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Published in:
8TH NORDIC CONFERENCE ON CONSTRUCTION ECONOMICS AND ORGANIZATION

DOI:
10.1016/S2212-5671(15)00198-7

Published: 01/01/2015

Please cite the original version:
Creating shared value in a construction project – a case study

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Abstract

The concern about climate change and its impact on our living environments is driving built environment towards energy efficiency and sustainability. Fast changing world, economic uncertainty and urbanisation call for new sustainable solutions. Built environment has a substantial role in sustainable development and noteworthy potential in shared value creation in changing world. Shared value creation can be defined as policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities it operates in.

The aim of this paper is to examine shared value creation in a construction project and how shared value creation improves quality, cost-effectiveness, sustainability and collaboration. The research is based on an in-depth case study. In order to understand actors’ involvement and ambitions in a construction project semi-structured interview were conducted and written sources of public and confidential documents of the case project were analysed.

Based on case project material and interviews shared value creation thinking has potential to improve quality, cost-effectiveness, sustainability and collaboration in a construction project. In the case project shared value creation components emerged, yet more benefits would have been gained if shared value creation would have been implemented intentionally and strategically.

Keywords: Shared value creation; construction project; case study; collaboration; sustainability

1. Introduction

Buildings and the whole built environment are in a key role when societies are mitigating climate change and adapting to its consequences. The built environment is constructed and shaped to respond to the social, cultural and economic needs of people; so people can reside, work, worship, move, consume and enjoy. The number of new building developments depends to a large extent on the social and economic circumstances, following the needs of...
the economy and occupants or users. Despite the temporary economic downturn, construction remains one of the most significant areas of human activities globally. (Hampson, et al., 2014; VTT, 2012).

In recent years, there has been an increasing interest in corporate responsibility and sustainability. Achieving environmental and social sustainability stands out as some of the major challenges that current business leaders have to deal with (Jackson & Nelson, 2004). Corporate responsibility (CR) programs and reports are widely used in companies today. The more business has begun to embrace CR, the more it has been blamed for society’s failures. The legitimacy of business has fallen to levels not seen in recent history. (Porter & Kramer, 2011). Yet most managers frame sustainable development not as a multidimensional opportunity, but rather as a one-dimensional nuisance, involving regulations, added cost, and liability (Hart & Milstein, 2003).

It seems that the problem is that companies are trapped in the outdated approach to value creation and continue to view value creation narrowly, optimizing for short-term financial performance while missing the most important customer needs and ignoring the broader influences that determines their longer-term success. (Porter & Kramer, 2011). Elkington & Hartigan (2008) found that social entrepreneurs are often ahead of established corporations in discovering shared value opportunities because they are not locked into the narrow traditional business thinking.

Sustainable development is partly social justice, and debate about what constitutes a fair and just distribution of wealth, rights and opportunities is not new (Holliday; Schidheiny & Philip, 2002). The purpose of a company according to Porter & Kramer (2011) must be redefined as creating shared value, not just profit per se. Creating shared value presumes compliance with the law and ethical standards, as well as mitigating any harm caused by the business, but goes far beyond that (Porter & Kramer, 2011). Elkington and Hartigan (2008) defined that shared value is created when a company generates value for both society and shareholders, while it is conducting its own. Shared value is defined here according to Porter & Kramer (2011). It can be created in three key ways:

1. **By reconceiving products and markets**
   Society has different needs: Lately financial security and sustainability have been the most exposed topics. In this sense shared value creation is about meeting the changing needs of customers and finding new products or services to complement the old products. To reconceive products and markets, a company should identify the societal needs, benefits and challenges that are or could be embodied in the company’s products (Porter & Kramer, 2011). It can be assumed that with these means the company will identify new markets in addition to opportunities for differentiation and repositioning in the current markets.

2. **By redefining productivity in the value chain**
   A company’s value chain is affected by material resources, education, working conditions and connections. Redefining productivity in the value chain includes new approaches to resources use, procurement, distribution, location and employee productivity (Porter & Kramer 2011). For example greenhouse emissions are not just costly to the environment but costly to the business as well. Pollution can be seen as a form of economic waste as it is a sign that resources have been used incompletely, inefficiently or ineffectively. More over waste creates additional activities and costs that are not creating value for the company or the customer. (Porter & Kramer, 2011; Porter & Van der Linde, 1995.) Today there is a growing consensus that major improvements in environmental performance can often be achieved with better technology at nominal incremental cost and can even yield net cost savings through enhanced resource utilisation, process efficiency, and quality (Porter & Kramer, 2011).

3. **By enabling local cluster development**
   No company is self-contained. The success of every company is affected by the supporting companies and infrastructure around it. Productivity and innovation are strongly influenced by “clusters,” or geographic concentrations of companies, related businesses, suppliers, service providers, and logistical infrastructure in a particular field (Porter & Kramer, 2011). Clusters include institutions, trade associations, competition laws, quality standards and market transparency as well. Clusters have a crucial role in driving productivity, innovation and competitiveness and vice versa without a supporting cluster, productivity suffers. Companies create shared value by building clusters to improve productivity while addressing gaps in the framework conditions surrounding the cluster. (Porter & Kramer, 2011.)
Although social entrepreneurs usually start with small initiatives, they often target problems that have a local expression but global relevance such as access to resources, education or waste management (Santos, 2012). Shared value creation is about expanding the total pool of economic and social value. The competitiveness of a company is interconnected with communities around it. A company needs a community not only to create demand for its products but as assets such as employees and suppliers. The result is a positive cycle of company and community prosperity, which leads to profits that endure (Porter & Kramer, 2011). Porter & Kramer, (2006) also noted that companies cannot tackle every CR dimension and issue; instead they ought to carefully choose few CR issues that will have the greatest shared value potential and then apply them throughout the value chain.

Based on earlier studies (Lenssen & Roodman, 1995; Perez-Lombard, et al., 2008; UNEP, 2006) buildings consume 40% of the world’s materials, use 55% of the wood cut for nonfuel use, use 12.2% of the total water consumed, consume 40% of the world’s energy and create 36% of the carbon dioxide emissions that cause global warming. In addition built environment counts for 50% of gross fixed capital formation and 7.6% of total employment in EU27 and corresponds to 30% of industrial employment (Loikkanen & Hyvönén, 2011). Furthermore buildings are exceedingly complex industrial products with a lifetime of decades (Airaksinen & Matilainen, 2011). Therefore it can be considered that construction and building sector has potential to legitimise its’ operations with shared value creation principles.

2. Research approach

The research is based on an in-depth case study. The research had distinctive phases, which are described below. Research began with a critical review of the literature focusing on sustainability and shared value creation in business and specifically in construction and real estate business. After that a case study approach was applied to gather empirical evidence. Eisenhardt (1989) defines a case study as "a research strategy which focuses on understanding the dynamics present within single settings." Case study can also be justified as “In general, case studies are the preferred strategy when “how” or “why” questions are being posed, when the investigator has little control over events, and then the focus is on a contemporary phenomenon within some real-life context”. In other words case study research consists of a detailed investigation that attempts to provide an analysis of the context and processes involved in the phenomenon under study. (Yin, 2009.)

The chosen case project was considered as an interesting case study as sustainability concern was a strong driver behind the project and high targets were set to the project by the developer, user and contractor. As the sustainability targets were high it could be assumed that shared value creation attributes could be identified in the project. The case project was analyzed based on available public and confidential material and following shared value creation attributes were identified. The findings were coded based on the three themes of shared value creation: reconceiving products and markets, redefining productivity in the value chain and enabling local cluster development.

In order to understand actors’ involvement and ambitions in a construction project semi-structured interviews were conducted. Interviewees were identified as persons who influenced design and execution of the case project. The interview data was collected with semi-structural interviews. A general structure of the interview and the main questions were decided in advance. The structure of the interview consisted of three themes of shared value creation. The detailed structure of the interview was left to be worked out in the interview situation. The interview focused on identifying the three main ways of creating shared value and whether these can be recognized in the case project. Interviews were recorded and interviewer made notes during the interview. Later on responses were grouped, coded and analyzed.
Table 1. Interviewees and their role in the case project

<table>
<thead>
<tr>
<th>Interviewees</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder party</td>
<td>Contractor, User</td>
<td>Mechanical engineering</td>
<td>Mechanical engineering</td>
<td>User</td>
<td>Developer</td>
</tr>
<tr>
<td>Role/Title</td>
<td>Sustainability manager</td>
<td>Product engineer production and product management</td>
<td>Design manager</td>
<td>Administrative manager</td>
<td>Project manager</td>
</tr>
</tbody>
</table>

2.1. Case study

The case study included a case company with a case project that was selected to conduct in-depth investigation. The selected company and the project can be described as a forerunner in sustainability. Neither the case company, the project nor the personnel involved in the project were familiar with the concept of shared value at the time of the research.

2.1.1. Case company

The case company is a global construction and development company with a sustainability agenda that includes social, environmental and economic aspects. These sustainability actions are coordinated firstly at group level and secondly each business unit has established a sustainability management structure appropriate to its needs. The company has acknowledged business opportunities in green business including sustainable buildings, living areas and Public Private Partnership projects.

The case company defines itself as a city builder and it has noted that sustainable development is not only about green agenda or environmental efficiency but also about social progress and economic certainty. The company sees sustainability as a good business practice and the company has a profitable growth business plan that aims to be leader in safety, role model in ethics, best in class in people development, recognised market leader in green and forerunner in risk management. As a contractor and developer the company aims to respond to society’s needs. This holistic approach contributes to value creation, sustainable development and economic progress.

2.1.2. Case project

The project was part of company’s green initiative and the building was designed to achieve LEED Core & Shell Platinum certification. The building is situated in a built up urban area in Helsinki, Finland and has easy access to various services and amenities. The building has a total leasable area of 9,100 m2, consisting of eight above ground floors and three basement garage levels. The office spaces are designed to promote healthy working environments and a long useful lifespan through functional and flexible design. The office floors are open planned to allow future users to easily customise their office spaces to suit their requirements. (Skanska, 2012).

The case project is a joint venture of the company’s different business units including the developer, contractor, mechanical engineering consultant and civil works contractor. As the building was designed to be the head office for company’s operations in Finland, all the above mentioned business units occupying the building after it was finished. Property Development unit was responsible for initiating and developing the project until the building permit wasvalid. After that production and execution responsibilities were transferred to construction unit. Contractor is responsible for construction works, scheduling and procurement. Construction unit’s subunit mechanical engineering was responsible for plumbing, air conditioning and electrical installation and systems. Energy savings and functionality of the building is highly affected by these mechanical engineering solutions. The building consumes approximately thirty percent less energy than the local building code requires, which leads to financial savings for the building’s owner and tenants. Energy efficient solutions include demand-based ventilation, airtight envelope, occupancy and daylight sensors for lighting and building management system and agreement. Other energy efficiency features include optimal window placement, sunshades to avoid excessive solar heat gain and the need for additional cooling. The building is connected to a city scale district heating and cooling network.
3. Findings

3.1. General findings

All of the interviewees stated that the target for the project was to be a reference or flagship project promoting know-how of the company. Each party also had their own ambitions for developing and testing new solutions and functionality to gain experience to offer these solutions to external clients. For example mechanical engineering unit tested prefabrication possibilities and demand-based ventilation solutions, contractor tested 4D building information modelling to gain efficiency, user and developer tested workplace and environmental efficiency solutions.

All the interviewees mentioned environmental certification LEED (Leadership in Energy & Environmental Design) having a guiding role in the project. It was seen as a good tool for communication (both internal and external), setting targets and ensuring that every aspect of sustainability was considered during the project. Yet it was also stated that every solution was not implemented just because of gaining the certification but the choices had to be justified based on functionality and other benefits. Interviewee E brought up that developer’s target in the case project was to be the most demanding customer of the construction unit. This was described as pushing forward safety, environmental and cost efficiency issues. All interviewees also stated that there are weaknesses in the process. Most often it was mentioned that life cycle calculations should have been utilized more in decision making and in comparing different solutions. Interviewees stated that brand value was gained as the project had good coverage in media during the process. This can be considered as a part of differentiation and competitiveness actions. Interviewees stated that this coverage led to interest from potential customers and partners as well as competitors. In addition interviewees found that there is business and shared value creation potential on rationalizing solutions and services. For example commissioning and adjusting is important after the building is completed and taken into use as by commissioning it is assured that building functions as it is designed. Interviewee B stated that there could have been more open co-operation with different stakeholders for achieving the optimal result. Interviewee C mentioned that solution to this could be integrated project delivery where the risks and revenues are jointly managed by the stakeholders.

3.2. Reconceiving products and markets

New solutions applied in the project to gain knowledge to organization and efficiency to building operation. New solutions included for example prefabrication of corridor ventilation modules, energy follow-up and optimization service, lighting system and daylight optimization, rainwater harvesting and testing ways to engage and involve employees to workplace design. Energy efficiency was a focus area that each interviewee brought up. The developer had ambitious targets towards low energy buildings. M&E was interested in developing and testing new intelligent systems and services to minimize energy consumption and user was interested in optimal work conditions and low energy costs. Another example of new implemented solution is demand based ventilation, cooling and lighting system equipped with presence and daylight sensors. It was expected to minimize energy use. The aim was to make it possible to adjust the indoor environment to fit the varying demand based on occupancy.

Energy use surveillance and optimization service was created to cover energy use of operational phase. The aim was to design and carry out mechanical engineering installations in such manner that operation of the systems was possible to be monitored. Monitoring enables reacting to deviations and disorders and with these means savings in energy use are expected.

Attention was paid also on utilizing sunlight by considering window placement for utilising daylight in lighting yet constraining overheating by sunshades. The building has an efficient lighting system that is optimized by daylight and occupancy sensors, which uses around 5 percent less energy than a system without sensors. LED (Light Emitting Diode) lamps have been used on the garage floors, which are powered by occupancy sensors that reduce lighting levels to around 20 percent when human occupants are not present. (Skanska, 2012).

Rain water harvesting was applied to gain knowledge of water saving actions. The building was equipped with water tank that collects rain water from the building’s and adjacent building’s roof. The collected water is used for flushing toilets, car and garage wash. This solution is expected to reduce potable water use.
Another new product-related issue that came up in the interviews was new ways of working and how the work environment should be arranged. Workplace design ideas were gathered in workshops. During the interviews the user representative stated that surveys and workshops were arranged among future users to map the workplace needs. New solutions implemented in the project included creating a meeting place for each floor for users, increasing the amount of videoconferencing possibilities and decreasing need to travel.

3.3. Redefining productivity in the value chain

Productivity was addressed with many actions. Firstly, Building Information Modelling (BIM) was used through the project for modelling the project’s architectural, structural, mechanical engineering and geotechnical aspects. The model information was utilized also for example in quantity take off and costing, visualizing forthcoming tasks, visualizing dependencies between tasks, synchronizing tasks and planning deliveries on site. Design solutions were tested in models to function as expected. The models were used for finding design errors and solve those before production. For example utilization of BIM made it possible to observe intersections between components and clashes. BIM reduced disturbances during the design and construction period by excluding possible errors in design, quantity and cost estimations, scheduling, procurement and logistics, production and in hand-over. (Skanska, 2012).

As an innovation the project team used pioneering four-dimensional (4D) Building Information Modelling (BIM) to plan the construction of the project with a delivery timeline to help decision making throughout the project. The BIM model incorporated construction scheduling, safety and site logistics information, existing underground utility lines and the site’s terrain, which was laser-scanned prior to the project. The visualization indicated different work phases clearly with different colors. This included also safety planning to prevent accidents. Site and safety modelling covered temporary structures such as site office, storage areas, roads, cranes, falling prevention, marking of dangerous areas and other safety equipment including connection points for safety harnesses (Skanska, 2011; Skanska, 2012). As the situation on site varied weekly, it was easy to use the BIM model to visualize situations and take preventive actions. (Skanska, 2011; Skanska, 2012).

BIM was utilized also in carbon footprinting and energy modeling. For example a CO2 footprint was calculated based on architectural model quantities, energy simulations were made using an architectural model as the basis for an energy model and energy consumption was estimated via the BIM-based energy simulations and energy-efficient solutions (Skanska, 2011). The carbon footprint was calculated for the building’s embodied carbon. The calculation did not include carbon emissions resulting from transportation and construction activities. The calculation provided a quick and cost-effective carbon analysis of the construction materials. Carbon footprinting can help to identify low carbon project options that have the potential to make carbon savings during the design and construction phases. (Skanska, 2010). Carbon footprinting can also help to identify key construction materials with high-embodied carbon and promote low-carbon alternatives. (Skanska, 2010)

Another solution enhancing productivity in the project was utilization of prefabrication. Prefabrication concerned ventilation and corridor modules. The modules were fabricated and assembled in a factory that provided efficiency in installation phase as modules are plugged into building and there was no need to schedule works of different specialists such as electrical, ventilation etc. installation workers. Two interviewees stated that using prefabrication of ventilation modules was a new idea. It has been used in other countries of the case company and in this project it was implemented in Finnish market. The struggle in this project was that the prefabrication had not been used before and it was unclear whether it would be used in coming projects. Interviewee C stated it would bring increase in productivity if prefabrication was chosen to be a company strategy and there would be a continuum of projects utilizing prefabrication.

One of the other focus points of the project was waste management. During construction 99 percent of the construction waste materials were diverted from landfill. Approximately 85 percent of the waste was sorted on site into fractions, including wood, insulation, gypsum, plastic, steel, stone and waste for incineration at a local power plant. The remaining 15 percent of the waste was then sorted at a specialist facility off-site with an efficiency of 95 percent. The waste insulation accumulated on site was collected by the insulation supplier, which recycled the material back into their production process as part of a trial project. (Skanska, 2012).

Attention was paid also in purchase to find recycled materials. At the end of the project it was found that 11 percent of the building materials were recycled. The materials with the largest recycled contents were concrete
reinforcement bars, gypsum boards and insulations. The project’s ready mixed concrete also contained pulverized fly ash, which is a by-product from coal-fired power stations that can reduce embodied carbon by up to 30 percent compared with conventional concrete mixtures (Skanska, 2012). Another example of recycling is that a target was set to use either old furniture or the needed new furniture should be domestic products. Some of the furniture from the previous office was used in this new office also. For example cafeteria furniture was still usable and fitted the new building. Art works from the old office found new positions in the new office.

3.4. Enabling local cluster development

As a start point emphasis was put on choosing location of the project. The reason for this was to avoid development on green land and locate the building on desirable location from the future user point of view and provide urban infill development in already existing city structure. The site was previously a bus depot and the land was required to be decontaminated prior construction. In total 496 tons of decontaminated soil was removed from the site. (City of Helsinki, Environmental center, 2010; Pöyry Finland Oy, 2010). The site can be therefore considered to be part of urban infill development as the site use purpose was changed from bus depot to office quarter. The city had interest to steer the project through zoning plan and building permit as the location of the project was stated to be the start of the city. The city landscape advisory board (2009) stated that the block of the project is considered to be important since the site is in a perceptible location when entering urban Helsinki. The city landscape advisory board also required to use a landscaping architect to be included into design of the inner yard as the aim was to have an example of urban yard execution for other similar projects.

Interviewees stated that LEED was affecting on procurement by focusing on purchasing local services and supplies. Local sub-contractors, suppliers and materials were prioritised in the project. One incentive for this was meeting LEED requirements that aim for reducing the environmental impacts resulting from transportation of supplies or workforce. Around 75 percent of the workforce was based within the Helsinki area or surroundings. Another regional aspect was prioritizing local materials in procurement. Local materials were defined as materials or products that had been extracted; harvested or recovered and manufactured within an 800 kilometer radius of the project site. For example the hollow concrete slabs were sourced from within the Helsinki area. Other regional construction materials included the insulation and gypsum boards. As mentioned before insulation materials and gypsum boards were also recycled or surplus materials were returned to supplier. Therefore it was convenient to choose local supplier to minimise the need of transportation.

During the design and construction period the project was part of several research programs with research institutes and universities. One of the research concerned carbon foot printing of office buildings and the aim was to options in design phase to minimize energy consumption and how we should weight the primary energy use and the CO2 equivalent emissions of different design options (Airaksinen & Matilainen, 2011). Another research program by Technical Research Centre of Finland (VTT) concerned augmented reality for building and construction and it included mobile augmented visualisation of Skanska house. Augmented reality enables to visualise buildings in their location prior to construction.

4. Discussion and conclusions

The purpose of this paper was to explore how shared value is created in built environment. The primary aim was to examine shared value creation in construction project and secondary aim was to find evidence on possible improvements in quality, cost-effectiveness, sustainability and collaboration. The findings of this research support the idea that sustainability and shared value creation components can be identified in case company’s strategy and actions in a construction project. The case company defines itself as a city builder and it has noted that sustainable development is not only about green agenda or environmental efficiency but also about social progress and economic certainty which is in line with shared value creation principles.

The case project examination shows that solutions carried out in project and different stakeholders’ targets can be identified as ways of creating shared value. Porter and Kramer (2011) state that shared value by reconceiving products and markets, redifining productivity in value chain and by enabling local cluster development, all these aspects can be found in the case project as follows.
The case project was used as test-bed to different units to test new solutions and gain experience before they are offered to external customer. This can be seen as good knowledge of experimenting new solutions that are in the future offered to meet customer needs, environmental efficiency and new business opportunities. For example having the knowledge and the information of the commissioning and optimising the building systems in operational phase gives credibility and expresses liability to assure that final product meet design targets. Productivity was redefined in value chain by procurement and logistical solutions, material selection principles, new production management solutions such as BIM and minimising waste. Furthermore environment also benefits from conserving energy as this reduces primary energy use and greenhouse gas emissions from fossil fuels.

The company enables local cluster development by having a focus on business ethics, diversity, training and educating its employees and taking part to several research projects. In the case project the surroundings were regularly informed about ongoing stage of the project and local services and supplies were procured. The city of Helsinki was also taking part actively as the project situated in a significant location.

Based on case project material and interviews shared value creation has potential to create new business opportunities, improve quality, cost-effectiveness, sustainability and collaboration in a construction project. Yet new kinds of methods and contracts regarding responsibility and revenue distribution to include surrounding community and people to value creation are needed. In the case project shared value creation components emerged, yet more benefits would have been gained if shared value creation would have been implemented intentionally and strategically in the project.

This research raised up many questions in need of further investigation. The current investigation was limited to one project within the same group. Further studies of multiple case studies are recommended. Furthermore case studies with stakeholders representing different companies and parties concerned would establish deeper understanding of shared value creation process and its benefits. In addition investigating authority views and targets in a construction projects would provide a wider understanding of social effects.

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