner. Retailers suggested investment in the energy efficiency of buildings could be more effective when implemented by an integrated and concerted team involving owners and end users. Strong, dynamic and informed relationships between these parties could lead to a greater awareness of the opportunities in the building, improved efficiency efforts, increased tenant satisfaction and shared cost savings.

For the construction professionals, client demand was considered a driver as it is increasingly being demanded by leading sustainable retailers. However it is also a barrier as laggard retailers are not aware of the new technologies and benefits and hence are reluctant to adopt them.

### **Improvements to existing commercial stock**

The general perception of retailers was that the real challenge is with increasing the efficiency of the existing stock. The majority of sustainable innovation to date has been implemented on new build with very little work currently being undertaken for the primary purpose of improving energy efficiency and reducing carbon emissions in the UK's existing commercial building stock. This was also identified in the literature review which found that the existing building stock remains largely untouched while very little is known about how green building initiatives might be incorporated into existing buildings (HM Government 2011). There is a big opportunity to cut carbon emissions and generate financial benefits, reducing emissions from existing building using existing technologies can lead to a net economic benefit of £4-5bn by 2020 (Carbon Trust 2010).

### **Competitive advantage**

Driven by discriminating customers and increasing competition, retailers and construction professionals are trying to enhance their product offerings, service levels and pricing models and are searching for new ways to gain and sustain competitive advantage. It was observed from the studies, retailers seeking competitive advantage in their sustainability strategies tend to be more actively involved in sustainability

within their supply chains and derive the most benefit from their efforts. Retailers who do not see the business case for sustainability tend to only do what they see as necessary to manage risk, such as resource availability. Also, those who see sustainability as a competitive advantage tend to look further into the future when developing related strategies. They generally apply metrics in order to set measurable goals for their efforts and are moving toward the development and use of industry-wide and universal metrics, rather than just those that are defined internally.

With sustainable construction evolving so quickly, particularly in terms of new technology, retailers must ensure they keep up with the latest developments. To achieve this, many of the most forward-thinking retailers are now putting competition to one side to discuss lessons learnt and best practice. Though some retailers, grocers in particular, remain concerned about giving away information that could help rivals make operational efficiency savings, an increasing number are realising that co-operation can help everyone improve margins while also benefitting the environment.

### **Technology**

There is uncertainty about future energy prices and the risk associated with new or unfamiliar products, technologies or services to achieve green retail buildings. Construction professionals were of the opinion that there is a lack of the skilled labour required to deliver green retail buildings as well as lack of awareness around technology. Also, the longevity of current solutions based on the pace sustainable technologies are advancing has created a general reluctance amongst both retailers and construction professionals to adopt new technologies.

Pearce and Vanegas (2002) identified that risks associated with the reliability and effectiveness of a new product prevent many professionals from specifying green or sustainable building materials. This lack of enthusiasm may be attributable to clients' risk aversity (Barbour Index, 2012). However, some leading retailers, like M&S, are keen to explore and exploit new technologies and are building stores known as eco-learning stores, in which new technologies are experimented with and if beneficial will be rolled out in future stores. Reducing anxiety about the risk associated with green specifications through a fair allocation of responsibilities and awareness should increase the uptake of new and innovative sustainable technologies.

### **Collaborative working**

A major barrier identified by constructional professionals was their lack of early involvement in projects to enable better specification, design and certainty of budget to promote green retail buildings. Step change in carbon reduction in infrastructure requires the key decisions to be made very early in the design process in order to minimise the capital and operational carbon (RICS 2011, HMG 2010). Industry-wide challenges such as team formation, fragmentation of design disciplines, undefined roles and responsibilities and misalignment of incentives are major problems to the project delivery process (BBP 2010, Yates 2003). The integrated design process seeks to ease these challenges through increased communication and collaboration between team members. The integrated design process can be encapsulated by early participation in the project by everybody involved and comprehensive discussion of each system design (Yates 2003). Increased collaboration aids the development of efficient and effective designs which reduce energy costs and increase occupant satisfaction.

## **CONCLUSIONS**

The retail sector involves several activities that have a direct impact on climate change. Retailers can improve their environmental performance and make cost savings that will improve profitability and competitiveness. Step change in carbon reduction in retail construction can be achieved by aligning existing work practices, such as early engagement, client dialogue and the whole life approach to the low-carbon agenda. The paper has reviewed sustainable building practice in retail construction, identifying the drivers, barriers and opportunities for sustainable retail building. The study found key challenges that need to be addressed at the levels of government policy, organisational structure and practical implementation for the retail industry. Current policy does not create the sufficient incentives; within individual organisations, corporate management needs to be more aligned with desired sustainability outcomes; and more 'real world' information is needed on the performance and carbon impact of new technologies. Retailers are leading the way in improving resource efficiency and reducing environmental impact. At the most proactive end of the spectrum, leading retailers such as M&S have demonstrated how sustainable stores can produce both cost and retail brand benefits, and are motivating others to follow suit. Among more reluctant retailers, a much greater number are finding themselves penalised by Carbon Reduction Commitment (CRC) payments and other regulations. With further legislation on the way they, too, are paying increasing attention to store sustainability. Laggards and leaders are both moving forward.

The focus group workshop and interviews with the case study company may appear to be limited to underpin new theoretical knowledge. However, Flyvbjerg (2001) argues that even a few cases can be important for enhanced knowledge. For generalisation, such limited case numbers will serve as a starting point for further studies, (Flyvbjerg 2001; Yin 2007). The results provide the basis for an in-depth, longitudinal case study by which to establish a matrix for the decision making process in selecting sustainable technological solutions applicable to the retail industry to optimise energy usage and carbon efficiency and effectiveness for retailers.

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