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SUSTAINABILITY BEST PRACTICES

Benchmarking Results of the SUSTIS Project

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1. PURPOSE OF THE STUDY AND METHOLOGICAL ASPECTS

The study has been conducted as part of the SUSTIS project in order to benchmark sustainability practices extant in industries that share similar characteristics with shipbuilding industry. The information provided by this study is intended to be used during the mapping of sustainability arguments and eventual implementation of sustainability within the targeted company.

Methodologically, the benchmarked industries were selected based internal communication between the members of the SUSTIS project starting from the needs of the main funder (the shipbuilder). The main criteria for their selection linked to the complexity of introducing sustainability: complex products, which require a great number of inputs into the production process and a complex network of suppliers, whose activities can pose risks for the company because of difficulty to control them (ex. child labor in non-Western countries). Some of the benchmarked industries also have a limited number of customers, who are able to pose conditions on features of the final product. Given these criteria, the main industries on which the study focuses are: constructions, automobile manufacturing, aircraft manufacturing, and vacation resorts. Sustainability management in cities was initially considered but dropped out during the process, due to the relatively different nature of cities: public ownership, multiple actors involved in the decision-making process at different hierarchical levels and the political nature of the decision-making process, which differs from commercial arguments in the private sector. The study could have included other similar industries but for reasons of space and available funding, the study limits to the above mentioned industries.

The themes covered in this study emerged in a similar manner, in internal communication with the main funder. When considering the specific needs of the shipbuilder, several issues emerged as important and thus, are in the focus of this study:

- What is done in other industries in terms of sustainability?
- What are the drivers of sustainable actions?
- How is the supply chain managed so that unsustainable practices in suppliers that cannot be controlled do not become a risk for the company?
- What indicators are used to communicate sustainability in a holistic manner?
- How sustainability is communicated to external stakeholders?
- How the shipbuilder can build competitive advantage based on sustainability practices?

The structure of this report followed the themes identified as relevant for the shipbuilder company, departing from general, contextual issues, such as stakeholders and drivers of sustainability in benchmarked industries and going into more detailed sustainability practices, such as supply chain management and communication.

In terms of the research process, the study proceeded with an investigation of academic studies available in the above mentioned industries. Among the keywords used were: sustainability, supply chain, sustainability drivers, arguments, reasons, indicators and reporting. The literature identified in this way provided several interesting case studies, theoretical frameworks for integrating sustainability into business practices and surveys on issues such as drivers for responsibility in some industries. However, these studies provided limited material, which did not cover systematically all the industries within the purpose of the study. Thus, the research process continued by looking at initiatives taken by leading companies in terms of sustainability as well as practical research undertaken by international associations in the targeted industries. Sustainability-focused pages of large companies and international associations were scrutinized for identifying sustainability practices related to the themes covered in this study. While many case companies in the study are from large, international companies, when appropriate, some also include local, Finnish firms (for this reason, some of the images and tables quoted in this report are in Finnish). Additionally, several examples of sustainability practices originating from companies outside the targeted industries were included to give a different flavor of extant practices in the field.

The findings of this study are reported mostly in a visual form, as this form of presentation was desired by the shipbuilding company.

2. SUSTAINABILTY CONTEXT TO BENCHMARKED INDUSTRIES – MAPPING STAKEHOLDERS AND THEIR EXPECTATIONS

2.1 Construction industry

In the construction industry, sustainability stakeholders differ along the lifecycle of the construction process. In the **pre-construction phase**, local authorities and town planner appear to have a prominent role, since they are the ones deciding whether the construction is needed or not and the specific requirements to be met by the constructor. Frequently, the public sector at this stage plays a role in setting sustainability targets, for instance how energy efficient a building should be, what systems for recycling should be in place etc.

Customers can also be important at this stage, especially if they are contractors who buy the building and then sell or rent it to final consumers. For reasons of cost efficiency, they are interested in various operational performances, such as water and energy consumption, which are linked to sustainability.

In the **construction phase**, in addition to the stakeholders mentioned – who play a role in monitoring compliance to requirements set in the pre-construction phase – local community and pressure groups can become important stakeholders, especially if the construction is not desired. Maintaining good relationships with these is important.

In the **post-construction phase**, also end users are important stakeholders, as they too often expect good operational performance in the case of new buildings. In some cases, customers with green values can expect higher performances – reuse of grey water, green roof. Figure 1 introduces the main stakeholders along the life-cycle of a typical construction project:
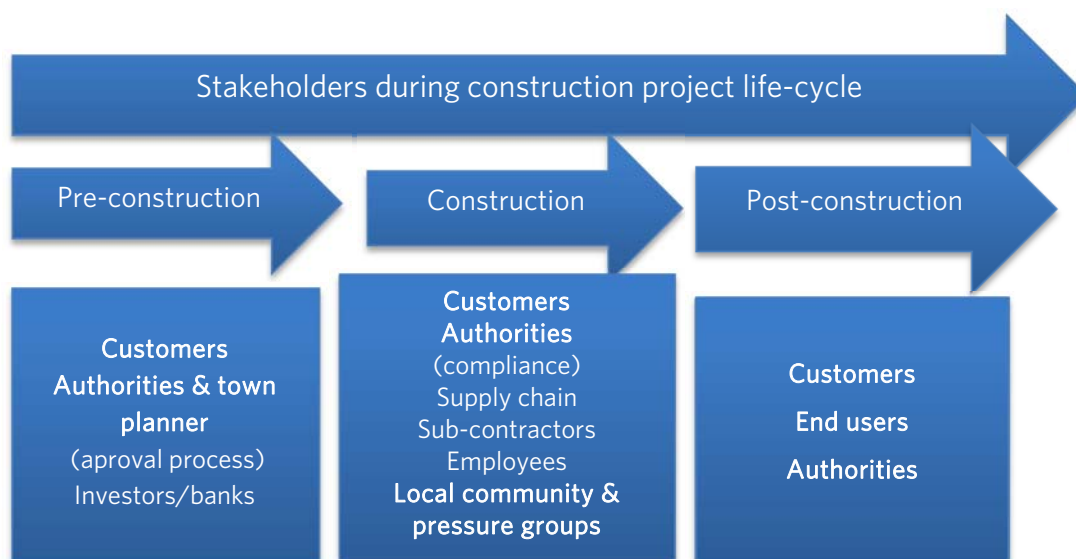
Figure 1. Stakeholders during construction project life-cycle.

A similar perspective, which identifies stakeholders in different construction stages is offered in Figure 2, although the stakeholders differ a bit from the previous picture:

STAGE	STAKEHOLDERS	BARRIERS	GREEN INTERVENTIONS
1 **CONCEPT DEFINITION** ↓	• Public authorities • Developers • Capital providers • Designers	• Lack of policy • Financial risk • Disregard for whole life costs • Lack of knowledge and trust	• More progressive public green building policies • Private sector green building policies • Favorable financing terms for green buildings • Alternative procurement models for green buildings
2 **DESIGN** ↓	• Public authorities • Developers • Designers/Engineers	• Lack of incentives • Technological risk • Lack of communication and leadership	• Green performance guarantees • Green incentives in permitting process
3 **CONSTRUCTION** ↓	• Developers • Contractors • Material & equipment suppliers	• First mover risk • Supply-chain relationships • Tender process • Lack of communication and leadership • Lack of knowledge and trust	• Green/sustainable private procurement • Green/sustainable public procurement
4 **IN USE**	• Owner • Developer • Facilities manager • Tenants	• Lack of incentives • Tender process • Lack of knowledge and trust • Lease structure	• Green facilities management • Benchmarking and follow-up • Green leases • Green criteria in asset valuation

(Left vertical label: **DELIVERY AND MANAGEMENT PROCESS**)

Figure 2. Stakeholders in different construction stages. Source: UNEP Sustainable Buildings and Climate Initiative, 2014, Greening the Building Supply Chain, p. 11.

Implementing sustainability in the construction sector is a joint effort of different actors in the sector, ex. designers, capital providers, developers, engineers, contractors, materials and equipment suppliers, agents, owners, as Figure 3 below indicates:
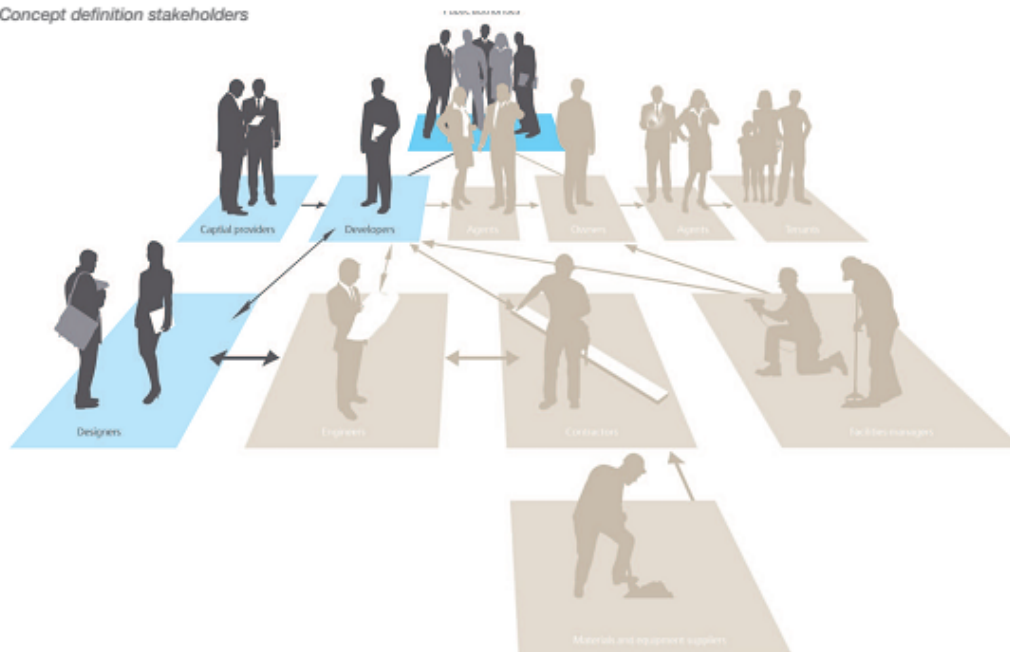
Figure 3. Actors active in the construction sector. Source: UNEP Sustainable Buildings and Climate Initiative, 2014, Greening the Building Supply Chain, p. 18.

Below, the stakeholders of two sustainability leaders in the construction industry are introduced, after which a more nuanced perspective on stakeholders is presented in the context of a construction project in Sweden.

2.1.1   Skanska

Skanska is a major international player in the construction industry and one of the leading companies in terms of sustainability. The main stakeholders that Skanska identified are the following:

- Customers
- Employees
- Suppliers
- Business partners
- Local communities
- Investors
- Non-governmental organisations (NGOs)
- Governments
- Media

While in its external communication Skanska extensively discussed various topics relevant for stakeholders, stakeholders' concerns are not identified on their web section of sustainability neither in their sustainability reports. Some details on stakeholder expectations are introduced in the case of each building constructed. These details are communicated in documents entitled "Case studies" available on their web pages. A more holistic view on stakeholders' concerns for the entire company is, however, not clearly outlined.

2.1.2   Senaatti

Senaatti is a state owned company in Finland, which is well known for its responsible practices. The main stakeholders identified by Senaatti are visualized in Figure 4:
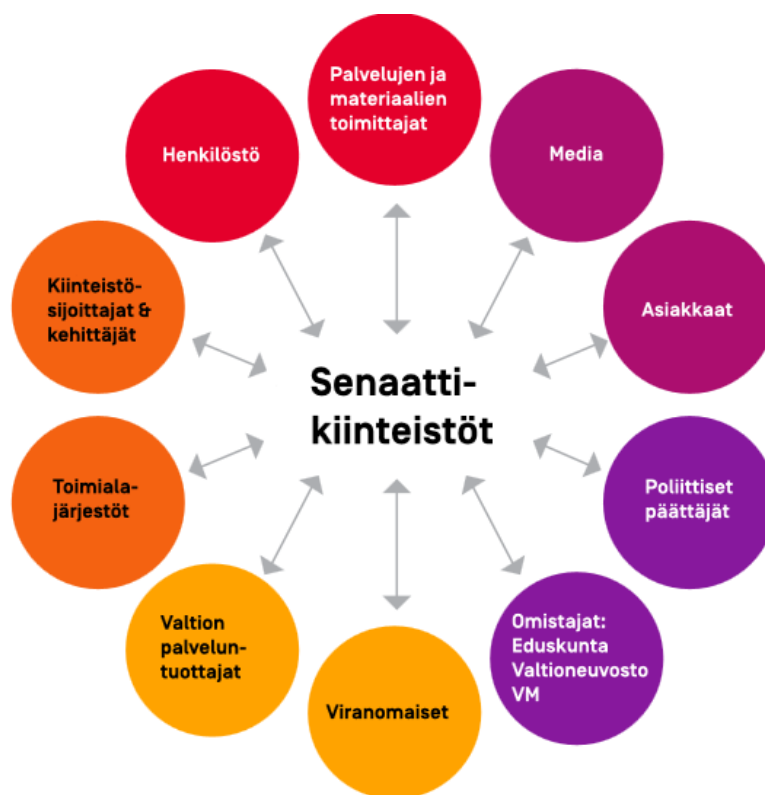
Figure 4. Senaatti's stakeholders expectations are well communicated and are introduced below:

The expectations of Senaatti's main stakeholders are presented below:

1. Customers (state administration, end users, other customers): safety, healthy, productive spaces; guidance on sustainable use of spaces; energy efficiency; reducing impact on climate change

2. Suppliers of services and materials (around 3800 suppliers): long-term relationships, transparency, impartiality

3. Officials (EU, Finnish state, local administration, land owners, neighborhoods): legal compliance, employment provider, tax payer, open dialogue

4. Senaatti owners (Parliament, Government, Ministry of Finance): achievement of social and environmental goals, preserving cultural values

5. Employees (300): competitive salaries, career development possibilities, appropriate work spaces

Source: http://yhteiskuntavastuuraportti2015.senaatti.fi/vuosi-2015/sidosryhmat/

2.1.3 The case of a construction project for housing in the South of Sweden

Stakeholders in the construction industry vary greatly from one project to another and from one country/region to another depending on the actors that are involved as well as who have decisional power. Below is the case of a housing construction project in the South of Sweden, which offers more insights into stakeholders' dynamic in one construction project. It shows the complexity involved in the construction field and the diverging interests of the actors involved in a project, which can greatly impact the development of a construction project.

Project: Housing for senior citizens consisting of 60 apartments

The project duration was 11 years, from 1988 to 1999 and the project had two distinct phases. The first phase was from 1988 to 1993 and consisted of two 9-storey buildings. This proposal was stopped because the permits to build were not granted, mainly because of influence from stakeholders who opposed the project and appealed against the municipal decision to grant it. In the second phase from 1994 to 1999, the project changed to consist of five 5–6 storey buildings, which were a less controversial proposal. In 1998 the permit to build was granted and construction on site began in the same year. The main concerns from opposing stakeholders were that the new development would negatively affect the living conditions of surrounding houses and that the site of the proposed development had some intrinsic cultural value. Seven external stakeholder groups could be identified in the project:

1. The municipality (grants local building permits in the formal planning process).
2. The county administrative board (the first instance of appeals in the formal planning process).
3. The national government (the last instance of appeals in the formal planning process).
4. Residents in the vicinity (perceived themselves to be negatively affected by the project).
5. Interest group for the preservation of the historical city image.
6. Interest groups for senior citizens (spokesperson for the future tenants).
7. The media.

Extract from Olander, S. (2007), Stakeholder impact analysis in construction project management, *Construction Management and* Economics, 25: 277-287.

2.2   Automobile manufacturing industry

In automobile manufacturing industry, the key sustainability stakeholders were identified as: customers; employees & trade unions & potential employees; suppliers; policy makers; and NGOs (civil society). **Customers** are interested in sustainability performance of the products (automobiles), especially fuel efficiency and emissions but also in safety and quality issues. **Employees** and their representatives are interested in employment issues (health and safety, human rights, diversity and skills) but also in business ethics and integrity, and legal compliance. **Suppliers** mostly expect automobile industry to address issues related to responsible supply chain, legal compliance and innovation. **Policy makers** look at legal issues but are also interested in environmental performance of the products. **NGOs** expect the industry to reduce operational impacts as well as to improve products' environmental performance.

Below, the sustainability practices of three major players in the automobile field are introduced.

2.2.1   Ford

For Ford, the main stakeholders are: employees, customers, dealers, suppliers, investors and communities but also government agencies, nongovernmental organizations (NGOs) and academia (see Figure 5).

Figure 5. Ford's stakeholders. Source: http://corporate.ford.com/microsites/sustainability-report-2013-14/blueprint-governance-stakeholder.html.

While Ford has identified stakeholders' concerns in detail using a materiality matrix (see section 4.3), it does not provide details on what are the expectations of each category of stakeholders. The highest on stakeholders' concerns ranks **climate change**, followed by:

- **Water** in three key areas: in local communities; from and on Ford operations; and from Ford's product design decisions. All three of these issues were of the highest concern to Ford and external stakeholders.

- **Supply chain** issues: sustainability of raw materials and the environmental and human rights performance of suppliers remained at the highest level of importance for Ford and other stakeholders. In the 2012/13 analysis, a new category of supply chain issues was added relating to Ford's approach to identifying and managing supply chain sustainability risks – including raw materials sustainability – and Ford's process for promoting, assessing and remediating sustainability performance among suppliers.

- **Vehicle safety** moved down in importance to stakeholders to a medium level of concern but remained at the highest level of concern for Ford.

- **Sustainability strategy, management and governance** also increased to the highest level of importance for non-Ford stakeholders, moving this issue to the "upper right" box on the material issues matrix.

2.2.2   Volvo

For Volvo, the key sustainability stakeholders and their expectations are introduced below:

1. Customers – are interested in product emissions, fuel efficiency and legal compliance
2. Employees – interested in how Volvo addresses customer satisfaction, business ethics and integrity, and legal compliance
3. Trade unions – issues related to health and safety, human rights, diversity and skills
4. Potential employees: health and safety, energy efficiency, innovation and skills
5. Suppliers – interested in responsible supply chain, legal compliance and innovation
6. Capital markets (shareholders, investors, analysts): financial performance, legal compliance, and customer satisfaction
7. Policy makers: legal compliance, business ethics and integrity, and product safety and emissions
8. NGOs: emissions (products), environmental impacts (operations) and societal engagement
9. Academics and research partners: innovation, energy efficiency, emissions and skills

2.2.3   Fiat

The main stakeholders for Fiat are:

1. Public institutions (government, local authorities, public agencies, regulatory bodies, institutions and trade associations) - are interested in compliance with standards on safety, quality and environmental impacts

2. Employees – interested in transparent communication, safe and healthy work environment, rewarding system, training and professional development, diversity, inclusion and respect for human rights

3. Trade unions: dialogue on employment issues

4. Dealer and service network: competitive products and transparent information on them

5. Customers: product quality, innovation, affordability and safety; emissions and fuel efficiency of the product; environmental friendly business processes

6. Suppliers and commercial partners: sustainability practices in the supply chain; sustainability as criteria in purchasing decisions

7. Local communities and NGOs: alternative fuels, alternative drive systems (ex. electric cars), safety, education and culture of sustainability in society.

A ranking of the importance of sustainability issues for Fiat stakeholders, identified based on stakeholder consultation events, are presented in Figure 6:

2014 FCA Materiality Diagram

■ Product   ▲ Environment   ● Social

- Very important (y-axis top: Importance for external stakeholders)
- ■ Vehicle safety
- ▲ Vehicle CO₂ emissions
- ■ Vehicle fuel economy
- ■ Product innovation
- ● Customer satisfaction
- ● Human rights along the value chain
- ■ Vehicle quality
- ● Business integrity and ethical standards
- ● Community engagement
- ● Employee health and safety
- ● Workforce diversity and equal opportunities
- ● Employee development and training
- ■ New mobility solutions
- ▲ Energy and CO₂ emissions from operations, offices
- ● Engagement with trade unions
- ▲ Waste generated by operations
- ● Engagement with business partners
- ▲ Water used by operations
- ■ Alternative fuels (natural gas, biofuel)
- ▲ Responsible sourcing and recycling
- ■ Alternative propulsion and drive systems (hybrid and electric)
- ▲ Environmental impact of logistics
- ● Employee well-being and work-life balance

Important — Importance for internal stakeholders — Very important

Figure 6. Significant sustainability issues for Fiat. Source: Fiat 2014 Sustainability Report, p. 133.

2.3 Aircraft manufacturing industry

In aircraft construction industry, the common stakeholders reported by companies operating in this industry are owners, customers, employees, suppliers and society.

Customers are important since, similarly to shipping industry, there are a handful of producers and a relatively small number of aviation companies who buys for running commercial or military flights. Products are highly customized and customers have some power to decide the features of the products they buy. Since fuels are the biggest cost component of aviation companies and since fuel price has increased considerably in the last decade, customers expect higher fuel efficiency through technological innovation. Customers (aviation companies) have also pressures from governments to reduce CO2 emissions of their flights and transfer this expectation to the aircraft manufacturers.

Society is also an important stakeholder. Especially **state officials** can put pressure on aviation industry, due to its major contribution to CO2 emissions, which is linked to climate change. Since there are climate change commitments at the state level, officials can request aviation industry to innovate its products in order to minimize CO2 emissions.

Below, the stakeholders of two major players in the aircraft construction industry, Airbus and SAAB Group, are presented.

2.3.1　Airbus

Airbus communicates its stakeholders and how the company adds value to each of them (see Figure 7 below).

Airbus Group's businesses are characterised by long product lifecycles and corresponding returns on investments, considerable costs and risks in programme development, and cyclical civilian markets. The principal stakeholders are shareholders, customers, employees, suppliers and partners, as well as society at large.

DUTIES TO STAKEHOLDERS

SHAREHOLDERS
The Group will generate value by developing a sustainably profitable portfolio of aeronautics and space businesses. It must foster profitability in the following ways:
— maximise the economic return of long life cycle investments, while minimising their risks;
— maintain a capital structure consistent with the needs of future growth, with continued solvency and with dividend payments;
— adapt its portfolio of businesses continuously, using disciplined and transparent disclosure to reflect their value in the share price.

CUSTOMERS
Airbus Group is a provider of choice, offering superior value-for-money product and services. It must:
— commit only to specifications and to schedules that it is assured to meet, and manage customer expectations transparently and honestly;
— warrant the price of products, systems and services by their quality, and by the economic and performance advantages they provide;
— anticipate evolving market requirements.

EMPLOYEES
Airbus Group engages its employees as partners who share its goals and rise to the challenges. It must:
— offer personal and career development commensurate with competence and attitude, with equal opportunity principles and diversity objectives;
— promote leadership that sets clear, achievable and measurable objectives;
— offer fair rewards commensurate with performance.

SUPPLIERS
Airbus Group treats its suppliers as partners based on mutual interest. It strives to:
— deal fairly with suppliers, ensuring that they understand the commitments, challenges and risks they take;
— assist them so they can perform optimally under their contracts;
— set clear, achievable and measurable objectives.

SOCIETY
Airbus Group plays a key role in society and towards local communities. It aims to:
— be a symbol of cutting edge technology and capabilities;
— be a sustainable source of high-quality employment;
— be a resilient source of export revenues and tax income for its home countries.

Figure 7. Airbus stakeholders & duties to stakeholders. Source: Airbus 2014 Corporate Responsibility and Sustainability Report.

2.3.2　SAAB Group

In the following paragraph, SAAB Group makes clear who its stakeholders are and what are their expectations of SAAB:

"The sustainability issues that most stakeholders point to as especially important for Saab's business are zero tolerance for corruption and compliance with export regulations. Many also want to know more about how Saab works with environmentally sustainable innovations. Each stakeholder group also has expectations on Saab based on their particular interests. **Customers** and business partners expect Saab to offer cost-efficient solutions designed based on their needs. They want a relationship that can develop over time and that is based on mutual trust and a shared view of regulatory compliance, international agreements and business ethics. **Employees** expect Saab to make use of their competence and offer development opportunities. **Owners and investors** expect a consistent return and that Saab will be transparent in its communications with the capital market. **Society as a whole** ex-

pects the business to be run in a responsible manner and contribute to security. This includes responsibility for the environment and that Saab's operations contribute to positive social development locally and globally."

In Figure 8, SAAB presents the forms of engagement with its stakeholders.

Stakeholder group	Forms of engagement
Owners and investors	• Separate meetings with investors on sustainability issues. • Annual General Meeting. • Sustainability surveys from investors and analysts. • Continuous engagement with investors and analysts.
Employees	• Annual employee survey. • Sustainability survey among Saab's trainees.
Students and potential employees	• Career days and similar events. • Workshops with Saab's student ambassadors. • Interviews with students. • Collaborations with universities and institutes of technology. • External surveys on students' expectations of future employers.
Customers	• Stakeholder engagement with focus on Saab's sustainability strategy with the largest customer in Sweden. • Customer surveys. • Personal meetings, trade shows and conferences.
Society in general, including decision-makers and interest groups	• Participation in defence forums and debates, such as Almedalen and Folk och Försvar (Security and Defence) in Sälen. • Collaborations with public organisations and authorities, such as the EU and UN.
Suppliers and partners	• Sustainability as a theme at Saab's procurement day. • Continuous contact with suppliers and partners.

Figure 8. SAAB forms of engagement with stakeholders. Source: SAAB Group - http://saabgroup.com/responsibility/stakeholders-and-dialogue/; emphasis added in the text.

2.4   Vacation resorts

Vacation resorts depend on a number of stakeholders to continue their business. **Customers** are one significant stakeholders and their safety is one major concern. **Local communities** in which these resorts operate are also important since there can be major social and environmental impacts on a local level. **Employees** feature high on sustainability issues because of industry's poor reputation on grey employment and inappropriate practices related to wages and treatment of employees.

The range of stakeholders are, however, broader, as the case of **TUI Group** indicates. While on the website TUI group dedicate the section on stakeholders mostly to discuss how local communities' needs are addressed and what actions are taken to meet the requirements of local communities, the sustainability report provides more details on stakeholders in this industry (see Figure 9).

Figure 9. TUI stakeholders and means of engagement with stakeholders.

3. DRIVERS OF SUSTAINABILITY

Drivers for engaging with sustainability actions vary greatly from an industry to another and from a country/region to another. As explained on http://www.sustrana.com/sustainability, the main drivers for a business to engage in sustainability are one or a combination of the following:

- Customers are demanding it
- Competitors are doing it
- Investors are asking about it
- The CEO is interested in it
- Employees (current and prospective) care about it
- A new market demands it
- A growing perception that risks, such as resource scarcity, waste, climate change, conflict minerals, or supply chain management, impact business, now or in the future.

Below, we elaborate on the key drivers of the industries included in this report.

3.1 Construction industry

Construction industry has compelling reasons to implement sustainability practices within its operations. At least when it comes to environmental aspects, constructing green building makes good business sense because increasing efficiency in terms of water, energy and materials consumption is seen in the bottom line of the constructing company and the users of a building. In addition, customer demand is also a key driver. Especially when the customer is a state-owned company, in many Western countries there are regulations requiring sustainability practices in state-owned buildings.

3.1.1 Key drivers worldwide

According to a study from 2013, the key drivers for green building have changed over time (see Figure 10). "The right thing to do" was apparently the most significant driver in 2008 but now the business case seems to play an important role. This is linked to numerous factors, such as: cost efficiency (lower operating costs), positioning a company on a market or gaining a competitive advantage (market demand) or customers' expectations (customer demand). Environmental regulation also increasingly has a role to play in driving green constructions.
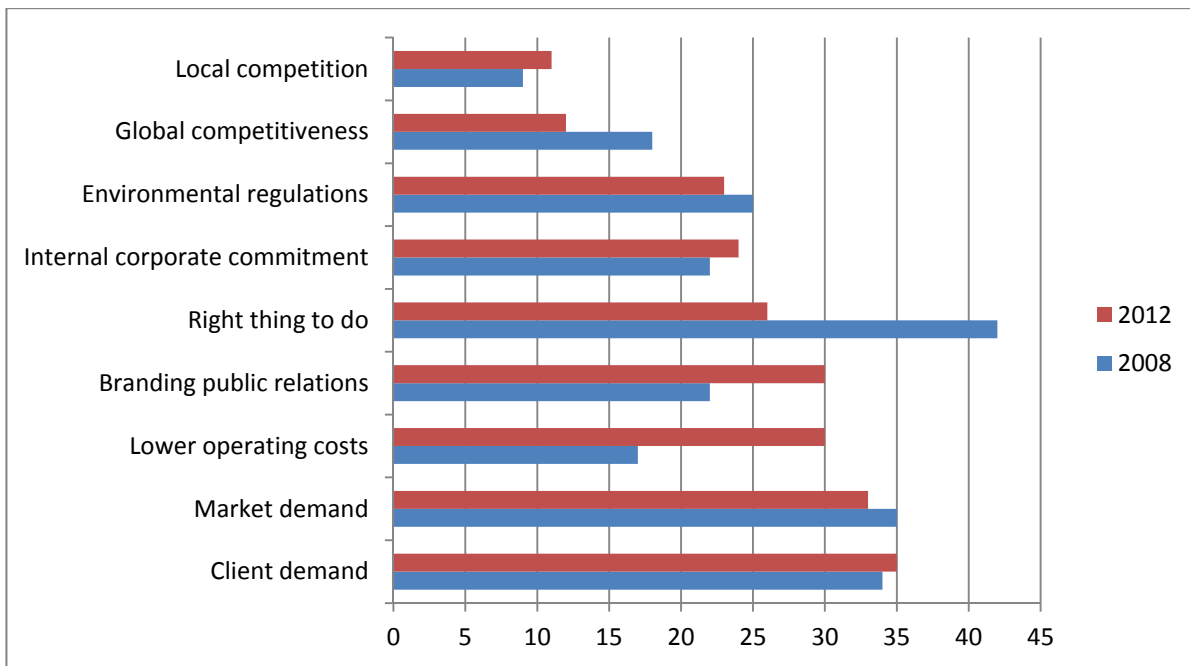
Figure 10. Drivers for green building. Source: World Green Building Trends, SmartMarket Report 2013, p. 15.

Some variation in the drivers for green building can be observed between different locations in the world (see Figure 11 and 12).

Top Three Triggers Driving Future Green Building Activity (By Respondent Location)

Source: McGraw-Hill Construction, 2013

	US	Australia	Europe	UAE	Singapore	Brazil	South Africa
Top Reason	Client Demand	Market Demand	Client Demand	Regulations	Regulations	Market Demand	Right Thing to Do
	41%	37%	39%	55%	41%	52%	44%
Second	Corporate Commitments	Client Demand and Lower Operating Costs	Market Demand	Client Demand	Client Demand and Corporate Commitments	Client Demand; Lower Operating Costs; Market Transformation; and Higher Building Value	Lower Operating Costs
	32%	35%	37%	50%	35%		42%
Third	Market Demand and Lower Operating Costs	Corporate Commitments	Branding/Public Relations	Market Demand	Lower Operating Costs		Regulations
	30%	31%	34%	32%	31%	26%	34%

Figure 11. Top three triggers driving future green building activity. Source: World Green Building Trends, SmartMarket Report 2013, p. 16.

Most Important Environmental Reason for Building Green (By Firm Location)

Most Important Environmental Reason	US	Australia	Europe	UAE	Singapore	Brazil	South Africa
Reduce Energy Consumption	#1 (78%)	#1 (68%)	#1 (70%)	#1 (86%)	#1 (93%)	#1 (61%)	#1 (76%)
Reduce Water Consumption	#2 (32%)	#4 (21%)	#5 (10%)	#2 (64%)	#2 (24%)	#2 (39%)	#3 (40%)
Improve Indoor Air Quality	#3 (25%)	#4 (21%)	#4 (17%)	#3 (23%)	#4 (17%)	#5 (13%)	#5 (4%)
Protect Natural Resources	#4 (19%)	#3 (23%)	#3 (29%)	#4 (14%)	#2 (24%)	#3 (26%)	#2 (48%)
Lower Greenhouse Gas Emissions	#5 (14%)	#2 (38%)	#2 (31%)	#5 (5%)	#4 (17%)	#4 (22%)	#4 (18%)

Source: McGraw-Hill Construction, 2013

Figure 12. Most important environmental reason for building green. Source: World Green Building Trends, SmartMarket Report 2013, p. 18.

There are regional differences in drivers for sustainability and the sections below provide insights into the key drivers of different regions in the world.

3.1.2 Australian housing builders & developers

In Australia, developers, customers and state regulations seem to be significant drivers for green building (see Figure 13 and 14).
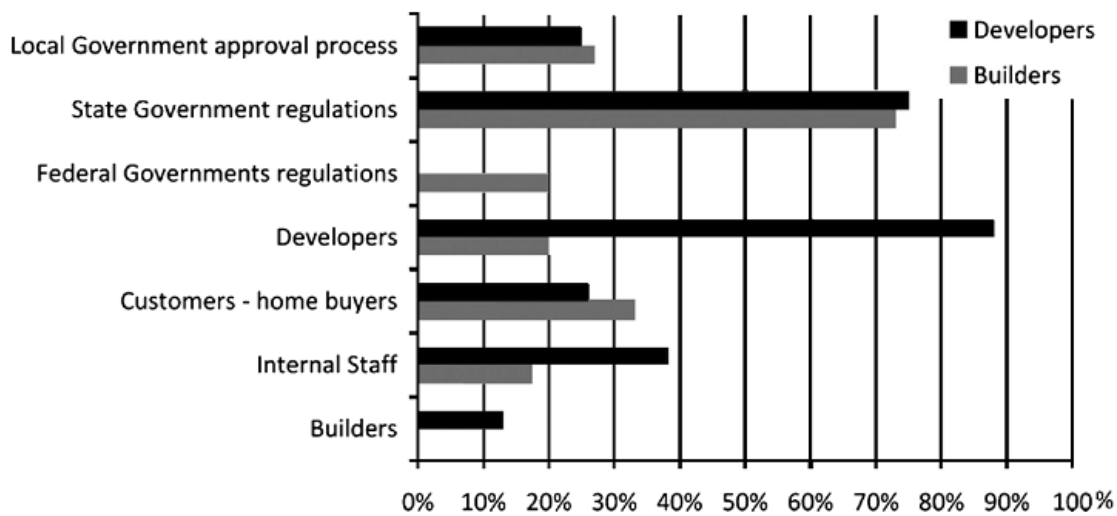
Figure 13. Drivers for ecological sustainable design (ESD) in Australia. Source: Crabtree, L. & Hes, D. (2009), Sustainability Uptake in Housing in Metropolitan Australia: An Institutional Problem, Not a Technological One, Housing Studies, p. 212.
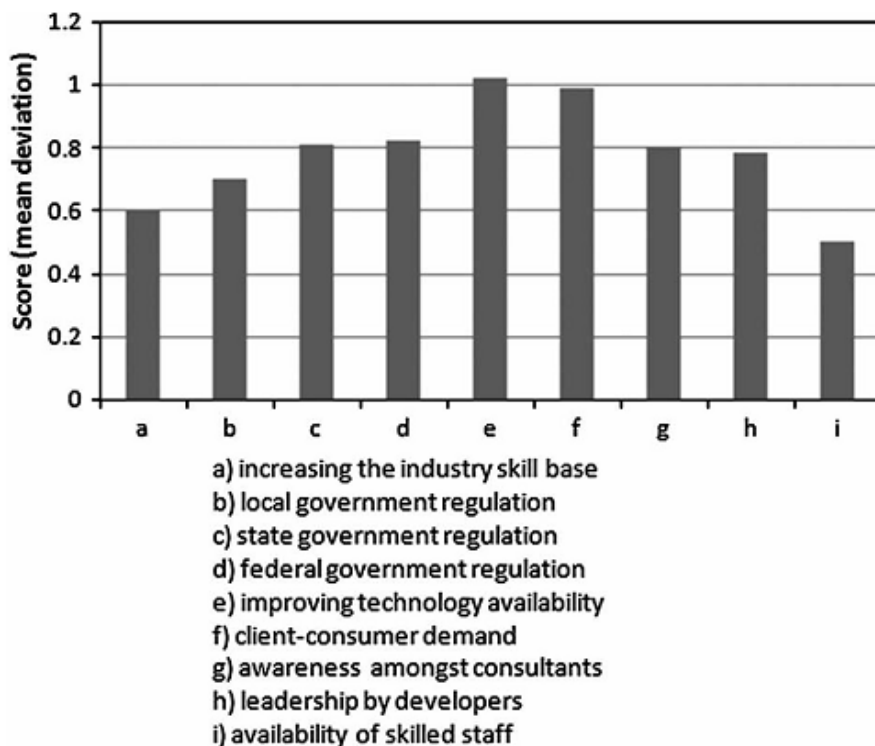
Figure 14 Drivers for green building in Australia. Source: World Green Building Trends, SmartMarket Report 2013, p. 15.

The some studies suggest that there are also obstacles in implementing sustainability in the construction sector, at least in the case of Australia (see Figures 15 and 16).
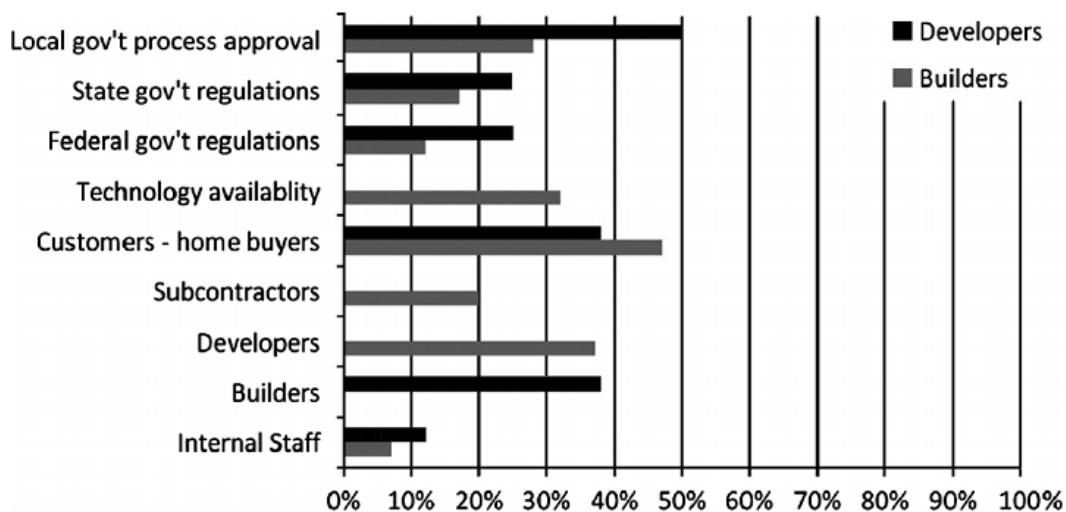
Figure 15.Barriers to ecological sustainable design in Australia. Source: Crabtree, L. & Hes, D. (2009), Sustainability Uptake in Housing in Metropolitan Australia: An Institutional Problem, Not a Technological One, Housing Studies, p. 213.
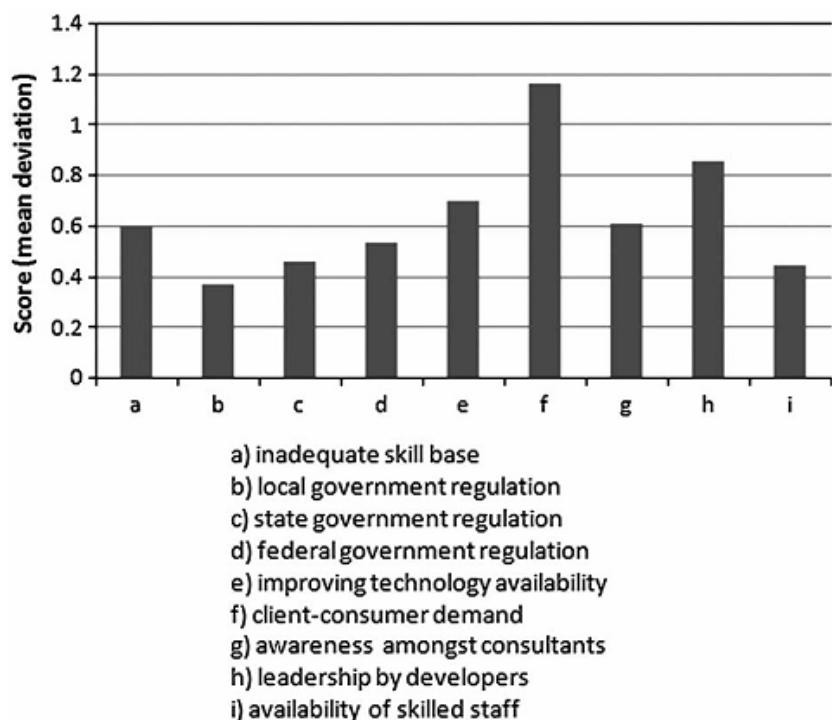
Figure 16. Barriers to green building in Australia. Source: Crabtree, L. & Hes, D. (2009), Sustainability Uptake in Housing in Metropolitan Australia: An Institutional Problem, Not a Technological One, Housing Studies, p. 214.

3.1.3   South-African constructors

Green building is at a premature stage in South Africa, with the public and the government showing little interest in the subject. The main drivers for constructors are the following:

- Raising energy costs
- Industry (Green Star) rating system
- Operational cost savings
- Marketing potential
- The ability to charge higher rents
- Healthy indoor air quality is almost unanimously considered unimportant

The green accreditation provided by the Green Star rating tool has enabled developers to portray their buildings as green and therefore, gain a competitive advantage and a new marketing tool. The costliest aspect of green building is the ventilation system.

Source: Windapo, A.O., 2014, Examination of green building drivers in the South African construction industry: Economics versus ecology, *Sustainability,* 6: 6088-6106.

3.1.4   USA constructors

In USA, the key drivers are:

- Leadership in Energy and Environmental Design (LEED) green building rating system
- An increase in green building council membership
- Government, and private sector incentives
- Strong government leadership
- An expansion of state and local green building programs
- Advances in the green building technology

Source: Kibert, C.J. (2012), Sustainable Construction: Green Building Design; Wiley & Sons, Inc.: New Jersey, NJ, USA, 2012.

3.1.5   New Zealand

According to the New Zealand Green Building Council (NZGBC), industry rating system for green buildings played an essential role in boosting sustainable investments in the field (see Figure 17). Various business-related reasons, such as competitive advantage or reducing costs were also important drivers.

Exhibit 2 | Drivers of Green Building Development

(1 = most important, and 10 = least important)

Greater availability of green products	9
Increased education	10
Industry rating system (Green Star)	1
Building code	8
Government policy	6
Rising energy costs	7
Superior building performance	5
Lower Lifecycle costs	4
Competitive advantage	2
Tenant satisfaction & productivity	3
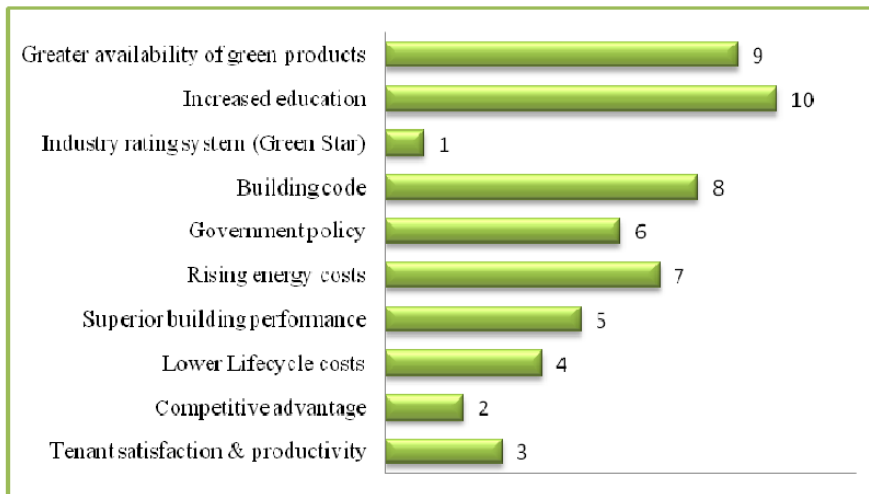
Figure 17. Drivers of green building in New Zealand. Source: Bond, S. and Perrett, G., 2011, The key drivers and barriers to the sustainable development of commercial property in New Zealand, p. 57.

According to the same study, low customers' interest in sustainability is one of the key barriers in developing green building. Other barriers can be observed in Figure 18.

(1 = most important, and 10 = least important)

Other (nil response)	10
Unwillingness to pay additional costs	4
Low client demand	1
High Costs vs low perceived benefits	2
Limited availability of new technology	9
Lack of government incentives	3
Unreliable/unproven technology	5
Poor access to information	6
Lack of owner/occupier awareness	7
Lack of developer awareness	8
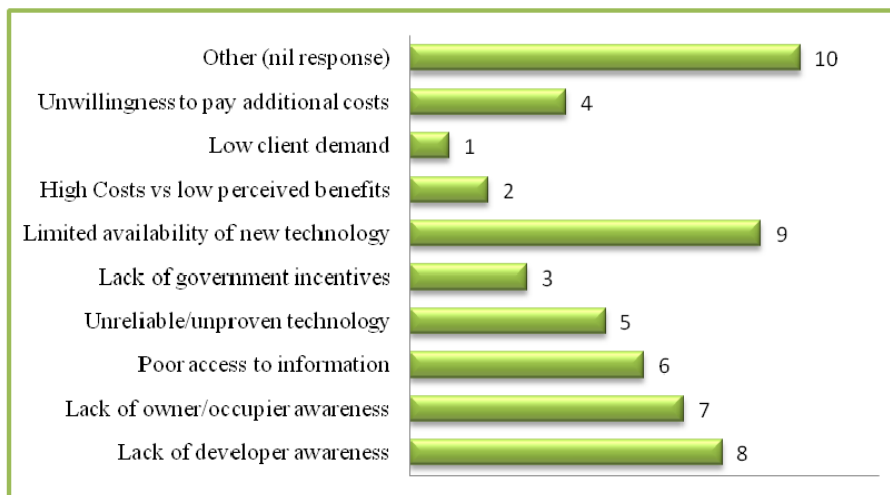
Figure 18. Barriers to sustainable constructions in New Zealand. Source: Bond, S. and Perrett, G., 2011, The key drivers and barriers to the sustainable development of commercial property in New Zealand, p. 57.

3.1.6 European countries

In the European context, the key drivers appear to be customers and the markey (source: World Green Building Trends, SmartMarket Report 2013, p. 16). European countries, especially Germany and Norway put high emphasis on the marketing advantages of green because consumers and owners can make business decisions based on greenness. In United Kingdom, there are legislative drivers for sustainable constructions, such as legislation on reduction of operational CO_2 emissions: all new buildings should be 'nearly zero energy' by December 2020. However, there are also barriers to sustainable building in UK, as Figure 19 below indicates.
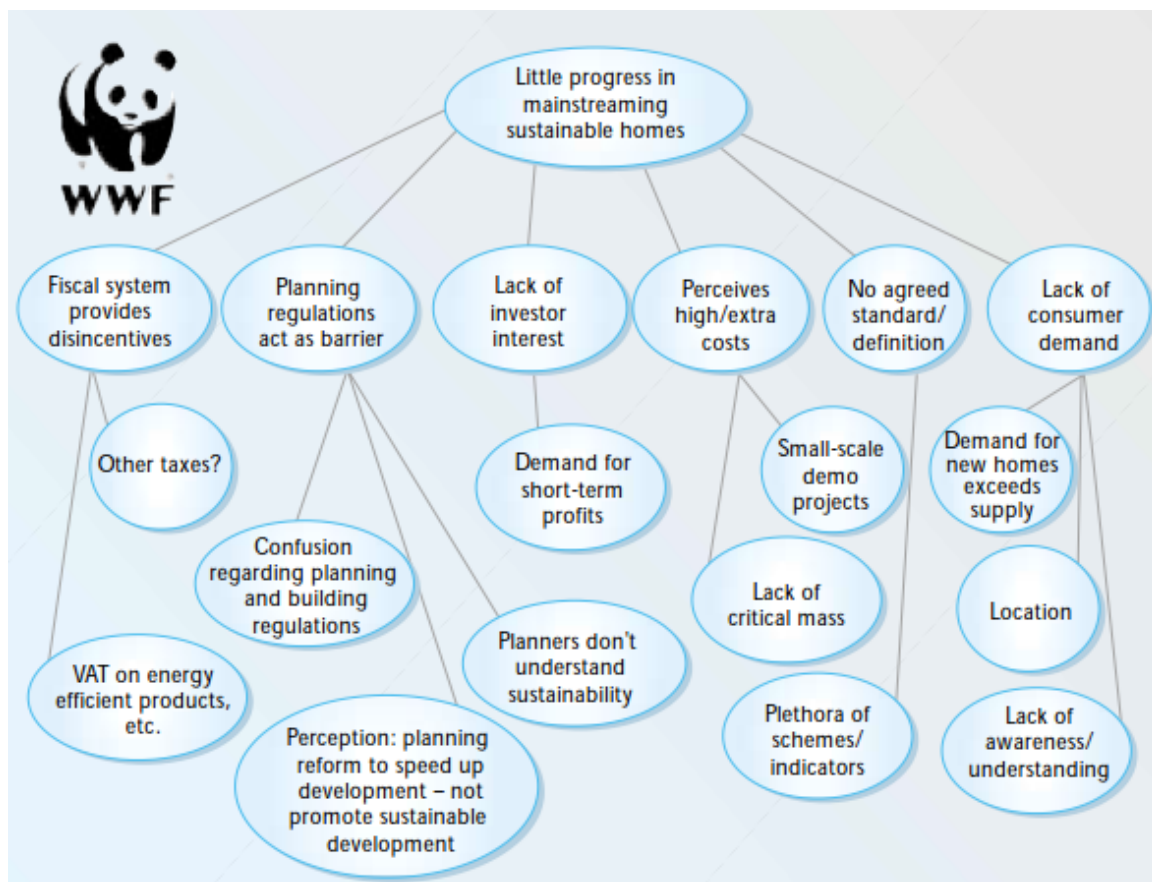
Figure 19. Barriers to sustainable building in United Kingdom. Source: UNEP Industry and Environment, 2003, Drivers for sustainable construction, p. 27.

3.2   Automobile industry

In automobile industry, there is strict regulation especially concerning environmental aspects and thus, legislation is seen as the key driver for sustainability. **Regulations** cover different issues depending on the region or country. For instance, in US there is an emphasis on conflict minerals (minerals extracted from various regions of the world in conditions of armed conflicts and human right abuses), while in Europe there is more environmental emphasis. **Customers** rank high as a driver, since customers are expecting fuel efficiency and a low level of CO_2 emissions, due to tax reasons. **Market opportunities** drive sustainability innovations, especially new technologies to minimize environmental impacts, ex. electric cars, gas buses, hydrogen motors. **Cost savings** are important in terms of reducing the environmental impacts of the construction site (water, energy, materials consumption) and the impacts of the cars during use (fuel consumption).

Below, the key drivers identified in this industry in different parts of the world are briefly introduced in order to outline some regional differences.

3.2.1   Automotive Industry Action Group (AIAG)

AIAG is a not-for-profit association of professionals in the field of automotive industry: retailers, suppliers of all sizes, automakers, manufacturers, service providers, academia, and government.

AIAG identified the following key drivers for sustainability, although these are mostly US-driven:

- governmental regulations on the use and management of chemicals in the production process (cars should be free from hazardous chemicals)
- legislation on the use of "conflict minerals" – car manufacturers have the obligation to check if minerals used in manufacturing process originated from mines under the control of armed groups in Central Africa and if so, to discontinue these sources of supply.
- expectations from customers, governments, NGOs, stockholders to lower CO_2 emissions
- expectations to have good working conditions

Source: https://www.aiag.org/corporate-responsibility

3.2.2   European automobile producers

In Europe, the main drivers were identified as:

1. Regulatory pressures at national and regional level

EU legislation regulating different aspects:

- End-of-Life Vehicles Directive (2000): 95% recovery /reuse rate, 85% recycling rate
- EU 2020 Directive
- Euro 4 or 5 emission limit

National level: ex. legislation regarding reduction of COs emissions for meeting the targets of Kyoto protocol

1. Customer demands
2. Gaining a competitive advantage or opening a new market for a new product (ex. gas buses, hydrogen motors)
3. Cost savings & reduction of resource consumption

Sources: 1. Triebswetter, U. and Wackerbauer, J. (2008), Integrated environmental product innovation and impacts on company competitiveness: a case study of the automotive industry in the region of Munich, *European Environment*, 18: 30-44, and 2. Martinuzzi, A. et al., 2011, CSR activities and impacts of the automotive sector, RIMAS Working Papers, no.3.

3.2.3   Chinese automobile producers

Main drivers for sustainability innovations (especially environmental) are:

- Regulatory pressures – the highest
- Market pressures (competition with international competitors) - high
- Pressures from customers and suppliers – not very high
- Poor quality of air in China
- Increase in material and oil consumption that makes China dependent on imports for car production

Source: Zhu, Q., Sarkis, J. and Lai, K. (2008), Green supply chain management: pressures, practices and performance within the Chinese automobile industry, *Journal of Cleaner Production*, 15: 1041-1052.

3.3   Aircraft construction

Sustainability drivers in aircraft manufacturing industry are a combination of cost efficiency and regulations:

1. Fuel cost on the raise; dependency on oil-based fuels (there is need to reduce operational costs as fuel cost amount to 20-30% of these) and changing expectations of customers (expecting lower priced trips).
2. Climate change and requirements to reduce CO_2 emissions:
   - There are emerging standards related to environmental impacts, for example United Nations' specialized agency and International Civil Aviation Organization (ICAO) has promulgated international emissions and noise standards for aircraft

- There is no regulation or standard for aircraft emissions during cruise but there is strict regulation on emission control during taking off and landing at airports throughout the world
- Governments' pressure to reduce CO2 emissions

3. Public pressure is low (due to low awareness of impacts of CO2 emissions).

Source: Lee; J. and Mo, J. (2011), Analysis of Technological Innovation and Environmental Performance Improvement in Aviation Sector, *Int. J. Environ. Res. Public Health*, 8: 3777-3795.

3.4 Vacation resorts

For vacation resorts, there is an important business case especially for environmental performance since it brings significant resource savings. A number of other drivers are also introduced below:

1. Cost savings (the strongest driver):

- There is much emphasis on eco-efficiency (reducing consumption of inputs – water, energy, waste management and recycling) as a way to reduce costs and decrease environmental impacts;
- Especially after the financial crisis of 2008-2009, one of the most important driver is reducing costs with utilities through eco-efficiency.

2. Fiscal and economic incentives (ex. tax credits, cash incentives for achieving certification, low interest loans etc.) offered by many governments, agencies and organizations around the world for environmental innovations and green buildings.

3. Regulations on various aspects related to environment, safety, employment depending on country or region.

4. Marketing, brand image as a response to (especially) younger generation, which appears to be more environmentally and socially conscious.

5. Guest experience driven by better customer demand – better indoor air quality, thermal comfort, less noisy buildings.

6. Employee retention: involvement in sustainability issues increases loyalty of employees. Employees are interested in a safe and sustainable work environment but also in the public image of their employer.

Sources: 1. Jones, P., Hillier, D. and Comfort, D, (2014), Sustainability in the global hotel industry, *International Journal of Contemporary Hospitality Management*, 26(1): 5-17, and 2. Goldstein and K.A., Primlani, R.V., 2012, Current trends and opportunities in hotel sustainability, HVS.

3.5   Other industries

Procter & Gamble "Turn to 30°" campaign is an example of business campaign undertaken in order to gain competitive advantage from sustainability.

Procter & Gamble has positioned the Ariel brand as a low-temperature wash detergent across Europe since 2003. Ariel's Coolclean technology is a formulation that performs optimally at lower wash temperatures, significantly reducing energy consumption and greenhouse gas emissions. By simply turning the wash temperature down from 40°C to 30°C, UK field studies in 2006 showed a 41% reduction in washing machine electricity use. P&G's "Turn To 30" UK marketing campaigns raised awareness about climate change, persuading consumers to adopt a more sustainable washing practice.

Benefits for consumers:
- Meet consumer cleaning expectations
- Aave consumer money by lowering electricity bills

Environmental benefit:
- Reduce domestic greenhouse gas emissions significantly

Procter & Gamble benefit: competitive advantage from positioning the company as a socially and environmentally responsible actor.

In order to be successful with mainstream consumers, it is essential to include relevant environmental benefits successfully within a brand's equity in order to create a proposition that appeals to a broad range of consumers. Successful brands must establish mainstream appeal by translating the sustainability benefit directly into a primary consumer benefit. This "benefit-led sustainability" approach overcomes one of the key limitations associated with marketing "ethical" or "green" products communicates simultaneously a performance and a sustainability message to the consumer.

Source: Procter & Gamble. Building sustainability into the heart of a brand, World Business Council for Sustainable Development, Case Study 2008.

4.   MANAGING THE SUPPLY CHAIN

Implementing sustainability in the supply chain can be a sensitive issue because it intervenes in the long-term relationships developed over many years with suppliers and may require an entire rethinking of these relationships. However, making the supply chain sustainable is an inevitable development of modern businesses. According to research in the field, sustainability implementation in business has been done in several stages, which were mostly focused on a single firm. Currently, we are living a transition from the concept of "sustainable company" towards the "extended enterprise" philosophy, which means that sustainability is expected to be designed in partnership with business partners, both upstream and downstream. Remaining competitive in the market requires a proactive attitude towards new developments, such as the extended enterprise philosophy.

The following sub-sections introduce best practices of managing the supply chain identified in the industries analysed in this report. In the aircraft construction, practices reported on the web sites or sustainability reports of companies operating in this industry are presented in general terms and do not deal much with sustainability. For this reason, we do not report in this chapter about the aircraft construction industry.

4.1   Tools to work with suppliers in implementing sustainability

Working with suppliers in implementing sustainability can be done using different tools, which are briefly introduced below.

1. **Codes of conduct** are documents specifying ethical attitudes of employees and also clarifying how a company deals with problematic aspects, such as forced and child labor or violation of human rights. The document confirms the public that a company does not tolerate such practices in its operations and works towards eliminating them from all activities.

    A company should first introduce a code of conduct for itself before working with suppliers in implementing codes of conduct for them.
2. **Certifications of activity and implementation of standards.** These are normally introduced in a company's own activity first and only after in suppliers' practices.
3. **Training sessions and virtual platforms for increasing awareness among suppliers.**
4. **Partnering with suppliers:** for example common initiatives to better control the problems at the far end of the supply chain.
5. For less significant suppliers: **"vendor rating system"** – implementing a system that assesses the sustainability performance of suppliers and selects them based on this performance.

Below, we introduce examples from various industries and their approach to implementing sustainability in the supply chain.

4.2 Construction industry

Some tools used by the construction industry to manage suppliers' chain are presented in Figure 20:

Tools	Description
Pre-qualification assessment	This includes qualitative (essay format, e.g. quality submission) and quantitative (rating of statements, e.g. capability assessment toolkit) methods. The quality submission is common within the local authority contracts, which demand written statements from contractors on a set of issues such as design, recycling initiatives, innovation in material use and other environmental issues. Very recently, the Highways Agency introduced CAT, a self-assessment tool covering such issues as internal resources, partnering, processes, people, strategy and planning, direction and leadership.
Third-party certification	This includes ISO 14001 Environmental standard. Many clients insist that their contractors and suppliers meet this standard.
Pre-qualification database	Details include contractors, suppliers and subcontractors that meet legislative requirement, high environmental management standard with proven records of technical ability and innovation. This is undertaken through questionnaires and interviews on environmental policy, awareness and achievements, and working conditions.
Continuous improvement agreement	Procurement contracts for supply chain parties to work with clients to continuously improve the environmental performance and achieving the governmental public sector agreement (PSA) are required.
Behavioural code of practice	Where appropriate, projects are registered on the considerate contractor scheme (CCS). The CCS is a voluntary initiative for better site management to reduce site noise and nuisance and waste and to improve working relationships between contractors and subcontractors.
Procurement and contract guidelines	Handbooks containing procurement procedures, environmental requirements, environmental manual containing a list of hazardous substances to be avoided, vehicle procurement specifications and so on.
Strategic alliance and partnering	Contracts are awarded to contractors on a 5-year basis through strategic alliance. Partnering between contractors and first-tier subcontractors and suppliers, where appropriate, is common.
Validation of performance	This is a crucial part of the management process. Examples of tools used for validations are reviewing questionnaires and documentation from contractors, subcontractors and suppliers, site visits, third-party audits, and measurement of contract performance using jointly agreed indicators.
Training and communication	Third party and in-house training on such issues as environmental and health and safety issues. Communication materials such as Toolbox talks, workshops, brochures, information on the internet and intranets, and newsletters are commonly used.
Collaboration with supply chain	Collaborating on R&D, development of environmentally efficient products, waste management systems, to meet environmental targets and so on. There are hosts of examples of innovation through collaboration in the area of waste management, resources use and material.
Operational integrity	Contractors are required to work toward ISO 14001 certification for their depots. Individual businesses within the group set up their own management systems to comply with the parent company's environmental requirements. Use of environmental coordinators at various levels working closely with procurement and marketing departments is required.
Purchasing specifications	For product and services this is a useful tool for influencing the supply chains. Examples of purchasing specifications involve restriction on certain environmental damaging substances, amount of recycling material use, whole-life costing outcome and so on.

Table 4. Inventory of tools and techniques within case study organisations

Figure 20. Tools to manage sustainability in the supply chain of construction industry. Source: Adetunji, I., Price, A.D.F. and Fleming, P., 2008. Achieving sustainability in the construction supply chain. Proceedings of the ICE Engineering Sustainability, 161 (3), pp. 161–17.

4.3   Automobile industry

4.3.1   Automotive Industry Action Group

Automotive Industry Action Group is an international not-for-profit association representing various stakeholders in the automotive industry. In order to make the supply chain more sustainable the association has adopted two measures:

1. A software (iPoint) has been developed at the level of the industry for the management of suppliers and materials used in the production process. The software integrates heterogeneous data sources, formats, standards, systems, platforms, services, stakeholders at the company level. iPoint's integration programs support the company-internal and cross-company exchange of data and information. The software help master the different process steps: communication and data collection, data preparation/analysis/evaluation as well as the corresponding functionalities for reporting to stakeholders and relevant regulatory authorities. It also serves the communication between manufacturers and suppliers. The framework of the software is introduced in Figure 21 below.

Figure 21. Software framework for managing the supply chain in the automotive industry. Source: http://www.ipoint-systems.com/en/.

2. The association has introduced the so-called AIAG Supply Chain Management initiatives at the industry level. They include guidelines, training and education and e-learning tools. For example, the 2016 Supply Chain Summit was organized for AIAG members (see https://www.aiag.org/events/event-list/event-details?EventCode=E16SUPPLY).

4.3.2 Volkswagen

In 2003-2004, Volkswagen was involved in a joint project with an academic institution (the University of Oldenburg) with the purpose of making its supply chain sustainable. The project has produced a number of tools that Volkswagen implemented in its supply chain. These tools are presented below (see Table 1 for an overview).

1. Early detection of supply related risks ("environmental and social radar")

This tool is intended to make it possible for Volkswagen to identify risks before they can produce effects on the company. It functions as follows:

- It collects external information relevant to automotive industry using (1) internet inquiries; (2) expert panels; (3) media and specialized journalism screening; (4) contact to watchdog organisations; (5) noting legal drafts; and (6) regular dialogues with NGOs;
- Risks are identified based on the information collected;
- Screened risks are passed on to suppliers to comply with.

2. Suppliers' selection

Usually suppliers are selected on criteria such as products' costs or quality. This tool introduced social and environmental performance as part of the criteria for selecting suppliers. Hence, Volkswagen implemented a "supplier rating system", consisting in having social and environmental criteria among other criteria used for selecting suppliers. In some cases, suppliers' selection is based on the best social and environmental performance of products/services delivered to Volkswagen. If suppliers are in monopoly position, then the solution is to work with suppliers in implementing sustainability targets. This consists in setting targets to achieve, steps taken to achieve targets, setting timeline to achieve targets and checking results.

3. Catalogue of sustainability requirements

- It is a catalogue that specifies sustainability requirements. It was created by the company and passed on to suppliers to accept.
- Catalogue requirements are based on international standards: ISO 14001 for the environmental dimension; SA 8000, AA 1000 for the social dimension.

4. Monitoring suppliers

- Regular inspections or visits to production sites of suppliers are planned;
- Volkswagen has made a database with the environmental and social condition of its major suppliers, which is continuously monitored.

5. Training suppliers

- An online supplier platform is available to suppliers. This platform contains information related to sustainability and technical support is provided to suppliers.
- Seminar-type of training is organized regularly for suppliers.

Table 1. Changes adopted by Volkswagen to implement sustainability in the supply chain. Source: Koplin, J., Seuring, S., Mesterharm, M. (2007), Incorporating sustainability into supply management in the automotive industry: the case of the Volkswagen AG, Journal of Cleaner Production, 15: 1053-1062.

Table 1

Overview of necessary changes for the Volkswagen AG conformed when implementing sustainability into their supply policies and supply structures

Level	As-is analysis	Sustainable supply management concept
Normative Requirements for Sustainable Supply Management	Product based environmental supplier requirements	Product and production based environmental and social supplier requirements
	ISO 9000 as prerequisite	ISO 9000 und 14001 as prerequisite
Early Detection of Supply Related Risks	International environmental issue-screening	International environmental and social issue-screening with additional focus on suppliers
	No reporting requirement for divisions	Reporting obligations for all divisions to a central department
	No co-operation between divisions, no expert-team	Expert-team (human resources, environment protection, procurement, quality assurance, occupational safety) to evaluate supplier information
Operational Implementation of Supply Processes	Supplier information for quality performance	Explanations for a self check via supplier platform
	No evaluation and classification of suppliers	Environmental and social supplier evaluation related to the self check
	Ratings from quality assurance, F&E and logistics for the sourcing decision	Inclusion of environmental/social information in the sourcing process (no specific "sustainability" ratings)
Monitoring and Supplier Development	Quality audit with some environmental questions	Added case oriented revision of environmental and social standards
	No supplier information about environmental and social aspects	Provision of information on the supplier platform via Internet; Duty for supplier qualification
	Support to suppliers with environmental questions	Support to suppliers with environmental and social problems

The conceptual framework for integrating sustainability in the supply chain in the case of Volkswagen is introduced in Figure 22.
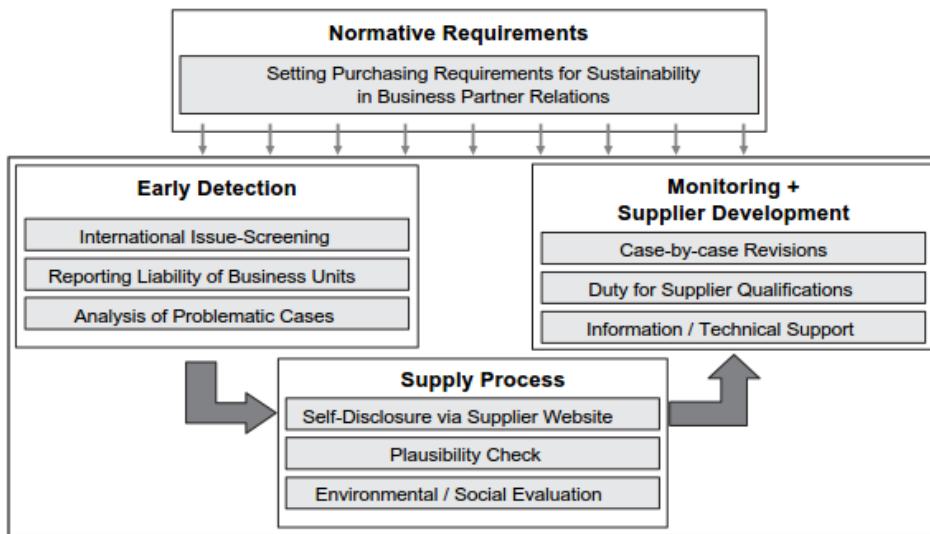
Figure 22. Conceptual framework for integrating sustainability into supply chain at Volkswagen. Source: Koplin, J., Seuring, S., Mesterharm, M. (2007), Incorporating sustainability into supply management in the automotive industry: the case of the Volkswagen AG, Journal of Cleaner Production, 15: 1053-1062.

4.3.3 Ford

The supply chain in automotive industry is complex and includes multiple tiers of suppliers in a diversity of countries, which makes it difficult to control. Because of this complexity, Ford adopted a multi-directional approach in managing the supply chain, which combines various actions taken in different stages, as follows:

1. Adoption of supply chain policy and Code of Conduct for employees and manufacturing facilities inside Ford (which includes issues related to working conditions, human rights, child and forced labour etc.).

2. Making a supply chain profile, which maps the suppliers and identifies risky countries where suppliers are located

3. Working with suppliers in multiple ways (with a focus on suppliers in risky areas):

   - Training sessions

   - Gradually adopting Code of Conduct by suppliers

   - Working with suppliers to extend the adoption of Code of Conduct by their own suppliers

   - Assessing suppliers: third-party audits of suppliers in the first tier. The audits consist of a detailed questionnaire, a document review, factory visits, and management and employee interviews, and are conducted by external, qualified social auditors. Audits focus on: emergency preparedness and response; working hours; and occupational safety.

4. Working with other automakers to identify and reach suppliers in the industry (a working group was initiated within the Automotive Industry Action Group).

5. Rewarding compliant suppliers.

The supply chain profile of Ford can be seen in Figure 23, while Figures 24, 25 and 26 provide more details on how Ford work with its suppliers in order to make the supply chain more sustainable.

Supply Chain Profile

Production

Products that become part of the vehicle

60+
Countries in which suppliers are located

36
Emerging markets in which suppliers are located

21
Countries considered to have risks of substandard working conditions. These countries were identified as higher risk based on consultation with nongovernmental organizations, other companies with human rights experience, local Ford operations and various media and government reports

65
Ford manufacturing sites

1,100+
Supplier companies (Tier 1)

4,100+
Supplier manufacturing sites (Tier 1)

130,000
Parts currently being manufactured

500
Production commodities to manage

Figure 23. Ford supply chain profile. Source: Sustainability Report 2013/2014.

We encourage our ABF suppliers to develop a shared commitment to our sustainability goals and effective systems for managing sustainability issues through a three-phase developmental process:

(1) Verify Supplier Code of Conduct

We ensure that our ABF suppliers have, or develop, a code of conduct aligned with our Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility.

(2) Training and Compliance

We provide training as needed to our ABF suppliers and ask them to conduct their own internal trainings to ensure that their employees understand their code of conduct. We also ask suppliers to develop a rigorous compliance process supporting their code.

(3) Extending Expectations to Their Supply Chain

Finally, we ask our ABF suppliers to extend our shared sustainability goals and expectations to their own suppliers, expanding the impact of our sustainability goals throughout the multiple tiers of our supply chain.

Figure 24. How Ford works with suppliers.

Goal: Encourage our key production suppliers to introduce codes of conduct aligned with international standards and Ford's Code of Human Rights, Basic Working Conditions and Corporate Responsibility; develop robust management and compliance systems to support their codes; and extend these expectations to their own suppliers.

Approximately 80% of our production Aligned Business Framework (ABF) suppliers have demonstrated that they have codes of conduct in place that are aligned with international standards. Approximately 45% of our ABF production suppliers have demonstrated that they have met all three Ford milestones.

Goal: Help suppliers build their capacity to manage supply chain sustainability issues through factory-level and management training on working conditions, human rights, ethical business practices and environmental responsibility; and require participating suppliers to cascade training information to their own employees and suppliers.

In 2013, we trained more than 230 Ford suppliers in Brazil, Mexico, Turkey, Romania and South Africa.[1] The global total of Ford suppliers trained since program inception is nearly 2,100.[2]

Goal: Assess the carbon footprint of Ford's supply chain to inform the development of a broad-based carbon management approach for our supply chain.

We surveyed 145 suppliers in 2013 (up from 135 in 2012, 128 in 2011 and 35 in 2010) regarding greenhouse gas emissions, and achieved an 89% voluntary response rate.

Goal: Source at least 10% of U.S. purchases from minority- and women-owned businesses annually.

We purchased $6.5 billion in goods and services from approximately 250 minority-owned suppliers and $1.8 billion in goods and services from more than 150 women-owned businesses, our fourth consecutive year of improvement.

Figure 25. Implementing different goals in the supply chain of Ford.

Supplier Corporate Responsibility Recognition of Achievement Award

For several years, Ford has recognized supplier companies that demonstrate leadership in environmental and social performance with a corporate responsibility award. Suppliers must meet several criteria, including ISO 14001 certification at all manufacturing sites, an operational code of conduct aligned with international standards, an exemplary material management reporting record and demonstration of overall sustainability leadership by incorporating environmental and social considerations into their business.

In May 2014, Ford selected two winners for the 2013 Corporate Responsibility Recognition of Achievement Award: Laird Technologies headquartered in St. Louis, Missouri and Maersk Line headquartered in Copenhagen, Denmark.

Figure 26. Motivating suppliers: awards for good practices. Source: Sustainability Report 2013/2014.

4.3.4   Chinese automobile

To manage supply chain, monitoring of suppliers is performed also in the Chinese automobile industry. First, environmental information is collected from suppliers in order to evaluate their environmental performance. Second, a database of environmental situation is maintained for main components of the product.

Source: Zhu, Q., Sarkis, J. and Lai, K. (2008), Green supply chain management: pressures, practices and performance within the Chinese automobile industry, Journal of Cleaner Production, 15: 1041-1052.

4.4   Vacation resorts

While many tools are used by different vacation resorts, a comprehensive framework to manage sustainably the supply chain was suggested in academic literature by Schwartz et al. (2008) and is presented in Table 2 below.

Supply chain management framework	Small tour operators	Large and medium tour operators	
	Implementation	Initial implementation	Full implementation
Step 1. Engage your business	Appointment of a sustainable tourism representative, create goals, promote dialogue on the issues	Appointment of a sustainable tourism representative and management team, create goals, communicate business benefits to employees, directors and shareholders	Training for the sustainable tourism management team, with this cascaded down
Step 2. Create a policy for SSCM	Written SSCM policy document	Written SSCM policy document	Refined SSCM policy document
Step 3. Integrate your SSCM policy into your business	Identification of how SSCM procedures can be integrated into job roles	Review of job/role specifications, role profiles and working procedures	Investment in a sustainability management system
Step 4. Conduct a baseline assessment of suppliers	Evidence of use of assessment system (including informal systems) for suppliers	Use of formal assessment system (checklists, etc.) for some suppliers/in selected pilot destinations	Use of formal assessment system (checklists, etc.) for all suppliers
Step 5. Prepare and implement an action plan	Evidence of actions to implement the company's SSCM policy (including relevant internal management, staff training and customer communications)	Written action plan with clearly identified priorities for implementation of the company's SSCM policy (including relevant internal management, staff training and customer communications)	Refined action plan with clearly identified priorities for implementation of the company's SSCM policy (including relevant internal management, staff training and customer communications)
Step 6. Monitor and report on progress made	Evidence of monitoring of progress (including use of informal systems and feedback from tour leaders, etc.)	Use of formal monitoring system (checklists, etc.) for some suppliers/in selected pilot destinations	Use of formal monitoring and reporting system (checklists, etc.) for all suppliers, combined with some independent review

Table 2. Sustainable supply chain management framework for tourism industry. Source: Schwartz, K., Tapper, R. and Font, X. (2008), A sustainable supply chain management framework for tour operators, Journal of Sustainable Tourism, 16(3): 298-314.

4.5 Case studies from other industries – how different companies manage their suppliers

4.5.1 Kinnarps

Kinnarps is an office furnishing company and Figure 27 introduces how it deals with its supply chain in terms of sustainability.

1

WHAT ARE YOUR MOST IMPORTANT QUESTIONS?

Begin by identifying the questions which are important in your own sustainability work. Which changes would have the greatest effect? It's hard to go from zero to a hundred. It's easier to achieve results if you choose to focus on a few key questions. Better to ask a few specific questions that you really understand, make sure that you ask for documented evidence and follow up.

2

CHOOSE FSC®

Forests have a decisive role to play if we are to achieve the global objective in the climate agreement and the UN's sustainable development goals. So set requirements for responsibly sourced raw wood. The FSC® label is a third-party certification which guarantees that raw wood has been inspected by an independent third party. Require the supplier to have FSC Chain of Custody traceability certification, which means having a system for handling and separating labelled raw materials. Traceability certification does not mean, however, that all wood is FSC-labelled. We therefore want to encourage the active choice of FSC-labelled products. Then you can be entirely sure that all wood is from responsibly cultivated forests.

3

DEMAND SOCIAL RESPONSIBILITY IN THE SUPPLIER CHAIN

Require the supplier to set social requirements on their own supplier chain. And that the supplier has a Code of Conduct for suppliers. Make sure the code is based on international principles such as the UN's Global Compact, and that requirements concerning the working environment are included. Only having a Code of Conduct is not enough – also require the supplier to have a system for regular assessments of their supplier chain and conducting a risk assessment on it. Ask questions and request information on working methods, risk assessment or the results of audits. We always welcome on-site follow-ups of audits. The Swedish Möbelfakta labelling sets requirements for standard setting, risk assessment and follow-up of social responsibility in the supplier chain. It is therefore evidence that the supplier works actively with social responsibility.

4

DEMAND PURE MATERIALS!

We are surrounded by masses of hazardous chemicals emitted by various products – but how do we know that something is dangerous if it's invisible? History shows that we cannot be careful enough. Make it clear that products must not contain materials or substances which can have a negative effect on your employees' health. By excluding flame retardants, formaldehydes and solvents, you will have a big effect. Set requirements for environmental standards which include requirements for chemical content (Möbelfakta and NF Environnement).

5

FOLLOW EU RECOMMENDATIONS

The EU has developed a new tool for the public procurement of office furniture. The proposal will come into effect during 2016 and is a good starting point when you want to set requirements for your suppliers. What's interesting is that the proposal now also gives guidance for the refurbishment and reuse of existing furniture as well as the purchase of new furniture. This is so clear, in fact, that the user of the tool, in otherwords the procuring authority, is encouraged to consider the reuse of old furniture before making new purchases. So require the supplier to offer a system for handling reuse and refurbishment.

A. The Supplier Code of Conduct is applicable to all Kinnarps operations and to any part that contributes to Kinnarps products, services or business activities from the supply chain. Kinnarps therefore requires suppliers to comply with the Kinnarps Supplier Code of Conduct – even if the Code stipulates a higher standard than is required by law.

B. Acceptance and compliance of the requirements in the Supplier Code of Conduct shall be effective immediately upon a reached agreement.

C. Evidence and verification of compliance shall be presented upon request. Compliance is verified and maintained through audits (second or third party) or through other appropriated verification.

D. The Supplier is requested to accept responsibility to ensure that its workers and subcontractors are informed and in compliance with the Kinnarps Supplier Code of Conduct.

E. Identified and/or reported violation of the Code is properly investigated. Violations can lead up to and including termination of contract.

Figure 27. Sustainable supply chain at Kinnarps. Source: http://www.kinnarps.com/en/International/InteriorSolutions/Sustainability

4.5.2 Paulig

Paulig is a coffee producer company and Figure 28 presets the system in use in this company for tracking the origin of the raw materials provided by the suppliers.

IMPROVING TRACEABILITY BENEFITS THE ENTIRE COFFEE CHAIN

12.5.2014

Traceability is a part of the coffee chain's management of risk and quality. It can help to obtain information on both the quality of the raw materials and such quality-related issues as ethics in the procurement chain. The better the coffee's origin is known, the easier it is to secure the smooth running of the delivery and production chains and to solve problems arising in them.

Because of the massive scale of the coffee trade and the predominantly small size of plantations, tracing green coffee back to the plantation is a challenge. Tracing all coffee is still a long way off, because there are no established, global methods available. There are also big differences between the coffee producing countries. At the same time, consumers' interest in the origins and responsible production of coffee is constantly growing.

Paulig is working systematically on the traceability of all the coffee it buys in cooperation with its trading partners. In 2011, the coffee bought by Paulig could be traced 100% to the export companies in the countries of origin, 88% to the cooperatives and processing plants, and 47% to the coffee plantation or cooperative representing plantations.

Research on traceability continues in 2013. Research is performed in the form of spot checks, but it covers a considerable portion of green coffee purchases. Targets are set for traceability, and traceability is monitored by Paulig for individual countries. For the targets to be realistic, they figure in the countries' differing stages of development.

Collaboration between Paulig and its partners is long-sighted. A stable chain of partners is also important in promoting practical responsibility work. A large percentage of coffee purchases is made direct from the countries of origin, and the specialists in charge of Paulig's procurement visit these countries regularly. Visits to the coffee plantations and processing plants are an important part of the collaboration and they provide information on operational requirements and operating methods in the countries of origin. This information is utilised in assessing potential output, quality, risks and responsibility. The Paulig Group Code of Conduct for Suppliers (pdf) specifies the principles for responsible operation, and all raw material suppliers are required to comply with these principles in their own operations.

In 2014, procurement focused particularly on responsibility themes by preparing for the implementation of the Sustainable Coffee programme and by participating in the Paulig Group's common Responsible Sourcing project. This was the framework for creating a common procedure for the entire Paulig Group as well as tools to enable the recognition of the social and environmental risks of our supply chain and to tackle problems. The project included, for example, a preliminary risk survey of suppliers and an update to the Paulig Group Code of Conduct for Suppliers. All high-risk suppliers next receive a questionnaire to determine the consistency of the suppliers' responsibility procedures, both within the company and in the sub-procurement chain. The responses are used to determine the necessary follow-up procedures, which include an in-depth questionnaire and various levels of auditing.

JÄLJITÄ KAHVISI

Valitse ensin tuote. Syötä sitten kahvipaketin takaa löytyvä valmistuspäivämäärä alla olevaan jäljittimeen, niin pääset tutustumaan kahvitiloihin, joilla juuri omaan kahvipakettiisi paahdetut kahvipavut on viljelty. Syötä päivämäärä muodossa pp.kk.vvvv eli esimerkiksi 09.05.2016.

Valitse kahvi ▾

LÄHETÄ

Figure 28. Tracking raw materials in the supply chain of Paulig. Source: http://www.paulig.com/en/responsibility/reporting/corporate-responsibility-report-2014/a-reliable-network-of-partners-builds

5. MEASURING AND COMMUNICATING SUSTAINABILITY

Communication of sustainability varies greatly from a company to another. There are some common features that are shared by companies in the same industry in the sense that certain issues are highly relevant for an industry and need to be measured and communicated by all companies in the sector. For example, aviation industry is highly concerned with CO_2 emissions. In this report, the focus will be on commonalities for industries that are reviewed here.

Additionally, there are certain aspects that are common to companies in all industries and which a company can choose to report or not and it can do it in various degrees. Such issues are for instance: engagement with stakeholders, employees' wellbeing and satisfaction, customer satisfaction, contribution to local community etc. These aspects are excluded from the general characterization of an industry but are included in individual cases of companies.

5.1 Identifying relevant sustainability indicators

Criteria for selection of sustainability indicators

Relevant indicators to report on can be identified in several different ways. The table 3 below introduces criteria that can be used to assist in defining what is relevant to measure and report for a company:

Table 3. Criteria to consider in the selection of sustainability indicators to report about to the stakeholders. Inspired by: Moldan, B.; Janousková, S. and Hák, T. (2012), How to understand and measure environmental sustainability: Indicators and targets, Ecological Indicators, 17: 4-13.

Criteria for indicators' selection	Details
Reporting standards (ex. Global Reporting Initiative)	Based on indicators suggested by reporting standards.
Stakeholders' expectations	Dialogue with stakeholders is carried out and major concerns are identified; indicators are developed to measure these concerns.
Official policy targets	1. EU 20-20-20 target (20% reduction in greenhouse gases, 20% share of renewable energy resources, 20% increase in energy efficiency) 2. Millennium Development Goals 3. EU Sustainable Development Strategy 2015

Major impacts	Ex. aviation industry: eco-efficiency, especially fuels consumption and CO_2 emissions
Focused selection of indicators	Selection of some unique indicators, which underlie the specificity of the product/service. ex. large sustainable cities are not known for a comprehensive approach to sustainability but rather for something unique, ex.: public transportation system (Bogota, Colombia), green energy used inside the city (Munich), CO_2 measurement & planning (Copenhagen) etc.

Below, some relevant aspects for the industries analysed here in terms of reporting and communication.

5.2   Construction industry

Construction industry is communicating sustainability in different ways. The focus is on **operational impacts** during the construction process and on the performance of buildings in the post-construction phase. Issues relating to environmental performance, especially eco-efficiency are highly relevant for the construction industry. These refer to water and energy consumption, waste and recycling, and materials used (safety, origins of materials, quality). Usually, reducing their consumption makes good business sense for the construction company and for customers and end users also. For this reason, high attention is paid to eco-efficiency aspects. CO_2 emissions and impacts on biodiversity due to reshaping of local landscape are also important for the industry.

In terms of **social issues**, employees' safety during the construction process is one of the key issues due to high incidence of injuries in the industry. Grey work is another important aspect because construction companies frequently use grey labor in their operations. Supply chain and the origin of raw materials used in construction is another issue that responsible companies try to take into account. From a consumer perspective, the building is important in terms of healthy and safe environment to live and work in.

In general, the construction sector is not well developed in terms of sustainability practices. However, there are several worldwide companies that pioneered in terms of sustainability and actively communicate their sustainability actions. To make their practices credible to the public, these companies have used recognized **international sustainability certifications**, such as:

1. Green Seal
2. US Green Building Council's LEED (Leadership in Energy and Environmental Design) – used especially in construction industry and hotel industry
3. "GreenLeaders" from TripAdvisor – the world largest travel site

Below some examples of sustainability topics and forms of communication in the construction industry.

5.2.1   Skanska

Skanska appears to select its indicators on the criteria of company's major impacts on environment and society (see Table 4). Eco-efficiency indicators play a key role, especially in assessing the environmental performance of the construction site and of buildings in their operational lifetime. Skanska reports also on social issues, especially safety and engagement with local communities (ex. employing local people, disadvantaged population).

Table 4. Sustainability reporting at Skanska.

Forms of reporting	Topics & indicators	Attractive forms of reporting
Website section on sustainability	**Focus areas**: 1. Safety - indicators: lost time accident rate, Executive Site Safety Visits; safety awards 2. Ethics: ethics vision; activities in ethics 3. Green: -policy & strategy - ISO 14001 standard - energy: efficiency; substitutions of fossil fuel with renewable energy - CO2: carbon footprint; green strategic indicator; carbon initiatives - materials: resource efficiency, hazardous materials, sustainability of materials, local suppliers - water: efficiency, recycle & reuse, substitutions of potable water for alternatives - local impacts 4. Community investment 5. Diversity & inclusion Sustainability awards Sustainability case studies Stakeholders	Case studies (story of buildings - 4-5 pages length) and numerous practical examples (see section 6.4.1) Skanska color palette (see section 6.4.2)
Annual sustainability report (2015)	The same focus areas as on the web.	
Sustainability related publications	- Green Urban Development Reports (material, water, carbon) - Green Thinking book	

5.2.2   Senaatti

Senaatti reports about sustainability on its web pages. It also has a dedicated section inside the annual report, which is available in interactive form in Senaatti's web pages.

Indicators that are used appeared to be selected based on major impacts of the construction work (as introduced at the beginning of 4.2). The company has also used GRI (Global Reporting Initiative – a widely known international reporting framework), which means that some indicators have been adopted from GRI. Table 5 give information on reporting at Senaatti.

Table 5. Sustainability reporting at Senaatti.

Forms of reporting	Topics & indicators	Attractive forms of reporting
Website section on sustainability	Focus areas: Ethical principles Social responsibility Environmental resp. Economic resp. (brief narrative sections)	
Web-browsed sustainability report (as part of annual report) (2015)	Focus areas: 1. Environment: energy, water, CO2, contaminated areas, waste, biodiversity, impacts from construction work 2. Työympäristö: aesthetics, safety, indoor air 3. Vastuulliset hankinnat 4. Henkilöstö: equality, employees distribution on age, gender etc.	Use of color coding (see section 6.4.2)

5.3   Automobile industry

The automobile industry is communicating on the following sustainability aspects.

1. **Environmental issues** are really important, especially when it comes to emissions and fuel efficiency of the final product. Operational environmental performance of the manufacturing sites is communicated in terms of water, energy and materials consumption, and waste and recycling. Environmental performance of suppliers is also monitored and communicated. Related to environmental performance, technological innovation is really important and automobile companies are reporting on

their efforts to innovate products in order to reduce CO2 emissions and make fuel consumption more efficient.

2. **Social issues**: safety and quality of vehicles are reported with priority but also safety during manufacturing process is communicated. Labor in supply chain is another important aspect due to a diverse and complex network of suppliers, whose activities are difficult to control.

Ford

Ford reports on a variety of sustainability issues, some of which relate to specificity of the automobile industry (fuel efficiency, CO2 emissions). Ford follows GRI reporting framework and therefore, many indicators are pre-defined by this standard. Below, in Table 6, some aspects and indicators used by Ford in its reporting.

Table 6. Sustainability reporting at Ford.

Forms of reporting	Topics & indicators	Selection of indicators
Sustainability report 2014	1. Code of conduct, human rights and corruption	GRI Probably based on major impacts
	2. Employees: satisfaction, training, turnover, fair compensation, diversity, work-life balance	
	3. Occupational health & safety: H&S standards, safety program, initiatives of prevention	
	4. Stakeholder engagement: materiality, relevant topics for stakeholders	
	5. Customers: vehicle quality & safety	
	6. Sustainability in dealer and service network. training for the network; reducing environmental impacts of the network	
	7. Suppliers: supply chain standards; supplier assessment process; labor practices	
	8. Trade unions	
	9. Communities	
	10. Product innovation	

5.4 Aircraft construction

Aircraft construction industry is largely concerned with **operational impacts** of their products and among these, the specific focus is on emissions into air, since the industry is considered to be have an impact on climate change. Thus, environmental indicators are especially relevant but the industry also reports on **social aspects**, such as safety of their products. Below, some examples of how specific companies communicate sustainability.

5.4.1 Airbus

Airbus reports on environmental performance of their aircrafts **during flights**, but also on environmental impacts **during the construction process**. Linked with environmental performance, Airbus reports on technological innovation, since this is essential for reducing the amount of emissions.

Some examples of indicators used are reported in Table 7.

Table 7. Sustainability indicators used in Airbus reporting.

Forms of reporting	Topics & indicators	Selection of indicators
Website section on CSR	KPIs: 1. Environmental (cumulated for all production sites): energy, air emissions (CO2, VOC, NOx, SOc), waster, waste 2. Social: workforce; full time & part time employees; employees by age, gender. 3. GRI indicators	Probably based on major impacts of the company & GRI Part of KPIs is externally audited. Most production sites have ISO 14001 or EMAS certification

Picture 29 gives several examples of how operational performance at construction sites is reported at Airbus.

ENERGY CONSUMPTION*

Evolution of energy consumption – Airbus European sites
Revenue-based energy consumption decreased by 45% between 2006 and 2014

— The Nantes plant in France has set up a heat recovery wheel for the Nepal paint booth. A heat recovery wheel is a rotary heat exchanger. It recovers more than 60% of the energy used to condition a paint booth.
Savings: 56% of the annual consumption of gas and around 185 tonnes of CO_2 emissions.

— The integration of the cold water production from 2B stage phase into centralised control and expand the centralisation to the whole east area of Illescas' plant in Spain. The central cooling power installation was optimised without increasing the number of cooling machines.
Savings: 2,503 MWh/year and 876 tonnes CO_2/year.

* This figure does not include consumption related to mobile sources.

CO_2 EMISSIONS*

Evolution of CO_2 emissions – Airbus European sites
Revenue-based CO_2 emissions decreased by 51% between 2006 and 2014
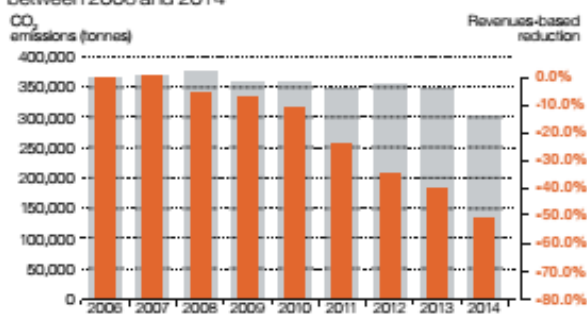
— Installation of a 12 MW biomass boiler as a source of renewable energy in Toulouse, France. By burning woodchips sourced from nearby certified forests, the boiler provides enough low-carbon energy for the new A350 XWB Final Assembly Line.
Savings: 52,000 MWh of energy produced and 12,000 tonnes of CO_2 emissions avoided every year.

* This figure does not include consumption related to mobile sources, fugitive sources and processes on site.

WATER CONSUMPTION

Evolution of water consumption – Airbus European sites
Revenue-based water consumption* decreased by 52% between 2006 and 2014

— Fix-installed water leakage detection equipment in all German sites.
Savings: 10,200 m³ potable water and 4,500 m³ waste water per year.

— Substitution of obsolete autoclave water pumps with refrigeration system by loss water in Illescas, Spain. The new pumps are energetically more efficient than the current ones due to frequency converter, achieving additional energy savings.
Savings: 10,000 m³ per year (approximately 10% of plant consumption)

* Blue5 scope: does not include the volume of water that goes back to the same natural environment without any external treatment.

Figure 29: Reporting on operational performance at Airbus. Source: Airbus 2014 Corporate Responsibility and Sustainability Report, p. 34.

There are several **attractive forms of reporting** at Airbus, which are introduced below.

1. **Target-oriented reporting** refers to setting certain sustainability targets and reporting the progress towards achieving them (see Figure 30).

Figure 30. Target-oriented reporting at Airbus. Source: Airbus 2014 Corporate Responsibility and Sustainability Report, p. 25.

2. Reporting, in a visual form, key indicator(s) for the industry and how a specific product performs in this respect (here the case of fuel efficiency, noise and emissions) – see Figure 31 below.

Figure 31. Visual form of reporting sustainability indicators at Airbus. Source: Airbus 2014 Corporate Responsibility and Sustainability Report, p. 26)

5.4.2 Boeing

Boeing reports sustainability on its webpage and opted to have separate reports covering environmental issues and citizenship (this one covers mostly issues related to employee programs, training and contribution to community).

The environmental report discusses similar issues as in Airbus case but following a structured approach along the lifecycle of the manufacturing and use processes:

- Design of products in a way that pays attention to environmental sustainability. Here technological innovation in order to reduce environmental impacts & negative effects of materials used in aircraft construction take a large space
- Operational aspects of environmental performance at Boeing facilities, using indicators such as greenhouse gas emissions, water consumption, solid waste, hazardous waste, recycling.
- Use of products: environmental performance of aircrafts: fuel efficiency, CO_2 emissions, biofuel
- The end of product lifecycle: reuse and recycle of aircraft components; rehabilitation work for contaminated sites

There are **attractive forms of reporting** at Boeing also, as exemplified below.

1. Reporting, in a visual form, key indicator(s) for the industry and how a specific product performs in this respect (here the case of CO_2 emissions) – see Figure 32.

Figure 32. Visual form of reporting key indicators at Boeing. Source: Boeing 2015 environmental report, p. 19.

5.5   Vacation resorts

The following indicators are frequently used to reporting sustainability performance of the hotel industry:

1. Eco-efficiency indicators related to consumption of water, energy, recycling and waste management
2. Employee issues: diversity and equality of opportunity, employees' work/life balance, training and development, human rights (given problems with grey employment and low payment in the sector)
3. Health, safety and security of customers – indicators of customer feedback and satisfaction
4. Working with local community: charity and donations for helping poor communities

Source: Jones, P., Hillier, D. and Comfort, D, (2014), Sustainability in the global hotel industry, *International Journal of Contemporary Hospitality Management*, 26(1): 5-17 – based on an examination of sustainability reporting of top leaders in hotel industry.

Below some examples from companies in the tourism field.

5.5.1   TUI Group

TUI uses mainly an operational approach to measuring and reporting sustainability. In its latest sustainability strategy, TUI mapped the main activities in which it is involved and the main operational aspects linked to sustainability, for example reducing CO2 emissions from flights, greener hotels, more efficient cruises (see Figure 33 and 34).
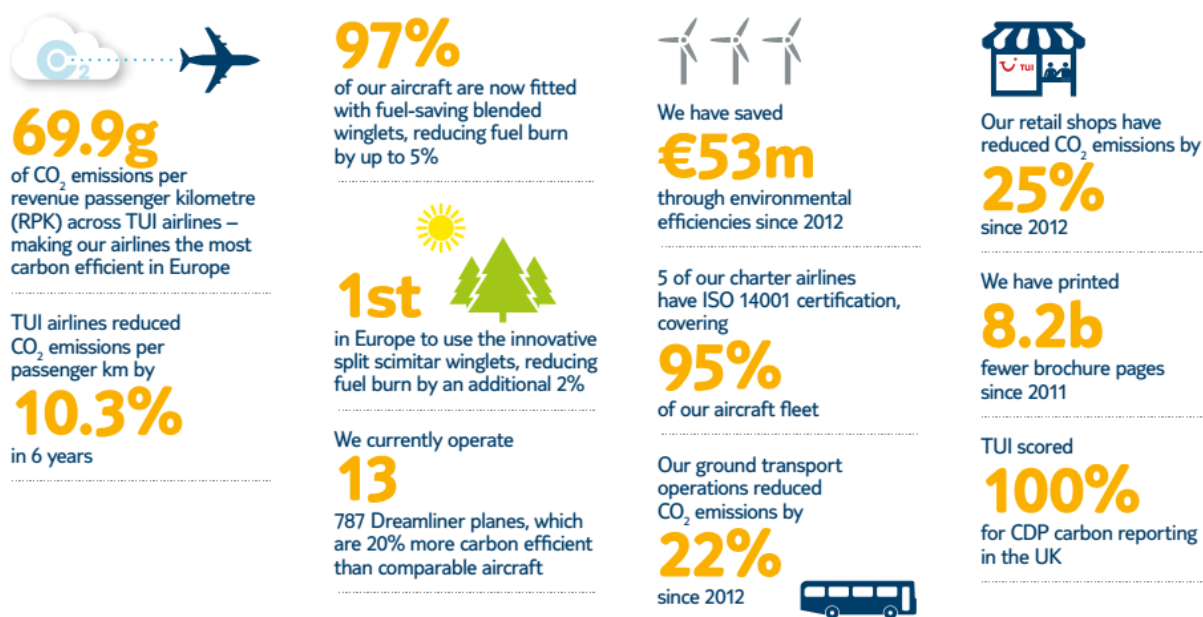

69.9g of CO_2 emissions per revenue passenger kilometre (RPK) across TUI airlines – making our airlines the most carbon efficient in Europe

TUI airlines reduced CO_2 emissions per passenger km by **10.3%** in 6 years

97% of our aircraft are now fitted with fuel-saving blended winglets, reducing fuel burn by up to 5%

1st in Europe to use the innovative split scimitar winglets, reducing fuel burn by an additional 2%

We currently operate **13** 787 Dreamliner planes, which are 20% more carbon efficient than comparable aircraft

We have saved **€53m** through environmental efficiencies since 2012

5 of our charter airlines have ISO 14001 certification, covering **95%** of our aircraft fleet

Our ground transport operations reduced CO_2 emissions by **22%** since 2012

Our retail shops have reduced CO_2 emissions by **25%** since 2012

We have printed **8.2b** fewer brochure pages since 2011

TUI scored **100%** for CDP carbon reporting in the UK

Figure 33. Reporting operational performance at TUI Group. Source: Sustainable Holidays Report 2014, p. 16.

Figure 34. Reporting sustainability at TUI Group. Source: Sustainability strategy 2015-2020, TUI Group, p. 7.

5.5.2 Suncadia vacation resort

Suncadia vacation resort is a spa resort in the mountains in North West of USA. Some of the indicators used in sustainability reporting are introduced in Table 8.

Table 8. Sustainability reporting at Suncadia vacation resort. Source: http://www.suncadia-aresort.com/about/environment-friendly-resort.

Forms of reporting	Topics & indicators	Selection of indicators
Website section on sustainability	1. Awards received on environmental performance (ex. Build Green Community) 2. Land management (restauration work on damaged sites, conservation, open space) 3. Buildings design and construction (use of *Build Green* rating system – 1 to 5 starts). Environmental indicators not provided but actions taken towards usual environmental efficiency explained. 4. Environmental initiatives: Destination Earth® Initiative	no indicators

6.   BUILDING COMPETITIVE EDGE

*"At present, the construction industry seems unaware of its potential
to reshape demand through product redesign."*
(UNEP Industry and Environment, 2003, *Drivers for sustainable construction*, p. 22)

The current chapter is intended to show that sustainability can be used for competitive edge purposes. Sections 6.1 and 6.2 indicate that there is a business case that can be passed on customers and other business partners. For instance, section 6.1 shows that the design of a building directly impacts the productivity of the employees working inside the building. This means that in the shipbuilding industry the design of a ship have implications for the cruise members of the ship. Chapter 2 builds on extant evidence indicating that there are multiple benefits for a company to engage in sustainability-related issues.

6.1   Sustainability in the design of a construction increases employees' productivity, health and wellbeing

A recent report from the World Green Building Council brings substantial evidence that the interior design of buildings is directly linked to the wellbeing and productivity of employees at work (see Figure 35, 36 and 37). This means that taking into account various features of the interior design (such as ventilation, lightning, CO2 levels in the air, flexibility to adjust temperature) a company can directly improve the productivity of its employees. In the case of shipping industry, the way it designs the interior of the ship has direct effects on the productivity of the crew members of the ship. Figure 38 suggests a number of indicators that can be used to measure the impact of building design on employees.

This evidence can be used in building competitive gains. Section 6.2 elaborates on organizational benefits from engaging with sustainability. The last part of the chapter (section 6.4 and 6.5) provide two means that can be used to build competitive advantage. Section 6.4 is about communicating sustainability in a way that can bring competitive benefits during the communication with customers. Section 6.5 suggests that documenting the life cycle of the ship is a feasible way to make sustainability clearer for organizational members of the shipbuilding company and for its business partners.
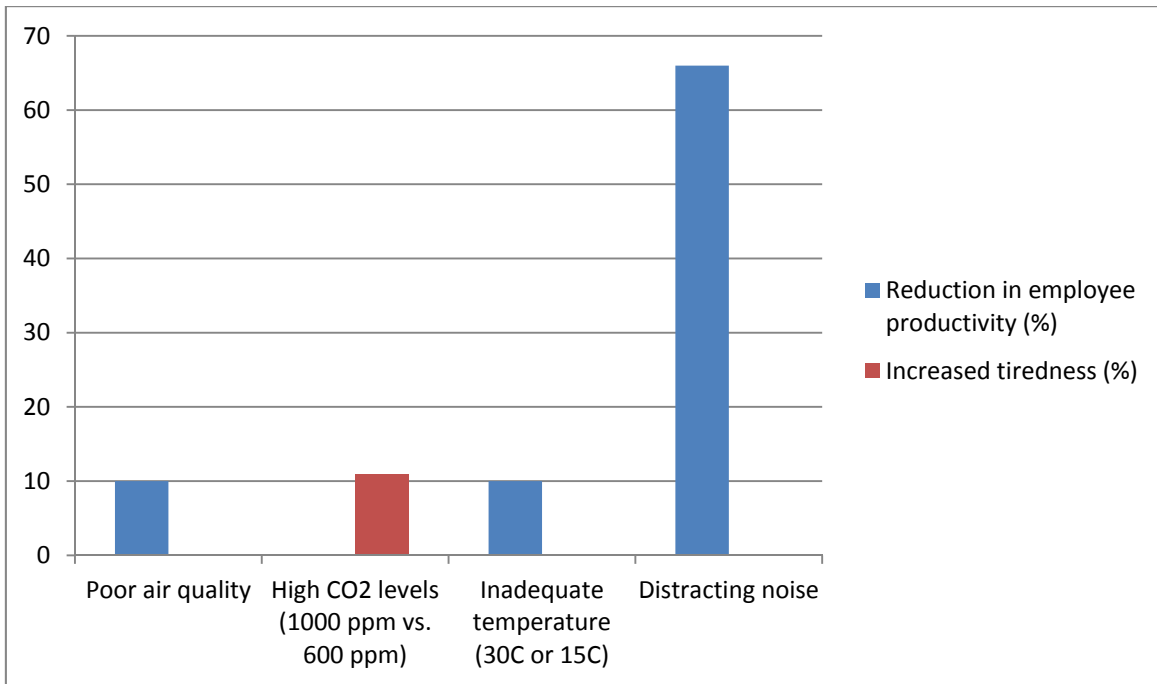
Figure 35. The negative impact of improper design of buildings on employees. Based on findings reported in World Green Building Council (2014), Health, wellbeing and productivity in offices.
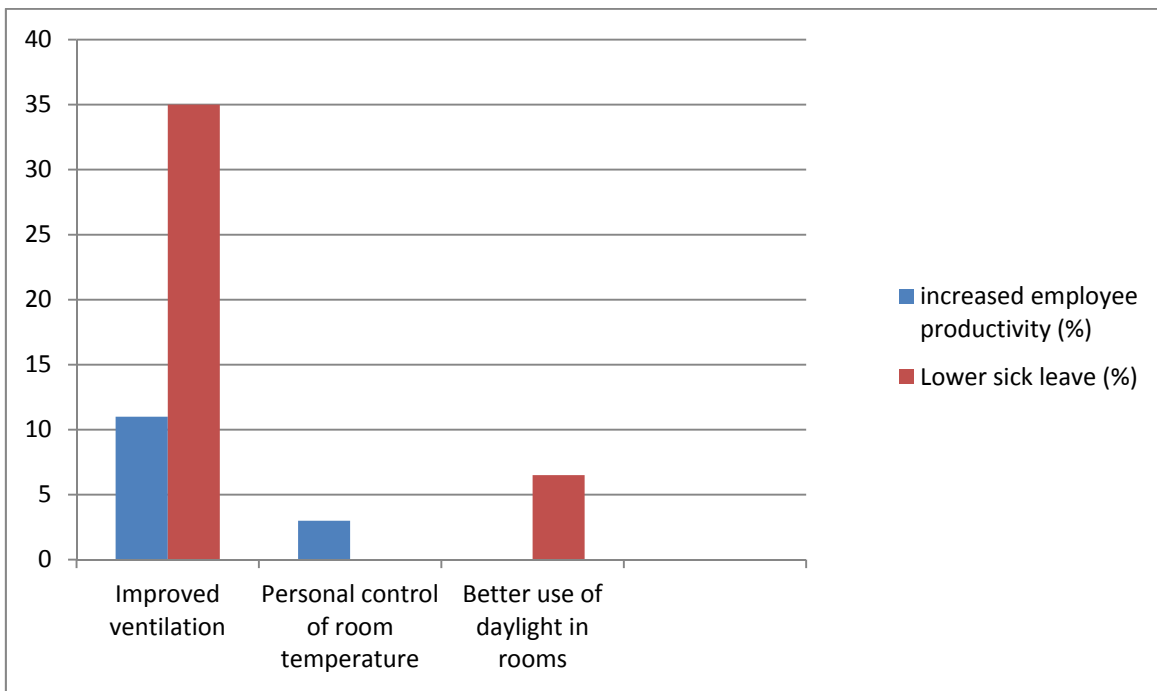

Figure 36. The positive impacts of sustainable building features on employees. Based on findings reported in World Green Building Council (2014), Health, wellbeing and productivity in offices.
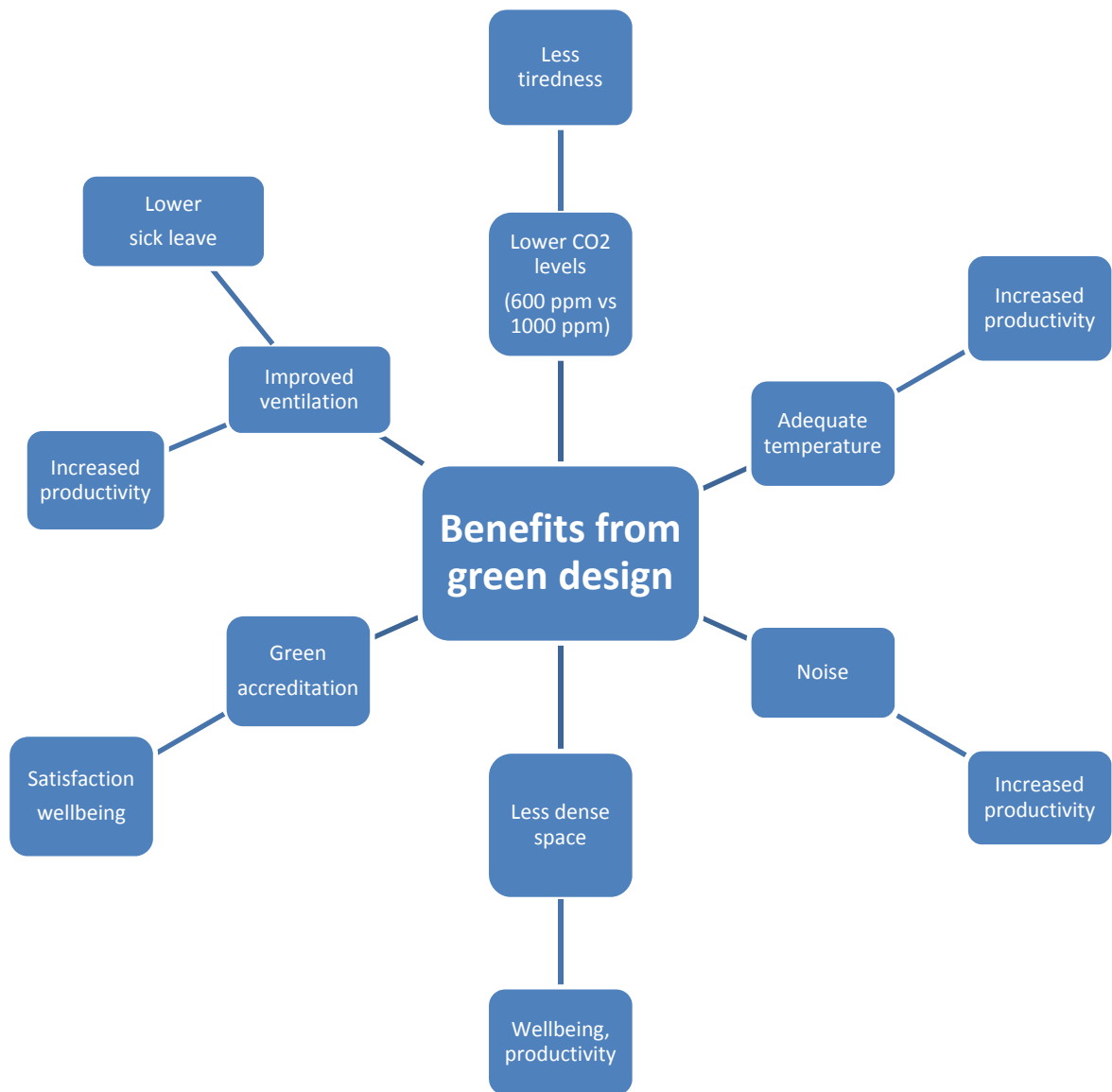
Figure 37. The positive impacts of sustainable building features on employees. Based on findings reported in World Green Building Council (2014), Health, wellbeing and productivity in offices.

Figure 38. Indicators to measure the impact of building design on employees. Source: World Green Building Council (2014), Health, wellbeing and productivity in offices, p. 61.

6.2 Multiple benefits from sustainable actions

Numerous studies indicate that there are benefits associated with engaging in sustainable actions, regardless of the industry. Figure 39 and 40 below indicate some of these benefits, while there are studies focusing specifically on some particular issue, such as employee satisfaction or risk management.
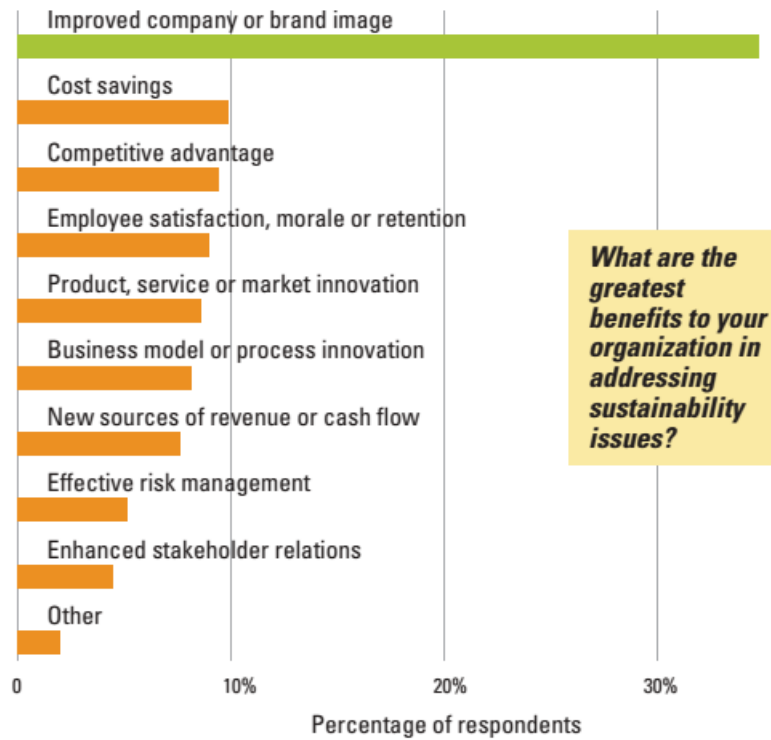
Figure 39. Benefits from engaging with sustainability (1).
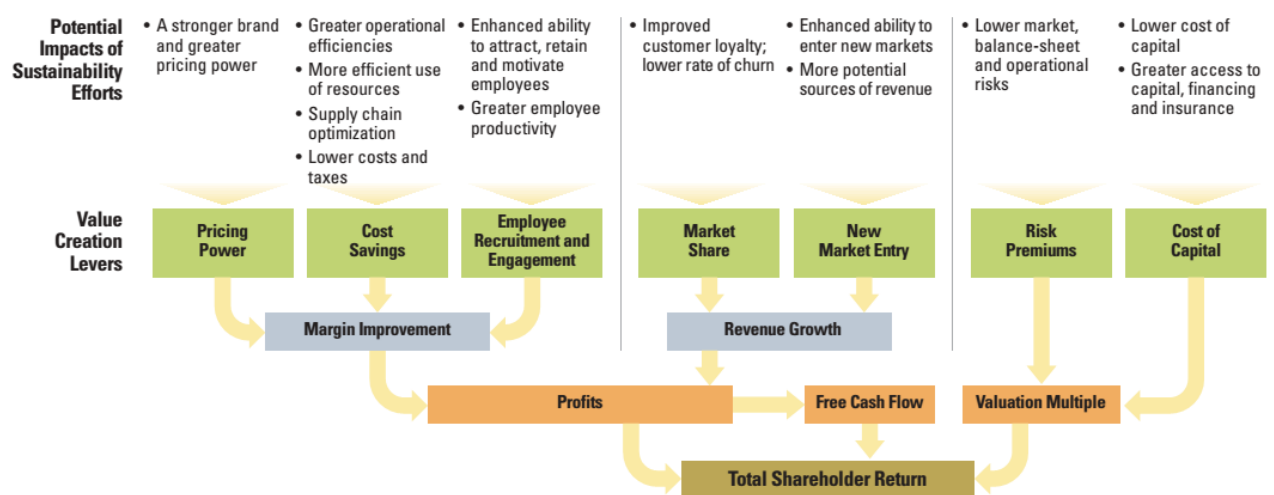
Figure 40. Benefits from engaging with sustainability (2). Source: Berns, M., Townend, A., Khayat, Z., Balagopal, B., Reeves, M., Hopkins, M.S., Kruschwitz, N. (2009), Sustainability and competitive advantage, MIT Sloan Management Review, 51(1): 19-26.

6.3   Forecasting trends that may affect the industry

Looking at the specific needs of customers is important but may no longer be sufficient to forecast the future of one industry. The case below indicates that while Ford uses extensively market research to construct detailed customer profiles, it also looks at wider trends in society, which may not necessarily be related to its specific industry. However, these societal trends may impact greatly the industry in the future, reason for which Ford anticipates and uses them in designing future products in a way that builds competitive advantage.

We know that we cannot predict the future. However, we can prepare for a broad range of possibilities through "futuring" exercises that help us to ensure we have robust strategies in place, whatever the future might bring. Therefore, in addition to product- and brand-specific market research, we have an office dedicated to tracking shifts in social, technological, economic, environmental and political arenas. In 2013, we again made our global customer trends research public in "Looking Further with Ford", a report revealing insights about consumer habits and behaviors expected to shape 2014 and beyond. This trends report leverages years of research and collaboration with thought leaders from around the world.

Examples:

The Sustainability Blues: People are becoming increasingly aware of the importance of "going blue" as we are "going green," and becoming more aware of sustainability challenges related to water, one of our most precious and pressured resources. In the last century, global water use per person has doubled, while global population has tripled, paving the road for serious issues with water scarcity. Today, one in seven people worldwide do not have access to quality drinking water. South America, South Africa and South East Asia are among the areas that suffer the most. Within the regions, women and children spend up to three hours a day seeking out water sources for their communities. In 2012, Ford announced a comprehensive water strategy based on an analysis of risks and opportunities throughout our value chain from environmental and social perspectives. As part of this strategy, we will reduce water-use-per-vehicle by 30 percent from 2009 to 2015.

The Old School Trend: In the face of political shifts, economic malaise and increasing pace of technological breakthroughs, some customers find themselves longing for the "good ol' days" when things were seemingly kinder, gentler and simpler. Not surprisingly, products and experiences that evoke a sense of nostalgia or romantic view of the past do quiet well in the marketplace. For instance, when Ford revealed the 50th anniversary of the Ford Mustang we were delighted to discover it has some 5 million Facebook fans worldwide. Even in markets where the Mustang has never been sold, people were drawn in by its rich history and heritage.

Source: http://corporate.ford.com/microsites/sustainability-report-2013-14/people-customers-needs.html.

6.4   Competitiveness in communicating sustainability

Sustainability can be communicated in a way that customers understand the value added of engaging in sustainability. Below are two examples. The first one refers to the use of individualized storylines for a product, a method which underlies the uniqueness of the product, which comes from its sustainability features. The second one indicates various means to communicate sustainability in a simple and attractive way.

6.4.1   Use of individualized storylines for products

Storylines are already used in different industries to differentiate own products from other products on the market. The strategy consists in creating a unique story about a product, which emphasizes its originality and potentially some distinctive benefits for the user. Sustainability has been used as an original feature of different products. Below the case of Skanska building storylines.

Skanska building storylines

Skanska reports on its website numerous so-called "case studies" on sustainability of its buildings. The case studies present the 4-5 pages long unique story of the buildings, emphasizing:

1. the construction phase: interesting aspects that relate to how it was constructed (e.g. using mostly local employment, local sources of raw materials or employing disadvantaged employees)
2. operational stage of the buildings and the environmental aspects related to it (energy, water and heat consumption post-completion) and interesting aspects that make the building to be a model: ex. green roof, geothermal energy system

The first page of one such case study looks as in Figure 41 below.

SKANSKA

Entré Lindhagen, Sweden

Case Study 122

Entré Lindhagen is Skanska's new head office in Stockholm that was designed to be one of the greenest and smartest workplaces in Europe. The building is certified according to LEED Platinum Core & Shell and is pursuing LEED Platinum Commercial Interiors for both Skanska's own office and that of the other main tenant.

Aspects of Sustainability

This project highlights the following

Green Aspects

Energy

Carbon

Materials

Water

Local Impacts

Social Aspects

Human Resources

Corporate Community Involvement

Business Ethics

Health and Safety

Skanska Color Palette™

Energy

Carbon

Materials

Water

Click here for more information

April 2014 12JC6 / V7

Project Sustainability Highlights

Economic
- Utility costs 50% lower than a conventional Swedish office building

Green
- LEED Platinum Core & Shell certification
- Pursuing LEED Platinum Commercial Interiors for two office spaces
- 55% Energy savings
- Environmentally responsible Materials and over 99% waste diverted from landfill
- 50% Water savings

Social
- Activity-Based Workplace design
- Healthy indoor environments

Project Introduction

Entré Lindhagen is situated in Lindhagen, western Kungsholmen, central Stockholm. Around 1,100 Skanska employees are based at the new head office, which offers a modern, flexible and multi-faceted working environment. Skanska relocated to Entré Lindhagen as the leasing contract for their previous head office expired. The company developed Entré Lindhagen to be a purpose built, green, smart and flexible office, which reflects Skanska's brand and provides modern working conditions for its employees.

The US$ 180 million Entré Lindhagen project was designed and built by Skanska Sweden for Skanska Commercial Development Nordic (Skanska CDN). The office consists of three connected buildings, between 7 and 9 floors above ground and 3 floors below ground, which include a parking garage and equipment rooms. Entré Lindhagen includes 55,000 m² of leasable office space in total and can

Figure 41. Skanska case study type of reporting.

6.4.2 Attractive forms of reporting

The Skanska Color Palette™

Color palette is a communication tool developed to measure company performance in achieving certain sustainability targets. Colors are set for different levels of sustainability and the current situation is reported based on its corresponding color. The significance of each color is explained below (source: Skanska web site):

Vanilla – The construction process and/or product performance is in compliance with law, regulations, codes and standards.

Green – The construction process or product performance is beyond compliance, but not yet at a point where what is constructed and how it's constructed can be considered to have near-zero impact.

Deep Green – The construction process and our product performance has a near-zero impact on the environment and thereby Future Proofs our projects.
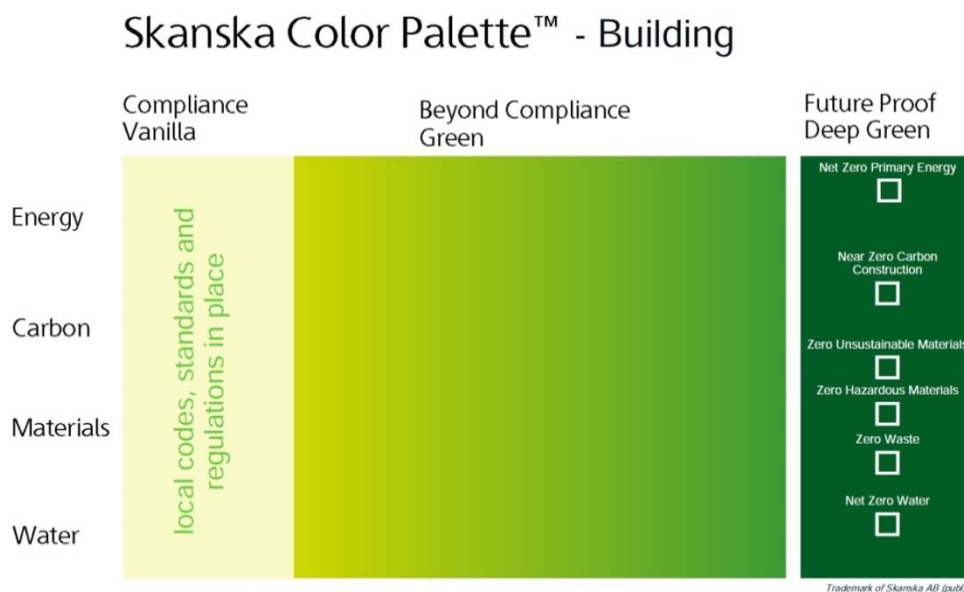
Figure 42. Skanska color palette

What does Deep Green look like?
Deep Green is defined by 6 zeros that relate to the priority opportunities for reduction of the environmental impact of our projects, i.e Energy, Carbon, Materials and Water. These zeros are:

- net zero primary energy
- near zero carbon in construction
- zero waste
- zero hazardous materials
- zero unsustainable materials
- net zero water for buildings and zero potable water for construction in civil/infrastructure

Example of color palette use:

Skanska Color Palette™

Energy

Carbon

Materials

Water

Source: case study Entré Lindhagen, Sweden - http://skanska-sustainability-case-studies.com/index.php/latest-case-studies/item/212-entr%C3%A9-lindhagen-sweden.

Senaatti color coding

Color coding is a communication tools to inform stakeholders on progress towards sustainability goals. Sustainability issues are given a color according to the ability of the company to achieve its previously set targets. Below, green color is given for targets achieved, yellow for targets achieved in part and red for targets not yet reached (Table 9).

N:o	Ohjelma	Pitkän aikavälin tavoite	Katso miten onnistuimme vuonna 2015	
1	Energian kulutuksen vähentä-minen Senaatti-kiinteistöjen ylläpitämissä kohteissa	Vuoden 2016 loppuun mennessä -6 % vähennys vuoden 2010 tasosta	> Energian ja ve-denkulutus	⌄
2	Kestävän rakennuttamisen prosessin uudistaminen	Ekologinen rakennuttaminen osana jokapäiväistä toimintaa	> Kestävä rakenta-minen	⌄
3	Pilaantuneiden maa-alueiden hallinnan kehittäminen	Pilaantuneiden maa-alueiden hal-linta osana normaaleja prosesseja	> Pilaantuneet maa-alueet	⌄
4	Sisäilmaongelmakohteiden hallinta	Sisäilmaongelmakohteiden hallin-nan kehittäminen reaktiivisesta proaktiiviseksi toiminnaksi	> Sisäilma	⌄
5	Verkostojohtamisen kehittä-minen	Verkostojohtaminen hyvällä mallilla Senaatti-kiinteistössä	> Toimitusketjun hallinta	⌄
6	Tilatehokkuuden parantami-nen	Tilat ja palvelut tukevat asiakkaan turvallista toimintaa	> Kustannusteho-kas toiminta	⌄

🟩 vuoden 2015 tavoitteet saavutettu

🟨 vuoden 2015 tavoitteet saavutettu osittain

🟥 vuoden 2015 tavoitteita ei saavutettu

Table 9. Senaatti color coding. Source: http://yhteiskuntavastuuraportti2015.senaatti.fi/kestava-toiminta/yhteiskuntavastuun-johtaminen/yhteiskuntavastuuohjelmat

Ford materiality matrix

An attractive way to evaluate the relevance of sustainability aspects and communicate it to the public is used by Ford and is called "materiality matrix" (Figure 43) and has been constructed based on stake-holders dialogue and identification of their concerns. Materiality does not refer to materials but to how important some issues are for stakeholders. The more important it is, the more material.

Materiality Matrix

Figure 43. Materiality matrix at Ford

A similar method of evaluating the significance of sustainability issues is used by Fiat and is called "materiality diagram" (see 2.2.3).

An example of the content of one box in the materiality matrix is introduced in Figure 44 below.

Materiality Matrix

Figure 44. Details of materiality matrix at Fiat. Source: http://corporate.ford.com/microsites/sustainability-report-2013-14/blueprint-materiality-matrix.html.

6.5 Documenting the life cycle approach of products

6.5.1 The case of Kinnarps

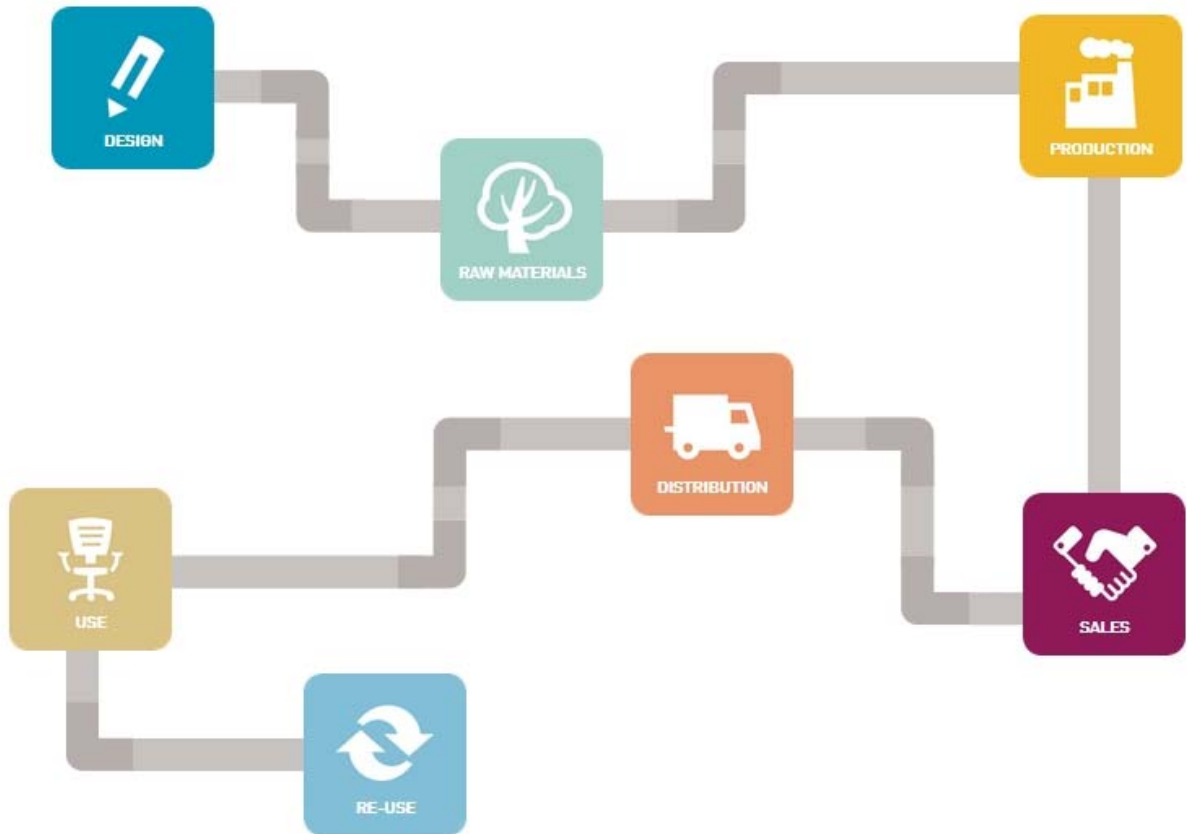Kinnarps follows the life cycle approach to document its products (see Figures 45, 46 and 47).

Figure 45. Life cycle approach for Kinnarps products (1). Source: http://www.kinnarps.com/en/International/InteriorSolutions/Sustainability/

INITIATIVE We have created a tool, the Kinnarps Evaluation System, for systematically requesting and handling information concerning the environmental performance of the materials we purchase. This gives us even better control over the contents of our products. We use either certified wood or wood which we have risk-assessed and whose source we have verified. Many of our fabrics are certified for their environmental credentials. We use recycled metal as far as possible, taking into account availability and quality requirements. We also mould our own padding at the production unit in Skillingaryd, which gives us full control over the material.

EFFECT Products made of pure materials contribute to healthier indoor air quality, sustainable forests and better use of the earth's resources. We thereby become part of the customer's sustainable supplier chain. Our customers can be confident that their furniture consists of pure materials which fulfil tough standards.

92%
RESPONSIBLE RAW WOOD

Figure 46. Life cycle approach for Kinnarps products – details (2)

EFFECT We take responsibility for ensuring that our products have been manufactured in an equitable and responsible manner through the whole chain. We thereby also become part of the customer's sustainable supplier chain. By avoiding unnecessary chemicals in the manufacturing of our products, we create a healthier working environment not only for the employees in our own factories, but also for our customers.

INITIATIVE We avoid environmentally hazardous and unhealthy substances in all our production processes, and choose alternative solutions as far as possible. We have been inspected through an ethical audit, the so-called SMETA, with very good results. This shows that we live up to high social requirements. We have introduced a whistle-blowing system so that employees can communicate any problems. We also require our suppliers to fulfil our Code of Conduct. We ensure that this actually happens by means of on-site follow-ups with high-risk suppliers.

98%
OF HIGH RISK SUPPLIERS HAVE BEEN INSPECTED WITH AN AUDIT

Figure 47. Life cycle approach for Kinnarps products – details (3)

6.5.2   The case of Airbus

 "How is an aircraft build?" – this is a web section where different stages of building the craft are introduced along with pictures and brief explanations (see Figure 48). This is not currently linked to sustainability but it would make an interesting journey to follow how sustainability links to each stage of the manufacturing process (including pre- and post- stages).

Figure 48. Following the making of an aircraft at Airbus. Source: http://www.airbus.com/company/aircraft-manufacture/how-is-an-aircraft-built/

6.5.3   A theoretical framework for a life cycle analysis in the construction sector

A life cycle approach would link sustainability issues to each stage of the production process, from the moment of extracting raw materials to the moment of disposing the product. This is how a life cycle approach would document each stage of the production process in the case of the construction industry, as exemplified in Figure 49.
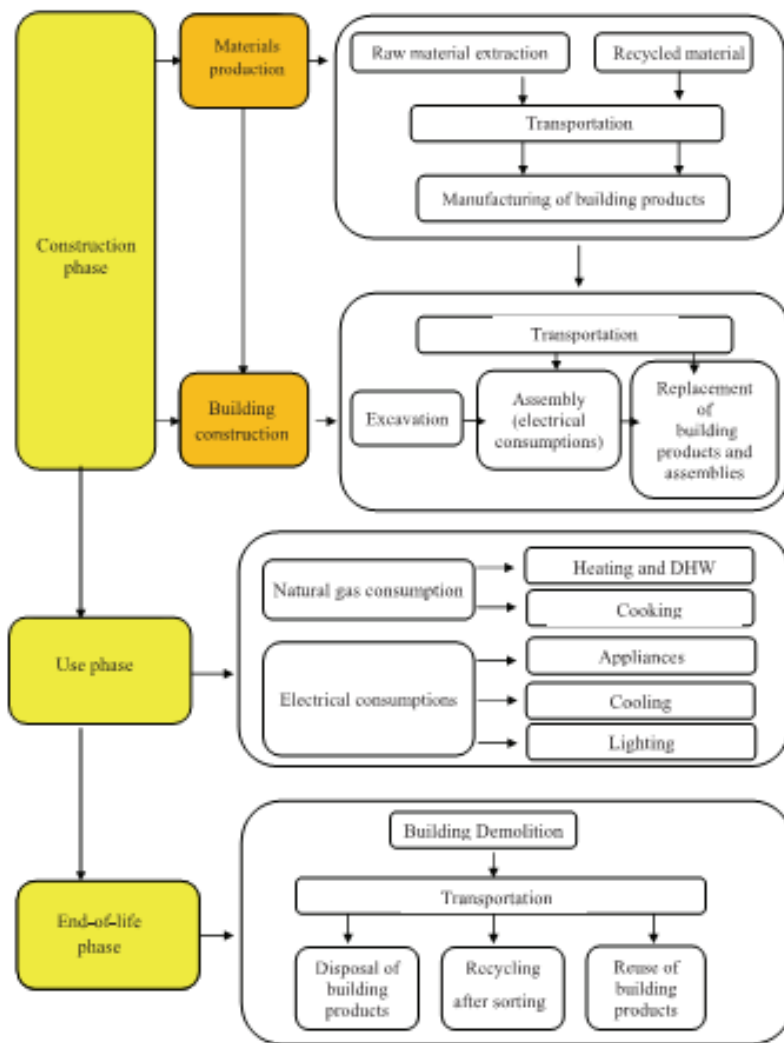
Fig. 3. LCA system boundaries.

Figure 49. Life cycle analysis in the construction sector. Source: Asdrubali, F., Baldassarri, C. and Fthenakis, V. (2013), Life cycle analysis in the construction sector: Guiding the optimization of conventional Italian buildings, Energy and Buildings, 64: 73-89.

7.   CONCLUSIONS

There are multiple benefits from engaging in sustainability as introduced in chapter 6. Many industries are already engaging in sustainability actions as chapters 2, 3, 4 and 5 indicate.

This report suggests that a life cycle approach could be a feasible path to follow in implementing sustainability, especially in the case of complex products as the ones in shipbuilding industry. Some of the reasons for taking such an approach are outlined here. First, it makes visible how sustainability links with different stages of the product life cycle. This can be used by the shipbuilding company itself to understand which sustainability aspects are significant at different stages of the shipbuilding life-cycle and it is also valuable knowledge for the business partners involved in the industry. Second, agreeing on a set of core sustainability indicators for each stage provides a common language for all actors involved in the sector of shipbuilding in order to better implement sustainability. Third, life cycle approach in shipbuilding industry is an emerging tool, with potential to provide competitive advantage to those engaging with it in an early stage.

8.   AKNOWLEDGMENTS

REFERENCES

Adetunji, I., Price, A.D.F. and Fleming, P. (2008), "Achieving sustainability in the construction supply chain", *Proceedings of the ICE Engineering Sustainability*, 161(3): 161–17.

Asdrubali, F., Baldassarri, C. and Fthenakis, V. (2013)," Life cycle analysis in the construction sector: Guiding the optimization of conventional Italian buildings", *Energy and Buildings*, 64: 73-89.

Berns, M., Townend, A., Khayat, Z., Balagopal, B., Reeves, M., Hopkins, M.S., Kruschwitz, N. (2009), "Sustainability and competitive advantage", *MIT Sloan Management Review*, 51(1): 19-26.

Bond, S. and Perrett, G. (2011), "The key drivers and barriers to the sustainable development of commercial property in New Zealand", *Journal of Sustainable Real Estate*, 4(1): 48-77.

Crabtree, L. & Hes, D. (2009), "Sustainability Uptake in Housing in Metropolitan Australia: An Institutional Problem, Not a Technological One", *Housing Studies,* 24(2): 203-224.

Lee; J. and Mo, J. (2011), "Analysis of Technological Innovation and Environmental Performance Improvement in Aviation Sector", *Int. J. Environ. Res. Public Health*, 8: 3777-3795.

Goldstein K.A. and Primlani, R.V. (2012), *Current trends and opportunities in hotel sustainability*, HVS.

Jones, P., Hillier, D. and Comfort, D, (2014), "Sustainability in the global hotel industry", *International Journal of Contemporary Hospitality Management*, 26(1): 5-17.

Kibert, C.J. (2012), *Sustainable Construction: Green Building Design,* Wiley & Sons, Inc.: New Jersey, NJ, USA.

Koplin, J., Seuring, S., Mesterharm, M. (2007), "Incorporating sustainability into supply management in the automotive industry: the case of the Volkswagen AG", *Journal of Cleaner Production*, 15: 1053-1062.

Martinuzzi, A., Kudlak, R., Faber, C. and Wiman, A. (2011), "CSR activities and impacts of the automotive sector", *RIMAS Working Papers*, no.3.

Moldan, B.; Janousková, S. and Hák, T. (2012), "How to understand and measure environmental sustainability: Indicators and targets", *Ecological Indicators*, 17: 4-13.

Olander, S. (2007), "Stakeholder impact analysis in construction project management", *Construction Management and* Economics, 25: 277-287.

Reardon, C. (2004), "Diffusing 'sustainable innovations' within the building industry: 3 years on, where does your home fit?", Paper presented at the Your Home stakeholder committee, Canberra, 13 October.

Schwartz, K., Tapper, R. and Font, X. (2008), "A sustainable supply chain management framework for tour operators", *Journal of Sustainable Tourism*, 16(3): 298-314.

Triebswetter, U. and Wackerbauer, J. (2008), "Integrated environmental product innovation and impacts on company competitiveness: a case study of the automotive industry in the region of Munich", *European Environment*, 18: 30-44.

United Nations Environmental Program [UNEP] Sustainable Buildings and Climate Initiative (2014), *Greening the Building Supply Chain*.

United Nations Environmental Program [UNEP] Industry and Environment, 2003, *Drivers for sustainable construction*.

Zhu, Q., Sarkis, J. and Lai, K. (2008), "Green supply chain management: pressures, practices and performance within the Chinese automobile industry", *Journal of Cleaner Production*, 15: 1041-1052.

Windapo, A.O. (2014), "Examination of green building drivers in the South African construction industry: Economics versus ecology", *Sustainability,* 6: 6088-6106.

World Business Council for Sustainable Development (2008), Procter & Gamble. Building sustainability into the heart of a brand, Case Study, available at www.lead.org.pk/cscc/attachments/Case_Studies/P&G.pdf, retrieved April-June 2016.

World Green Building Council (2014), *Health, wellbeing and productivity in offices*.

World Green Building Trends (2013), *SmartMarket Report 2013*.

Other materials

Automotive Industry Action Group (AIAG) webpages at https://www.aiag.org/ , accessed April-June 2016.

Airbus webpages at http://www.airbus.com/company/corporate-social-responsibility and http://www.airbus.com/company/aircraft-manufacture/how-is-an-aircraft-built accessed April-June 2016.

Airbus, 2014 Corporate Responsibility and Sustainability Report, available at http://www.airbus.com/company/corporate-social-responsibility/, retrieved April-June 2016.

Boeing, 2015 Environmental Report, available at http://www.boeing.com/principles/environment/report.page, accessed April-June 2016.

Fiat, 2014 Sustainability Report, available at 2014sustainabilityreport.fcagroup.com, accessed April-June 2016.

Ford, 2013/2014 Sustainability Report, available at http://corporate.ford.com/microsites/sustainability-report-2013-14/blueprint-governance-stakeholder.html, retrieved April-June 2016.

Kinnarps webpages at http://www.kinnarps.com/en/International/InteriorSolutions/Sustainability/, accessed April-June 2016.

Paulig webpages at www.paulig.com/en/responsibility/reporting/corporate-responsibility-report-2014/a-reliable-network-of-partners-builds, accessed April-June 2016.

Senaatti webpages at http://www.senaatti.fi/, accessed April-June 2016.

Senaatti, 2015 Social Responsibility Report, available at http://yhteiskuntavastu-uraportti2015.senaatti.fi/vuosi-2015/sidosryhmat/, accessed April-June 2016.

Skanska sustainability case studies webpages at http://group.skanska.com/sustainability/sustaina-bility-case-studies/, accessed April-June 2016.

Skanska sustainability reporting webpages at http://group.skanska.com/sustainability/reports-publi-cations/sustainability-reporting/, accessed April-June 2016.

Skanska 2015 Sustainability Report, available at http://group.skanska.com/sustainability/reports-publications/sustainability-reporting/, accessed April-June 2016.

SSAB webpages at http://saabgroup.com/cs-CZ/responsibility/stakeholders-and-dialogue/, accessed April-June 2016.

Suncadia resort webpages at http://www.suncadiaresort.com/about/environment-friendly-resort, accessed April-June 2016.

Sustrana webpages at http://www.sustrana.com/sustainability.

TUI Group webpages at http://tui.g3dbuild.com/sustainability#.WE-mdnpqJCc, accessed April-June 2016.

TUI Group, Sustainability strategy 2015-2010, available at http://tui.g3dbuild.com/sustainabil-ity#.WE-mdnpqJCc, retrieved April-June 2016.

TUI Group, Sustainable Holidays Report 2014, available at http://tui.g3dbuild.com/sustainabil-ity#.WE-mdnpqJCc, retrieved April-June 2016.

Volvo webpages at http://www.volvogroup.com/en-en/about-us/csr-and-sustainability.html, accessed April-June 2016.

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