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International Environmental Science

Green Purchasing to Achieve Corporate Sustainability

- Case study on Swedish large companies

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Abstract

Integrate sustainability into business management process is an important aspect of achieving sustainability. One of the effective and efficient approaches of achieving sustainable business is green purchasing. As the most costly business activities in corporations, purchasing affects decision-making in companies at large. Theories proposed multiple benefits for companies, ecology and society, providing theoretical rationality for the intake of green purchasing for companies. However, compared to other environmental initials, few firms have implemented extensive green supply chain programs. The gap between theory and practice in green purchasing is the research area of this thesis work. Literature review in the field of supply chain management (SCM), corporate sustainability (CS) and green purchasing lead to the understanding of purchasing in supply chain, main strategies and tools in greening purchasing, the difficulties of implementing CS and green purchasing. Three world-class companies practical performance are studied under this theoretical framework. Their policies and uneven performances in green purchasing are analysed base on theories to locate and describe the gap between theory and implementation. Comparisons are conducted first between companies than between companies' practices and theory. Results show though large companies are working towards CS through green purchasing approach, lack exist in common green purchasing frameworks and implementation approaches. Business values, as a base for corporations' activities, are not all origin from triple bottom line and CS requirements. Finding also identify corporations tendency on achieve sustainability by mere eco-efficiency. The missed link between CS measuring and green purchasing criteria is discussed as the gap that leads to all the disjoint in theory and practice. Finally, suggestions are made on theory development companies policies.

Keywords: *Green purchasing, corporate sustainability, case study*

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1. Introduction

This chapter will give an introduction of the thesis work, explaining the necessity of the research, presenting the research question that is to be answered throughout the paper, defining the research objectives and scopes accordingly as well as the methodology of the research.

1.1. Background

It is now a trend in business for companies entering the field of sustainable development. The reasons for companies to be involved in sustainability development are various. Some are due to the increasing regulatory pressure from government and public demand for a better environment (UNEP¹, 2002), others concern with the impacts of social and environmental performance on financial performance. It is argued by some that integrating sustainability into business is an approach to achieve corporate competitive advantages (Porter, 1998). Confronting diverse sustainability issues relates closely to their business activities, (e.g. climate change, ecological degradation, cultural and social problems and so on), companies start to integrate various kinds of sustainability strategies into corporate management system. For instance automobile manufacturing companies emphases greatly on cleaner energy in addressing climate change while household application companies tend to focus on social responsibilities. Those sustainability strategies cover also different business units and scopes. Some companies works more on recycle and reuse while others try to deal with the problem from a complete product life cycle.

“Value chain” is used often to address sustainability issues in companies lately. The main benefits adopt from this concept might be a holistic perspective of managing “cleaner” product from its entire life cycle. “Value chain” is a notion that first brought out by Porter in 1985. It refers to a combination of all activities within a value adding process of a company to provide to customer (Porter, 1998). Goals of companies’ sustainability strategies are no longer limited to reduction of waste or replacing hazard material input. Companies start to try solutions from a more holistic perspective, by integrating sustainability strategies into the whole value adding process, namely the “value chain”. “Value chain” is also referred as “supply chain” from a focal company’s perspective.

¹ The UN Environment Programme (or UNEP) coordinates United Nations environmental activities, assisting developing countries in implementing environmentally sound policies and encourages sustainable development through sound environmental practices.

Since “supply chain” covered all the activities from raw material exactions in nature to the use phase in human society, greening supply chain is an opportunity for linking all the companies’ strategies together to tackle the problem, instead of individual efforts on certain phase of the product life cycle. Theoretically, greening supply chain is a win-win solution on both limitation of environmental damages caused by a certain supply chain and delivering benefits companies along the chain. These benefits include straightforward cost reduction, closer co-operative relationships with suppliers and possibility of more holistic decision-making (Bowen F. et al. in Sarkis, 2006). The total value of a company determined by the whole of its sales value and the ultimate goal of a company’s all activities above is to make sure total value generated is more than its cost (Porter, 1998). Therefore, value chain concept is crucial to companies’ decision making, which is fundamentally important for companies to move towards sustainability in practice.

Within the value chain, purchasing value plays an extremely important role because it is the largest part of cost of goods sold (COGS)². Figures show the occupation of purchasing value³ in COGS is approximately 50% while in some cases even amounts to 68% when other business cost⁴ with important purchasing component are added to the purchasing value. Purchasing relates to sustainability issues closely because of the restrictions it posed on suppliers and its position along the value chain of linking companies with its suppliers. Green purchasing, namely integrate sustainability consideration in purchasing management, is a direct supplier management approach for companies. Applied by more and more companies, Code of Conduct (CoC) for suppliers ensures less harm impact to environment and society, not only in the company themselves but also in their suppliers. By imposing requirements on their suppliers and requesting social and environmental information of the purchased goods from suppliers, companies are generally adopting a product life cycle perspective in business, that everything enters the manufacturing process eventually must leave it.

² Cost of goods sold, COGS, or "cost of sales", includes the direct costs attributable to the production of the goods sold by a company. (Wikipedia)

³ Purchasing value is defined by Central Statistical Office (CSO) as "the invoice value of the purchased goods, raw materials and catalysts, packaging goods and work done by third parties, excluding sales tax and returned import duties and levies."

⁴ Other business costs are defined by CSO: the rent of building, sites, machines, installations and transport, the costs of maintenance and insurance, banking costs, auxiliary, materials not included in the use of raw materials and catalysts, car costs, communication costs, office supplies, subscriptions, advertisements and costs of professional services.

However, compared to other environmental initials like environmental management system (EMS), few firms have implemented extensive green supply chain programs. It is argued that companies often consider it as complex, expensive and time consuming (Rex, 2005), especially for small and medium sized enterprises who have limited time and budget (Berkel et al., 1999). There is also conflicts regard to individual company's respective responsibility along the supply chain, which becomes more complex under the set of globalization where product chains cross over the world (Frydenlund, 2005). Also on operational level practices, purchasing department has to handle tradeoffs between low emission transportation and "greenest" suppliers, or between short time competitiveness and long time sustainability. This thesis research started from looking up for the gap between the greening supply chain theories and corporations' practices. This investigation discovered a missed link between corporations' green purchasing goals and corporate sustainability requirement. To locate and understand these gaps, this research exams current greening purchasing related activates in companies and compares the result with literature theorises.

1.2. Research question

Given the background above, this thesis research aims to find out how large companies are working on sustainability issues through purchasing activities, what does green purchasing mean to companies on policies, strategies and everyday decision making and why there are gaps between CS theory and companies' practices. The research question is proposed as:

How does green purchasing promote companies to achieve corporate sustainability?

1.3. Research objectives

The research objective is to find out how large companies work on sustainability issues in supply chain management (SCM) through green purchasing activities. More concretely, the objectives of the research are to:

- Enhance understandings of how companies working with sustainability issues;
- Explore the current state-of-the-art knowledge in the field of green purchasing and corporate sustainability in companies;
- Investigate in the main strategies, policies and activities that large companies are using in green purchasing activities, find out how and why these strategies are used;

- Link these green purchasing activities to corporate sustainability theories and find out the relations;
- Locate the gap between greening purchasing theory and companies practices in reality and explain the gap;
- Provide recommendations to promote greening purchasing from corporate sustainability perspective for future practices.

1.4. Research scope

Based on research objectives and feasibilities, research scope is defined by both system boundary and analytical boundary.

System Boundary: “Value chain” defined by Porter is composed by primary activities and supportive activities (Weele, 2002). Procurement is one of the supportive activities that relates to the purchasing inputs in the firm’s value chain (Weele, 2002). Considering the complexity of a complete supply chain, this thesis work focuses not on the whole supply chain from manufactures to end customers, but only on purchasing activities that link company to its suppliers. Large companies play the leading roles in supply chains on sustainability issues. A survey on US firms green purchasing performance suggests that firms with large purchasing volume involves more in green purchasing programs and large companies act more on green their suppliers due to “greater bargaining power” they have (Min and Galle, 2001). Consequently, the physical boundary of this research is the purchasing management in large companies. The boundary is shown in Figure 1

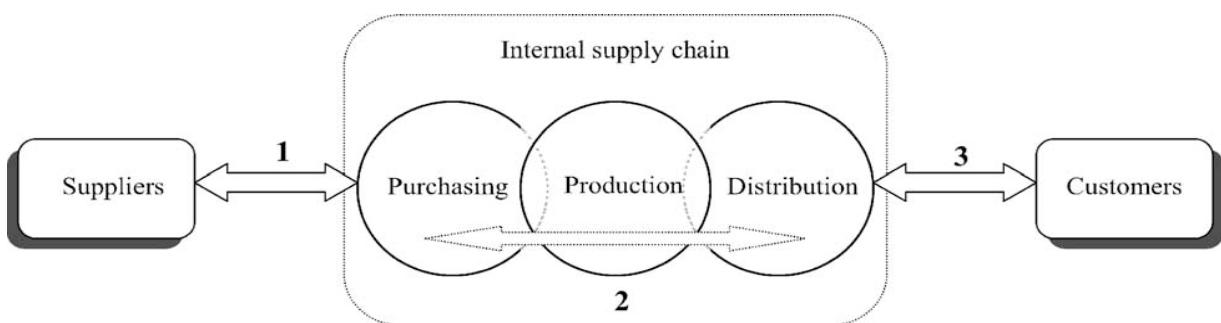


Figure 1 Illustration of a companies supply chain (Source: Chen and Paulraj, 2004)

Analytical Boundary: This research is designed as a qualitative research because of the characters a qualitative research has: Qualitative research is concerned with process and meaning of reality, involving field research in its natural setting (Marshell et al., 1999). For social science research, it is important to understand human behavior without setting bias (Marshell et al., 1999). Qualitative

research is descriptive in understanding the process and meaning and inductive in building abstractions, concepts, hypotheses and theories (Neill, 2006). After considerations of the research objectives, qualitative research meets the requirements and is able to reach the goals.

1.5. Methodology

The research aims to examine the gap between real-life practice and theory in a “how” and “why” manner, hence it is designed as a case study. Because a case study is conducted when a “‘*how*’ and ‘*why*’ question is being asked about a contemporary set of events, over which the investigator has little or no control (Yin, 1994).” The research topic demands for the feature of holistic, meaningful and real-life setting, while according to Yin, case study method allows the researchers to “*retain the holistic and meaningful characteristics of real-life events*”. The following part will introduce how this case study is designed, how and what data are collected and analyzed, followed with a discussion on reliability and validity of the methods.

1.5.1 Research design

The research design is a logical plan for getting from initial set of questions to the conclusions (Yin, 1994). This research is designed in the following steps:

- **Theory development:** reviewing the literature in the field of purchasing management, supply chain management and corporate sustainability. Theoretical platform provide the basic theory for the following case study to test.
- **Case selection:** One of the main purposes of the study is to generate valuable, valid and reliable theory on green purchasing activities to achieve sustainability. The best alternative is to study the entire population within supply chains, namely all large companies, their suppliers and customers. But, this may neither be possible considering costs, time, and data accessibility nor necessary. Therefore, a series of cases of the entire population is selected and studied. Two important issues for sub-population selection are:
 1. **Size and randomness:** Both size and randomness are largely applicable in quantitative studies. The larger the size of cases the better, hence this study choose multiple cases instead of single case to study. Multiple-case study provides more chances of avoiding sample bias and secondly analytic benefits from having two or more cases can be substantial (Yin, 1994). The replication logic is implemented to ensure external validity in the multiple-case study method. Individual member of sub-population should have equal opportunities of

being selected. Therefore multiple cases are chosen with the consideration of equally coverage of industry sectors.

2. **Representativeness:** Sub-population should be chosen with representativeness. In order to meet this requirement, criteria for cases are built as following:

- The size of the company: large and multinational companies who have great impact on its suppliers and concern more on environmental and social issues than small companies
- The position of the company in supply chain: produce final products rather than intermediate products whose supply chain is more close to a complete product life cycle.
- The multiple cases should cover most sectors to ensure reliability and the data are sufficient for investigation to ensure validity.

Due to the place of research is limited within Sweden, the cases been chosen are Volvo, Electrolux and IKEA, covering typical industry sectors in Sweden.

Table 1 a brief introduction of these five typical enterprises (Source: Fortune global 500 of 2007 from cnn.com)

Name	Industry	Position in Supply Chains	Revenues (million\$) 2007
Volvo	Motor Vehicles and parts	Final products	35,091.00
Electrolux	Electronics, Electrical equips	Intermediate and final products	16,382.10
IKEA	Home furnishing	Final products	27,017.10

1.5.2 Data collection methods

Data are collected via different sources: documentations, archival records. Documentations include previous studies, literatures and reports from companies. Archival records refer to computer files and records, including previously collected survey data, budgets and charts over a period of time and etc. Most companies' reports and policy, regulations are obtained through Internet on their homepages. Interviews are planned to conduct by telephone on some cases, but failed to realize due to companies non-response. However, thanks to the substantive information from case companies' homepages, it is still possible to forward the research. Information from their homepages includes reports (e.g. annual reports, sustainability reports, social and environmental responsibility reports and etc) and whitepapers (e.g. policies on sustainability and regulations in purchasing).

- **Library Study:** Through library study, theoretical background is obtained from books, journals, conference papers and scientific papers. Libraries cover the schools of economic, sustainability and logistic in Lund University, including Library of LTH, School of economics and management library, Geo-library, the IIIEE library and University Library. Main key words used in searching materials are: “supply chain management”, “life cycle assessment”, “measure sustainability”, “measure supply chain performance”, “greening supply chain”, “corporate sustainability”, “green purchasing” and so on. The course of *industry and sustainability* provides a fundamental knowledge of the research. More than 20 books are read on theory to understand the topic of supply chain management (SCM) and corporate sustainability (CS).
- **Internet search:** Internet search is important for this thesis work because it is the main data collection approach in terms of companies’ policies and strategies. Scientific papers in related fields are also collected through electronic library via Internet. The Searching starts from either *Elin* database or *Google scholar*, by the keywords above. Three rules proposed by Thuren (Thuren, 1997) are applied when making decisions of the relevant materials:
 - A selection is distorted if relevant data is withheld.
 - A selection is distorted if the person has reasons to hide how the selection was made.
 - A selection is distorted if additional data could change the general picture.

Overall more than 100 scientific papers are found relevant; some are directly referred while others are inspiring throughout the research process. 33 whitepapers on companies’ Sustainability policies, purchasing strategies, annual reports, and sustainability reports were found on their homepages. White paper materials are listed sort by companies in Table 2.

Table 2 Whitepaper List sort by companies

Company	White papers on Sustainability and Purchasing
Volvo	Car Corporation Sustainability Report, 2006 Group Vision, Mission and Value, 2006 Environmental Data, 2006 Group Code of Conduct, 2003 Group NAP (Non-Automotive Purchasing) Environmental Assessment, 2007 Key Elements Procedure 1 - General Requirements, 2007 Key Elements Procedure 2 Key Elements Procedure 3 - Production and Engineering, 2007 Key Elements Procedure 4 - Cost Management, 2007 Key Elements Procedure 5 - Environmental Requirements, 2007 Key Elements Procedure 6 - Corporate Social Responsibility, 2007 Key Elements Procedure 7 - Logistics Requirements, 2007
Electrolux	Sustainability Report 2006 Electrolux Manufacturing Data2006

	Supplier Profile Tools, 2007 Electrolux Workplace Code of Conduct Management practices 2.0, 2004 The Global Supplier Quality Assurance (GSQA) Policy and Definitions EL 29000, 2007 GSQA Policy and Definitions EL 29001, 2007 GSQA Process audit questionnaire EL 29002, 2007 GSQA Process Audit questions interpretation EL 29002A, 2007 GSQA Process Audit questionnaire - OEM version EL 29002A OEM, 2007 GSQA Preliminary Supplier Process Audit Questionnaire EL 29002 P, 2007 GSQA Supplier/Commodity quality status EL 29005, 2007 GSQA Supplier/Commodity purchasing status and on hold process EL 29005 A, 2007 GSQA Supplier self certification EL 29006, 2007 GSQA Supplier ongoing evaluation EL 2000, 2007
IKEA	Social and Environmental Responsibility Report, 2006 Social and Environmental Responsibility, 2006 Facts and Figure, 2007 IWAY Standard: Minimum Requirements for Environmental, Social & Working Conditions and Wooden Merchandise, 2002 CONDITIONS AND WOODEN MERCHANDISE IKEA'S position on Forestry, 2006

- **Interviews and communications:** Surveys were sent to 10 companies, only two of them, Ericsson A.B. and Scania A.B., have replied with minimum public information.

1.5.3 Analyzing methods

Three analyzing methods are used to analyse the data on each case separately. Comparison is the main analyzing method, including both cross case comparison and data- theoretical proposition comparison. Rival explanation is made when analyzing to eliminate other influences, for example different company history or industrial sectors may affect green purchasing strategies. When it is difficult to analyze based on the proposition, a case description is developed to identify the appropriate causal links.

System approach is taken as a mindset throughout the research including data analysis. Companies are considered as a learning organization based on system thinking, which becomes a central discipline in research of sustainability field (Stead & Stead, 2004). A system can be an open system within which there are components that can be omitted, or a closed system where no outside component can influence the system. (Abnor and Bjerke, 1997) In this case, companies and supply chains are regarded as open systems since their components are interrelated. Subsystems for supply chain are individual companies along the chain while subsystems for companies are functional sectors that add value to products (Mattsson, 1999). Although system approach is still objectively descriptions of the reality, it brings system thinking upon the reality as a creation. (Beltrame and Foresto, 2005) Fundamentally, system approach states that reality arranged in a certain way and entirety is no equal to the simple sum of its parts. The concentration of system approach is on the

interaction between the different parts in attempts to take all relevant aspects into account (Checkland, 1981). System approach serves to understand the complexity of the world. Therefore a system thinking mindset can be positive to answer this research question.

1.6. Validity and reliability

Validity is “*the best available approximation of the truth or falsity of the given inference, proposition or conclusion*” (Cook and Campbell, 1979). It requires no systematic errors, meaning the results are true and the collected data are right. Reliability is the “*repeatability*”⁵ of the result, which requires the research for no random error, that the results would be the same if the research were conducted again by different samples and data. Validity and reliability are not separate concepts but closely related (Arbnor and Bjerke, 1997). Validity of this case study is considered in construct validity, internal validity and external validity. Construct validity is improved by use multiple sources of data; internal validity is improved by explanation-building and address rival explanations; and external validity is improved by use replication logic in multiple-case studies and multiple case selection criteria. Reliability of this research might be affected because of the data are mainly from companies’ website. There might be doubt about the reliability of the companies report, but the fact that those reports are all co-generated with third party association certainly assures the reliability to some extent.

⁵ The Laymans guide to social research method (www.socialresearchmethods.net)

2. Theoretical platform

This chapter will introduce the basic theoretical concepts and models of this thesis work. After explaining the state-of-the-art in the fields of supply chain and corporate sustainability and links between them from theory, green purchasing is presented in a “why” and “how” manner.

2.1. Supply Chain (SC)

Terms like supply chain, value chain, logistics and product life cycle are used interchangeably by some scholars and companies, generating confusions in understanding issues in SCM. It is necessary to clarify the terms before research further in this field. These terms are all initialized to describe the interrelated activities around a company's products or services, from a holistic view rather than one-sided. As the author sees, these terms were brought up under a historical phase of demanding closer stakeholder relations to achieve more multi dimensional values for multiple stakeholders. Those values are not limited to economic but also on environment and society. For example, many multinational companies under the set of globalization have enclosed environment, human safety (Volvo) and Ethics (SKF⁶) as corporate value. This multiple value goal of companies results in corporate responsibility in local environment and society for their stakeholders. Similarity of these terms sometimes causes confusions. *Supply chain* and *value chain* covers similar scope and stakeholders of a product from different perspectives. In other words, ‘demand’ and ‘supply’ are functions of a firm’s position relative to other participants on the same value chain” (Sarkis, 2006). Therefore, in this report *supply chain* and *value chain* are used interchangeably. *Product Life cycle* extents the scope to inclusive use by customers, recycling and other “grave” activities of a product. Recently, *reverse logistics*⁷ as an additional value adding function complicate the *value chain* even more. Related research field is for example *industrial ecology*, referred by some as “science of sustainability”, trying to create an artificial “ecosystem” by an organic net of products. *Industrial ecology* sees one production waste as another production’s resource, based on which the *value chain* and *supply chain* could be further extended. Though “grave” activities provide more

⁶ SKF (Svenska Kullagerfabriken AB) is a Swedish bearing company founded in 1907, supplying bearings, seals, lubrication and lubrication systems, maintenance products, mechatronics products, power transmission products, customer solutions and related services globally (*source: www.wikipedia.org*).

⁷ Defined as all activity associated with a product/service after the point of sale, the ultimate goal to optimize or make more efficient aftermarket activity, thus saving money and environmental resources (Reverse Logistic Association).

sustainable choices for purchasing, this research uses *supply chain* concept to focuses on the company side activities instead of customer side.

2.1.1. Supply Chain (SC) definition

There is a wide range of definitions for supply chain, due to the multi-disciplinary origin of the term from quality control (Dale et al., 1994), integrated logistics (Carter and Price, 1993) and some others including industrial markets and networks (Chen, 2004). Some definition focus on the interrelation of the stakeholders (Christopher, 1992; Mentzer et al, 2001), some emphasis greatly on the value adding process (Lambert et al., 1998); some points out the essentials of supply chain are materials and information flows along the chain (Handfield, 1999). Based on the research objectives and scope, this research uses one of the most accepted definition from Handfield's book "*Introduction to supply chain management*" (Handfield, 1999), which points out the beginning point as "Mother earth" and ending point as "ultimate end user". According to Handfield (1999),

"The supply chain encompasses all activities with the flow and transformation of goods from the raw materials stage (extraction), through to the end user, as well as the associated information flow, material and information flows both up and down the supply chain" (Handfield, 1999, p2).

2.1.2. Supply Chain Management (SCM)

Oliver and Webber first brought up the term *Supply Chain management* (SCM) in the early 1980s (Oliver and Webber, 1992). SCM is the management of all the activities within a supply chain, from raw material extraction to end-user, to achieve sustainable competitive advantage (Handfield, 1999). SCM is defined in *Introductions to supply chain management* (Handfield, 1999) as

"The integration of these activates through improved supply chain relationships, to achieve a sustainable competitive advantages" (Handfield, 1999, p2).

Porter categorized activities within a supply chain into primary activities and support activities (Porter, 1998). Primary activities contain activities in five phases along the chain (Porter, 1985):

- Inbound logistics (receiving, material handling, warehousing and distribution, inventory control and management, demand and supply planning, order processing and etc.),
- Operations (machining, packaging and etc.),
- Outbound logistics (finished goods warehousing, material handling, delivery vehicle operations, order processing and scheduling and etc.),

- Marketing and sales (advertising, sales, pricing and etc.),
- Services (installation, repair, training, parts supply and product adjustment and etc.).

Support activities include procurement, technology development, human resource management and firm infrastructure (Porter, 1985)

The supply chain model used in this research is a combination of Porter's activities explanation and Handfield's supply chain model. Shown in Figure 2, the left part is from Weeble's value chain activity model based on Porter's explanation of activities within the supply chain (Weeble, 2002). The right part is inspired by Handfield's supply chain model including business units and three kinds of flows along these units (Handfield, 1999). Combination of these two supply chain explanations from two different perspectives highlights purchasing in the whole supply chain system. *Procurement* is used Figure 2 to refer the scope of purchasing based on Porter's argument, “*usual connotation of purchasing is too narrow among managers*” (Porter, 1985).

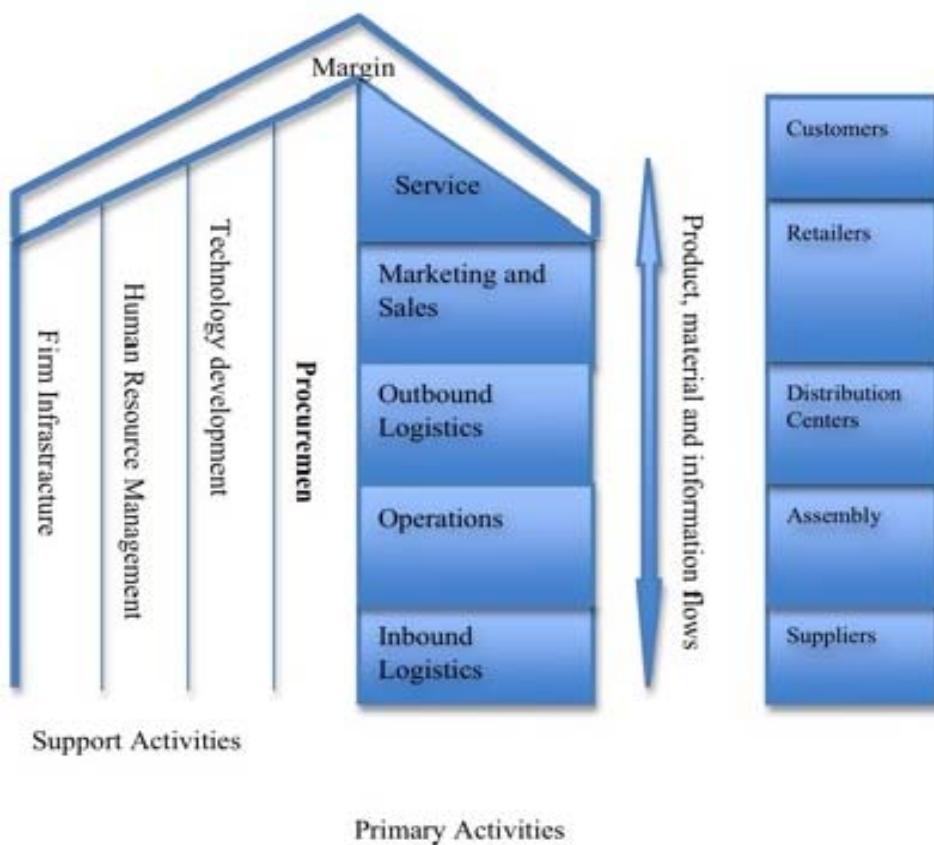


Figure 2 Procurement in an integrated supply chain model (*Inspired by Weeler, 2002 and Handfield, 1999*)

2.1.3. Purchasing and purchasing management

Purchasing is not a single activity in SCM but a function encompasses series of activities. Traditionally, purchasing refers to only buying, involving a work flow of need determination to suppliers' selection, condition specification, contract issuing or ordering arriving and delivery ensure (Weele, 2002). Purchasing management and SCM in companies has been developing over time. Purchasing management has changed its focal point throughout history: from serving the factory to achieving the lowest unit price; from co-ordinated purchasing between different business units to internal integration of cross functional purchasing; from external integration of supply chain management to value chain orientation (Weele, 2002). The ultimate goal for purchasing function is to obtain right quality items in right quantity from the right source at the right place.

Other terms (e.g. procurement, sourcing) are mixed used with purchasing, it is necessary to define the term of purchasing at the beginning of the research. In this report, purchasing is defined according to Weele's book *Purchasing and supply chain management*:

"Purchasing is obtaining from external sources all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company's primary and support activities at the most favourable conditions (Weele, 2002, p. 14)."

The main activities in purchasing function is shown in Figure 3

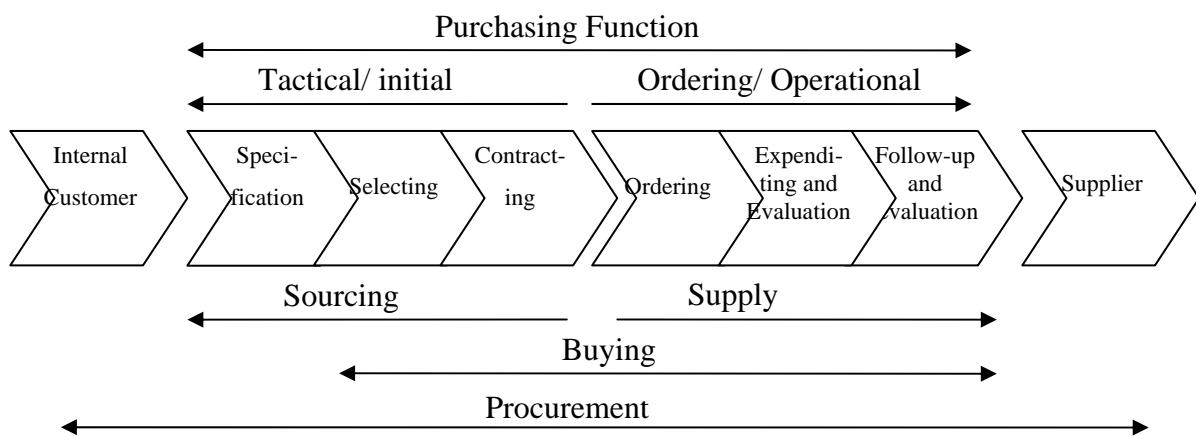


Figure 3 Purchasing process model and some related concepts (Source: Weele, 2002, p15)

Based on Weele's model in Figure 3, purchasing function in companies includes the following activities:

1. Specification: the quantity and quantity of the goods or services that are to be bought
2. Selecting suppliers: select the most suitable suppliers based on all kinds of criteria
3. Contracting: preparing and negotiating with the suppliers to establish agreements
4. Ordering: placing order according to the agreements with selected suppliers
5. Expending and evaluation: monitoring and control of the order
6. Follow-up and evaluation: setting claims, keeping product and suppliers files up-to-date, suppliers rating and ranking

Weele's purchasing function model excludes activities for material requirements planning, scheduling, inventory management, incoming inspecting and quality control. However these activities are closely interrelated with purchasing function, therefore companies purchasing strategies and frameworks often include regulations on these activities.

Figure 3 illustrates concepts related to purchasing (e.g. procurement, buying, sourcing, supply, ordering and etc.). Business uses these concepts under different occasions with overlapped boundaries. These concepts are explained in scope descending order in Table 3.

Table 3 Related concepts and differences (Source: Weele, 2002, p17)

Procurement	All activities required to get the product from the suppliers to the destinations
Purchasing	All activities for the company receives an invoice from outside parties
Buying	Exclude the determining specification step from purchasing
Sourcing	Finding and Selecting adequate suppliers
Supply	Can be either broad or exclusive
Ordering	Place purchase orders directly, without questioning the supplier's conditions.

Purchasing management is an important part in SCM on both cost reduction and product quality control. In this report, purchasing management refers to “*all activities to manage supplier relationships*” (Weele, 2002).

2.1.4. Importance of purchasing in SC

Purchasing is fundamentally important in business success in both direct and indirect manner (Weele, 2002). Direct impact shows in cost saving while indirect impact shapes in better quality,

logistic arrangements and innovation process. Indirect manner in practice is sometimes more substantial than direct saving on money. For example, an analysis of Philips in 1997 shows a 2 % saving on purchased materials and services leads to 12.1% return on net assets (RONA)⁸ improvement (Weele, 2002). Positive relationship between effective purchasing management and supply chain performance is also proved by previous research (Carr and Smeltzer, 1999). Effective purchasing management requires a cross-functional approach, involving not only purchasing department but also other business units such as engineering department. Engineers' involvement is comparatively higher in the early stages, mainly on design, construction and quality aspects of the purchase product (Weele, 2002).

2.2. Corporate Sustainability (CS)

"There is only one alternative to sustainability, unsustainability."

- Bossel H., 1999

2.2.1. Sustainability

Sustainability has without a doubt become the most urgent prerequisite for human development in the world today. Sustainability has been defined in many ways, among which the most common quoted definition is from WCED⁹ in the report *our common future*¹⁰:

"development that meets the needs of current generations without compromising the ability of future generations to meet their needs and aspirations"

Sustainable development is a concept in development paradigm rather than pure environment protection because it is, essentially, an approach for development. However it focuses on not only economic growth and production but also human condition in this generation as well the future generation (Bell and Morse, 2003). WCED pointed out in *our common future* that sustainability cannot be realized only through governmental regulation and legislations. Achieving sustainability requires balanced, complex interactions involving cooperation and competition among all subsystems on the planet (Stead and Stead, 2004), including companies. Companies, especially

⁸ RONA: Profit after tax / (Fixed assets + working capital) It is a way to measure the overall winning power and/or profitability of a company (Source: ERI distance learning centre, www.eridlc.com).

⁹ United Nation-sponsored World Commission on Environment and Development

¹⁰ Our Common Future is a report from the United Nations World Commission on Environment and Development (WCED) and was published in 1987. Key contribution of this report is the definition of sustainability development. This report lays the groundwork for 1992 Earth Summit and adoption of Agenda 21.

industrial corporations are considered to play a significant role in sustainable development because of three reasons: Firstly, they are the ultimate engines for economic growth, secondly they are partly cause of current unsustainable conditions and thirdly they have the resource to address the problems (Wilson, 2003). Many large corporations have committed to sustainable development and show concerns on sustainability issues. Corporate activates are labeled with *green* or *eco*, for example green supply chain, green purchasing and all kinds of eco products.

2.2.2. Corporate sustainability (CS)

Corporate Sustainability (CS) can be seen as sustainable development on corporate level. This term was brought up to address the change of value system in companies driven by sustainability requirements (Welson, 2003; Salzman et al., 2005). Traditionally, companies operate under government's legislations to create economic values for its shareholders. Now most companies accepted CS as a precondition for their business activities (Dyllick and Horkerts, 2002) and seek to create value for multiple stakeholders, which include not only shareholders, but also employees, customers and communities. Taking the idea of sustainability development, CS means corporation "*meet the needs of corporations direct and indirect stakeholders without compromising the ability to meet the needs of future stakeholders*" (Dyllick and Horkerts, 2002).

2.3.2.1 Theoretical ground for CS

CS identifies a realization in companies that economic sustainability alone is insufficient for overall sustainability in a corporation (Gladwin et al., 1995). From Dyllick and Horkerts' definition, CS contains three key elements: economic, social and environmental. These three elements of CS set up three capitals for companies to grow: environmental, social and economic capital. Understanding of the three capitals is important for company to understand what they are aiming to sustain. Below will explain the three capitals based on Dyllick and Horkerts's CS definition (Dyllick and Horkerts, 2002):

- **Economic capital** means debts, stocks, machinery, inventions, and reputations and so on. Applying the sustainability concept, economical sustainability in corporation is achieved by guarantee cash flow at anytime and meanwhile producing "*a persistent above average return*" to shareholders, in the form of perceived values, shareholder values and investor relations (van Marrewijk & Werre, 2003)

- **Natural capital** consist both natural resources (e.g. fossil fuel, wood) and ecosystem services (e.g. climate stabilization, water purification). Some categorize it into natural resources aspect and emissions aspect (Bennett and James, 2000; Harris in Sakis, 2006). Ecological sustainability in corporation means consume natural resources at the rate below natural reproduction and cause emissions at the rate below natural absorption and assimilation. This way, corporations will not degrade eco-system but sustain its service ability.
- **Social capital** can be both human capital and societal capital. Human capital concerns people's skills, motivations and growth while societal capital concerns public service, community health and so on. Social capital has drawn a great attention from companies recently. Many companies show their commitment on social responsibility and report their efforts on corporate social responsibility (CSR) regularly. Social sustainability in corporation can be achieved by add values to the community within which they operate.

Move towards CS requires effective management to sustain these three kinds of capitals. Experiences and theories in economy capital management mislead people's understanding on how to manage social and economic capitals. These two capitals have unique features compared to economic capital so that the way of managing these capitals has to be different.

- There are very difficult to be translated into monetary units completely. As a result, social and environmental capital cannot be substituted by economic capital completely (Dely, 1991).
- Social and environmental capitals are irreversible so that the losses of these capitals are definite.
- Social and environment capitals process in a non-linearity, meaning that crash of a certain resource or ecological service can be suddenly once reaches a certain condition.

These three features of social and environmental capital cause problems in the attempts of applying the same economic theories on environmental and social issues. For example, environmental and social accounting based on “free market” theory reduced the value of these capitals to a pricing concern of what people are willing to pay (Lehman, 1999). Later, the trail from accountability perspective provided political means to solve problems that brought up by free market model, to make corporations accountable to community (Grey et al., 1996). Laws and regulations set standards for companies in many countries for years (Salzmann, 2005). These laws and regulations help internalizing environmental and social issues into business activities. However, the endless internalizing of externalities becomes a pressure for companies because they have to ensure economic survival while dealing with environmental and social issues. This arises reasons for

companies to be involved in CS, the pursuance of which might result in corporate competitive advantages, rather than business value reduction. CS concept integrates the three capitals sustainability together within a “triple bottom line”¹¹ to drive innovations and adding values (Figure 5) (Grayson et al., 2008). CS, as an approach to pursue multiple corporate values, embodies environment and social value into the companies’ value system. Adding value to either of the three values benefits and sustains the corporation. Corporations start to realize that environmental, social and economic values are no longer opposing to each other. Though own survival in business is still the ultimate goal for each company, integrated value system will promote social and environmental considerations within business activities. Moreover corporations’ continues efforts on local environmental and social sustainability makes them the promoter among other social citizens in achieving large-scale sustainability (Grayson el al., 2008).



Figure 5 Balancing demands of investors, environment and society (source: Grayson et al., 2008, p2)

CS provides common social goals for corporation, government and civil society to work towards: economical, social and environmental sustainability (Wilson, 2003). Empirical studies have also proved the positive relation between financial performance and environmental/social performance (Salzmann el al., 2007) and CS as a great value adding opportunity for business (Lo & Sheu, 2007).

2.3.3.2 Confusions and difficulties in practicing CS

In practice, confusions of CS exist in both boundary and measuring while difficulties lie in implementation. The definition of CS embodies many issues within the concept, thus various efforts are attributed to achieve a certain aspect of CS. In fact, some scholars argues that the “one definition fits all” for CS should be abandoned (van Marrewijk, 2003), meaning that each

¹¹ A term coined by John Elkington in 1994 in "Triple bottom line of 21st century business", captures the spectrum of values that organizations must embrace – economic, environment and social. (source: www.bsdglbal.com)

organization should have its own detailed definition of corporate sustainability based on their specific concerns and intentions (van Marrewijk & Werre, 2003). The lack of normative in CS content leads to problems in measuring CS, on both what to measure and how to measure. The level of a company's activities aligning with sustainability goals is difficult based on value judgment rather than hard data (Keeble et al., 2003). *Ecological footprint*¹² has been used to try measuring CS, demonstrating useful only in the way of providing main drivers of corporate un-sustainability (Barrett and Scote, 2001). The difficulties for absolute measuring of CS lead to a tendency of relative measuring. According to Atkinson, corporate contributions to sustainability can be used to address CS measure in a dynamic manner (Atkinson, 2000). The standards of relative measuring are eco-efficiency and socio-efficiency, distinguished from effectiveness on both ecology and society. Though mere efficiency criterions might be a unilateral measuring philosophy in CS theory, it is more understandable and practical to corporations. Efficiency is a ratio, the measuring of which is to demonstrate how much a corporation has improved in sustainability performance. Corporations manage to find ways to integrate eco and socio-efficiency into its business management process. Corporations efforts on CS are marked with terms derived from business management, for example total quality environmental management (TQEM) (Zhu and Sarkis, 2004), Green supply chain management (GSCM) (Chien and Shin, 2007, Zhu et al., 2007, 2008). These initiatives make environmental and social management more compactable to existing business management systems.

Many Indicator indexes are provided by organizations to monitoring corporate performance on sustainability, for example GRI (Global Reporting Initiative) and WBCSD (World Business Council for sustainable development). Among those, GRI framework is used in many leading corporations as a guideline for corporate sustainability reporting. Though the demand and effort for standardized Indicators index in CS measuring has been for years, there are no certain standardized indicators for communicating.

Confusions exist also in the approaches of achieving CS. Currently, there are a number of overlapped theories and practices strive to address CS, such as Corporate Social Responsibly (CSR) (e.g. McGuire et al., 1988; Cramer, 2007), strategic environmental sourcing (e.g. Handfield et al., 2002); green supply chain (e.g. Sheua et al., 2005) and green purchasing (e.g. Min and Galle, 1997;

¹² Ecological Footprint (EF) is concept brought up by Rees in 1992: what urban economics leaves out uses the concepts of human carrying capacity and natural capital to develop a framework to evaluate each city's "ecological footprint". It also argues that prevailing economic assumptions regarding urbanization and the sustainability of cities must be revised in light of global ecological change.

Green et al. 1998; Sundstrom, 2005). Salzmann el al. conducted a literature review in 2005 which suggest significant lack of descriptive studies on the importance and role of CS in companies (Salzmann et al., 2005). There lacks a common recognized framework for managers to apply CS into their business agenda. There are even critics about common frameworks for all companies, arguing that CS has multiple levels and each company should choose its own ambitions level of CS within their own context (van Marrewijk and Werre, 2003). EU has financed a design research European CS frameworks aims to support corporations implementing CS in practice (Hardjono and Klein, 2004). These confusions in practice may provide an explanation for a research result by Ernst & Young¹³: among 114 companies from the global 1000, 73% confirmed CS on the board's agenda, 94% committed a CS strategy lead better economic performance but only 11% actually implementing CS (van Marrewijk, 2003).

2.3 Green purchasing

Green purchasing refers to a responsible purchasing process that accounts environmental and social consequences. It involves activities that reduce, reuse or recycle materials that express environmental preferences through the supply chain (Chien and Shin, 2007). Green purchasing seeks to provide high level of quality to ensure economic benefits while continuously decreasing destructive environment and social impacts. Purchasing function controls the goods and services entering the company, therefore it determines the items and amount of environmental and social capital consumed by business activities. “Reverse logistics” offer a new way of purchasing from reusing and recycling. Purchasing activities is also important in a sense of passing a focal company’s own standards onto its suppliers. It is argued that CS can’t be achieved if green purchasing is not integrated into it (Preuss, 2000). Many companies are using green purchasing management as an effective approach to implement CS.

2.3.1 Reasons for green purchasing

There are different reasons and approaches for companies to green purchasing. Drumwright proposed two types of reasons for companies’ engagement in green purchasing (Sarkis, 2006):

- i. Green purchasing is applied as a deliberate outcome of articulated strategies of corporate socially responsible behavior. This means that if a company takes corporate social

¹³ Ernst & Young is a large assurance, tax, transaction and advisory company, and among one of the Big Four Auditors in the world. (Source: www.ey.com)

responsibility, it normally starts green purchasing programs. This is because of the environmental and social performances of a company's suppliers can affect greatly its own performance and reputation (Bacallan, 2000). Also suppliers' information on environmental and social performances is necessary for a company to conduct a life cycle assessment.

- ii. Green purchasing is motivated by business reasons. Companies either see green purchasing as opportune or out of external restraints. Studies show potential competitive advantage firms can create through the creation of a sustainable supply chain (Markley and Lenita, 2007).

Green purchasing ensures environmental and social friendly product and services in a focal company while affects its suppliers to work on more environmental and social friendly product and services. Green purchasing passes on sustainability requirements up to upstream companies to create a green supply chain from material extractions to end-users, towards the sustain environmental and social capital throughout a product life cycle.

2.3.2 Green purchasing strategies

Green purchasing strategies means purchasing policies, framework, systems or fundamental principles that lead purchasing activities towards sustainability. There are many green purchasing strategies applied by companies, summarized as following: (Sarkis, 2006):

- a. Product content requirements: Buyers require products with desirable green attributes.
- b. Product content restrictions: Buyers require products not contain environmentally undesirable attributes.
- c. Product content labeling or disclosure: Buyers require disclosure of the environmental or safety attributes of product contents.
- d. Supplier questionnaires: Buyers ask suppliers for information about environmental aspects.
- e. Supplier environmental management system: Buyers require suppliers to have an EMS (Environmental Management System) that is certified or develop an EMS that conforms to recognized international standards (for example ISO14001).
- f. Supplier compliance auditing: Buyers audit suppliers to determine their level of compliance with environmental requirements.
- g. Supplier environmental management system auditing: Buyers audit suppliers on both compliance status and their EMSs.
- h. Buyers set their own compliance standards: Buyers develop their own standards or environmental compliance for suppliers to meet.

- i. Product stewardship: Buyers take responsibility for managing environmental effects of products throughout the product life cycle.
- j. Education and collaboration: Buyers educate suppliers about environmental issues and strategies and helps suppliers solve environmental problems.
- k. Industrial Ecology: Buyers work with both suppliers and customers to develop fully integrated system for recycling and re-use of materials within an *industrial ecology*¹⁴ framework.

Among these strategies, desired levels of buyer effort and impact on supplier behavior are different. Figure 4 shows tradeoff between the desired effort from buyer and efforts on suppliers. This figure indicates the most effective strategy on suppliers is cooperation collaboration, which also demands the highest level of buyer effort. Product content restrictions and uncertified supplier EMS require the least efforts and the least effective strategies on buyers are product content restrictions and product content requirements.

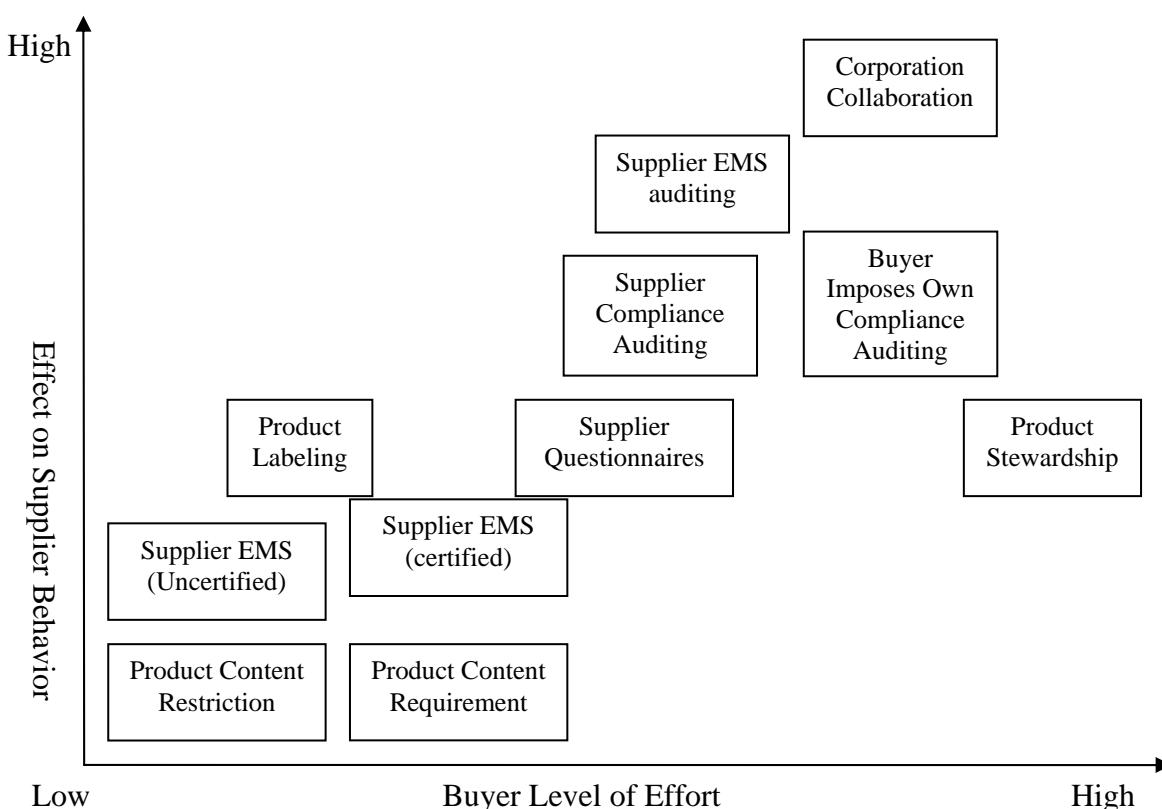


Figure 4 Green purchasing strategies: level of buyer effort in relation to impact on supplier behavior (Source: Sarkis, 2006, p34)

¹⁴ Industrial Ecology (IE) is a concept in which the interactions between human activities and the environment are systematically analyzed. IE seeks to optimize the total industrial materials cycle from virgin material to finished product to ultimate disposal of waste (Source: *Industrial ecology and global change* by R. Socolow, 1994, p23)

2.3.3 Practices on operational Level

On operational level, there are many key decisions to be made in different steps of purchasing activities. Originally, selection of suppliers are based on product's quality and cost, for example ISO 9000 regulations are widely used in companies purchasing process to assure product quality. Once companies achieve CS within triple bottom line, cost and quality of the environmental and society should be imbedded in the supplier management process. Green purchasing demands more criteria other than product's quality and cost to assess suppliers. During the purchasing process, decisions on vendor selection, vendor location, mode selection and carrier selection have great impact on environment and society (Wu & Dunn, 1995). Environment and society can be affected by purchasing function along transportation, supply, maintenance, control, contracting, requiring systematic thinking for solutions (Camm, 2001). Two common used management tools in green purchasing are explained in the following:

- **ISO 14000:** ISO 14000 is a series of international standards on environmental management created by International Standards Organization (ISO). ISO 14001:2004 is a famous and widely applied standard, providing requirements of an Environment management system (EMS) as a “common reference” for communicating environmental issues among organizations, public, government and other stakeholders. Since ISO 14001 does not specify environmental performance levels, it works only as a framework for a holistic, strategic approach to an organization’s environmental policy¹⁵. Many companies are using ISO 14001 currently to create competitive advantages in the way of allocating resources, reducing costs and driving cleaner productions (Chen, 2005). But some misconception ISO 14001 as just an extension for ISO 9001 (widely adopted quality management standards by ISO). It is an environmental standard that is compatible with and related to ISO 9001 on supplier relationships (Mezher and Ajam, 2006). Though ISO 14000 is generally accepted and used on suppliers to ensure life cycle environmental performance to support sustainability, it contains no green purchasing specifications (Chen, 2005).
- **Codes of Conduct (CoC):** CoC is defined by International Federation of Accountants (IFAC) as the “*principles, values, standards, or rules of behavior*” to guide an organization to contribute to “*the welfare of its key stakeholders*” and “*respects the rights of all constituents*

¹⁵ Source: www.iso.org

affected by its operations”. It is also recognized as “codes of ethics”. Many companies adopt codes of conduct as a symbol of taking social responsibility in its business practices since 1990s (Jenkins, 2001). Globalization makes it difficult in managing codes of conduct because of the distributed suppliers in uneven economic, legal, cultural and political status (Pedersen and Andersen, 2006). CoC is argued to be structural limited (Jenkins, 2001). Firstly they concentrate on items that affect greatest on their brand name and corporate image. Secondly codes tend to focus on particular issues regard as highly damaging. For example the Child labor is highlighted in company’s CoC because of the emotive reaction in developed countries (Jenkins, 2001).

3. Empirical data – case description

This chapter describes three cases on their corporate value system, sustainability concerns, policies for corporate sustainability and green purchasing efforts on both strategic level and operational level.

3.1. Case 1 - Volvo

Volvo is a large vehicle manufacturer and service provider, whose market covers about 180 countries around the world. According to Volvo's *Sustainability Report 2006*, CS in Volvo lies in achievement of three values: quality, safety and environment. Quality management system is certified by ISO 9001 and operated decentralized. Safety includes not only driver's safety but also work condition and contribution to efficient transport. The most concerned environmental issue in Volvo is climate change and the biggest driver for sustainability considerations in Volvo is worldwide oil depletion. Thus the main focus of their practices is on fuel efficiency. For example, Volvo Car aims to reduce harmful particulates and NO_x to zero by 2010¹⁶.

Volvo Environmental Policy 2004 identified Volvo's environmental policies on four aspects¹⁷:

1. Based on complete life cycle perspective and prerequisite principle, work with suppliers, dealers and other business partners within its policies.
2. Integrate environmental activities into all operations with all employees involved
3. Work on technical solutions (e.g. low environmental impact solutions, reduction of products' fuel consumption, exhaust emissions, noise).
4. Focus on resource efficiency by minimizing the consumption of energy and raw materials, the production of waste and residual products.

3.1.1. Green purchasing strategies

Green purchasing is an essential part of Volvo's Environmental management system, as it applies various green purchasing strategies. Volvo's website has a *supplier* portal that explains the selection process, supplier requirements documentations and supplier self-evaluation forms. According to its whitepaper to suppliers, Volvo tries to create long-term corporate relationship with its suppliers by

¹⁶ Source: Volvo car corporation sustainability report, 2006

¹⁷ Volvo Environmental policy, 2004

integration of knowledge and understandings. The buyer-supplier relationship in Volvo is no longer co-operation but integration. Based on the requirements documentations, Volvo's green purchasing policies are summarized into the following categories:

- Product content Restrictions: Chemicals or materials from suppliers must fulfill the requirements restricted by Volvo Black and Grey lists¹⁸.
- Supplier environmental management systems: ISO 14001 or EMAS (Eco-Management and Audit Scheme)¹⁹. 90 % Volvo's product material suppliers adapt ISO14001 certification by 2006²⁰.
- Product Content Labeling or Disclosure: suppliers are asked to report specified chemical and material content of component parts on requirements.
- Supplier questionnaires: Suppliers are asked to report on their environmental work and provide all kinds of environmental related data for Volvo to enable environmental assessments (for example Life Cycle Assessment).
- Supplier compliance auditing: Suppliers are required to comply with applicable environmental legal requirement; suppliers are responsible for planning and choosing packing materials, handle excess and rejected materials to minimize environmental impact as well as their respective sub-suppliers for deploying these requirements through their supply chain.
- Education and Collaboration: Training program which proved effective in promoting local supplier in developing countries to move towards sustainability (Ivasson & Alvstam, 2004).

3.1.2. Green purchasing practices towards CS

According to the supplier portal, Volvo's white papers on purchasing are specified into general requirements, quality requirements, production and engineering, cost management, environmental requirement, corporate social responsibility and logistic requirements. Based on these white papers, purchasing process in Volvo is summarized in Table 5

¹⁸ Volvo Black and Grey list are lists of banned list and restricted list of chemicals.

¹⁹ EMAS - the Eco-Management and Audit Scheme, is a voluntary initiative designed to improve companies' environmental performance (www.emas.org.uk).

²⁰ Source: Volvo car corporation sustainability report, 2006

Table 4 Volvo's purchasing process (Source: summarized from Volvo's white paper from webpage: www.volvo.com/suppliers)

Purchasing activities	Requirements	Contents Explanations
Selecting	Request for information (RIF)	General data of company, product and services
	Evaluation	Evaluate results of RIF to determine potential candidates
	Request for quotations (RFQ)	Suppliers are invited to quote on Volvo parts
	Selection	After RFQ answers and the suppliers profile
Contraction	Volvo Purchasing Agreement	Unified documents applied to all suppliers
Expediting and Evaluation	Evaluation Criteria	Four level ranks criteria include environment, quality, logistic, sourcing and so on
Follow up evaluation	Summary of result	Suppliers with low rank is asked to submit an improvement plan

Volvo has a series of white papers specifically for logistic requirements. Volvo's supplier evaluation is based on a questionnaire regarding to suppliers EMS implementation status and other requirements. Each criterion has four level scores. Supplier's performance is based on its overall scores. CoC to monitor and evaluate suppliers contains:

- Environmental: Resource Efficiency, Precautionary principle, Environmental impacts;
- Social: Human Rights, non-discrimination, labor and work environment

3.2. Case 2 – Electrolux

Electrolux is a world leading households' appliance company, whose market covers more than 150 countries. According to its whitepaper on business value, there are five values on Electrolux agenda to achieve in their business: cooperation, people development, environmental concern, professionalism and speed.

According to Electrolux white papers, the most concerned environmental issue in Electrolux is also climate change. They propose two options to address climate change: by reduce CO2 emission and by improve energy efficiency. The main goals for their environmental practices are to reduce CO2 emission, water pollution, and solid waste and to improve energy efficiency. They work on social aspects of human rights, health and safety. Electrolux have established a social responsibility committee as a management institution to control local communities related to their business activities. EMS in Electrolux is based on ISO 14000, ISO 9000 and their own-build ALFA (Awareness-Learning-Feedback-Assessment) management system with a life cycle consideration.

According to *Electrolux Sustainability Report 2006*, Electrolux has more than 4000 suppliers with an increasing purchasing share from low-cost countries (for example China, Brazil and India). Due to poor local laws, they pay specific attentions on SCM to ensure environmental and social performance in these countries. Electrolux adopted CoC to improve local robust, transparent corporate governance system, health and safety conditions in manufacturing along the supply chain and quality of life. According to its Sustainability Report, their effort on China's suppliers can affect supplier's own supply chain on environmental and social performance, thus extent the effect to local community.²¹ Electrolux adopts four groups of CoC under different conditions: Codes of ethics, Workplace CoC, Policy on countering corruption and Bribery and environmental policy. Their CoC for suppliers covered following aspects:

- Environmental: environmental compliance.
- Social: Child labor, forced labor, health and safety, non-discrimination, harassment and abuse, working hours, compensation, freedom of association

3.2.1. Green purchasing strategies

Two main strategies used are by Electrolux in green purchasing:

- Product content restrictions: They have restricted environmental list to restrict hazard chemicals of products and services from suppliers.
- Buyers set their own compliance standards: They built their own management system ALFA to communicate, support learning and assess suppliers' performance on workplace codes of conduct.

3.2.2. Green purchasing practices towards CS

Electrolux's strategies towards CS are integrated along the purchasing process. Electrolux applied a global supplier assurance policy consists a package of purchasing whitepaper, a clear and strict system for assessment, monitoring, classification selection and a uniform handling of supplier's quality activities²². These documents put requirement on suppliers within all activities along purchasing²³. CoC in Electrolux are documented clearly involves responsibilities from three types

²¹ Electrolux sustainability report 2006

²² Electrolux global supplier quality assurance system: Policy and Definitions EL29000, 2007

²³ *Electrolux Workplace Code of Conduct management practices*, Electrolux group environmental affairs, September, 2004.

of groups: group purchasing, operating units and business sectors. Table 6 shows requirements on its suppliers along purchasing activities and responsibility group.

Table 5 Requirements and responsible group in purchasing activities (Source: Electrolux, Sep, 2004)

Purchasing activities	Requirements	Responsibility
Specification	Products are specified as “local” and “common” component to clarify responsibility.	N/A
Selecting	Supplier’s ability to meet CoC	Operating units and Sector purchasing
Contraction	CoC integration, standard form	Operating Units
Expediting and evaluation	Several criteria’s to assess suppliers performance concerning quality, price, environmental performance and etc.	N/A
Follow up evaluation	Compliance monitoring and Non-compliance record documentation	Operating units and sector purchasing

Purchasing process is based on a clear and strict documented assessing and monitoring system (Figure 5)

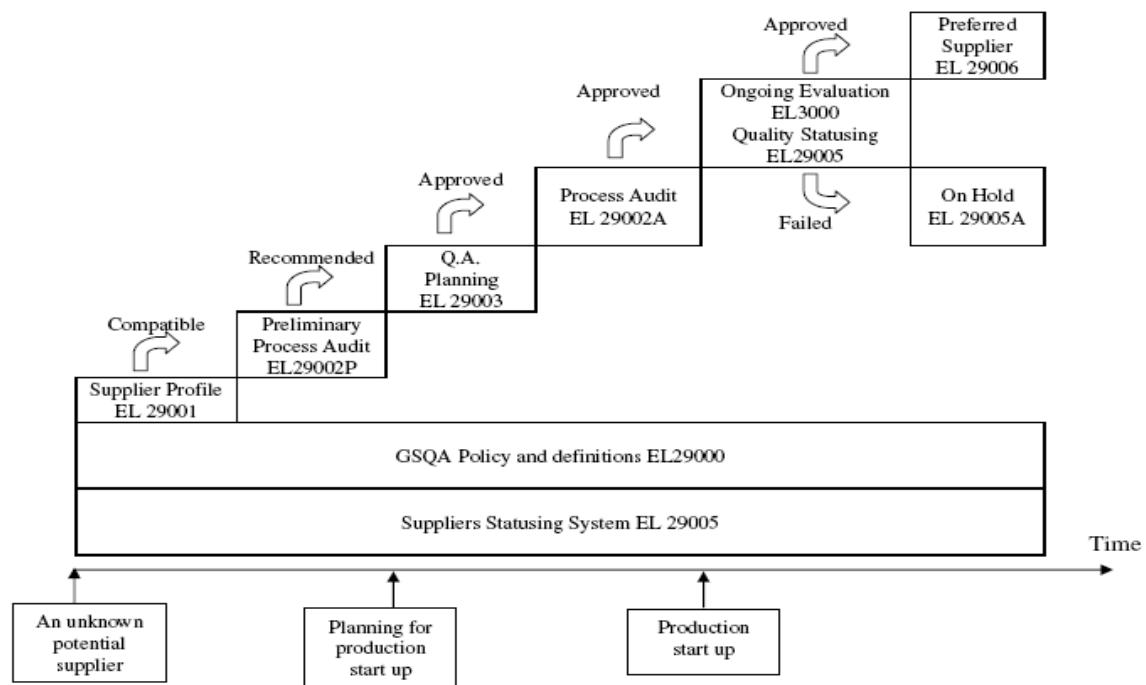


Figure 5 Supplier assessing and monitoring process in Electrolux (source: Electrolux global supplier quality assurance system, 2007)

Supplier assessing and monitoring process consists of several procedures from gathering unknown supplier's information to self-certification of a well-performed supplier. Each procedure is based on a white paper explained below (Source: Electrolux global supplier quality assurance system, 2007):

- EL 2900 is a questionnaire for supplier primary assessment, consisting business philosophy, long-range strategy, environment and communication. Only companies who meet standards on those basic topics are possible to be recommended to the next assessment stage.
- EL 29002P is short initial potential suppliers assessment on quality and purchasing personnel.
- EL29003 is used to ensure the capability of product quality and reliability.
- EL29002A is a management system based on ISO 9000 to ensure suppliers consistent quality.
- EL3000 is for continuously evaluation of suppliers
- EL29005 is the classification process based on EL3000 into Green, Yellow and Red.
- EL29006 and EL 29005A is then based on the classification: green suppliers are purchasing approved, yellow suppliers are purchasing active and red suppliers are purchasing on hold or purchasing disqualified.

During purchasing, sustainable transportation is also on Electrolux's agenda. According to Electrolux sustainability report 2006, though transportation mode selection is most preferably rail, sometimes it is impossible because of bad rail-connected suppliers destinations, demand for faster deliveries, pressure on lead times and unsatisfied rail service.²⁴ *Electrolux Sustainability Report 2006* encloses a detailed sustainability indicators index of its own, which is explained in Table 7:

Table 6 Sustainability Indicators in Electrolux (Source: *Electrolux Sustainability Report, 2006*)

Economic indicators	Net sales Distribution of value added by stakeholders Operating Income Distribution of Group Avenue	
Environmental Indicators	In product	Green Range(1) Fleet Average(2) Phase out of substances with ozone depletion and global warming potential (3)
	In operations	ISO14001 certification Direct material balance Energy consumption/added value Treated water added value CO2 added value Transportation
Social Indicators	Employee in relation to net sales Number of employees per net sales Employee by geographical area Health and safety	

There are three unique indicators in the index within product related area:

²⁴ Electrolux Sustainability Report 2006

- (1) *Green range* is defined as the top products in each product category and its criteria are made stricter each year to reflect improvement. The most efficient products account for a higher share of gross profit, reflecting consumer awareness that life-cycle savings from lower electricity costs offset higher purchase prices.
- (2) *Fleet Average* shows the relative improvement in energy-efficiency of the various product groups each year using an energy index.
- (3) *Phase-out of ozone-depleting and global warming substances*: Means percentage of free chlorofluorocarbon (CFCs) products, which as a refrigerant or in insulation is prohibited in most markets including the EU and the US.

3.3. Case 3 – IKEA

IKEA is a largest home furnishing company in the world, owning 45 trading service in 31 countries and 1350 suppliers in 50 countries. Main competitive advantage of IKEA has been low price. Their business value is to benefit people by low price product with high quality. IKEA was critics by media in 1980s for its environmental and social conflicts, mainly on wood sourced and chemicals like PVC (Reeve & Steinhausen, 2007). Since then IKEA made environmental issues a central role of its business strategies and started sustainable purchasing strategy. CoC has been introduced to all suppliers' agreements. They have built partnerships with many well know organizations in environment and sustainability field, including WWF (World Wide Fund for nature)²⁵, BSR (Business for social responsibility)²⁶, GC (Global Compact)²⁷, Forest Stewardship Council²⁸ (FSC) and etc. These partnerships show their commitment to social and environmental sustainability. For IKEA, commitment on sustainability is a necessity to rebuild its brand name and business reputation.

IKEA's mainly focus is on environmental issues of climate change and sustainable forestry. Efforts they make to address these two issues include sustainable products design, material use, energy

²⁵ The World Wide Fund for Nature (WWF) is an international non-governmental organization for the conservation, research and restoration of the natural environment,

²⁶ Business for Social Responsibility (BSR) is a global, nonprofit organization that helps member companies to achieve business success while respecting ethical values, people, communities and the environment (www.bsr.org).

²⁷ The Global Compact is a framework for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labor, the environment and anti-corruption (<http://www.unglobalcompact.org/>).

²⁸ Forest Stewardship Council (FSC) is an international network promoting responsible management of the world's forests.

efficiency, emission reduction, forest management and efficient transportation. IKEA has social concerns on child labor, human rights and health in local community.

3.3.1. Green purchasing strategies

According to its purchasing whitepaper, Green purchasing in IKEA means looking at “*what purchasing has to be made*”; “*products are made of*”, “*where they come from*”, “*how they were made*” and “*how they will be disposed*”²⁹. Strategies for green purchasing in IKEA include:

- Product Content Restrictions: Suppliers must abide by restrictions or prohibitions for chemical stated in IKEA’s specification of chemical compounds and substances.
- Product Content Labeling: Supplier should ensure all containers of chemicals are labeled with appropriate danger symbols.
- Buys set their own compliance standards: IKEA start-up requirements include labor and wood type condition restrictions.
- Supplier Compliance Auditing: Evaluation for foresters are highlighted in IKEA’s purchasing management. IKEA launched its own Forest tracing system enables annual report from suppliers on all wood resources. Then classify forest suppliers by this record, followed with a number of forest supply chain audits on selected suppliers’ supply chain till its origins. IKEA has launched a long-term forest project with its direct suppliers in wood sourcing countries.

3.3.2. Green purchasing practices towards CS

IKEA has its own system of CoC for purchasing home products, namely the IWAY (IKEA way on Purchasing Home Furnishing Products). IWAY standards describe the minimum requirements on social, working conditions and environmental demands at suppliers. According to *IWAY standards*, Green purchasing involves following purchasing functions:

- Monitoring and evaluation process is in charged by three groups of auditors: their own auditors, compliance and monitoring group who train auditors and third party auditors. It is conducted on a regular basis, both noticed and unnoticed.
- Follow up evaluations are for non-compliance suppliers. Long-term relationship with suppliers will be terminated due to several times non-compliance. Asia supplier CoC fulfillment rate has

²⁹ GVRD (Greater Vancouver Regional District Policy & Planning Department): IKEA sustainable purchasing guide

dropped greatly from 80 % to 69 % in 2006, reflecting a strict judgment in Asia³⁰. Criteria for IKEA's purchasing evaluation are illustrated in Table 8:

Table 7 IKEA's Supplier evaluation Criteria (Source: IKEA, 2006)

Environmental	Emissions, ground contamination, chemicals, waste and hazardous waste, forestry and fulfillment of IKEA legal demands, forestry and routines for procurement of wood
Social	Legal compliance, fire prevention, workers' health and safety, dormitories, wages and overtime, child labor, forced and bonded labor, discrimination, freedom of association and collective bargaining, harassment and abuse
Others	Continuous improvement

IKEA social and environmental responsibility report 2006 lists key indicators for sustainability in IKEA: renewable material used, waste recycled or reused, recovered or reused products, organic food, energy consumption in operation, renewable energy percentage, CO2 emissions per kilometer transportation, fulfillment of minimum requirements by transport suppliers, customers traveling by public transportation and suppliers meet CoC requirement environmental.

To summer up the data, each case company has its own business value, management policy, supplier requirements and purchasing process: Volvo and Electrolux adopted a comprehensive purchasing process while IKEA has its IWAY standards. CoC are used as an effective tool in all case companies. Case companies CS indicator metrics are also distinguished from each other in both scope and contents.

³⁰ IKEA social and environmental responsibility report 2006

4. Data analysis

This part analyzes data by make comparisons horizontally (between companies) and vertically (between theory and companies' practices). The outcome is to identify the gap between theory and practice and provide explanations.

4.1. Diverse green purchasing practices

Three cases (Volvo, Electrolux and IKEA) represent three industrial sectors (Automobile, households' appliance and home furnishing) on their green purchasing strategies and practices. There are some common strategies as well as unique ones. The management system and managing tools, participating business units for green purchasing are all different. What reflected from their respective management mode, value system, and sustainability concerns are different understandings of CS by the companies.

4.1.1 Strategic level green purchasing comparison:

Green purchasing strategies, that are different in buyer effort and supplier effect, are used in different companies. Strategies adopted are summarized in the table 9.

Table 8 Strategies adopted by in companies

Strategies	Companeis	Volvo	Electrolux	IKEA
Product content Restrictions	✓	✓	✓	
Product Content Labeling or Disclosure	✓		✓	
Supplier environmental management system	✓			
Supplier Questionnaires	✓			
Supplier compliance auditing				✓
Buyer set their Own Compliance standards	✓	✓	✓	
Education and Collaboration	✓			

Illustrated from Table 9, all three companies are using their own compliance standards on suppliers. The explanation of this can be the companies' positions in the supply chain. Their positions enable them the biggest power as well as the biggest responsibility along the supply chain. Large companies like Volvo, Electrolux and IKEA have great power over it's product supply chain than other companies, there efforts should also be greater than other companies along the chain. A survey on major corporations on their implementation of sustainable supply chain management (SSCM) found that the best performing corporations are the ones who own the most power over the

supply chain (Charter et al. 2001). The position also means the most business risk in brand reputation because customers and other stakeholders do not distinguish a company and its suppliers (Bacallan, 2000). To minimize risks, they take the most control of the supply chain to ensure on environmental and social performance. Own compliance standards are easy for companies to manage its suppliers by taking control in its own preferable way. Different ways also distinguish them among its competitors. All companies use product content restrictions because it is the least buyer effort demand strategy in theory. The most effective strategy in theory is education and collaboration is only partly adopted by Volvo in the way of supplier training on environmental and social sustainability. Considering the high-level buyer effort this strategy demands, it is understandable that few companies educate and collaborate its suppliers. Volvo's supplier relationship may relate to its shade interest in this strategy.

4.1.2 Operational level comparison

All three companies have their own purchasing management process to put requirements on suppliers along purchasing activities. The most focused activities are selection, evaluation and follow-up evaluation. There are often pre-selection requirements on suppliers to add certain environmental or social restrictions as a requisition. Transportation is also considered in all companies in mode selection. IKEA even consider transpirations for its customers by picking up the best store site.

CoC are the main tools in operational level practices. However, it has limitations on both the contents and the way of implementation. There is a clear diversity of CoC content in companies and most CoC covers only limited scope on addressed issues and limited human rights and benefits. Among the companies, only Electrolux integrate CoC in its purchasing management system, applying different CoC within different procedure. Volvo's CoC demonstrate only its business ethics without detailed requirements. IKEA's CoC has a greater focus on social issues on labor and safety, but without implementing approaches. IKEA is the only company who has third party auditor in monitoring process to ensure the reliability of supplier performance outcomes.

Since CoC is the interface of focal company to its suppliers, different CoC items and requirement shows directly the different efforts each case has made. CoC in Volvo is comparably vague with limited environmental and social criteria. What Volvo actually focuses on is technological solutions for energy efficiency to achieve eco-efficiency, as the company claimed on its sustainability report.

Volvo's CEO Lief Johansson noted two major ways to address climate change in 2007 European transport Forum: “*by switch to cleaner alternative fuels and by using less whatever fuels are used*” (Leavitt, 2007). Volvo has been working on cleaner fuels deliberately and proposed seven fuel options to cut emissions (Leavitt, 2007).

IKEA focuses on ethics and social issues greatly because of reputation damage from social issues it suffered in the 80s. IKEA's cheap price marketing approach is based firmly on its cheap labor in low cost countries. Therefore the social and environmental performances in low cost countries affect greatly its reputation and markets. This explains the great efforts they made on partnerships with various associations. Third party authorities can improve reliability in the management process to its customers and stakeholders. Clearly IKEA has been working on its social image and reputation, but this motivation might not be enough for IKEA to move towards sustainability. IKEA's CoC barely touched environmental issue, indicating separate management of environmental and social issues in IKEA. Also seen in its business whitepaper, safeguarding its reputation by reduces harm local impact has not change its main business goal of cheap price.

Electrolux has the most complete, detailed and clear operational purchasing management system among the companies. They have a whole package of CoC used in different phases of purchasing management to suppliers under different conditions. Electrolux brings in other business units other than purchasing department for decision-makings along the purchasing process. Clear responsibility and clear structured process makes the supplier selection more transparent.

4.2. Gap between theory and practice

Though companies are trying to green purchasing to improve environmental and social performances, they adopt different approaches and methods in doing it. Though sustainability appears on their business agendas, business goals of purchasing in these companies are not quite what CS required. The arguments of CS defined differently within each company's context provide the chance for company's commitment, but at the same time cause reliability problems because it allows corporations to have its own sustainability indicators or value systems or even level of satisfaction on specific indicators. For example Electrolux have three unique indicators (Green range, fleet average and phase-out of ozone-depleting and global warming substances) highlighted in its sustainability report.

4.2.1. Gap in Value system

Value system in a corporation determines directly what issues it concerns and how many efforts it may want to make on each issue. Three case corporations' claims different value system of their own (Table 10).

Table 9 Value system Diverse in case corporations

Volvo	Quality, Safety, Environment
Electrolux	Cooperation, people development, environmental concern, professionalism and speed
IKEA	Togetherness, Cost consciousness, Respect, Simplicity

Theoretically, the value system of a corporation should be Economic, environment and society, whose maintain determines a sustainable corporation. Practically, only Volvo adopts a similar value system concerns quality for economy, safety for society and environment. Electrolux has five values on environment, corporate governance and society while IKEA has no specific value system towards corporate sustainability. IKEA focuses on cost efficient and social effectiveness, without a systematic approach towards CS. What triple bottom line means to corporation is unclear and the interpretation of the strategic value creation into practical efforts is also confused. Though Volvo, Electrolux and IKEA all committed to sustainable development, they differentiate value system and all other management systems and regulations based on the value system.

4.2.2. Gap in CS Indicators

Case companies have different sustainability indicator index from each other and from their CoC criteria respectively. Reflections on these indicators are:

Firstly indicators in corporations are distinguished in different context based on business goals that relate to business values. In theory, to achieve CS, indicators should imply the ability and level of sustainability of three capitals instead of improvement oriented. Relative improvement, as most companies are trying to demonstrate, does not necessarily mean moving towards sustainability. Electrolux has three unique indicators to show their improvement, "green range", "fleet average" and "Phase-out of ozone-depleting and global warming substances". These indicators might be questioned in its reliability. For example, "green range" means top products percentage in each product category. It is questionable in the way that top products might not be equal to environmental and social preferable products. An improvement of "green range" might mislead consumers on the concept level.

Secondly, CS indicators should contain both lagging and leading indicators to be effectively used in corporation management (Tenzil and Beloff, 2006). Lagging indicators reflects past while leading indicators predict the future. Due to the non-liner and inevitable nature of environmental and social capital, perditions are extremely difficult. This might explain to some extent why CS indicators of the companies focus mainly on lagging indicators.

Thirdly, the gap between sustainability indicators and CoC criteria reflect the missed link in green purchasing and CS. Though theoretically green purchasing is an ideal approach to achieve CS, this missed link would result in week green purchasing practice even under a high commitment to CS or Sustainability. The reason of this missed link could be un-awareness of know-how and unclear the value system or insufficient effort on suppliers.

4.2.3. Eco-efficiency and Socio-efficiency

Most companies have committed to operate towards sustainability. But few clarify their commitment level on social efficiency. All case companies set eco-efficiency as a principle for their business, as if it stands for CS entirely. Socio-efficiency, as an important aspect in sustainability is left out somehow in their agenda, despite the strong theoretical argument on socio-efficiency as an element of CS. Linking to theory, this left out agrees with theoretical difficulty of CS measuring. Relative measuring is emphasis in companies because of its measurability, compared to absolute CS. Stead and Stead argued in the book “sustainable strategic management” for a demand of social-efficiency as a perquisite of achieving sustainability (Stead and Stead, 2004). Dyllick and Horkerts suggest a CS model include six criteria in Figure 6.

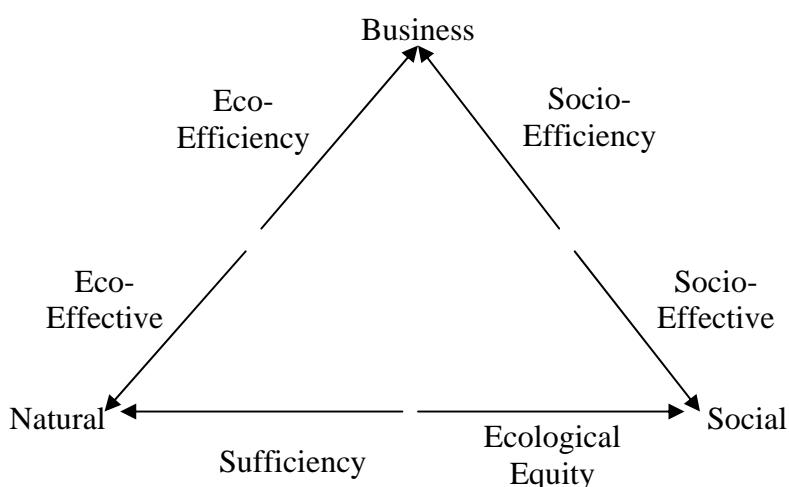


Figure 6 Six criteria of CS (Source: Dyllick and Horkerts, 2004)

Based on this model, eco-efficiency is just one side in related to nature. Eco-efficiency can't fulfill all sustainability goals, for example biological resources, long-term production capability of soil, and animal ethics (Stead and Stead, 2004). Socio-efficiency means minimize social impact per value adding in the corporation. This is under a scenario of closed value chain which embracing absolute rights and limits of human capital and social capital. Closed value chain is a concept seeing the earth as a living system, where the basic system is individual human beings, who is the dominant actor influencing the ultimate state of society and nature. The most valuable resource capital is people's interaction that accumulate after been used. Positive forces for this living system are innovation, continuous improvement, diversity and everything that brings in value. People are the core that drive and extend this system. Issues brought in by socio-efficiency include not only child labor, human rights, but also human capital expansion, disease, economic justice and over-consumption of resource in the north, preservation of indigenous cultures and so on (Stead and Stead, 2004). Compared to these issues, social issues highlighted in companies are too limited.

Moreover, socio-effective is even far beyond reached by companies' current social efforts. Social effective requires absolute positive social impact of a company, instead of relative improvement, as what companies are aiming to achieve currently. Socio-efficiency may lead to small-scale social excellence, but fails to provide equality on a large scale (Dyllick and Hockerts, 2002). For example, IKEA's efforts on local operators might help to address human rights, child labor issues to some extent, but not possible to provide sufficient good quality products for poor countries, no matter how cheap the price is.

Figure 6 shows other three criteria that are commonly ignored by corporations: eco-effective, sufficient and ecological equality. Eco-effective is different from eco-efficiency in its absolute requirement. Eco-efficient products may be low-price, which might introduce more consumption. Sufficiency is another criterion on consumption, related to individual choices and ecological equality is stands for balancing the management of natural capital and social sustainability (Dyllick and Hockerts, 2002). If the products is relatively efficient but still sells at a market price that lower than what it cost, then this eco-efficient product is no eco-effective and has been accumulating negative impact. For example, Volvo's rely on technological innovations and Ikea's low price more sell goals might end up in bad performance in eco-effective and sufficient. Ikea's separate management process on environmental and social performance might risk a problem of ecological equity. Regarding to these six criteria of CS, companies' performances are far below CS.

5. Conclusions and Recommendations

This chapter will conclude on the key findings of the research. Based on the analysis, some recommendations are made to improve green purchasing implementations in companies. Limitations are discussed and further research areas are suggested at the end.

5.1. Conclusions

This thesis work investigated on three Swedish large companies on green purchasing practices towards CS. This investigation shows efforts of large companies towards CS through various green purchasing approach. There appears a lack in a common green purchasing frameworks and implementation approaches. The most commonly used requirements – CoC, is questionable in many ways. Business values as a base for corporations' activities are not all origin from triple bottom line. Moreover, as labelled in some companies, companies are greening purchasing towards sustainability by achieving eco-efficiency, which is only one aspect of CS criteria in theory. The missed link between CS measuring and green purchasing criteria might be the reason of these gaps. A general framework to integrate six CS criteria with purchasing criteria is suggested.

Through literature review and case study, the research enhanced understandings of how companies working with sustainability issues, explored the current state-of-the-art knowledge in the field of green purchasing and CS in companies, analyzed main policies, strategies and how those strategies are implemented. By linking CS and green purchasing together, the gaps on understanding level and operational level is pointed out and discussed. The descriptions of the gap lead to recommendations and further researches to better implement green purchasing for companies to move towards CS.

5.2. Recommendations

Based on the analysis above on gap between CS theory and green purchasing practices, some recommendations are provided below on companies, third party authorities and government.

- **Clarify value system:** A sustainable value system should be clearly stated and adopted in a company to ensure it's all strategies and activities towards sustainability. If a company fails to understand the triple bottom line in sustainability, they may risk one-sided sustainability. Clear value system will shape their sustainability indicators but not necessarily detailed sustainability indicator index, thus leave company a space for own approach or concept built.

- **Third party authority involvement:** Companies green purchasing practices based greatly on own auditing and self-assessment. It is hard to tell the real implementation situation, especially in developing countries where lacks legislation and corruption happens normally. Third party authority from reliable associations or NGOs can provide non bias auditing and same level requirement.
- **Fill the theoretical gap:** In terms of the missed CS criteria in corporations, there should be theoretical instructions, governmental policies or expertise education and consults to companies to address all CS criteria.

5.3. *Limitation and future research areas*

Due to time and resource limits, this thesis work is just a tip of the iceberg. The main limits might be the lack of direct communications with corporations and small case numbers. Future research areas could be the following: Firstly on value system built in companies, for example what values can best imply sustainability bottom line while adoptable to companies; How to make this value transition happen. Secondly on institutional built, how to involve more third party auditing while maintain great governance? Find out effective and clear CoC implementing process, preferably capable to be universal. Thirdly, analyze on current green purchasing process to build a green purchasing framework for companies to easily adopt green purchasing idea. Lastly, there is a theoretical blank field and in addressing ecological equality. Explorations on how to equally manage natural capital and social capital is important to complete the theoretical foundation of CS.

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