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SYSTEMATIC GUIDANCE FOR HOW TO INTEGRATE A STRATEGIC SUSTAINABILITY PERSPECTIVE IN CORE BUSINESS DECISION SYSTEMS

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ABSTRACT
Sustainability integration in core business and product development has been a challenge, even if many supporting methods, tools and concepts are available today. However, these are mainly focusing on specific environmental aspects and are often failing to serve companies in integrating sustainability thinking into their strategic decision processes, and consequently into their core business and product development. In this study a previous proposal for an approach to assessing the current state of sustainability integration in company decision systems was used at two case companies, ABB High Voltage Cables and Hammarplast AB. The purpose was to develop this approach further so that it can better assist decision makers to integrate sustainability thinking into the strategic decision processes, to help prioritize actions in a backcasting plan for a sustainable company within a sustainable society. The developed approach includes a SWOT analysis supported strategic capability assessment, and generic guidelines for how to identify appropriate targets, which can also serve as a basis for development of indicators – all informed by a framework for strategic sustainable development.

Keywords: sustainability principles, backcasting, framework for strategic sustainable development, strategic decision processes, goal-oriented indicators.

1. INTRODUCTION
Many studies demonstrate that our society is contributing to negative impacts on the earth's life sustaining systems, e.g., the climate system [1-3], and consequently we are heading into an unpredictable and unsustainable future, while, and to a great extent because, sustainability thinking remains essentially apart from core business decisions [4].

Bringing the concept of sustainable development [5] from theory to practice is imperative for future human wellbeing. This is realized by many and therefore several methods, tools and concepts have been developed to support operations; e.g. agenda 21 [6], conventions on climate change [7], sustainability assessment methodologies [8], strategic environmental assessment (SEA) [9], environmental management systems such as ISO 14001 [10], life cycle assessment (LCA) [11], ecological foot-printing [12], global reporting initiative [13], and many others. However, such approaches are mainly focusing on specific environmental issues and are often failing to support companies in integrating sustainability thinking into their decision processes, and consequently into their core business and product development.

This situation indicates an urgent need for an overarching science based approach that includes an operational definition of sustainability and that can be used to coordinate the use of existing methods, tools and concepts and bring out the best of them in different situations. A framework for strategic sustainable development (FSSD) [14-17], also known as the Natural Step framework (TNSF)[1], is gaining international recognition for having these qualities and is used as a basis in the current study.
The aim of this study is to develop further a previously proposed approach to assessing the current state of sustainability integration in company decision systems [18]. The purpose is to create a better support for decision makers to integrate sustainability thinking into company's strategic decision

[1] *After the non-governmental organization that facilitated its development and use internationally.*

processes by filling out the gaps identified in the initial assessment, i.e. align vision, management system and tools to help prioritize actions in a backcasting plan for a sustainable company within a sustainable society. The need for this study is based on the conclusions from some introductory case studies [18]: i) senior managers are often failing to relate long-term strategic sustainability challenges to short term business challenges, ii) product developers are lacking systematic incentives, disincentives and monitoring systems to facilitate implementation of sustainability measures and iii) companies are lacking a standardized "toolbox" to integrate sustainability-related information in decision processes.

2. METHODS

The aim and purpose of this study are pursued through literature studies and two company case studies. The methodological base is a framework for strategic sustainable development (FSSD) [14-17] and the assessment approach developed in a prior study [18]. The latter includes guiding questions in two steps: i) an inventory stage and ii) a strategic capability assessment stage.

2.1 Case Study Companies and Interview Process

A sustainability assessment was performed in case study companies and the results served as basis for further improvements.

ABB High Voltage Cables AB is a business unit of ABB, which is a global leader in power and automation technologies organized in 5 divisions: Power Products, Power Systems, Automation Products, Process Automation and Robotics. The whole company, with headquarters in Zurich, Switzerland, has 115.000 employees and has operations in more than 100 countries. High Voltage Cables is based in Karlskrona, Sweden, with 500 employees and is part of ABB´s Power Systems Division. The company's competitive edge is to help customers to use electrical power efficiently and effectively and to increase industrial productivity in a sustainable way. Therefore managers at High Voltage Cables recognize the importance of developing appropriate support for integrating sustainability into their business decisions, with a special interest in sustainable management of metals.

Hammarplast AB is a medium sized company responsible for the consumer business area within the Hammarplast Group, producing and marketing plastic and complementary consumer products for home and storage. It has 160 employees. Their strategic competitive edge is to create an innovative product-service system and thereby increase customer's perceived value of their product. Hammarplast aims to become a global leader in the sector and by adopting this strategy it wants to be more profitable and build financial capacity to deal with major sustainability challenges related to the oil based raw material they use for plastic production. Therefore the managers recognize the importance of developing appropriate support for integrating sustainability into their vision, management system and tools.

All interviews included the following basic steps: recorded interviews with senior managers at production, product development and CEO levels. The process was conducted by two to three researchers to collect data concerning the company's strategic decision processes in general and in relation to sustainability in particular as shown in Table 1. The interviewees were scrutinized using the mentioned guiding questions which are based on the strategic capability assessment stage and the FSSD. The results and findings from this analysis served as a basis for the verification of the assessment process as such and for further improvements.

Table 1. *The inventory stage activities in the companies.*

Date	Company	Activity	Persons Involved
August 080814	High Voltage Cables	Interview	Manager New Products and Manager Operations
August 080826	High Voltage Cables	Interview	Manager Operations
September 080901	Hammarplast	Interview	Managing Director
September 080910	Hammarplast	Interview	Product Development Manager
October 081002	High Voltage Cables	Interview and discussion on metals sustainability	Manager New Products
October 081016	High Voltage Cables	Visit to Production Facilities	Manager New Products
October 081021	High Voltage Cables	Interview	Manager Operations
November 081005	High Voltage Cables	Interview	Local Sustainability Officer

2.2 Framework for Strategic Sustainable Development

Using the FSSD in this study is based on the reasoning that sustainability integration in decision processes occurs through a range complex internal and external interactions and this framework has proven successful in many cases of planning in complex systems [14-17]. It has backcasting from sustainability principles as a key feature and enables a clear and systematic understanding of strategic planning in general and in relation to sustainability in particular.

Backcasting from sustainability principles is the process of planning with the ultimate objective of sustainability in mind, defined by first-order sustainability principles. Instead of dealing with the problems one by one as they appear, backcasting is an approach where a successful outcome is imagined followed by the question “what shall we do today to get there?" To be useful for backcasting the sustainability principles are designed to fulfill a set of criteria. They should be: i) based on a scientific world view, ii) necessary and sufficient for sustainability, iii) general enough to be applicable everywhere and in all situations, iv) non-overlapping to facilitate comprehension and development of tools and indicators, and v) concrete enough to guide problem analysis and decision making.

2.3 Assessing Sustainability Integration in Strategic Decision Systems

This approach offers a generic template that was previously used to assess sustainability integration in the strategic decision systems of the case study companies: *Tetra Pak Carton Ambient AB, Aura Light International AB, Evolator AB, Hydro Polymers Ltd,* and for verification to compare with the experiences of *Indigo Management AB and The Natural Step International.* It focuses on decision systems and interactions between senior management and product development levels. Decision systems here include methods, tools, processed information and actors involved in decisions at different organizational levels. This approach supports an inventory and a strategic capability assessment, as briefly explained below.

The inventory is the process of collecting information about general and sustainability related strategic decision systems, and about the interactions through such support between senior management and product development levels as shown in Figure 1.

To understand the information flow and decision processes in companies, guiding questions based on sustainability principles and strategic guidelines of the FSSD are used. At this stage information required for the diagnostic of companies’ strategic capability is gathered. Overarching, detailed and control questions are used throughout the process [18].

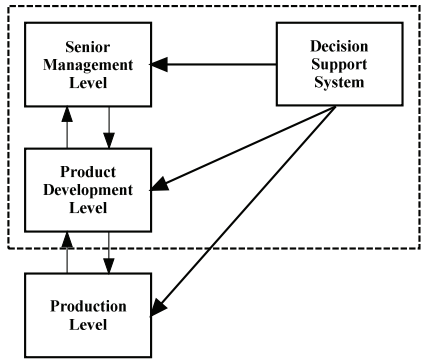

***Figure 1**. Decision system in a company and interactions between senior management and product development levels.*

The strategic capability assessment (SCA) is an evaluation of strategic decision systems in general and in relation to sustainability in particular. In this study the previous approach [18] is supplemented by a SWOT analysis [19], all guided by the FSSD and strategic capability assessment questions. The purpose is to stimulate integration of sustainability in the decision processes by utilizing the company's *Strengths*, identifying its *Weaknesses* to further eliminate them, explore potential *Opportunities* and find solutions to mitigate *Threats* [19].

The FSSD guided SWOT analysis was used also to support consensus building among participants and to leverage a co-creation process to generate improvement ideas and solutions to the challenges. The results of this serve as a basis for target identification and further development of indicators.

2.4 Guidelines for Identification of Appropriate Targets and Construction of Indicators

The FSSD [(Table 4)] is used to develop guidelines for the identification of appropriate targets and to support companies to further develop their specific sustainability indicators. The process is initiated by understanding the five levels of the FSSD, which will inform the following stages: identification of specific GOALS, TARGETS and INDICATORS. Targets are quantified measures that can be described as stepping stones, or flexible platforms, taking the company towards the goals. Indicators are variables informed by the targets that will support monitoring of the company's progress towards established targets.

Table 2. *Templates for assessing strategic capability of company decision systems – in general and for sustainability. [18]*

Levels of generic assessment framework	**Template 1** **Assessing company decision system - for general strategic capability**	**Template 2** **Assessing company decision system - for strategic sustainable development capability**
1. System	How does the company describe its business idea, operations in relations to key stakeholders? *Advisor response: ...* *Company response: ...*	How does the company describe its business idea, operations in relations to the environment and societal stakeholders globally? *Advisor response: ...* *Company response: ...*
2. Success	How, if at all, does the company define its long-term success? *Advisor response: ...* *Company response: ...*	How, if at all, is global sustainability integrated in the company's long-term success definition? *Advisor response: ...* *Company response: ...*
3. Strategic Guidelines	How, if at all, does the company use overarching strategic guidelines for planning towards success in general? *Advisor response: ...* *Company response: ...*	How, if at all, does the company integrate sustainability in overarching strategic guidelines? *Advisor response: ...* *Company response: ...*
4. Actions	How, if at all, are decisions in practice made in line with strategic guidelines towards the company's long-term definition of success? *Advisor response: ...* *Company response: ...*	How, if at all, are decisions in practice made in line with strategic guidelines towards the company's long-term definition of success? *Advisor response: ...* *Company response: ...*
5. 'Tools'	How, if at all, are decisions justified and monitored by suitable methods, tools and concepts? *Advisor response: ...* *Company response: ...*	How, if at all, are decisions justified and monitored by suitable methods, tools and concepts? *Advisor response: ...* *Company response: ...*

3. RESULTS

Figure 2 illustrates schematically a systematic guidance for how to integrate strategic sustainability thinking into a company's decision system. The process includes the original assessment approach [18] and the suggested added support.

3.1 Assessment of Sustainability Integration in Strategic Decision Processes

Inventory Stage

An approach based on Qualitative Research Interviews [20] resulted in recorded interviews that were transcribed, analyzed, verified, reported and sent for companies' feedback. The aim was to establish consensus based on the findings of the inventory stage, and to create appropriate conditions to proceed to the next stages. A workshop to present the results and to introduce the methods was decided upon.

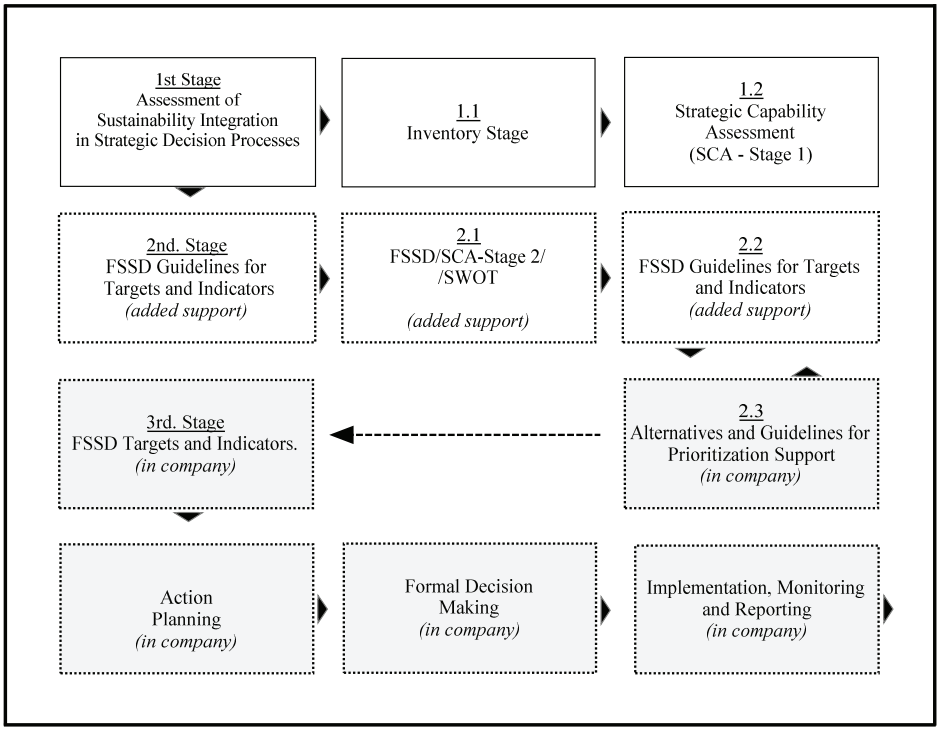

Figure 2. *Processes and activities for how to integrate strategic sustainability thinking into a company's decision system. In stage 1: Inventory and Strategic Capability Assessment (SCA stage 1) are based on previous studies [18]. Stage 2 is the added support and stage 3 shows recommended steps for the companies.*

Strategic Capability Assessment with SWOT Analysis

Based on the FSSD and the Strategic Capability Assessment, SCA (see Table 2), a SWOT analysis was conducted to identify strengths, weaknesses, opportunities and threats regarding integration of sustainability thinking in the strategic decision processes of the case study companies. This supplemented SCA is performed after SCA stage 1(see Figure 2) and found to enhance data structuring and identification of sustainability gaps. It was found that sustainability thinking is not fully integrated in their strategic decision processes. Clearly, it is not enough to have sustainability embedded in the vision. It is necessary to also have a concrete sustainability definition to be able to set strategic targets and develop relevant indicators. Otherwise it is difficult to clearly communicate sustainability issues among employees and stakeholders. Examples of results from the assessment of the case study company High Voltage Cables are presented in Table 3. The findings were similar in the other case study company.

Based on the identified gaps in the companies' strategic decision processes, goal-oriented targets and indicators were identified as described in the next section.

***Table 3**. Strategic Capability Assessment and SWOT Analysis for the case study company High Voltage Cables*

FSSD	SCA QUESTIONS	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Systems level	*How does the company describe its business idea, operations in relations to the environment and societal stakeholders globally?*	Sustainability is aimed at the company vision of the system. Good knowledge of the system / environment related to high voltage cables production	Lacking definition and common understanding of systems sustainability Lacking description of company business idea, operations and stakeholders within system	To integrate understanding and communicate a sound definition of sustainability into business idea, processes and operations.	The lack of a sound understanding of the system, leads to the risk of making wrong decisions and investments Materials used in cables might became scarce and expensive
Success level	*How, if at all, is global sustainability integrated in the company's long-term success definition?*	Sustainability is considered within company vision	Sustainability is not defined by the vision The lack of definition transmits an inconsistent understanding of success	Define sustainability and support stakeholder to do the same. Cables to transfer energy can be part of the solution for a sustainable society	Gaps related to Sustainability communication due to lack of alignment between vision - management and tools. Due to the lack of sustainability knowledge Stakeholders can undermine companies efforts.
Strategic level	*How, if at all, does the company integrate sustainability in overarching strategic guidelines?*	Strategies are aligned with vision - mission (in conventional way)	Strategies are not aligned with a clear sustainability definition of success in company´s vision	Explore backcasting from sustainability to communicate / inform and discuss strategic guidelines.	Threats related to forecasting: risks of making investments in wrong strategies
Actions level	*How, if at all, are decisions in practice made in line with strategic guidelines towards the company´s long-term definition of success?*	Actions are in line with strategies and vision (in conventional way)	Actions are not guided by clear sustainability constraints.	Develop actions to capitalize on emerging market for sustainability Engage employees with a concrete definition of sustainability	A competitor with a proactive approach for sustainability could be a threat.
Tools level	*How, if at all, are decisions justified and monitored by suitable methods, tools and concepts?*	Tools are available and used according to their specific nature: systems, strategic and capacity tools.	Strategic, systems and capacity tools are not linked to a concrete definition of sustainability	To strengthen the outreach capacity of existing tools	Too many tools without a unifying framework can generate unnecessary competition among them.

3.2 FSSD and Goal-oriented Targets and Indicators

In this study the FSSD is also used to inform development of goals, targets and formative indicators [22]. Upstream indicators are preferred to indicators only reflecting downstream actions and effects because upstream it is possible to prevent problems. This amendment is seen to: i) support structural integration of sustainability thinking in companies' strategic decision systems, i.e. align vision, management system and tools, and ii) bring in the sustainability perspective in decision making and product development processes. Appropriate indicators are known to trigger improvements, development of ideas and problem solving [8]. During the past ten years there has been an increasing interest in linking indicators to goals. Recently the millennium development goals [23] became a major reference of such an approach.

Guidelines for the Construction of Targets and Indicators

Goal-oriented indicators in general are developed using pre-defined goals and targets [23]. The goal-oriented indicators in the new assessment approach are based on the FSSD five levels, which are used to inform the construction of the indicators. The process starts by understanding each of the FSSD's five levels and its operational method - backcasting from sustainability principles. Each FSSD level enables the identification of an overall GOAL, which is expressed in qualitative terms. Quantified TARGETS related to the goal are then identified for different time perspectives. INDICATORS are the variables used to measure progress toward the targets.

The identification and construction of appropriate indicators is a process that needs to consider the characteristics of each company. This activity is informed by FSSD five levels and by Backcasting from Sustainability Principles. Some general support in building indicators can come from thinking about the following categories:

- ***Input***: e.g., financial and physical resources (money, staff, materials, etc.).
- ***Output***: e.g., the amount of goods and services produced by inputs (educational resources, research, tools for sustainable product development, return on investment rates, etc.).
- ***Outcome:*** e.g., final results related to FSSD goals: access to, use of, and satisfaction with services (participation rates, practical use applied research, etc.).
- ***Impact:*** e.g., influence, effect on: well-being, creation of a shared mental model (Sustainability awareness rates, economical social and environmental influence).

The use of these guidelines for the case study company High Voltage Cables is exemplified in table 4.

Table 4. *Suggested FSSD Guidelines for Targets identification and further development of Indicators for the case study company High Voltage Cables*

FSSD level	GOAL	TARGET	INDICATORS
1: The system level *is a description of the overarching system in which we are planning and solving problems. In this case, the company within the society with the biosphere.*	Ensured sustainability integration in core business and explained its relation to stakeholders globally.	**1.1:** Leverage as from 2010, continuous growth on the number of senior managers with knowledge concerning strategic sustainability planning. **1.2** ---	**1.1.1:** E.g., Proportion of investments allocated for sustainability capacity building programs, type of activity, purpose, area of influence, participation rates, etc. **1.2.1** ---
2: The success level *describes the overall principles* that are fulfilled in the system when the goal is reached, in this case social and ecological sustainability.*	Integrated a global sustainability perspective in the company's long term success definition.	**2.1:** Integrate within three years as from 2010, a clear sustainability definition into the company's vision documents, and communicate it to the company´s 500 employees and stakeholders in general. **2.2**: ---	**2.1.1:** E.g., volume of resources (financial, staff) allocated for developing and communicating the vision definition to employees and stakeholders, type of activity, purpose, participation rates, etc. **2.2.1:** ---
3: The strategic level *describes the strategic guidelines for planning towards success in the system, using Backcasting from Sustainability Principles [14 17].*	Defined strategic guidelines to achieve the company's long term success in line with vision, management system and tools.	**3.1**: Integrate in senior management planning routines, within three years as from 2010, the use of the strategic guidelines based on backcasting from sustainability principles, to inform all actions considered first steps. **3.2:** ---	**3.1.1:** E.g., number and type of early steps identified, staff involved, number and type of workshops, areas of influence, type and amount of investments, etc. **3.2.1:** ---
4: The action level *includes concrete actions that fit strategic guidelines. The actions are assessed to understand its relation with other levels, i.e. overall strategies to reach successes in the system.*	Performed prioritized actions, i.e. actions that fit the strategic guidelines.	**4.1:** Develop within three years from 2010 the Sustainability Life Cycle Assessment [25] of HV Cables material (copper lead and aluminium). **4.2:** Develop within three years from 2010 a sustainable material management database.	**4.1.1:** E.g., type of impacts, as regards Aluminium, Copper and Lead, amounts used, type of research produced etc. **4.2.1:**
5: The tools level *describes the tools used to manage and monitor the activities so that they are chosen in a strategic way to arrive at success in the system.*	Ensured that decisions are justified and monitored by suitable methods, tools and concepts.	**5.1:** Develop within three years from 2010 a suitable toolbox, i.e. to combine the current tools and/or implement new suitable methods and tools. **5.2:** ---	**5.1.1:** E.g., number and types of tools of different kinds (system, strategic and capacity tools) within the toolbox that are based on a strategic sustainability perspective, etc. **5.2.1:** ---

* Sustainability Principles: *In the Sustainable Society, nature is not subject to systematically increasing...*
1…concentrations of substances from the Earth's crust.
2…concentrations of substances produced by society.
3…degradation by physical means. And…
4…people are not subject to conditions that systematically undermine their capacity to meet their needs.

Strategic Prioritization Support

The FSSD systematic guidance for how to integrate sustainability thinking into the strategic decision processes, i.e. align vision, management system, tools and product development, is supported by a prioritization process through the selection of measures where "yes" can be answered to three key questions:

(i) will this measure bring us closer to compliance with all the principles of success (i.e.´sustainability principles`),

(ii) is the measure possible to develop further (if it needs to be to come into compliance with the principles of success), so that it doesn´t lead into a blind alley (i.e., is it a ´flexible, technical platform´) and,

(iii) is it likely to generate a good return on investments?

Together "yes" to these questions brings about measures that provide good stepping stones for future successful moves while increasing the flow of money, or other required resources, to the process [26].

4. CONCLUDING REMARK

The importance of integrating sustainability thinking into the core business of companies is receiving greater and greater emphasis around the world. The systematic guidance for how to do this, involving a SWOT analysis supplemented strategic capability assessment and guidelines for development of relevant and feasible targets and indicators – all informed by a framework for strategic sustainable development – as presented in this paper, could therefore be of significant value for business and society. This is likely to assist decision makers to determine which actions that should or should not be taken in order to support sustainable development of the whole society and at the same time strengthening the own organization.

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