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Improving the Supplier Sustainability Evaluation Process for the Energy Company

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The brave choice I made to pursue a Master's degree still surprises me. What motivated to start this study was the talented and pleasing faculty at Metropolia UAS. Master's degree in Industrial management at Metropolia UAS has very inspiring people there. If not for them, I would most likely never have considered pursuing a Master's degree. I want to thank everyone who has contributed to this thesis, including those who have helped, inspired, supported, and challenged me on my way.

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<p>The thesis focuses on supplier sustainability evaluation. The objective of this thesis is to improve the Supplier Sustainability Evaluation (SSE) part of the Supplier Evaluation and Selection (SES) process conducted by the Procurement team of Oil and Gas Sector of the case company. The case company is one of the biggest EPCM (Engineering, Procurement, Construction and Management) companies in India that increases its focus on sustainability compliance of its suppliers. As part of the current supplier sustainability evaluation, this thesis suggests improvements to the current process and proposes a relevant tool.</p> <p>To achieve this objective, this thesis first evaluated the current supplier evaluation and selection process conducted by the Engineering and procurement team and the Business Unit, as well as analyzed the current supplier sustainability evaluation part which falls under responsibility of the Engineering and procurement team. Based on the identified weaknesses, literature and best practice from energy companies was explored. The proposal for the improvements to the current supplier sustainability evaluation combined the findings from the current successful practices at that case company with the suggestions from literature and best practice, and further developed the improvements based on the stakeholder's suggestions.</p> <p>The outcome of this thesis is an improved Supplier Sustainability Evaluation (SSE) part of the wider Supplier Evaluation and Selection (SES) process at the case company. As mentioned in the company's 'Sustainability report 2017', the company plans to implement the software for sustainability evaluation and implementation by 2020 (as part of the Supplier Evaluation and Selection process). This thesis work helps to achieve this target and also to meet the end customer requirements who are increasingly concerned with sustainability.</p>	
Keywords	Sustainability, Supplier sustainability evaluation, supplier selection process, business continuity

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Acronyms

BU	Business Unit
EPCM	Engineering, Procurement, Construction and Management
CF	Conceptual Framework
CSA	Current State Analysis
DSSI	Dow Jones Sustainability Index
GRI	Global Reporting Initiative
HSE	Health, Safety, and Environment
ILO	International Labor Organization
ISO	Organization for Standardization
KPI	Key Performance Indicator
NGO	Non-Government Organisation
OTD	On-Time Delivery
QA	Quality Assurance
QC	Quality Control
QM	Quality Management
SD	Sustainability Development
SSE	Supplier Sustainability Evaluation
SES	Supplier Evaluation and Selection
UN	United Nations

1 Introduction

A growing number of companies are treating "sustainability" as an important objective in their strategy and operations and related to growth and global competitiveness. Top management of the companies are often motivated to implement sustainability practices for several reasons such as corporate responsibility, reducing environmental foot print, reducing emissions, showcasing sustainability initiatives through sustainability reporting, gaining legitimacy in the society, and conforming to pressures from various stakeholders. The result of adopting sustainability practices extends beyond the principal company to its suppliers, thus making the entire upstream supply chain into a sustainable supply chain. In line with these latest developments, this Thesis investigates the ways in which the case company in the energy EPCM (Engineering, Procurement, Construction and Management) sector implements supplier evaluation from a sustainability perspective.

For the case company, it has become vitally important that it is able and successful in implementing sustainability practices as it has a direct influence on its mission and customer requirements in the EPCM projects. The case company, however, cannot succeed alone in adopting sustainability practices, and it is essential to bring its supplier base into the sustainability umbrella in order to gain significant results throughout its supply chain such as (a) improved environmental impact, (b) optimum utilization of resources, and (c) increased operational efficiency by reducing costs and waste. In addition, the compliant sustainability practices give the ability to reach to new customers and increase competitive advantage. Finally, these practices also protect and strengthen the brand reputation and build public trust resulting in increasing long-term business viability.

This thesis explores the current practices involved in the supplier evaluation and selection process in the Gas and Oil Department of the case company, especially focusing on the supplier sustainability evaluation. The significance of this topic can be further echoed by a recent UN quote related to the situation globally: "There is no 'Plan B' because we do not have a 'Planet B.' We have to work and galvanize our action." (Source: UN 2015)

1.1 Business Context

The case company of this Thesis is a construction company, India's largest construction organization, ranked among the world's top 30 contractors. It has approximately 4000 employees. Over the past seven decades, the company has been involved in doing Engineering, Procurement, Construction, and Management (EPCM) projects with global operations. The company's capabilities span the entire gamut of construction - civil, mechanical, electrical and instrumentation engineering - and its services extend to all core sector industries which includes in Oil and Gas sector, Mining, Power, Water treatment and other industries. The company either provides EPCM or 'Turn-key' solutions, or builds some facilities (for example, particular units such as a cooling plant in a nuclear plant, rigs for a petroleum offshore station), or does revamping projects. They also do maintenance of these facilities, as needed by the customers.

The supplier sustainability evaluation (SSE) is the part of the wider Supplier Evaluation and Selection process (SES) conducted by the Procurement team of EPCM contractor in the energy sector. Here, the mission of the case company and the interest of customers are in line with ensuring the supplier in various areas of sustainability compliance.

To comply with sustainability requirements, currently, there are some sustainability compliance elements captured as part of the wider Supplier Evaluation and Selection process (such as corporate responsibility, codes of conduct, HSES etc.). However, current practices are somewhat *ad hoc*. It was already noticed in the Procurement team that current practices, for example, miss to take into account such sustainability variables as recycling index, material reusability, responsible production and consumption, and possibly some others among those stated in the Global Reporting Initiative (GRI) recommendations on sustainability evaluation. Hence, the case company was eager to investigate the current practices in order to improve them into a clear, comprehensive yet practical and streamlined process in relation to supplier evaluation on sustainability compliance.

1.2 Business Challenge, Objective and Outcome

Although the case company is strong in its own procurement operations, it depends on its suppliers in several activities as a matter of outsourcing. This strategy inherently brings in the business need to rely on its suppliers also in relation to sustainability compliance. Some of the manufacturing processes that the suppliers execute involve heavy environmental emissions, and very low energy efficiency levels. So far, the case company has developed a very basic criteria of supplier evaluation on sustainability compliance such as corporate social responsibility, codes of conduct, and responsible sourcing. Hence, it has become important to evaluate the suppliers also in other critical criteria of sustainability to meet customer requirements.

Moreover, suppliers for the case company are spread across various parts of the world, which makes more challenging to get compliance and implement across-the-company supplier sustainability metrics. In addition, suppliers from some emerging economies such as Brazil and Russia have different environmental standards compared to the suppliers from the EU, US and the Pacific. So, it is important to revise and update the current supplier sustainability evaluation practices and clarify the applicable standards based on the customer requirements in order to avoid excessive time delay in projects execution.

The case company has envisioned its implementation of sustainability practices across its business units. The process has been kick-started in the company's head office and as a pilot project in some regional offices in the Indian subcontinent. The idea has been taken into supplier board rooms and as a result, the case company has employed a third-party auditing firm to assess the sustainability practices. In addition, a random Internal audit is also conducted in the middle of the supplier evaluation process. These activities, however, have not given the desired mileage to the case company in driving sustainability practices in the supplier's premises.

Hence, the Indian head office of the case company considers these efforts as insufficient to address the whole gamut of supplier sustainability evaluation that could lead to measurable changes in the supplier business processes and outcomes. Thus, the existing supplier evaluation practices need revision and possibly

streamlining regarding the Supplier sustainability evaluation part, since this part is currently time and effort consuming, and not fully meeting the client requests.

The objective of this thesis is to improve the *supplier sustainability evaluation part* of Supplier Evaluation and Selection (SES) process conducted by the Procurement team of the Oil and Gas department of the case company.

The outcome of the thesis is an improved *supplier sustainability evaluation part* of the wider Supplier Evaluation and Selection (SES) process.

1.3 Key Concepts Used in This Study

Sustainability is defined in many various ways and covers a wide range of areas. In this study, "sustainable supply chain management is defined as the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements" (Seuring and Muller, 2008:1700).

However, this definition does not include the sustainability of business from a business continuity perspective. Business continuity is also as important as the three other dimensions of sustainability. Business continuity provides a perspective from issues arising due to risks and uncertainties associated with the business. The risk and uncertainties could be as small as disruptions (for example, labor strike in a manufacturing plant which could last from a few days to a few weeks) and in some cases as big as a natural disaster (a tsunami or earthquake which could potentially throw the buyer and supplier out of business for several weeks to several months). Hence the need to consider also business continuity as a dimension to supplier sustainability evaluation. In essence, it captures the readiness of a supplier to cope up with any disruption (small or large) and get the business back on track at the earliest.

Thus, *Business continuity* planning refers to the ability of firms to recover from a disaster that causes a disruption to business operations by the integration of formalized procedures and resource information (Barnes, 2001).

Evaluation of supplier sustainability – in this study, the process of assessing the compliance of the suppliers with the existing supplier sustainability criteria.

Supplier sustainability criteria - in this study, a set of criteria defined by the case company based on the sustainability regulations and pointing to the key parameters for supplier evaluation as for their compliance to the existing regulations.

1.4 Thesis Outline

This thesis is conducted by exploring relevant literature and best practice and conducting analysis of the input data from the case company (in most cases, published company reports, as well as internal documents). Based on this investigation, this thesis proposes an improved process for supplier sustainability evaluation as a part of supplier evaluation and selection process and an easy-to-use tool for supplier sustainability evaluation for the procurement team of case company in the energy sector.

This thesis is written in seven sections. Section 2, Method and material, describes the research design, data collection and analysis methods, followed by a validity and reliability plan of this study. Further on, in Section 3 the current state of supplier evaluation is discussed, followed by Section 4, overviewing the key concepts from existing knowledge on the topic of sustainability and best practice in the industry. In Section 5, the proposal is built how to improve the current sustainability evaluation practices in the company. The proposal includes the improved process and an easy-to-use supplier sustainability evaluation tool. At the end, Section 7 contains the discussion and conclusions from the study.

2 Method and Material

This section describes the research methodology and material used in this study. First, the research approach is described. Second, the research design is explained. Third, data collection and analysis are explained, followed by the validity and reliability plan.

2.1 Research Approach

The case study method is selected as research approach for this study. The case study considers the phenomenon in its context, with all the elements of the event, i.e. documents, artifacts, interviews, and observations as a part of the techniques used when conducting the research. The case study method is selected as the study based on the contemporary events taking into account for observations of the event as well as interviewing the persons involved in the event. (Yin, 2003:4-8)

The case studies typically combine data collection methods such as interviews, questionnaires, observations and analysis of documents (Eriksson and Kovalainen, 2008: (116-117) frequently used in case studies. The evidence is selected as qualitative. There are plenty of different approaches to conducting qualitative research. Case study can be selected as the research method especially when the research question is formulated in the form of "how" or "why" questions. The case study approach can be chosen to answer these types of questions due to its exploratory nature (Yin, 2003:7).

For the type of research in this study, case study research fits well, as it helps to explore the phenomenon in depth to provide a holistic answer to the research questions. One of the primary methods for conducting this study is by using interviews. The primary empirical data (collected directly by the researcher), in addition to the interviews, was also gathered from observations by the researcher. The secondary data (existing data), which includes both textual and visual materials, in this study included the documents, company standards, specifications, and datasheets.

In research practice, there are different types of interview techniques used as a method of data collection. Interviews can be roughly divided into three categories:

structured, semi-structured, and unstructured. In a structured interview, a standardised set of questions are asked with all the respondents giving no scope to capture anything beyond the questions. Unstructured interview data are more open and generally lack a specific direction (Eriksson and Kovalainen, 2011: 80) which makes the method unfit for this study. In a semi-structured interview, a broad guide is developed that takes the interview in the right direction meanwhile allowing the interview to probe more into the context thus capturing rich data. Many qualitative interviews within business research fall into this guided and semi structured interview, which can be used to study both 'what' and 'how' questions. This type of interviews is systematic and comprehensive; however, the nature of the interview is equally conversational and informal. (Eriksson and Kovalainen, 2011: 80)

This study adopts *semi-structured interview* as a technique to collect data. Observation is another technique of collecting empirical data in this study. Generally, observations that can be classified into several types: participant and non-participant, in natural and contrived settings, and structured and non-structured observation, etc. In this study, participant observation was used since the researcher was a participant who worked for the case company being observed. The major role of the researcher in the participant observation as a participant are the collection and storage of field notes, and the analysis of field data. (Eriksson and Kovalainen, 2011: 86)

2.2 Research Design

Figure 1 illustrates the research design used in this study. It captures the essence of every step and shows the links between each step from start to finish. Figure 1 also depicts the stages in data collection and corresponding outcomes.

Research Design

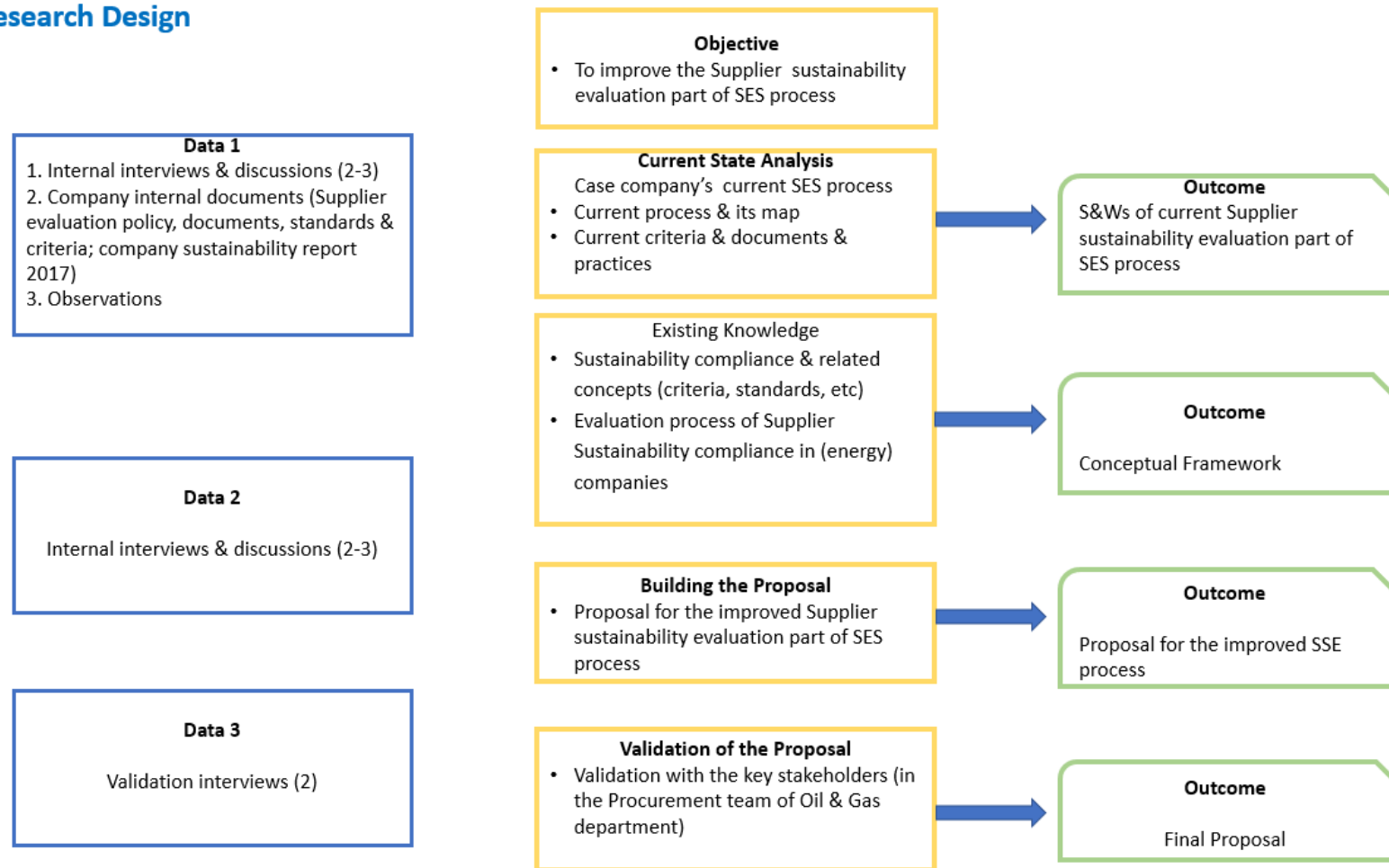


Figure 1. Research design of this study.

As Figure 1 illustrates, the research starts with setting the objective which is to improve the current process and propose a hands-on tool for supplier sustainability evaluation. The initial round of data collection is conducted from the case company through interviews and discussions, internal documents, supplier reports on sustainability metrics, the company sustainability report and also through observations. Data 1 is fed into the current state analysis that leads to identifying the strengths and weaknesses of the current practices of supplier sustainability evaluation conducted by the procurement team.

The weaknesses identified in the current state analysis also guide in search for relevant existing knowledge and best practice in the oil and gas industry. This search for relevant knowledge and best practice results in developing the conceptual framework for building the proposal for supplier sustainability evaluation.

Based on Data 2 collection through internal interviews and discussions, stakeholder suggestion are collected to build a proposal for the improved supplier sustainability evaluation process and tool. In the last round of Data 3 collection, through validation interviews, the proposal for supplier sustainability evaluation is validated with the case company stakeholders, resulting in the final proposal which is the principal outcome of this thesis.

2.3 Data Collection and Analysis

This study draws from a variety of data sources and collected data in several data collection rounds. Table 1 below briefly overviews Data collections 1-3 conducted in the study.

Table 1. Details of interviews, workshops and discussions, in Data1-3.

	Participants / role	Data type	Topic, description	Date, length	Documented as
Data 1, for the Current state analysis (Section 3)					
1	Procurement Manager 1	Telephonic meeting	<ul style="list-style-type: none"> a. Goal for the study, b. Sustainability practices in the case company c. Important areas of sustainability in the case company 	Jan 2018, 60 mins	Field notes

			d. Case company sustainability missions based on client's expectations		
2	Procurement Manager 2, BU Manager	Telephonic interview – Conference call	<ul style="list-style-type: none"> a. Current practices of supplier sustainability assessment b. Supplier sustainability evaluation in the economic aspects c. Strength of the current sustainability practices d. Weaknesses of the current evaluation practices 	Jan 2018, 75mins	Field notes
3	Procurement manager	Skype meeting - Doc. Review & Discussions	<ul style="list-style-type: none"> a. Company internal docs. (policy docs), b. Company sustainability report c. Future expectations regarding sustainability practices 	Feb 2018, 30 mins	Field Notes
4	Procurement Head– O&G	Internal meeting	<ul style="list-style-type: none"> a. Weakness in the current supplier evaluation practices b. Improvement opportunities 	Feb 2018 40 mins	Field notes and recording
5	Procurement Manager, Procurement Head– O&G	Conference call - Group interview	<ul style="list-style-type: none"> a. Process map of the current supplier evaluation process b. Weakness in the current supplier evaluation practices c. Improvement opportunities 	March, 2018 50 mins	Field notes and recording
Data 2, for Proposal building (Section 4)					
6	Procurement Managers 1, 2 and Sustainability implementation leader	Conference call - Group Interview	<p>Proposal building</p> <ul style="list-style-type: none"> a. Building the draft for current supplier sustainability evaluation process and Index 	April, 2018 60 Mins	Field notes
Data 3, from Validation (Section 5)					
7	Procurement Head and Sustainability implementation leader	Group interview/ Final presentation	<p>Validation and evaluation of the Proposal</p> <ul style="list-style-type: none"> a. Feedback for the proposed Supplier sustainability evaluation process and index 	April, 2018 2 hrs.	Field notes and recording

As seen from Table 1, data for this thesis was collected in three rounds. The first round, collecting Data 1, was conducted for the current state analysis. The data collection comprised the case company reports pertaining to the existing supplier sustainability evaluation of the case company, and well as interviews. Telephonic interviews with two procurement managers helped to clarify the understanding of

the current practices of supplier sustainability evaluation in the case company. Furthermore, observation was also done since the author has acted as a Procurement engineer for several years, giving the author a fair chance to assess the existing practice and report on the results in the current state analysis. The data was analyzed and extended with the internal documents compared to industry standards, and the GRI recommendations on sustainability evaluation. Based on this extensive analysis, the current practices in supplier sustainability evaluation were investigated.

In the next round, Data 2 was collected to gather suggestions from the case company for developing the proposal. The purpose of data collection was to create a proposal to improve the supplier sustainability evaluation, and to define key sustainability areas for evaluation. This data included group interviews with the Procurement manager and Sustainability implementation leader. This data was used to develop the initial proposal for improving the sustainability evaluation process and developing the index.

Finally, Data 3 was collected when receiving feedback for the proposal from the case company. The primary idea during this stage is to improve the first level supplier sustainability evaluation index through interviews with sustainability implementation leader and the head of procurement. This data results in the improved proposal of supplier sustainability evaluation process.

As seen from Table 1 above, in this study, the interviews were the primary method of data collection. The interviews were conducted as semi-structured, telephonic and skype meetings and conference calls, held on the company premises. The interview questions were created in advance with the literature background from both scholarly articles and industry best practice found in the trade journals and magazines. The questions for all three rounds of interviews can be found in the Appendix. The interviews were recorded and the field notes taken.

In addition to the interviews, another important source of data was various internal and external sustainability-related documents of the case company. They add to the overall understanding of the existing practices of the supplier sustainability evaluation and helped to compare them to general industry practices and standards. Table 2 lists the documents used for the current state analysis.

Table 2. Internal documents used in the current state analysis, Data 1

	Document	Category
I	Internal documents	
A	Case company Management Manual	L1-2
B	Clients Legal Aspects of Business Administration	L3-4
C	ISO 9001:2000 “Quality Management Systems – Requirements”	Q1
D	Quality Control Requirements for Site Works	Q2
E	Site Quality Control Management System	Q3
F	Management of Quality Specifications for Supplier and Subcontractor	Q4
G	Preventive Actions Management: Quality Alert	Q5
H	Quality Control Requirements at Manufacturing facilities	Q6
I	“Anticorruption” Management System Guideline	SRG1
J	Social Responsibility Guidelines – (Equal gender employer, opportunities for local community etc.,)	SRG (2-5)
K	"Procurement" Management System Guideline for subcontractor	EPG1
L	Management System Guideline “Procurement”	EPG2
M	Corporate Specifications on the management of HSE requirements for vendors and subcontractors	SCP1
N	Supply Chain Partner Guidelines	SCP2
O	“HSE Audit” Standard Procedure	HSE1
P	“HSE Requirements for Subcontractors (High HSE Risk)” Corporate Specification	HSE2
Q	“HSE Requirements for Subcontractors (Low HSE Risk)” Corporate Specification	HSE3
R	“HSE Bid Evaluation” Form	HSE4
S	“HSE Requirements for Subcontractors” Form	HSE5
T	“Specific Questionnaire for Health, Safety and Environment” Form	HSE6
U	Reduce Reuse Recycle Guidelines	RRR(1-2)
V	Environmental Management System – Requirements with Guidance for Use	PS1
W	Management of Nonconforming Products – Impact to environment - Product stewardship	PS2

As seen from Table 2, this study analyzed various standards and documents to form a comprehensive understanding of the case company's current practices. Presently, these internal documents provide a foundation for supplier evaluation. Importantly, the study analyzed all the documents that the case company is currently using for sustainability evaluation, so that to make the analysis complete. These company documents also made a valuable source of data for the final proposal. The findings from the current state analysis are discussed in Section 3 below.

2.4 Reliability and Validity

Reliability and validity are used to evaluate the quality of research (Quinton and Smallbone, 2005: 302). *Validity* of the study generally means the selection of appropriate tools for the study, and processes in the data analysis. Validity can be classified into four types: internal validity, construct validity, external validity and reliability (Yin, 2003). These four types of validity and reliability are discussed in detail below.

Internal validity helps in the assessment and selection of the research method against the purpose of the research. The important step in checking internal validity is to ask if what was found is a response to the research question. Further, internal validity needs to be checked to strengthen a qualitative study in terms of data collection (Quinton and Smallbone, 2005:301). Triangulation as a method typically improves internal validity of a study when several sources of data are used to re-search the same phenomenon (Yin, 2003: 99).

External validity measures the applicability of the research outcomes to a variety of naturally occurring contexts. For example, how the tool developed as an outcome of this study can be used in other companies in the oil and gas industry. Therefore, it can be understood that the external validity is not directly linked with this study as its research method is a case study that is context dependent. But in general, this criteria relates to the applicability of the outcome of this research to another context (Quinton and Smallbone, 2005: 302).

Reliability of this study is planned to be maintained through using multiple source of information to understand the phenomenon, as well as explicitly documenting and analysing them, to build a clear chain of logic and evidence (Quinton and Smallbone, 2005: 303). Further, the use of theoretical knowledge and relevant literature can also strengthen the reliability of a study.

Finally, *Logic* in this study aims to ensure the outcome of the research and development project meets its objective, and also ensures that the findings, solutions and interpretations are easily understood by others. In other words, logic of this study can be strengthened by the scoping of the research and development project logically (derived from the relevant business challenge, objective and expected type of outcome, and logically followed by building the research design to address this objective). It also checks if there is an overall match between the research objective and the choices made throughout the project, and if they are well grounded with arguments and rooted in the chain of evidence. Finally, it benefits from assuring that individual stages of the project are logically interlinked with each other, as well as the outcomes of one stage to the other stages.

Finally, stress on *Relevance* aims to ensure that the thesis addresses a relevant business challenge. The relevance of the findings of the current state analysis is linked to the literature search for relevant remedies and the outcome is relevant as it builds from the conceptual framework. Finally, the thesis also plans to pay special attention to evaluate if the developed solution is relevant to the case company.

3 Current State Analysis of Supplier Sustainability Evaluation Practices

This section discusses the current practices for supplier evaluation at the case company in the energy industry. In this analysis, both Engineering department of Oil and Gas sector and Business unit are taken into consideration. The main focus is placed on the steps involved in the supplier sustainability evaluation part by procurement team of the Engineering department. This section is divided into three subsections, starting with describing the current practices of supplier evaluation in the procurement team, followed by the current practices of supplier evaluation in Commercial team of Business unit, and finally ends with the key findings based on the understanding the whole current supplier evaluation and selection process of the case company.

3.1 Overview of the Current State Analysis Stage

The current state analysis (CSA) aims to scrutinize the current practices of supplier sustainability evaluation conducted by both the procurement team and commercial team. Based on this analysis, the study identifies the strengths and weaknesses of the current practices in supplier sustainability evaluation in the case company. Based on the observations made in case company, the gamut of sustainability assessment is being divided into three aspects: social, environmental and economic aspects. The assessment of social and environmental aspects is evaluated by the Procurement team and the economic aspects of sustainability are evaluated by the Commercial team.

As the first step in the CSA, the case company's internal sustainability documents and standards are collected and carefully analyzed to understand the existing documental support behind the current evaluation.

Second, the current supplier sustainability practices are identified and mapped into a process based on the examined documents, participant observations by the researcher, and based on the interviews with the Procurement Manager in the case company to understand the current sustainability evaluation practices. This meet-

ing also helped to clarify some questions related to the supplier evaluation documents to form a better understanding of the current process. These two steps of the analysis focused mostly on the actions by *the Procurement team*.

Third, the analysis zoomed into the actions of *the Commercial team of Business Unit (BU)* that handles the economic aspects of supplier sustainability evaluation. Here, internal documents related to evaluation of the economic aspects were collected and analysed and the steps in the supplier sustainability evaluation specified based on the interview with the BU Manager that was conducted in order to understand the sustainability evaluation part of the SES process. Finally, the analysis ended with identifying the *strengths and weaknesses* of the current supplier sustainability part of SES process in the case company.

3.2 Case Company Description

The case company, a major EPCM company in India, builds high-tech plants for foreign customers, especially in EMEA region. The company builds either EPCM or 'turnkey' solutions, or revamp projects, or maintenances based on the client's requirements. Figure 2 below shows the organizational structure of the case company and the place of the Oil and Gas division, and the Procurement team in it.

Within these sectors, multi-disciplinary specialist/engineers work together as a team to plan, design, build and execute the full projects, namely Electrical, Process/Chemical, Piping/Mechanical, Structural & Civil, Electronics and Instrumentation disciplines. Each team has both engineering and a procurement specialist. The procurement specialist liaisons with inter- and intra- disciplinary engineers and the Business unit (Commercial/Sales team) to evaluate and select (finalize) a supplier.

As seen from Figure 2, the divisions in the case company are categorized based on the type of plants they are building, namely Oil and Gas, Power plants, Metal and Minerals, Nuclear power plant, Water effluent and treatment plants.

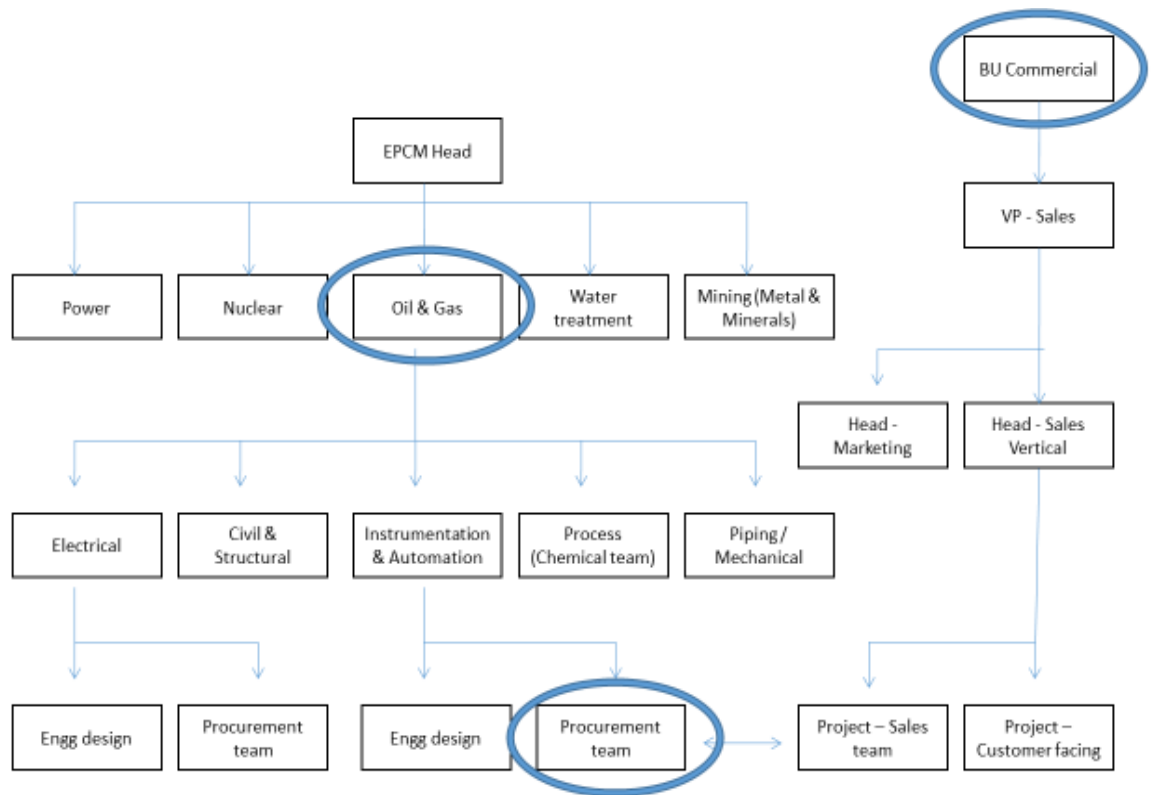


Figure 2. Organization chart showing Oil & Gas department and the Procurement team.

3.3 Description of the Current Supplier Evaluation and Selection (SES) Practices in the Case Company

The process of Supplier sustainability evaluation that makes the focus of this study, falls within the gamut of a broader *Supplier evaluation and selection process* (SES process).

In the case company, an interaction with a supplier begins when the actions by the customer who provides a list of potential suppliers ('Approved vendor list') for a major long-lead material. In very few occasions, the customer does not provide the list of potential suppliers. In all projects, the customer provides commercial and technical documents. Based on these documents, a call for 'Request for Quotation / Request for Proposal' (RFQ/RFP) is developed and disseminated among the potential suppliers. The RFQ also includes Specifications from the case company on sustainability related aspects, namely: social, environmental and economic metrics. The suppliers respond to the quotation. The responses are evaluated against

the technical and commercial aspects, and sustainability aspects of the case company. This process is detailed in Figure 3 below that shows the wider Supplier Evaluation and Selection process (steps 1-5) taken to finalize a supplier.

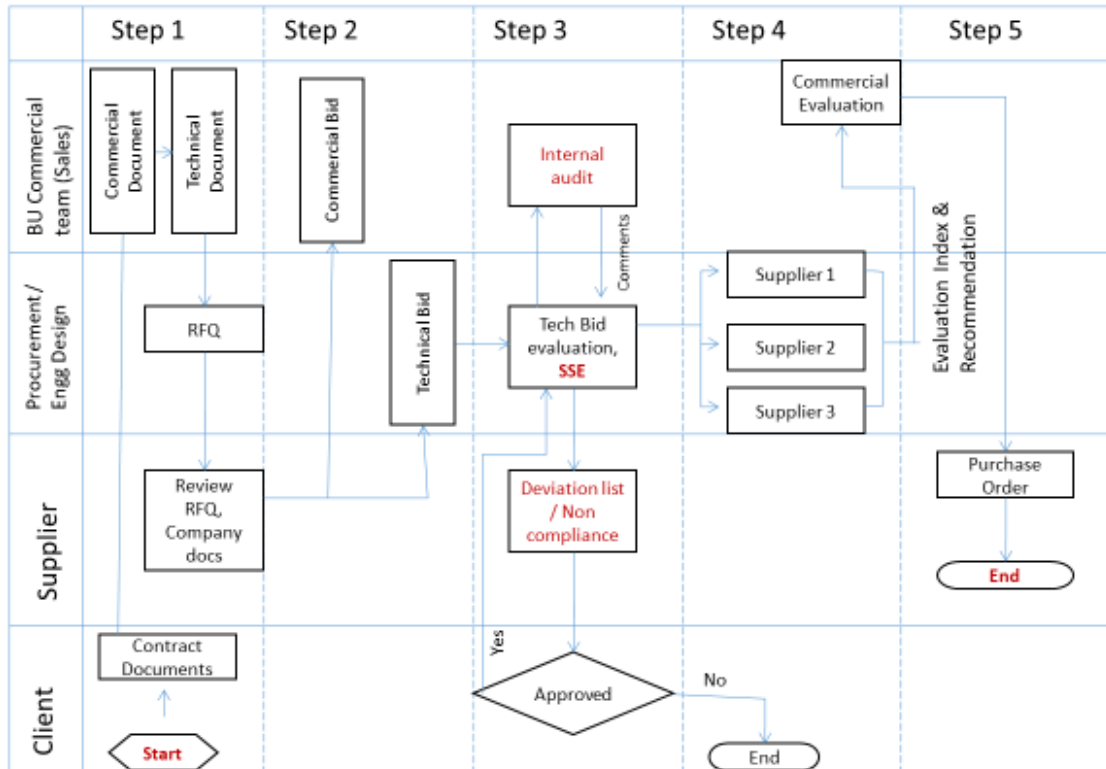


Figure 3. Supplier evaluation and selection (SES) process in the case company.

As shown in Figure 3, the process of Supplier evaluation and selection starts with an interaction with the client. In Step 1, after the project was awarded to the case company, the Client initiates and sends a set of contract documents to the Business unit. The contract documents contain both the technical and the commercial documents. The Business unit circulates the commercial documents internally and the technical documents to the relevant engineering discipline through the Document Controller. Once all the technical documents are received at the Oil and gas discipline, the engineering and procurement specialist start analyzing carefully to understand the client’s requirements and categorize the different types of technical documents. As a next step, the procurement specialist sends Request for Quotation (RFQ) along with supportive technical documents as an attachment to various suppliers as listed in the client approved supplier list.

In *Step 2*, after the supplier reviews RFQ and supportive documents received from the case company. Based on the RFQ, Supplier responds to the case company with two different set of documents: technical bid and commercial bid to Engineering department and Business unit respectively. The technical bid contains two sets of documents related to sustainability part, first set of documents contains supplier signed and sealed copy of 29 case company documents developed by case company for SSE and 11 supplier own documents as an evidence to the sustainability compliance with standards.

In Step 3, Once the technical bid documents are received by the procurement team, the supplier sustainability evaluation is initiated by procurement specialist by reviewing the documents with respect to client's standards and company documents. During the evaluation, if any deviation is found in the supplier documents, the same is raised as a technical query (TQ) to the supplier for clarification and compliance. Supplier may respond by email for the technical queries with supportive compliance documents. And the supplier responses are recorded/stored as a proof of compliance. If supplier is not compliant to the deviation mentioned in technical queries, the same is to be notified to the client for approval. If client accepts the deviation in case of minor in nature, the supplier considered for next level of evaluation, otherwise the supplier rejected and remaining waitlisted suppliers is considered for further steps of evaluation.

To examine overall evaluation process, a random internal audit is conducted by business unit. The auditor from BU cross verifies the evaluation process done by procurement team by verifying the critical data related to both sustainability criteria and technical specifications with respect to client requirements. If the auditor highlights any missed-out points during the audit, again the procurement engineer is asked to send a TQ to supplier for compliance. These steps are repeated till full compliance is received by the procurement engineer, and it is noted that there is excessive control from the BU as no structured information (related to SSE compliance) is kept in the procurement team before the Internal audit.

As a next step, the Engineering and procurement team starts to generate a technical bid evaluation index (TBE) to list and compare the supplier documents with respect to client requirements (standards and documents) in both technical and sustainability part. And then, 3 finalized suppliers are compared based on the score

obtained as a results of evaluation criteria. And the recommendations are sent to the commercial team to conduct the commercial evaluation and sustainability evaluation related to economic aspects as next steps of Supplier evaluation and selection process.

In Step 4, once the procurement engineer has sent the technical bid evaluation index with recommendations to the Business unit, for further commercial evaluation, the commercial team/sales specialist do commercial bid evaluation for only the recommended suppliers. This process results in finalizing 3 suppliers with respect to commercial aspects. As a next step, in the commercial evaluation done by the Business unit, the finalized supplier was called for face to face meeting with business unit for discussion and to sign the contractual agreement and legal documents before order placement.

In Step 5, finally, the purchase order is sent to the selected supplier among 3 from business unit. The Supplier evaluation and selection process ends by order placement to selected supplier with the purchase order.

Summing up, the current SES process typically takes place in Step 3, 4 and Step 5 and involves Procurement Engineer, Supplier, Client and the Commercial team. The part relates to supplier sustainability makes the central part in this broader SES process and involves the Procurement and commercial teams. Importantly, as practiced by the case company, the current SSE process heavily relies on the legislative and regulatory documents. Therefore, before describing the steps and practices related to the SSE process, the sub-section below zooms into the documents involved in this process.

3.4 Documents Involved in the Current Supplier Sustainability (SSE) Evaluation

In order to analyze the current state of Supplier Sustainability Evaluation (SSE) in the case company's Oil and Gas department, it is essential to clarify the key concepts related to supplier sustainability evaluation as practiced by the case company.

According to the case company, *sustainability* refers to three broad aspects as commonly referred in triple bottom line: *economic, social and environmental* aspects as performed by a supplier. The case company indicates *supplier sustainability* as performance of Tier 1 suppliers in terms of economic, environmental and social metrics.

As understood by the case company, *supplier sustainability evaluation* refers to the measurement of Tier 1 suppliers against *the standards set by the case company* in terms of economic, environmental and social aspects of its business. Always a supplier is evaluated *before* signing the contract in a project.

The documents that drive supplier sustainability evaluation include two types of documents: first, the company formulated (that suppliers need to sign and stamp) and the supplier provided documents (typically related to providing the evidence of compliance to standards and relevant certificates). Below, the analysis starts with *TYPE 1, the company-formulated* documents.

Presently, in the company-formulated documents relate to *corporate social responsibility, codes of conduct, and responsible sourcing*, which plays a critical role in the supplier sustainability evaluation.

It is essential to review first the gamut of *Code of conduct* documents of the case company. The Code of conduct is divided into two broad topics shown in Table 3 below.

Table 3. Code of conduct in the case company: guiding principles and focus areas (Source: Case company management manual - Internal documents).

Focus areas of the Code of conduct in the case company		
1	Promotion and adherence to ethical and responsible business practices, that are facilitated by	Making both ethical business practices and responsible corporate governance, including risk management strategies in the company operations.
		Using open and effective communication and engagement various stakeholders such as local communities, regulators, government, social watch dogs, environmental protectionist agency.
2		Protecting people inside the establishment and in the local community, and the environment through the

	Continuous strive to improve social and environmental performance by	responsible management of operations and their impacts.
		Engaging constructively with government authorities and industry associations / bodies to develop and continuously improving appropriate principles/objectives-based standards.
		Fostering industry level cooperation by supporting industry codes of practice, forums and standards.

As shown in Table 3, the Code of conduct practices by the case company focuses on promotion and adherence to ethical and responsible business practices (area 1) by practicing responsible corporate governance, risk management and openly communication with all the stakeholders at various levels. The Code of conduct also stresses to improve the company's social and environmental performance (area 2) by protecting people inside the premises and the local community and the environment through responsible management of operations. In addition, the case company is constructively working with government authorities and industry associations / bodies to develop and continuously improving appropriate principles/objectives-based standards.

Every year, all the employees of the company confirm their acceptance of the Code of conduct, corporate governance policies and guidelines in online by company intranet. This annual exercise reminds, encourages and motivates them to remain conscious of their responsibility towards the company. In addition, the Group Executive Chairman makes an Annual Declaration to the shareholders on the compliance with the company's Code of conduct by the senior management. The case company also conducts assessment of significant suppliers and contractors for compliance to the Code of conduct (Source: Case company's Sustainability report 2017) This type of the guidance, steered by the Code of conduct of the case company, makes the first type of the document governing the Supplier sustainability evaluation.

Another type of document that steers supplier sustainability evaluation relates to *social, environment* aspects such as corporate social responsibility, and *responsible sourcing*. Altogether, there are currently 8 categories of documents involved in SSE in the Oil and Gas department that embrace a total of 29 documents (TYPE

1) to form the basis of the current supplier sustainability evaluation. These documents are developed by the case company specifically for SSE. The compliance to every document in this package is confirmed separately by the supplier. The full list of the document categories is shown in Table 4 below.

Table 4. TYPE 1: the company-formulated documents involved in the current Supplier sustainability evaluation (developed by the case company for SSE evaluation).

	Category	Qty
1	HSE -Health Safety and Environmental Guide	6
2	QA/QC – Quality assurance/ Quality control	6
3	Legal aspects of Business and Administration	4
4	Ethical Procurement guidelines	2
5	Social responsibility guidelines	5
6	Reduce, Reuse and Recycle guidelines	2
7	Product stewardship	2
8	Supply chain partner guidelines	2
	Total	29

As shown in Table 4, eight categories of documents currently used for SSE are defined in the below sentences,

First, *Health Safety and Environmental (HSE) Guide* is a principle guide that relates to several aspects in the domain of health, safety and environmental concerns. It covers a wide range of topics such as accidents and first aid, building, workplace and the safety regulations, implementation of employee safety protocol, chemical hazard management, and environmental topics (such as air, water, and sound pollution management, waste management, risks of fire and safety protocol, and safety of employee at site location to operate machinery and work equipment).

Second, *Quality assurance/ Quality control(QA/QC)* is the combination of quality assurance and quality control. QA refers to the process, or a set of processes, used to measure and assure the quality of a product. QC refers to the process to ensure that products and services meet consumer expectations. Quality assurance (QA) is highly process oriented and focuses on defect prevention, while Quality

control (QC) is product oriented and focuses on defect identification. The documents under this category aim to ensure adherence to the areas related to the 'triple bottom line' and use the quality check as a mechanism for it.

Third, *Legal aspects of Business and Administration* documents providing evidence how the case company adheres to the rules and regulations, compliance with the law of the land and corporate social responsibility. These are the basic requirements that a supplier is expected to meet. This is a no-compromise rule book as it is applied stringently and supplier needs to show proof of compliance with the law. (Source: Case company management manual - Internal documents)

Fourth, *Ethical Procurement Guidelines* specify details about how to procure ethically. The concept of ethical procurement stems out from the basis of several aspects such as use of child labour, engagement with the local community, anti-dumping, fair use of labour at the supplier place.

Fifth *Responsibility Guidelines* are developed from ISO 26000 standard. The guidelines help the case company to check that it adheres to standards that consider the society in a responsible way. This means acting in an ethical and transparent way that contributes to the health and welfare of society. This category of documents also contributes to sustainable development, including the health and welfare of society.

Sixth, *Reduce, Reuse and Recycle guidelines* focus on effective waste management. *Reduce*—focuses on ensuring the avoidance of waste and looks for the ways to produce and use goods that stop the waste being generated. Reduce-waste guides in choosing the products that can be used productively, recycled locally, and have minimal packaging. *Re-use*— checks the points relates to re-use containers, packaging and waste products. *Recycle*— points to recycling waste material into useable products. As part of Supplier sustainability evaluation, a supplier needs to show evidence of these steps to effective waste management.

Seventh, *Product stewardship* deals with the product is a policy to place a shared responsibility for end-of-life product management on the producers and all entities involved in the product chain. This policy encourages product design changes that minimize a negative impact on human health and the environment at every stage

of the product lifecycle. This policy allows the costs of treatment and disposal to be incorporated into the total cost of a product.

Eighth, *Supply chain partner guidelines* mean a set of broad guidelines that show how to engage with supplier chain partners. It covers aspects related to information sharing from the supplier's supplier and the customer's customer, thereby allowing visibility across the supply chain. This information sharing helps the case company to keep a constant track of sustainability across the supply chain.

Thus, there are currently 8 categories of the documents related to the evaluation of supplier sustainability, with each category containing from two (as in categories 4, 6-8) up to six documents (as in categories 1-2). To illustrate the content, an example can be made for one category 1, 'HSE – Health safety and environmental guide' that contains 6 documents: (1) HSE Audit Standard Procedure – 36 Pages, (2) HSE Requirements for Subcontractors (High HSE Risk) Corporate Specification – 18 Pages, (3) HSE Requirements for Subcontractors (Low HSE Risk) Corporate Specification – 18 Pages, (4) HSE Bid Evaluation Form – 4 Pages, (5) HSE Requirements for Subcontractors Form – 4 Pages, (6) Specific questionnaire for Health, Safety and Environment Form – 2 Pages. Similarly, Other groups also have a similar logic and each category contains related documents developed either by the case company itself (as in categories 1,3 and 8), or the standards and legislation (as in categories 2,4,5,6 and 7).

Summing up, a voluminous set of 29 documents (TYPE 1 documents) formulated by the case company itself ensure supplier sustainability compliance, thus making the core of the Supplier sustainability evaluation (SSE) in Oil and Gas sector. Importantly, another type of documents (TYPE 2 documents), which support this initial set of the documents, come from the suppliers and make part of the evaluation process described below.

3.5 Process in the Current Supplier Sustainability Evaluation

Currently, the Supplier Sustainability Evaluation (SSE) process in the case company makes part of the wider Supplier Evaluation and Selection (SES) process (described in Section 3.5.1 below and shown later in Figure 5).

Currently, *the core* of the sustainability evaluation part relates to two main steps, 2 and 3, done by the Procurement team which is then followed by Business unit. The core of the sustainability evaluation is shown in Step 3, in Figure 4 below.

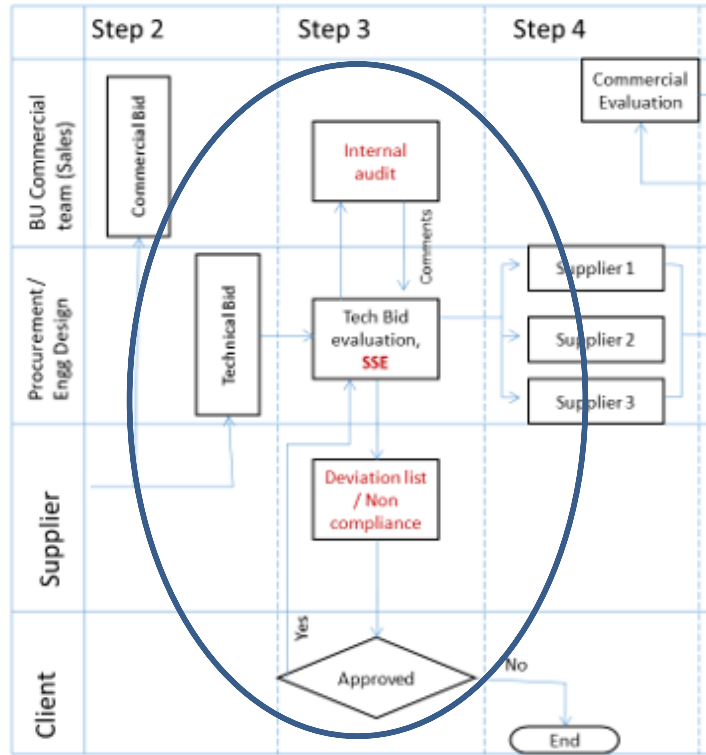


Figure 4. Supplier sustainability evaluation (SSE) process in Step 3 as part of the broader Supplier evaluation and selection (SES) process in the case company.

As seen in Figure 4, sustainability evaluation (SSE) starts with the two bids submitted to the Engineering and Procurement team (Technical bid) and the Business unit (Commercial bid) in Step 2.

The Procurement team, in Step 3, does SSE based on the *social and environmental* aspects of sustainability evaluation. The Procurement team also reduces the total number of potential suppliers to the top three potential suppliers for each Equipment and sent their recommendation to the Business unit. The Business unit, in its turn, does SSE based on the *economic* aspects with respect to the case company own evaluation criteria and the client requirements. The Business unit, presented with the top three suppliers recommended by the Procurement team, selects the one that can be approved as a finalized supplier.

A more detailed description of the wider SES process (steps 1-5) is given below.

3.5.1 Current Wider SSE Process by the Engineering and Procurement Unit

The wider process of SSE by the Engineering and Procurement team relates to the *social* and *environmental* aspects of sustainability evaluation and begins by conducting the needs assessment for the client's requirement. The client's requirements are identified from the Project manual (part of *the Contract documents*) as shown in figure 5, approved by the client and giving a detailed account of the requirements of the project, as well as a data sheet, and technical specifications.

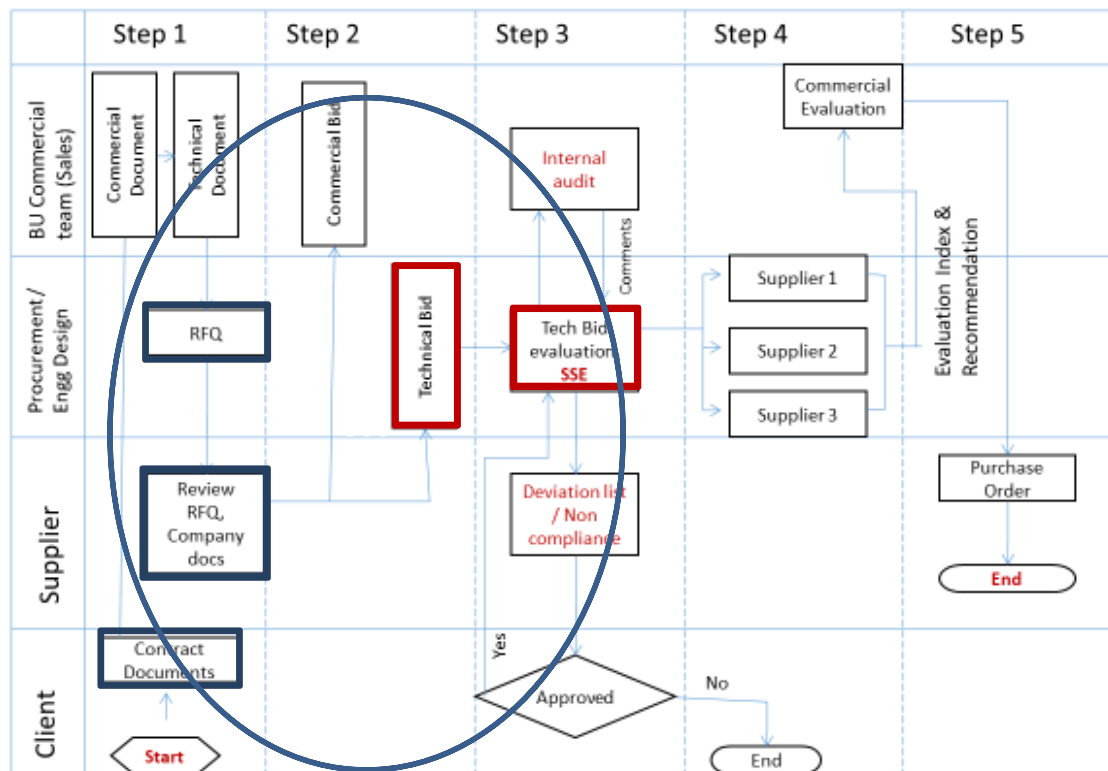


Figure 5. Supplier sustainability evaluation (SSE) process: early actions in Steps 1 and 2 by the Procurement team.

Next, the bill of materials required for the specific technical module are developed by Engineering team and sent to the procurement team for purchase. The procurement specialist consolidates the required supportive documents from case company namely Equipment list, datasheets and specifications and start evaluating the documents received from the various suppliers one by one carefully as per bill of material.

The response to RFQ from the suppliers (included the Technical bid documents) consist of two big batches of documents: (a) First, the 29 company documents related to SSE created by the case company (described earlier in Section 3.4) with supplier compliance seal and signature on it, and (b) The supplier's 11 technical documents specifying technical details of their goods and sustainability compliance in the supplier-formulated own documents. Thus, in addition to the 29 documents formulated by the case company, the RFQ response also contains the supplier's own set of documents. *TYPE 2 of the sustainability documents* – the supplier provided documents – are listed in Table 5 below.

Table 5. TYPE 2 documents: mandatory documents requested from suppliers involved in the current supplier sustainability evaluation.

List of mandatory documents to be submitted together with RFQ by a supplier:
<ul style="list-style-type: none"> (a) Product stewardship (b) Conformance to quality standards, (c) Energy efficiency (d) Raw material used in the component, (f) Occupational health and safety requirements for operating the component, (g) Recyclability, (h) Carbon emissions, (i) Level of hazardous material in the component, (j) Sourcing of raw materials, (k) Labor used in manufacturing the component with an emphasis on child labor, (l) Liquid and gas emissions of the component and its effects on the environment, etc.

The extensive number of documents, received from the suppliers, are listed in Table 5, undergo a stringent screening process in the Engineering and procurement team of the case company. In this stage of the SSE, supplier documents are evaluated against the standards set by the client organization and the case company.

To get evaluated at this stage, presence of various certifications becomes very significant for suppliers. Various international certifications, such as ISO 26000, ISO 14000, OHSAS 18001, help a lot to the suppliers to meet the stringent requirements by the case company. For example, compliance with ISO 26000 standards help organizations effectively assess and address those *social* responsibilities that are relevant and significant to their mission and vision, operations and processes, customers, employees, communities, and other stakeholders, as well as *environmental* impact. OHSAS 18001 contain the occupational health and safety policies

and are not only essential for employers, but also, they are increasingly important for the customers and other stakeholders. Compliance with the occupational OHSAS 18001 is a strong sign of supplier's commitment to the employees' health and safety. Typically, suppliers implement an Occupational Health and Safety Management System (OHSMS) as a fundamental part of their risk management strategy to address changing legislation and protect their workforce and other persons working under their control. The case company as an organization pays utmost attention to such supplier certifications. Generally, the supplier provides the compliance to the Standards and legislation with company sealed and signed by concerned authority in supplier organization and send by email to the procurement team of case company for record.

The Procurement team collects all these responses (which form the *Technical bid* in both (a) and (b) types) from potential suppliers in own document archive. Based on the evaluations of the provided documents, the potential suppliers are screened by the Procurement team for sustainability compliance (manually) and given scores in each category mentioned above. The scores are then converted by the Procurement team into a composite index that shows how good the supplier performs in terms of (a) Technical specifications, as well as (b) Environmental and (c) Social standards. The final index developed by the Procurement team is the crux of SSE in this department.

In effect, based on the evaluation of the Technical bid (a full set of required documents listed earlier in Table 5) by the Procurement team, the total number of potential suppliers for any project component is reduced to the top three potential suppliers. This selection is done by the Procurement team based on the SSE results. For example, if there are 400 potential suppliers listed in customer approved vendor list, out of four hundred potential suppliers for forty components, the potential supplier list is reduced to three potential suppliers for each component, thus leaving the list to one hundred and twenty potential suppliers. For each component a technical bid evaluation (TBE) index is generated to compare the finalized 3 suppliers with respect to case company/client's requirements.

To list the comparison of various supplier's performance, the procurement team have a support tool namely technical bid evaluation(TBE) Index. It is formulated

internally by the Engineering and Procurement team. It is derived from (a) the documents sent by the suppliers and (b) it reflects the criteria for SSE set by Engineering and procurement team internally (and checked very carefully by Internal audit), and (c) these criteria are visible in the questions in the TBE Index (as a preparation for the Internal audit).

Table 6 below shows the current Index used for the Technical Bid evaluation, showing how the information related to the Technical Bid is currently captured and structured.

Table 6. Current Technical Bid Evaluation Index – Equipment A (Step 3), sample.

S.No	Supplier Evaluation criteria – Clients and case company metrics.	Supplier A	Supplier B	Supplier C	Recommendations / Comments
1.	General Supplier information				
	a. Name of the company b. Location c. Size of the company....	ABB - -	GE - -	Emerson - -	
2	Technical criteria – Equipment XX 80% of procurement team's time				
3 (I).	Sustainability criteria based on compliance with the company-written documents				
	1. Document 2. Document 29. Document	Yes Yes Yes No	Yes Yes Yes Yes	Yes Yes No No	
3 (II).	Sustainability criteria based on the supplier provided documents and standards 20% of procurement team's time				
	1. Supplier document 1 2. Supplier document 2 3. ----- 11. Supplier document11	Yes Yes No	Yes Yes Yes	Yes No Yes	
4	Quality certifications and documents				
5	Logistics criteria				
6	Miscellaneous certifications and compliances				
7	Score	5	8	6	
8	Recommendations & Comments		Fully complied/ recommen ded		

As shown in Table 6, the TBE index contains various supplier evaluation criteria created by both engineering and procurement team, based on the contract documents and case company's specifications and standards. The TBE contains 6 sections, 1. General supplier information, 2. Technical specifications and criteria, 3.1 Sustainability criteria- Case company written documents, 3.2 Sustainability criteria- Supplier documents, 4. Quality standards and documents, 5. Logistic information, and 6. Miscellaneous criteria.

First section of the TBE provides general supplier information. This part contains questions related to basic information about the suppliers, mainly the name of the company, size of the company, location, what type of product or equipment manufacturer, etc. filled into the first section of TBE based on the documents received from all three suppliers.

Second section of TBE contains Technical criteria. In this part, technical specifications and data sheets are verified and listed to compare the critical technical specification with respect to the client requirements. This technical evaluation part consumes 80% of the time in the total index preparation by the procurement team.

As shown in Section 3 of Table 6, the supplier sustainability is outlined in the technical Bid, and divided into two parts as 3.1 and 3.2. In Section 3.1, the sustainability criteria are listed, based on compliance with the company-written documents. In this section, the procurement engineer verifies *the 29 documents* received from supplier whether supplier complied fully, or partially or mentioned a deviation. The compliance is captured in the index in the relevant field of each supplier for further evaluation and follow up. In Section 3.2, *all the 11 supplier-provided* sustainability documents and standards are reviewed by the procurement team with respect to case company sustainability documents and are recorded in TBE index for further evaluation and audit purposes. Thus, presently, the sustainability evaluation part consumes 20% of the time in total index preparation time done by procurement team.

Next, Section 4 of the Technical Bid Index (TBE) contains the Quality criteria, the supplier quality documents are verified with respect to the quality standards of case company and customer. In Section 5 of TBE, the logistic criteria are evaluated and compared with the client requirements, such as mode of transport, and delivery time, etc., Finally the section 6 of index contains the Miscellaneous criteria, if any, is captured in this section for further evaluation and selection. At the end of TBE index, the scores are given to all 3 suppliers based on evaluation result. The results are sent to the business unit along with the recommendations to the highest scored supplier.

As soon as filled in, the TBE Index is send to BU. These inputs from the Procurement team are taken for further evaluation by business unit. By this, SSE process of the Procurement team ends here (illustrated in the figure 6). But the participation of the Procurement team does not end here yet.

In the next step, in order to ensure the quality of SSE by the Procurement team, *an Internal audit* is conducted by the Business unit to review the contents and the rationale of the sustainability supplier evaluation in the three selected suppliers (for each project component). During the Internal audit step, questions are raised by the Business unit if there are any grey areas within the provided evaluation, and the scores are adjusted accordingly. Following these inquiries, if needed, additional technical and sustainability queries are raised to the supplier(s) and recorded as a proof of supplier compliance. If any critical deviation identified by the BU, the procurement specialist is contact the respective supplier by sending technical query by email to clarify and get compliance of the same. And then, the response from the supplier was recorded as addendum along with audit result. Each and every point highlighted during the Internal audit process are closed by sending back with proper supportive documents to BU for acceptance before proceeding with next steps. This process is time and effort consuming to get compliance from the various suppliers from different countries and consolidates manually all the compliance documents with addendum.

These actions in SSE part done by the Procurement team are shown in Figure 6 below.

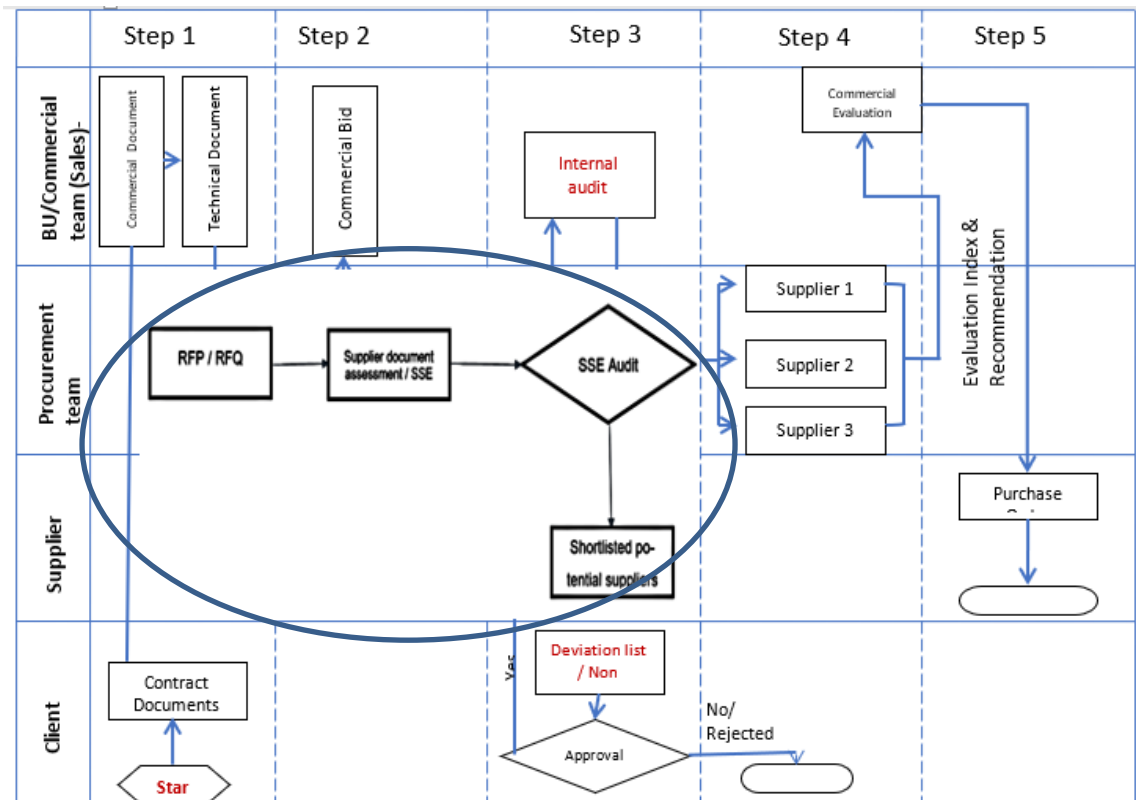


Figure 6. Current SSE process zoomed into the actions by the Procurement team.

As shown in Step 3 in Figure 6, during the Internal audit of supplier evaluation process, the auditor insists procurement specialist to show an evidence of sustainability compliance given by supplier for critical criteria for the specific projects randomly. Evaluation of sustainability part is done merely by verifying 29 company documents (stamped and signed copy for compliance) in addition to 11 supplier documents - evidence for latest standards - are being submitted by supplier or not. This verification method is superficial and does not capture specific points. Due to this kind of superficial document check, few critical standards, clause and sections are missed from capturing. Hence this evaluation process pushes for rework from Procurement engineer to check several times. In most cases this leads to asking for further details (repetitively, in almost the same areas) during the internal audit step. Such process eventually gets escalated leading to Technical Queries (TQ). These steps lead to excessive time delay due to slow supplier response.

Summing up, since *no structured compliance information* is currently captured into the TBE Index during the evaluation of sustainability part, this step increases the waiting time further to get compliance from supplier and leads to excessive communication between procurement team and the suppliers to ensure compliance

and maintaining multiple scattered supplier responses in email archives (multiple details are checked and scattered), It leads to the overall delay in the procurement process and project completion.

3.5.2 Current SSE Part by the Business Unit

Another important stakeholder in the SSE part of the wider SES process is the Business unit. The preparatory step in Supplier sustainability evaluation by the Business unit begins by *categorizing the required component* (material to be procured first). This categorization is done based on the delivery time and value of the component. The long lead items (More than 3 months delivery time) are directly propositional to the cost of the component. The case company follows the ABC classification of goods on the basis of their costs. This classification follows a pareto principle where 20% of the goods contribute to the 80% of the costs. Generally, the parts that are classified as A are 'outstandingly important'; B are 'of average importance'; and C are 'relatively unimportant' as a basis for a control scheme. Each category is handled in a different way, with more attention being devoted to category A, less to B, and even less to C. The Business unit uses this categorization in order to ascertain the type of product that is planned for procurement. Once the process of product categorization is complete, the next step is to evaluate the supplier documents.

Followed by the categorization, Business unit evaluate the finalized 3 suppliers per component in terms of commercial aspects with respect to client and case company requirements and standards. Figure 7 points to the participation by the Business unit in the Supplier sustainability evaluation.

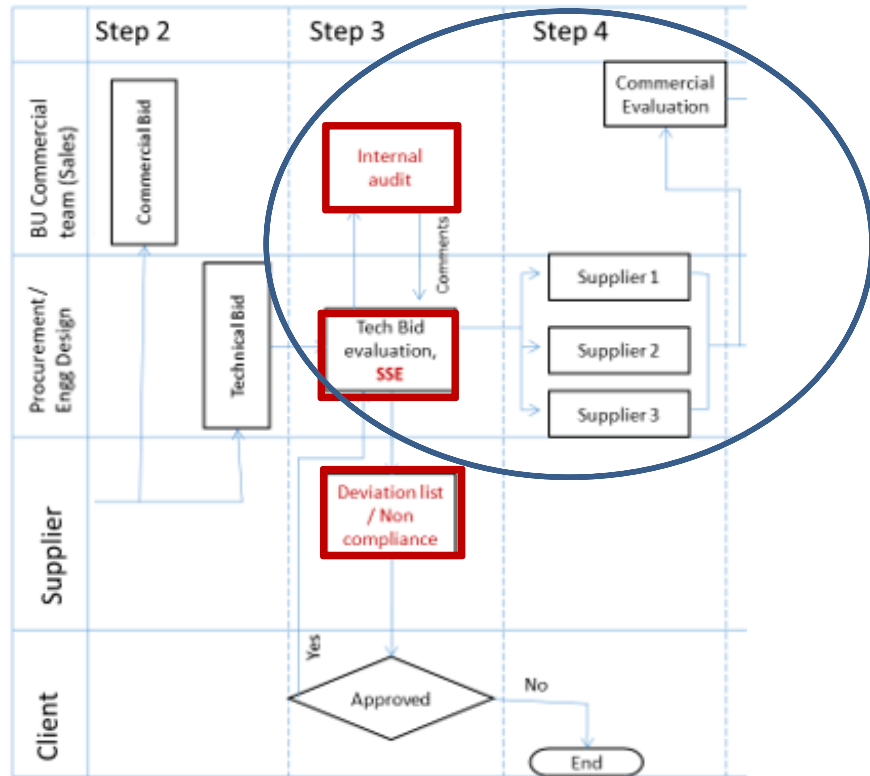


Figure 7. Supplier sustainability evaluation (SSE) process: actions by the Business Unit in Steps 3 and 4.

As soon as the technical and SSE parts are evaluated by the Engineering and Procurement team and are over, and the Internal audit is passed, the Business unit starts evaluating the supplier documents from a commercial point of view within the sphere of sustainability. From a broad perspective, the *economic* aspects such as profitability, supplier reliability, geographical location, order fulfilment rate (in case of available past records), defect records – return and replacement policy, payment terms, and supplier scalability are examined in depth.

A more detailed picture of participation of the Business unit in the Supplier Sustainability Evaluation (SSE) is shown in Figure 8.

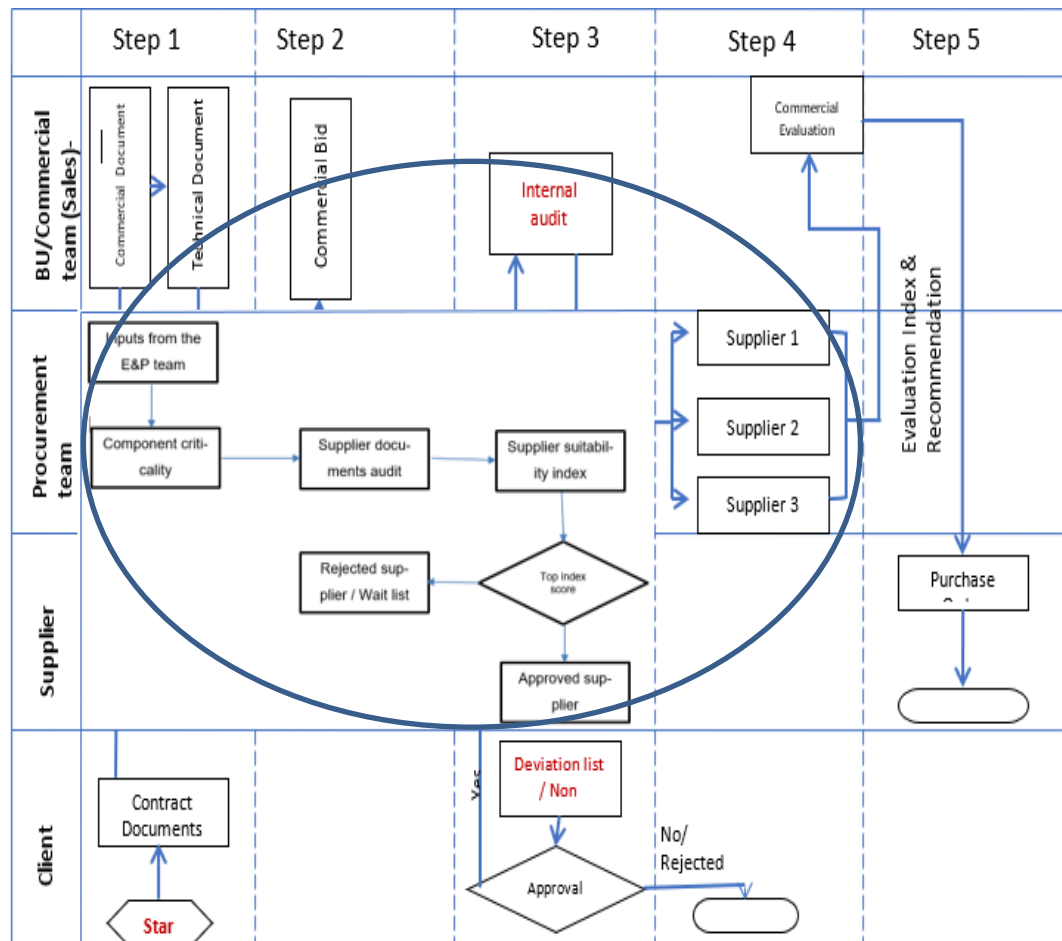


Figure 8. Current SSE process zoomed into the actions by the Business unit.

The case company has several divisions and for all the divisions, the Business Unit takes a uniform measure through adopting *Supplier suitability index*. The Supplier suitability index is calculated through inputs such as order fulfillment rate, flexibility in inventory lot, order fulfillment time, opportunity cost, supplier financial status, volume of business that the supplier can support, and capacity scalability that helps in future growth in the business. Supplier suitability index indicates the overall suitability of the supplier for the case company from the sustainability perspective. The index is formulated mainly to evaluate the supplier in the *economic* aspects of sustainability and *the manufacturing / operations* requirement. This index is developed in house (authorized use only) and is used across suppliers and categories and projects through a process through adjusted normalization.

The results of the evaluation based on the Supplier suitability index provide a guide to select the supplier to the Business unit. Usually the supplier with the highest

score is chosen as the preferred supplier and purchase order is issued. However, in some special cases, when the supplier with the highest score is unable to supply the required quantity, the next supplier in the supplier suitability index is chosen for supplying the components. In general, the decision based on the index puts one supplier in the approved supplier list and the next two suppliers on the wait list as vetted suppliers.

3.6 Key Findings from CSA

Based on the results of the current state analysis of the existing SSE practices, which was done with the help of the interviews, analysis of internal documents and observations from practice in the Engineering procurement team, the following key findings were identified.

3.6.1 Strengths of the Current SSE

First, the current SSE was analyzed by the stakeholders as very rigorous as it takes into account a wide variety of sustainability aspects. All the three dimensions of sustainability are covered very well (social, environment and economic), thus leaving no obvious gaps in the current evaluation parameters.

Second, the in-house made Supplier suitability index was assessed by the stakeholders as a great tool. The index simplifies the complex decision-making process into just one column of index results, thus making the comparison and decision easier. As noted by one stakeholder in the interview:

‘The index is developed through adjusted normalization smoothens the effects of supplier category, product type, cost of the product etc., into comparable number’. (Procurement head)

Third, the index also provides the supplier rank and pre-selects the substitute suppliers with comparable quality, in case needed. The supplier with the highest index for the component is given the purchase order. This system makes a transparent process that removes the influence of favorite supplier and other related unethical practices in supplier evaluation and selection.

3.6.2 Weaknesses in the Current SSE

First, the sustainability compliance (based on supplier documents) is not structured/ does not precisely capture the important standards and clause of sustainability criteria in the current Supplier evaluation index.

Due to the unstructured SSE practice, especially during the Internal audit process, the Procurement engineer is made to check again for further details (repetitively, in almost the same areas) and then escalated to the suppliers by technical queries (TQ) for responses. Due to unstructured process, excessive communication between Procurement and Suppliers is witnessed through multiple scattered suppliers' responses in email archives (multiple details are checked and scattered), eventually delaying the project.

Second, less focus on sustainability part in the existing Supplier technical evaluation index can be seen. As the sustainability evaluation is a minor part (20%), Technical bid evaluation index misses critical points of sustainability from being captured from supplier documents.

Third, the current supplier sustainability evaluation of case company misses 'Business continuity' criterion linked with UN SDGs (Goal No.16, also as defined in: Thawani 2018) and GRI guidelines G3.1 Sustainability Reporting Guidelines for Oil and gas, offshore drilling operations.

Presently, the supplier sustainability evaluation has the following challenges revealed from the current state analysis based on the interviews, analysis of the documents and observations from the current practices.

In brief, to elaborate all three weaknesses, the current practices are rigorous and extensive, but very time and effort consuming. Every time, there is a need for Technical Query that takes a long time. These inquiries lead to excessive communication between the Procurement team and the suppliers creating and archiving multiple, scattered suppliers' responses. To further elaborate, the overall time taken from the start to the end of supplier sustainability evaluation is very high: the average time taken is about 10 weeks, up to 16 weeks in some cases. The time delay is due to the communication between the procurement team and the supplier. The delays in such technical queries document exchange results in increased customer

waiting time for commissioning the project. The waiting time is directly linked to the increase in the overall project cost. Further, cost of holding other materials, engineering team mobilized from other projects, on-site team camping up under extreme conditions are unavoidable. The good is also at stake.

Also, the supplier's 'Yes' statement to sustainability compliance is too general. It lacks clarity in certain supplier claims (false promises) that can lead to avoiding supplier responsibility in case of failure. In some instances, there were suppliers that just said a blanket 'yes' statement for the conditions of compliance. The suppliers tend to overlook some finer aspects of the project requirements as shown in the RFP. The suppliers that are under pressure to keep their company afloat try to provide such blanket 'yes' statement before getting the procurement order. Later as the relationship continues, they tend to back off without taking responsibility. In a real-life example, this is how such statements may end up:

"British Petroleum had met with oil spill in the gulf is a glaring reminder that businesses must be responsible for more than bottom-line results, and business as usual is no longer acceptable. The success of a business are considered in the context of human and environmental impacts and the most sustainable businesses are those that are able to positively impact all their constituents (including people and the planet) to maximize long-term economic opportunities. Prior to the oil spill, BP had been recognized as a leader in promoting sustainable business practices and more sustainable energy development" (Source. Forbes.com)

In the above case, a major equipment supplier of offshore projects, have provided a blanket compliance for sustainability compliance for all criteria listed in the company documents related to social and environmental criteria, which even covers underwater life. But in practice the equipment failed to meet the standards due to the technical fault and hence deviated from compliance with sustainability part and the level of oil spillage are identified more than permitted level and affects the environment and eco system. Hence it affects the company reputation and share value as well. Since it is critical to evaluate the supplier based on sustainability compliance well in advance in Oil and gas sector.

In addition, the current SSE misses business continuity (now part of sustainability) evaluation. The broad aspects of sustainability in terms of business continuity is missing in the overall supplier sustainability evaluation. The concept of business continuity emerges from being prepared to bring the business up and running in

the event of any disruption. *The risk* can be small causing a short-term impact on the business and the supply chain as a whole. These short-term risks can be called as disruptions. Examples for disruptions include a fire in the plant, breakage of equipment, employees strike (labor union related issues). These can halt the production lines for a while. The supplier needs to be evaluated for measures taken in order to mitigate such disruptions.

On the other hand, the risks can be long term which can be called as disasters. For example, the Japan 2013 earthquake caused the Fukushima Nuclear plant to crack open which lead to emission of radioactive gas and heavy water. Such disasters pose a long-term threat as it effectively halts the production system for few weeks to few months. The current sustainability supplier evaluation does not show any sign of business continuity that takes into consideration the risk and resilience aspects of business.

In another real-life example, in a harsh environment a pipeline was installed to pump oil from the jetty to the refinery. The equipment supplier provided compliance with sustainability criteria as required by the case company during the evaluation. But, in real time, the equipment failed to perform under -40° deg. Celsius causing the pipe line to stop working which affected the transmission of *oil and gas* for two weeks until a new equipment was installed. This event effectively broke the production capacity around 15 days. To minimize such kind of impact or disruption, the case company can obtain the business continuity plan for disruption well in advance especially during the SSE and plan for alternative component/alternative channel to minimize the impact.

3.7 Summary of the Selected Areas for Improvement

Summing up, the results of current state analysis point to some *strengths* and some major *weaknesses* in the current SSE part of the wider SES process.

The strengths include inclusion of a wide variety of sustainability aspects in supplier sustainability evaluation. This shows that the case company is aware of basic requirements of supplier sustainability evaluation. Secondly, the TBE Index developed in-house is a great tool to evaluate the technical Bid. As a tool, this index can be extended to evaluate any component supplier evaluation and provide a useful

score in finalizing the supplier. This tool also ensures transparency and reliability on supplier sustainability evaluation.

Along with the strengths, the study also identified a number of *weaknesses* in the current SES process. The summary below points to the weaknesses that were selected as for focus for improvement in the SSE part of the SES process in this study.

1. **W1 : Overall, less focus on sustainability part (SES)** in the existing SES process, since sustainability is a minor part (20%) of current supplier selection.
2. **W2 : Information on Supplier Sustainability compliance (based on supplier documents) is not carefully captured in the current Supplier Sustainability Evaluation part in Step 3.** It misses structured capturing of critical SSE points from supplier documents.
 - During the '**Internal audit process**' (**Step 3**), it leads to actions of a Procurement manager to check details repetitively, and excessive control from BU. Since no structured information (related to suppliers' SSE compliance) is kept in the Procurement team BEFORE the Internal audit.
 - It also leads to **excessive communication (in Step 3)**, between Procurement and Suppliers to ensure details of compliance, and maintaining multiple scattered suppliers' responses in email archives. It results in **over delay in Procurement process** and overall project completion.
3. **W3 : Supplier Sustainability Evaluation (SSE) part is missing 'Business continuity' evaluation (linked with UN SDGs, (Goal No.16) and GRI guidelines (G3.1 Sustainability Reporting Guidelines for Oil and gas, offshore drilling operations).**

Weakness 1 points to the fact that the overall supplier evaluation and selection process gives *less importance and poor focus on the supplier sustainability evaluation*. The primary reason for this weakness is due to the fact that sustainability is given a minor part (about 20%) in the overall process of suppliers' Technical Bid evaluation by the Procurement team.

Weakness 2 relates to *processing the information on supplier sustainability compliance (obtained from the supplier-submitted documents)*. This information is not carefully captured in the current SSE part in Step 3. It misses structured capturing of critical SSE points from the supplier-submitted documents. Specifically, during the '*Internal audit process*' (Step 3), this lack of systematic capturing lead to the Procurement Manager checking the supplier documents over and over again. The process repeats several times, also by request from the Business unit, which result in the overall time delay. This is also due to not having the structured information

(related to suppliers' SSE compliance) maintained by the Procurement team before the Internal audit. Further, it also leads to excessive communication (in Step 3), between the Procurement team and the suppliers as a way to ensure details of compliance. Moreover, the present system results in multiple scattered suppliers' responses in email archives. Therefore, the present practices of handling the sustainability data in the Procurement team needs improving.

Weakness 3 points to the fact that, within the gamut of supplier sustainability evaluation (SSE), the entire concept of *business continuity* planning is missing. Business Continuity planning is an integral part of the UN SDGs, (Goal No.16) and GRI guidelines (G3.1 Sustainability Reporting Guidelines for Oil and gas, offshore drilling operations). It focuses on preventing discontinuity in business due to minor disruptions (employee strike resulting in factory shut down) or major disruptions (an earthquake resulting in few weeks of business disruption). Presently, suppliers are not evaluated in this part and, thus, they do not provide any adequate proof that they can ensure business continuity.

Thus, the case company needs to improve its current practices of supplier sustainability evaluation to address these development areas. This is done in Section 5, after exploring the existing knowledge in Section 4 in relation to these needs.

4 Existing Knowledge and Best Practice on Supplier Sustainability Evaluation

In the previous section, the current state analysis was done. It examined the case company's current state of activities in supplier sustainability evaluation. Several weaknesses were found – for instance the missing evaluation of business continuity. In this section, existing knowledge and best practice are reviewed from scholarly literature and industry websites to synthesize knowledge into a conceptual framework for improving the supplier sustainability evaluation.

The concepts such as sustainability, supplier sustainability evaluation, business continuity from scholarly articles are discussed. In addition, industry best practice on supplier sustainability evaluation are explored from some of the leading Oil and Gas companies.

4.1 Sustainability as the Concept of Supply Chain Management

There were multiple attempts to define sustainable supply chain management (SSCM). Carter and Rogers (2008) define SSCM as “the strategic transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes of improving the long term economic performance of the individual company and its supply chains.” In a more widely cited definition by Seuring and Muller (2008), SSCM is defined as “the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements”.

All the definitions on sustainability included economic, environmental and social focus. Therefore, as Ahi and Searcy (2013) show in their extensive literature search on definitions of sustainable supply chains and green supply chains conclude, sustainable supply chain management is an extension of green supply chain management. As a more encompassing definition, a sustainable supply chains can be defined as “ the creation of coordinated supply chains through the voluntary integration of economic, environmental, and social considerations with key inter-organizational business systems designed to efficiently and effectively manage the

material, information, and capital flows associated with the procurement, production, and distribution of products or services in order to meet stakeholder requirements and improve the profitability, competitiveness, and resilience of the organization over the short- and long-term". (Ahi and Searcy, 2013).

Sustainability and SSCM make one of the hottest topics discussed in both scholarly and business literature. More than 90% of the world's largest 250 corporations publicly report on their sustainability performance (Searcy and Ahi, 2014). In 1997, the United Nations Environment Programme (UNEP) together with Coalition for Environmentally Responsible Economics (CERES) launched the Global Reporting Initiative (GRI, 2002). GRI has published its sustainability reporting guidelines in 2011 outlining the need for sustainability reporting, what to report and how to report (GRI, 2011). As the field of sustainability gained traction, the United Nations came up with seventeen sustainability development goals, widely known as SGDs. Oil and Gas industry is one of the key industries that falls under the gamut of the SGDs as the industry has a significant impact on the economic, environmental, and societal spheres.

There is a surge in research that focus on sustainability measurement, related to the internal process and reporting, as well as the external process (Ahi and Searcy, 2013). Metrics for sustainability reporting include reporting on qualitative and quantitative approaches. McElroy and van Engelen (2012) classify these metrics broadly as "absolute" and "relative" absolute metrics "express operational performance in terms of what overall levels of performance are in specific areas of interest (eg. water use) for an organization" whereas relative metrics "express operational performance in terms of performance in one area (eg. water use) correlates with performance of the other (eg. revenue or total production)". GRI (2011) indicates that performance on upstream (supply chain) and downstream (customers) be reported. Moreover, clear emphasis is placed on environmental performance.

The environmental dimension of sustainability is about an organization's impact on living and non-living natural systems, including ecosystems, land, air and water. GRI (2011) environmental indicators cover performance related to inputs (eg. material, energy, water) and outputs (eg. emissions, effluents and waste). Under mandatory disclosures, the following are considered as per GRI (2011) guidelines: ma-

materials, energy, water, biodiversity, emissions, effluents, waste, products and services, compliance, transport and overall. Under each of these heads, there are seventeen core performance indicators and thirteen added performance indicators thus providing a comprehensive view.

Academic research on sustainability metrics in supply chains is broadly convergent on dimensions on which metrics are developed such as environmental performance. Few studies have advocated the use of different methods to measure the environmental performance: use of ISO 14031 in a green supply chain perspective (Hervani et al., 2005); supply chain operations reference model (SCOR) along with a seven-step methodology (Bai et al., 2012) using grey-based neighborhood rough set theory to illustrate environmental performance measurement of sustainable supply chains; Reefke and Toorche (2013) propose the application of balanced score card.

Following the millennium development goals in 2000, the United Nations has advocated the sustainable development goals (seventeen goals) beginning from the year 2015. This change brings in several aspects of environmental and social dimensions into the SDGs. The broader theme for the change emerges from a set of goals to end poverty, protect the planet, and ensure prosperity for all. These goals have specific targets to be met by the year 2030 (UN, 2015). Several goals such as, no poverty, zero hunger, good health and well-being, clean water and sanitation, clean energy, innovation and infrastructure, life on land, and life below water, etc., have a direct bearing on the humanitarian actors. These SDGs create a necessity for the humanitarian aid organizations to develop new products and services that comply with the goals.

4.2 Business Continuity – A New Element of Sustainability Evaluation in Supply Chains

Business continuity is defined as, “a holistic management process that identifies potential threats to an organization and the impacts to business operations that those threats, if realized, might cause, and which provides a framework for building organizational resilience with the capability for an effective response that safeguards the interests of its key stakeholders, reputation, brand and value-creating activities” (British Standards Institution, 2006, p. 1).

Organizations are exposed to a plethora of crises ranging from physical crises including industrial accidents, product failure, machinery failure, or sometimes a loss of utilities (gas, power supply, water, telecommunications), employee crises such as large-scale staff illness or sometimes death, industrial action or staff criminality (Mitroff and Alpasl, 2003; Herbane, 2010). Moreover, external criminal crises such as terrorism and product tampering, information crises such as cybercrime or information theft, natural disasters such as flood and storms, economic crises such as economic recession, and reputational crises such as internet defacement or malevolent rumours are part of crises that has a direct influence on the company affecting its business continuity (Mitroff & Alpaslan, 2003; Herbane, 2010).

Existing literature shows that business continuity planning is viewed as organisational learning from crisis (Elliott, 2009); cause and effects of crisis situation from a social and technological perspective (Pauchant and Mitroff, 1990), examination of crisis (Seymour and Moore, 2000). Gibb and Buchanan (2006) show that business continuity management has several stages. There are nine stages in business continuity management: programme initiation, project initiation, risk analysis, selecting risk mitigation strategies, monitoring and control, implementation, testing, education and training, and review. It is essential to note that each of the stages necessitate a lot of activities. For example, risk analysis can be shown in three processes: inputs, key activities and outputs. Inputs to risk analysis include interviews, statistics on risk, generic risk checklist, building plans, etc. Key activities in risk analysis include identifying risk, evaluate risk impacts, calculate risk scores, estimate probability of risk. The outputs in this process are – risk register, probability and impact scales, prioritized risks.

Literature also points at disaster contingency recovery plan as a basic component of business continuity planning. The contingency recovery plan includes identification of main and stand-by team members and their specific duties, including top management roles; communication procedures, safe zones for meeting, work-around processes to keep the function operational while damaged resources are being restored to a “business as usual” condition; contact details of all personnel and their expertise; identification of suppliers with primary and backup contact details (Cerullo and Cerullo, 2004).

Gilbert and Gips (2000) indicate that business continuity planning has four major elements: risk identification, risk assessment, risk ranking, and risk management. Morton (2002) shows a nine-step activity in business continuity planning. They are, provide top management guidelines; identify serious risks; prioritize the operations to be maintained and how to maintain them; assign staff to disaster teams; take a complete inventory; know where to get help; document the plan; review the test plan with key employees and train all employees; and maintain the plan. In essence the business continuity plan has four major stages from a risk prevention point of view: risk identification, risk assessment, risk treatment, and risk monitoring. Risk remediation consists of planning how to minimize impact, duration and resources and execution plan (Zsidisin et al., 2005).

4.3 Evaluation of Sustainability in Supply Chains

In a commercial setting, the amount of interest in measuring the performance of sustainable supply chains has resulted in several ways of defining how to measure and what to measure, for instance reduction of pollution (Green et al., 2012), reduction of carbon emission (Kronberg, 2012), reduction of water use, green and energy efficient products (Kozłowski et al., 2015), etc. This is compounded by the variety of goals that SSCM seeks to achieve: economic, environmental and social goals. While prioritizing one goal the other could be lost thus a strategic decision at the organizational level is required so that tradeoffs are aligned strategically beforehand (Hahn et al., 2015).

Wang and Sarkis (2013) indicate how financial performance is linked to a company's environmental performance. It is now evident that both measurement and reporting are discussed by GRI and academic scholars. The new frontier that was not researched much (any) is the sustainability performance impact on a firm's supply chain. The results are made visible in the so-called sustainability reports published by the industry and community.

According to the World Business Council for Sustainable Development, (WBCSD, 2002), "Public reports by companies to provide internal and external stakeholders with a picture of the corporate position and activities on economic, environmental and social dimensions" is defined as a sustainability report. Few reasons for sus-

tainability reporting include tracking progress against specific targets, implementation of environmental strategy, conveying corporate message internally and externally, credibility, enhanced business development opportunities, and enhanced staff morale (Kolk, 2003).

Outside an organization, several actors such as governments (Prado-Lorenzo et al. 2009), environmental management systems and international certifications such as ISO 14001 (Nazari et al. 2015), third party ratings such as Dow Jones sustainability index (Aguilera et al. 2006) and high level of media exposure (Cormier and Magnan, 2003) influence the adoption of sustainability reporting. Sustainability reporting is viewed as an important platform for demonstrating transparency, accountability and effective governance (Amran et al. 2014). Global reporting initiative also (GRI) provides broad guidelines on sustainability reporting (GRI, 2017).

As this study focuses on the sustainability evaluation in the industry context, it further zooms into the industry practices and reports on sustainability.

4.3.1 Industry Practices in Supplier Sustainability Evaluation: Example of Shell

In Shell, in accordance with the Shell General Business Principles and Group Code of Conduct, the company seeks to work with contractors and suppliers who contribute to sustainable development and are economically, environmentally and socially responsible. The company is poised to develop and strengthen relationships with contractors and suppliers are committed to the principles set out below or to similar standards through their own activities and the management of their own suppliers and sub-contractors (Shell, 2018). Contractors and suppliers need to provide workers with a dedicated whistle-blowing mechanism where grievances related to below topics can be logged confidentially.

In Shell, Health, Safety, Security and Environment are evaluated as the key sustainability evaluation areas. Contractors and suppliers have a systematic approach to HSSE management, designed to ensure compliance with all applicable laws and regulations and to achieve continuous performance improvement. Further, contractors and suppliers are committed to protect the environment in compliance with all applicable environmental laws and regulations. They need to use energy and

natural resources efficiently and continually look for ways to minimise waste, emissions and discharge of their operations, products and services.

With regard to social performance of Shell, contractors and suppliers respect their neighbours and contribute to the societies in which they operate and complying with local laws, in terms fairness in job opportunities, and community level assistance. (Shell, 2018).

From a labour and human rights perspective, Shell's contractors and suppliers conduct their activities in a manner that respects human rights as set out in the UN Universal Declaration of Human Rights and the core conventions of the International Labour Organization (ILO) such as; contractors and suppliers should not use child labour; should not use forced, prison or compulsory labour; need to comply with all applicable laws and regulations on freedom of association and collective bargaining. Further, the contractors and suppliers should not tolerate discrimination, harassment or retaliation and should provide a safe, secure and healthy workplace. Finally, suppliers and contractors should provide wages and benefits that meet or exceed the national legal standards and should comply with all applicable laws and regulations on extra hours of work.

4.3.2 Supplier Evaluation Criteria: Example of Shell

Shell indicates a long list of supplier evaluation criteria. Supplier selection and screening based on environmental and social/human rights criteria as set out by Shell. Training for procurement staff to conduct supplier prequalification assessment is provided to ensure high standards in supplier sustainability evaluation. The company provides supplier development programs in business and management skills, quality management systems, technical and leadership skills, sustainability-related issues, logistics, monitoring of suppliers, and due diligence investigation

In Shell, the supplier evaluation also relates to the local business environment assessment, supplier contribution on local government economic priorities, compliance on local regulatory and legislative requirements. Health, safety and environment requirements, compliance with regulations and ethical business conduct, adherence to quality management systems. Supplier conduct for sustainability performance assessment and reporting. (Based on: Ahmad et al.2016: "Sustainable

supply chain management in the oil and gas industry: A review of corporate sustainability reporting practices").

4.3.3 Other Sustainability Assessment Indices

Among other sustainability assessment indices, there are Environmental sustainability index (ESI), Ecological footprint (EFP), Operational performance index (OPI), Environmental performance indicators (EPI), Human development index (HDI), Wellbeing index (WI), Dow Jones sustainability index (DJSI). The result shows that majority of oil and gas companies use environmental performance indicators (EPI) in preparing their sustainability performance reports.

Global Reporting Initiatives (GRI) developed a framework of sustainability assessment and reporting covering economic, environmental and social indicators of sustainability (GRI, 2002). This shows that indicators of sustainability are massively being used to assess organisational sustainability performance (Labuschagne, 2005; Streimikiene et al, 2009; Singh et al, 2011). Indicators are instruments for reporting and measuring the progress of sustainability performance in organisations (Liverman et al, 1988; Crabtree and Bayfield, 1988; GRI, 1992). Economic indicators are those indicators that illustrate variations on financial capability of the system under review. Economic indicators describe all aspects of organizational operations in relation to its stakeholders financially, they show the organisation's financial system, financial validity and other aspects of economic interactions (GRI, 2002). There are many sustainability assessment guidelines covering the entire industrial sector such as: GRI, IChemE, ISO 14031, WBCSD indicators etc. (Delai and Takahashi, 2011).

Thus, by now there are various tools and practices available for the evaluation of sustainability, and supplier sustainability in particular. After discussing them above, the study pools together the key practices and evaluation criteria into the conceptual framework of this study that will be used to improve the supplier sustainability evaluation practices in the case company.

4.4 Conceptual Framework on Supplier Sustainability Evaluation

As demonstrated in the literature review above, the concept of sustainability that business practice and literature mostly rely on these days is based on the triple bottom line. Triple bottom line consists of economic, environmental and social indicators of a company (Elkington, 1998). These concepts capture all the three broad aspects that a company is expected to perform. However, for an organisation to be truly sustainable, it also need to include *the business continuity* planning as a part of its overall sustainability plan.

Business continuity planning is drawn from a contingency perspective where it focusses on alternative ways to cope up with any small-scale disruption or large-scale disaster. In essence, the background of business continuity planning is a source of information from the risk management practice a company is adopting (Zsidisin et al.,2005). As discussed in the previous section, risk can be small scale or large scale. In either case, it is essential for the case company to sensitize the following aspects from a risk mitigation stand point: risk identification, risk assessment, risk treatment and risk monitoring.

Further, these four aspects of risk mitigation strategy needs to have detailed operational level planning on plan for disruption, a plan to manage impact of disruption, a plan showing what are the alternate resources that can be tapped during an aftermath of a disruption, a plan showing what are the alternate components that can be used in such events, and finally a plan indicating alternate channels of communication and supply so that the firm can quickly bounce back to 'business as usual' scenario (Foerstl et al., 2010; Zsidisin et al., 2005).

The key concepts described above are merged into the conceptual framework of this study as they form the key concepts in the sustainability area. This synthesized conceptual framework id shown in Figure 9 below.

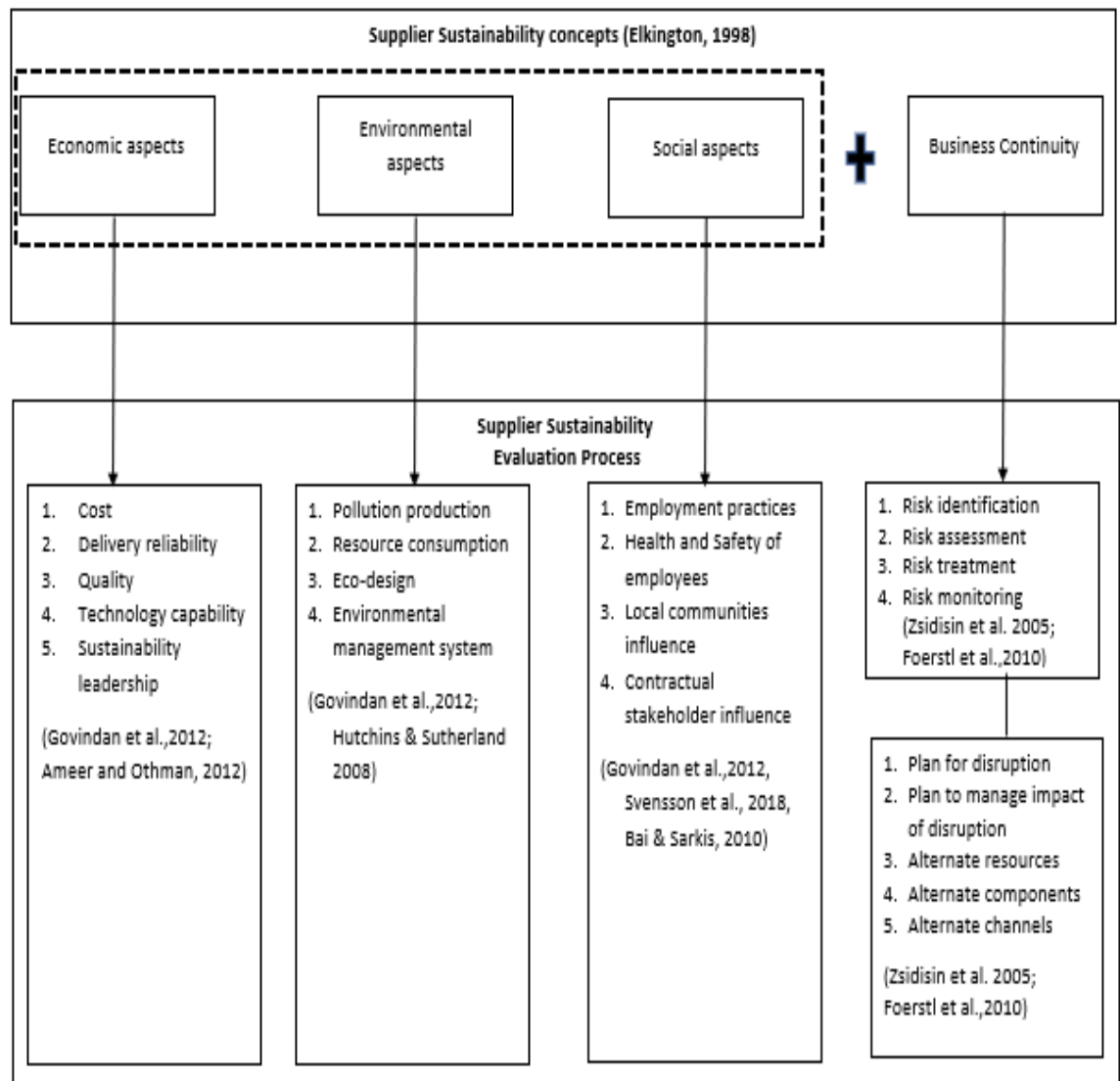


Figure 9. Conceptual framework for supplier sustainability evaluation.

In the next section, the conceptual framework will be used to improve the supplier sustainability evaluation practices in the case company. It will help to utilize these concepts and best practices to improve the present supplier sustainability evaluation in the case company.

5 Building Proposal for Improving the Supplier Sustainability Evaluation Part of the SES Process

This section merges the results of the current state analysis and the conceptual framework towards the building of the proposal using Data 2. First, an overview of proposal building process is given, followed by findings from Data collection 2. Finally, a draft proposal of the supplier sustainability evaluation part is presented.

5.1 Overview of the Proposal Building Stage

First, the proposal building started with *the comparison of the evaluation areas of sustainability* as recommended by the research and business literature (in CF) and *the current practices of evaluating some selected areas of sustainability* by the case company, as part of its current Supplier Evaluation and Selection (SES) process. This comparison shows *the difference* in the sustainability evaluation areas currently checked by the case company vs. those recommended to be checked by literature and leading oil and gas companies.

Second, as soon as these differences are identified, the researcher involved participation of the stakeholders and discussed with the stakeholders from the Procurement team how to overcome these differences, so that to become *closer to the present sustainability requirements* (as discussed in literature), which are also required by the company's end users (and visible in their sustainability reports).

5.2 Results of CSA and CF Comparison (Based on Data Collection 2)

As the first step in the Proposal building, the comparison was done aimed at checking the fit between *the current sustainability compliance* evidence required by the company as documents from suppliers, and the sustainability criteria discussed in recent research and business literature (which were summarized in the CF of this study). To make this comparison easier, the picture of the CF is repeated below, so that to point to the sustainability areas suggested from literature.

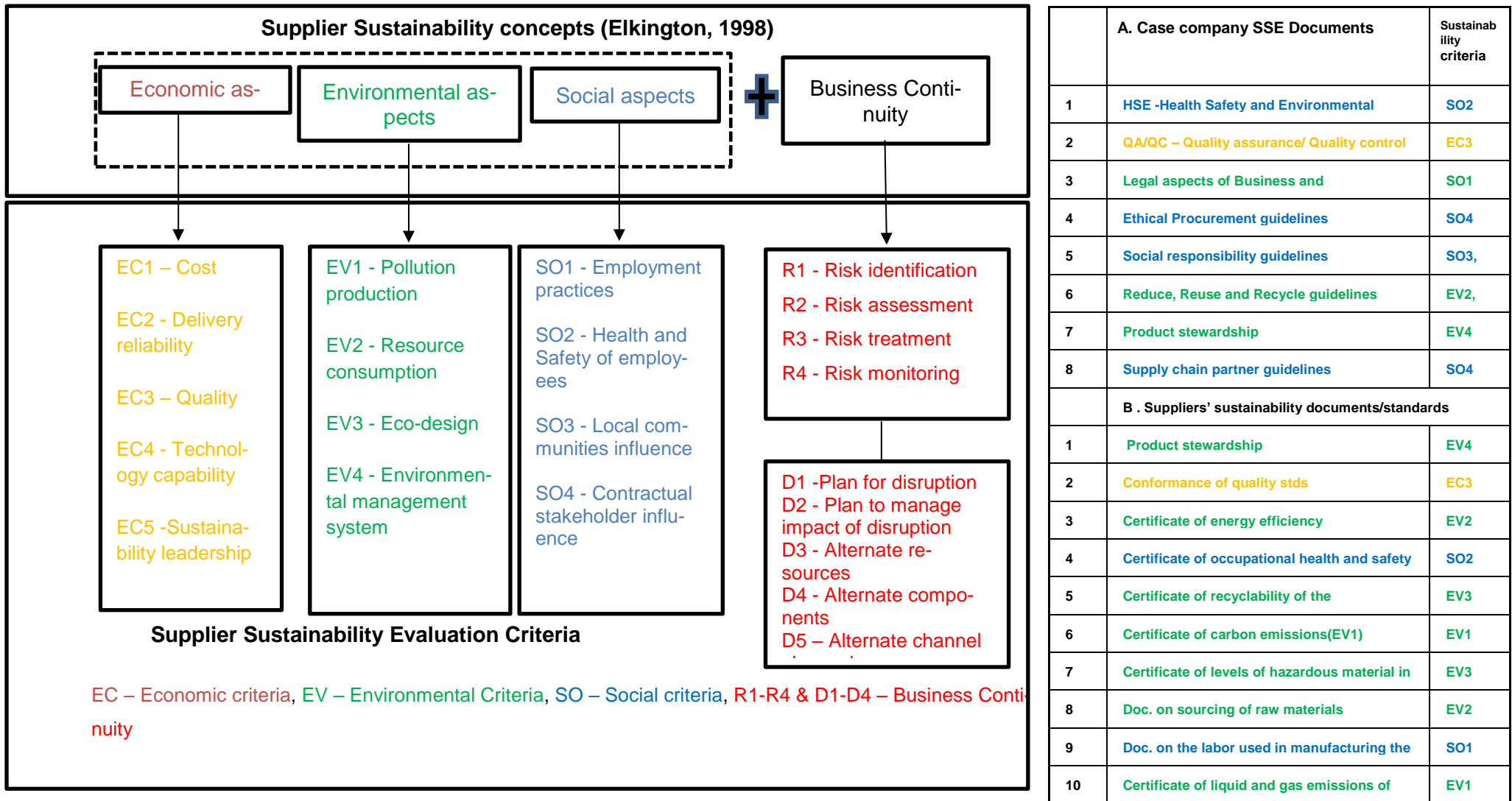


Figure 10. Comparison between the conceptual framework and CSA (in relation to the current SSE documents).

According to the results of this comparison, the following picture merged, based on the results of CSA (Data 1) and discussions with the stakeholders (Data 2) regarding the possible improvements, summarized in Table 7 below.

Table 7. Comparison between the current sustainability evaluation documents (TYPE 2 documents: evidence required from the suppliers) and their fit with the suggested evaluation areas from literature (CF).

	TYPE 2: Supplier-provided sustainability documents/ standards	Sustainability Criteria (in CF)
1	Product stewardship	EV4
2	Conformance of quality standard	EC3
3	Certificate of energy efficiency	EV2
4	Certificate of Material sourcing from sub contractors	EV2
5	Certificate of occupational health and safety requirements for operating the component	SO2
6	Certificate of recyclability of the component(EV3)	EV3
7	Certificate of carbon emissions(EV1)	EV1
8	Certificate of levels of hazardous material in the component(EV3)	EV3
9	Doc. on sourcing of raw materials	EV2
10	Doc. on the labor used in manufacturing the component, with an emphasis on child labor	SO1
11	Certificate of liquid and gas emissions of the component and its effects on the environment	EV1

First, at present, the company complies quite well with the views on sustainability from emerging literature. More specifically, in the **Social** aspect of sustainability, the company currently requires evidence for sustainability compliance in the areas of **S01**, **S02**, **S03** and **S04**, which can be proved by providing the documents **Legal aspects of Business and Administration**, **Health Safety and Environmental guide**, **Social Responsibility guidelines**, and **Ethical Procurement guidelines**, respectively, thus proving compliance with requirements in these sustainability areas.

Second, in the **Environmental** aspect, the company currently requires evidence for sustainability compliance in the areas of **EV1**, **EV2**, **EV3** and **EV4**, which is proved by providing the documents such as **Certificate of Carbon Emission**, **Documentation on sourcing of raw materials**, **certificate of level of hazardous material in the component**, and **Product stewardship**, proving compliance with requirements in these sustainability areas.

Third, in **Economic aspects** (that are currently checked by Business Unit – BU- as part of the Commercial Bid), the BU only currently asks about **EC1 (cost)**, and **EC3 (quality)** currently asked separately by the Quality management. It is important to note that **EC2**, focused on ‘delivery reliability’ is NOT asked by anyone. At the same time, issues related to the **delivery reliability** are more and more widely discussed in sustainability related literature, as part of Business continuity. Therefore, this area **EC2** was identified as the missing part of sustainability compliance evaluation and was suggested by the stakeholders to be asked together with the ‘risks’, identified in sustainability literature as another important sustainability criteria, and also missing from the current company’s SSE evaluation. Moreover, the economic criteria **EC5** was also missing. **EC5** is about **sustainability excellence** of the supplier company. Sustainability excellence is evidenced by the presence of a dedicated sustainability department in the supplier facility that oversees planning and implementation of companywide sustainability practice. Such existence of sustainability department can be seen as a parallel to burgeoning quality consciousness during 1960s and 1970s. Hence from a strategic perspective having a sustainability department in the supplier facility ensures both planning and implementation of sustainability practices. Although **EC1-5** are important economic aspects of sustainability, it is verified by the business unit and hence these does not fall into the scope of this thesis.

The main improvements areas identified from this comparison are: first, the missing evidence for complying with the sustainability requirement related to ‘**delivery reliability**’ (as part of the new area of ‘Business continuity’), and second, the missing evidence for complying with the sustainability requirement related to ‘**risks**’ (also, as part of the new area of ‘Business continuity’).

Based on the discussion with the stakeholders, it was suggested to do the following improvements as part of the Proposal:

First, it is necessary to develop the **Business continuity** part, which should be visible in two amendments: (1) first, the additional document(s) that the case company should

formulate and add to the package of the 29 currently required documents (TYPE 1 documents) that should relate to articulate and require to state the companies with: (a) the STANDARDS for managing risks (addressing R1– Risk identification, R2– Risk assessment, R3– Risk treatment, and R4–Risk monitoring areas), and (b) the actions from the supplier confirming their measures for increasing ‘delivery reliability’ (related to D1– Plan for disruption, D2– Plan to manage impact of disruption, D3– Alternate resources, D4– Alternate components, and D5– Alternate channels).

In addition, from the suppliers’ side (TYPE 2 documents), the company should also require: the documents to demonstrate: (a) the evidence proving their steps taken to tackle risk management (addressing R1, R2, R3 and R4 areas), and (b) the evidence from the supplier proving their measures for increasing ‘delivery reliability’ (addressing to D1, D2, D3, D4 and D5).

5.3 Improvement to the Current Supplier Evaluation and Selection process (in its Supplier Sustainability Evaluation part)

Based on the suggestions from the stakeholders, the Proposal suggests the improvements to two parts of the current SES process, in parts related to the current *SSE evaluations* practices:

First, there are two of documents involved in the current SSE (supplier sustainability evaluation) part of SES process which covers several criteria under triple bottom line described in Social, environmental and economic aspects. The first type of documents created by the case company (29 documents), relate to corporate social responsibility, codes of conduct, HSES-Health, Safety, Environmental and sustainability, which are central in the supplier sustainability evaluation. These documents are cross-verified by the procurement specialist in the index for compliance.

A new set of documents received from the supplier as an evidence of sustainability compliance to the standards and customer requirements, should include: (a) Product stewardship, (b) Conformance to quality standards, (c) Energy efficiency (d) Raw material used in the component, (f) Occupational health and safety requirements for operating the component, (g) Recyclability, (h) Carbon emissions, (i) Level of hazardous material in the component, (j) Sourcing of raw materials, (k) Labor used in manufacturing the

component with an emphasis on child labor, (I) Liquid and gas emissions of the component and its effects on the environment, etc.

These two types of sustainability documents are being evaluated with respect to customer requirements as a part of sustainability evaluation in the TBE Index (in Sections 3.1 and 3.2 of TBE Index), the case company presently having extensive list for technical evaluation criteria, (generally takes 80 % of overall evaluation time) and less focus on sustainability criteria (takes 20 % of overall evaluation time). Hence, the evaluation does not focus keenly on the exact requirement and standards on sustainability part, the SSE misses to capture critical points of compliance for all sustainability criterion. Due to the less focus on the sustainability part in the existing supplier technical evaluation index, the current SSE misses the critical point. As a result, an overwhelming iterative mail communication is triggered with the supplier at this part of the SES process, that is show in Figure 11 below:

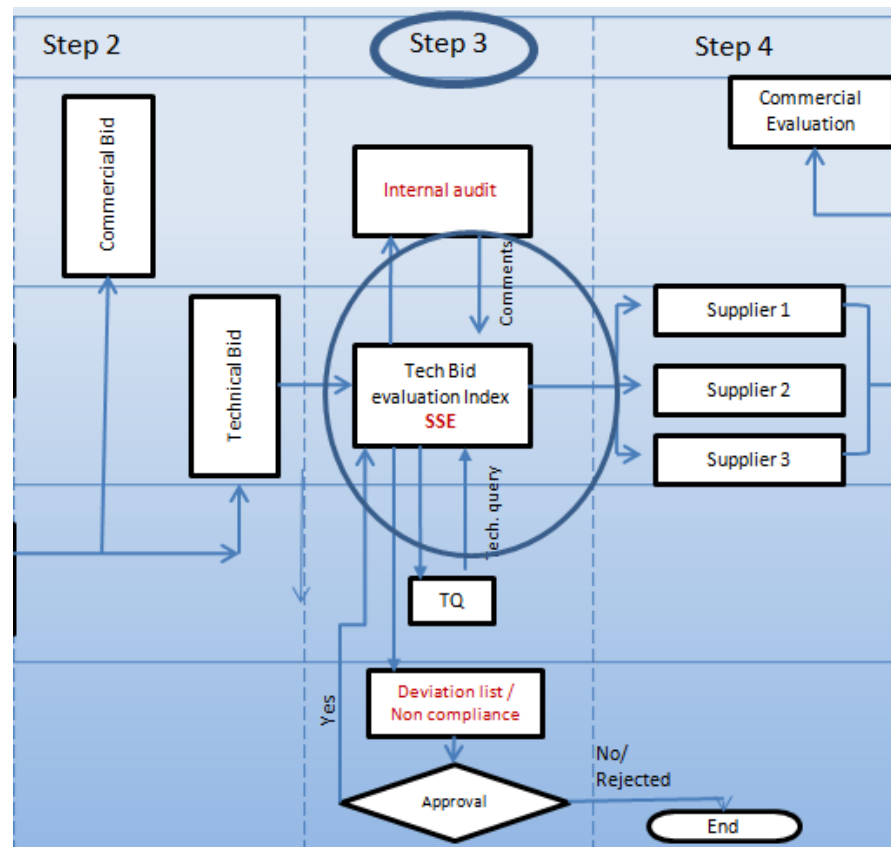


Figure 11. Current supplier sustainability evaluation practices zoomed in to the Index-related part.

As revealed by the CSA results, this practice shown in Figure 11 eventually causes delays in the project. To improve, the stakeholders suggested to expand the TBE Index and include a defined set of sustainability evaluation areas into it, as shown in Table 8.

Table 8. Proposal for the Index for SSE (PART1) for compliance to the supplier documents / standards.

Documents submitted by a supplier: (CSA)	Doc. submitted	Focus of SSE evaluation / Evaluation criteria – From CF	CLIENT REQUIREMENTS (for this project)	STANDARDS and Clause/Section, in needed	RESULT for Supply 1: COMPLIANCE with the client requirements, or existing standards
(1) Product stewardship (EV4)	✓	(1) Environment -EV 4	(1) CR specified	(1) ISO 9001/14001, Cl./Sec.....	(1) Acceptable / Not
(2) Conformance of quality Stds(EC3)	✓	(2) Economic – EC3	(2) CR specified		(2) Acceptable / Not
(3) Certificate of energy efficiency (EV2)		(3) Environment -EV 2	(3) CR specified	(2) ISO 9001 /Cl..	
(4) Certificate of raw material used in the component (flammable, etc) (EV2)		(4) Environment -EV 2	(4) CR specified	(3) ISO/ IEC 17025	(3)--
(5) Certificate of occupational health and safety requirements for operating the component(SO2)		(5) Social (SO2)	(5) CR specified	(4) ISO 14001, Cl. (5) ISO 45001, OHSAS 18001	(4)--
(6) Certificate of recyclability of the component(EV3)		(6) Environment -EV 3	(6) CR specified	(6) ISO 14001 (7) ISO 14001	(5) --
(7) Certificate of carbon emissions(EV1)		(7) Environment -EV 1	(7) CR specified		(6)
(8) Certificate of levels of hazardous material in the component(EV3)		(8) Environment -EV 3	(8) CR specified	(8)ISO14001	(7)
(9) Doc. on sourcing of raw materials(EV2)		(9) Environment -EV 2	(9) ISO 9001/1401, OSHAS 18001	(9) ISO 14001 (10) Standard	(8)
(10) Doc. on the labor used in manufacturing the component, with an emphasis on child labor(SO1)		(10) Social (SO1)	(10) CR specified	(11) ISO 14001	(9)
(11) Certificate of liquid and gas emissions of the component and its effects on the environment(EV1)		(11) Environment -EV 1	(11) CR specified		(10)
+					(11)
(12) Risk assessment ISO 31000 standards (R2)		(12) Business contunity – Risk (R2)	(12) ISO 31000	(12) ISO 31000, Cl..	
(13) Plan for managing the impact of disruption (D6)		(13) Business continuity – Disruption (D6)	(13)CR specified	(13) ISO 31000, Cl..	(12) Yes /No 13) Acceptable
(14) Alternative resources/components/channel (D7,8,9)		(14) Business continuity- Disruption (D7,8,9)	(14)CR specified	(14) ISO 31000, Cl.	14) Acceptable

As seen from Table 8, the improvements relate to expanding the SSE Index part of TYPE 2 documents (the supplier evidence/standards 11 documents), with the information captured and made visible in TBE index.

First, the proposed Index has *three new columns* that are critical in the supplier sustainability evaluation as set by the case company. The first column ‘*Client requirements for this project*’ indicates that if the client has clearly set a requirement from the supplier. This helps the evaluation process simple as there is information transparency that shows what is needed from the client to the supplier and also what the supplier has provided to

support the requirement. The second newly added column '*Standards if needed*' indicated what standards can be shown as a compliance for client requirements. Such standards are also easily verifiable by the case company and the client in case of supplier evaluation or clarifications. Finally, the third newly added column '*Result for supplier compliance with client requirements*' show what decision has been taken – has the supplier met the client requirement or not. Since the evaluation process is made very simple, it puts all the three actors – supplier, case company and the client – in the same page of understanding what is required, what is submitted and what is the decision taken.

Secondly, the improvements relate also to the documents required as an evidence from the suppliers (TYPE 1 documents: the company-formulated 29 documents).

Table 9. Proposal for SSE (PART2) for compliance to the company-formulated 29 documents.

	Sustainability Criteria (in Index) – CSA Result	Sustainability Criteria (in CF)
	A . Sustainability documents/standards - Case company written documents	
1	HSE -Health Safety and Environmental Guide	SO2
2	QA/QC – Quality assurance/ Quality control	EC3
3	Legal aspects of Business and Administration	SO1
4	Ethical Procurement guidelines	SO4
5	Social responsibility guidelines	SO3
6	Reduce, Reuse and Recycle guidelines	EV2
7	Product stewardship	EV4
8	Supply chain partner guidelines	SO4
	Proposed Business continuity criteria – Presently missing in index	
9	Risk Management and Business Continuity Planning	(R1-R4), (D1-D5)

It can be seen in Table 9, a new document (**Risk Management and Business Continuity Planning**) is proposed for compliance to the currently formulated company documents. The document relating to business continuity is missing at the moment and it is suggested in the proposal that a document covering Risk Management and Business

Continuity Planning (R1-R4),(D1-D5) be added. First, This document captures fundamental aspects of risk management practices (R1-R4) for example, identification of risk, assessment of risk, risk treatment – typically is done to plan for ways in which risk can be handled and finally risk monitoring – a continuous monitoring of risk so that the system is updated in a real time – which helps in planning for risk mitigation strategies.

Secondly, risk management procedure would be only complete not only when risk is identified and assessed but also when the mitigative steps are put in place to reduce the effects of the risk. This (D1-D5) is done by having a plan for disruption, a detailed plan to manage the disruption, what are alternate sources of supplies so that the production line is not affected, what are sources of alternate components in an event of disruption triggered delays, and what are the alternate channels of receiving supplies from the supplier so that the project is finished on time.

The purpose of this document (D1-D5) is to establish an understanding and assessment of the supplier's plan for sudden disruptions in its business. For example, this documents would capture, how the supplier is equipped to handle sudden unforeseen events such as, employee strike, a natural disaster, fire in the production facility, etc. that could potentially delay the client's project from several days to several weeks. This document is comprehensive that it covers (D1-D5) business continuity risks due to disruptions that occur in small scale to disasters that happen in a large scale.

5.4 Recommendations for the Proposal Implementation

The suggestions from the stakeholders created a bigger picture of the forthcoming improvements to the current SES process (*Recommended* to follow from these initial improvements). These proposed improvements related to the following practices that need to be improved in the case company.

First, the stakeholders discussed and agreed to the proposal *to expand the current TBE Index to cover SSE* so that to show not only the presence of certain documents (required from the suppliers), but also showing *the precise information related to the details* (which standard, or which class/level, etc) that are certified for. For example, if they are certified for energy efficiency, as required by the case company, the improved Index is not only contain the information on their general compliance (yes/no), but also give the precise

clause/section for their energy efficiency. This is important since that information is typically checked during the internal audit, in addition to the general statement for the sustainability compliance.

Second, *the expanded SSE part of Index needs to be discussed together with the Business Unit* of the case company, as another key stakeholder in the SSE. This discussion aims for agreement on the proposed additional step in the SES process. If agreed, the new step can relate to better cooperation between these units. In practice it means that the list of the checked sustainability evaluation criteria (and evidence for it) agreed for the project in advanced, and openly. If this SSE criteria list is agreed by both key stakeholders (the BU and the Engineering Procurement), it is allowed for gathering evidence from the supplier submitted documents easier and faster by both, the BU (at the internal audit step) and by the Engineering and Procurement (who is be looking for certain specified criteria and prepare a better report for the Internal audit). If implemented, this improvement is allowed to turn the 'controlling' relationship from the BU into a more 'collaborative relationships', when the Procurement team prepares better for SSE checkpoint, and points in structured way to the 'evidence' from the suppliers.

Moreover, such an established list of SSE criteria for the oncoming project should also become part of the required document package from the suppliers (as part of the Technical and Commercial bid for the project). In other words, suppliers should check and point very clearly that they not only provide the needed certificates, but also cite clearly the standard, or class/level/etc., information that their standard proves. This improvement should structure the required documents submitted by the suppliers and also demand evidence much earlier from the suppliers before it comes to the Technical bid and SSE evaluation by the procurement team. If implemented, this improvement is reduced the number of inquiries from the suppliers by making structured requests at the Technical Bid submission stage.

However, these recommended improvements require considerable efforts from the key stakeholders (BU and the Procurement team), ideally done on the 1-2 forthcoming projects. Therefore, the researcher was not able to develop them in detail, but only on a general level pointing to the steps that need to be done to implement these future improvements.

In order to truly improve the current SSE part of the SES process, this study recommends the case company to hold *two PILOTS*: first, for building the cooperation with BU, and second, from introducing the SSE Index to suppliers, so that the improvements proposed in this study could truly benefit the company:

First, PILOT 1 will need to focus on *Building cooperation with the BU* and should include the following steps. First, select a forthcoming project for establishing a common SSE criterion for the Engineering and Procurement team to define the list of sustainability criteria (visible in the SSE Index). Next, cooperate with the BU on polishing this list and the SSE Index for collecting SSE compliance information from the suppliers. And to check the outcomes of this proposed cooperation in a meeting with BU lead to the improvement at the Internal Audit stage, based on the provided a detailed Index of SSE evidence by the Procurement team. Then, Pilot 1 should establish a similar planning meeting with the BU for each forthcoming project.

Second, PILOT 2 will need to focus on making changes to the Technical Bid step of the wider SES process (the list of documents required from the suppliers as part of SES process): by sending the SSE-related Index to suppliers as part of Technical bid documents. Based on the early meeting with BU and fine-tuning the Index as part of Technical bid documents, the Index can be send to the suppliers BEFORE bidding for the project. In this case, suppliers should themselves fill in the SSE Index inserting details (such as the standard, or class/level of the required criteria) and submit this filled-in Index together with the other Technical bid documents. These 2 Pilots to be checked with the outcomes of this proposed change in a meeting with BU, if this leads to improvements can be implement for all upcoming projects.

In the future, if this practice piloted in PILOTS 1&2 works well with the BU and suppliers, they may be asked to fill in details related to all the other parts of the Technical bid. So far, this recommendation need piloting on the scale of several project in the SSE part before a wider change can be proposed. In the future, if successful, the company can even think of an application for filling in all the related information buy the suppliers themselves. This make the SES process semi-automated, with the role of the Engineering Procurement team shifting to educating the suppliers and comparing the results in a more efficient way. In future projects, the company can think of launching a Supplier Evaluation application (App) where suppliers can fill in all related information themselves, with the Tech. Bid information (including SSE). This is important since, based on the

discussions with the stakeholders, they foresee the number of the required SSE documents growing in the future. This make the job of the Procurement team even heavier in part of the SSE if process improvement steps are NOT taken in advance.

Such improvement could help the company to truly help its current supplier sustainability evaluation and better prepare for the ever-growing sustainability requirements.

Next, this Proposal and Recommendations for its implementation is validated with the key stakeholders in the SES process in the case compay.

6 Validation of the Proposal

This section reports on the results of the validation stage and points to further developments to the initial Proposal. This section begins with overview of the Data 3, followed by the findings from the Data 3. It continues with final proposal of the supplier sustainability evaluation process, the recommendations for the case company are presented and finally an action plan for implementation is also presented.

6.1 Overview of the Validation Stage

This section validates the proposal developed in Section 5. In general, validation refers to the action checking the quality of the outcome e.g. by piloting, testing, feedback, key stakeholder or expert evaluation.

In this study, the proposal makes suggestions to improve the current supplier sustainability evaluation process, which makes part of the wider Supplier Evaluation and Selection process of the case company. For validation, the proposal is submitted to the key stakeholders of the case company for review and feedback. The feedback obtained from the stakeholders form Data 3 of this thesis.

In this study, the proposal was sent to two key stakeholders of the case company: the Procurement Head and the BU-Sales Vertical Head. Interviews with the stakeholders were recorded and the feedback to the proposal was collected. The feedback served as validation and also guided in modifying the proposal to the state desired by the key stakeholders. These persons were selected as they make the key stakeholders in the SES process. Since during the previous round of Data collection 2, the same stakeholders already contributed to formulating the proposal, and the proposal conforms to the previous input from these stakeholders, they have accepted it for rolling out and for the pilot testing in the next for coming project with the Supplier sustainability evaluation.

6.2 Findings of Data Collection 3

For validation, the participants were asked to comment on the proposal and provide specific feedback if there is any further improvement necessary in any specific steps of the proposed Supplier sustainability evaluation. The results are presented in Table 10 below.

Table 10. Summary of the validation and feedback to the Initial proposal.

<i>Stakeholder</i>	<i>Feedback</i>	<i>Comments on implementation</i>
1. Procurement Head	<ol style="list-style-type: none"> 1. The proposal covers what we discussed 2. Business Continuity is a major dimension that we are interested in 3. Lets roll out and in the upcoming project and see what our suppliers say. 	<ul style="list-style-type: none"> • Ready to implement
2. BU – Sales vertical Head	<ol style="list-style-type: none"> 4. Its great to see the proposal to include Business continuity 5. It helps us in digging deeper from a risk management perspective 6. We can implement and discuss this with our suppliers 	<ul style="list-style-type: none"> • Positive feedback

At the outcome, the initial proposal received very positive feedback from the stakeholders due to them being actively involved already at the proposal building stage and the Procurements team's and Business unit's needs being well taken into account in the initial proposal. Moreover, simplifying the supplier evaluation process was highly appreciated as it would help moving with the project beginning faster than previously.

The BU-Sales Vertical Head, a key stakeholder from the Business unit, also noted that the proposed Business continuity needs to be given equal importance in the supplier sustainability evaluation.

The proposal looks as a beginning step in a faster supplier evaluation process. Let's see what the suppliers say. (BU Sales Vertical Head)

The Procurement Head, a key stakeholder from the Procurement team, indicated that the proposal can be used for making the supplier sustainability evaluation complete in all critical areas. This also opens up the dialogue with the suppliers for process improvement in the supplier sustainability evaluation.

Business Continuity evaluation is a key element in Supplier evaluation. It helps increase transparency of risk management practices of supplier through this evaluation. We can implement and take feedback in our next supplier evaluation process. (Procurement Head)

It was clear that through the discussion with the key stakeholders that the proposal can be taken 'as it is' into a pilot in the next forthcoming supplier sustainability evaluation in the next project.

6.3 Final Proposal for Supplier Sustainability Evaluation (SSE) Part of SES Process

The validation results allows the finalize the initial proposal into the final proposal for Supplier Sustainability Evaluation (SSE) part as shown in Table 11 below.

Table 11. Final Proposal for the INDEX for SSE (PART1) for compliance to the supplier documents/standards.

Documents submitted by a supplier: (CSA)	Doc. submitted	Focus of SSE evaluation / Evaluation criteria – From CF	CLIENT REQUIREMENTS (for this project)	STANDARDS and Clause/Section, in needed	RESULT for Supply 1: COMPLIANCE with the client requirements, or existing standards
(1) Product stewardship (EV4)	✓	(1) Environment -EV 4	(1) CR specified	(1) ISO 9001/14001, Cl./Sec.....	(1) Acceptable / Not
(2) Conformance of quality Stds(EC3)	✓	(2) Economic – EC3	(2) CR specified		(2) Acceptable / Not
(3) Certificate of energy efficiency (EV2)		(3) Environment -EV 2	(3) CR specified	(2) ISO 9001 /Cl..	
(4) Certificate of raw material used in the component (flammable, etc) (EV2)		(4) Environment -EV 2	(4) CR specified	(3) ISO/ IEC 17025	(3)--
(5) Certificate of occupational health and safety requirements for operating the component(SO2)		(5) Social (SO2)	(5) CR specified	(4) ISO 14001, Cl.	(4)---
(6) Certificate of recyclability of the component(EV3)		(6) Environment -EV 3	(6) CR specified	(5) ISO 45001, OHSAS 18001	(5) --
(7) Certificate of carbon emissions(EV1)		(7) Environment -EV 1	(7) CR specified	(6) ISO 14001	(6)
(8) Certificate of levels of hazardous material in the component(EV3)		(8) Environment -EV 3	(8) CR specified	(8)ISO14001	(7)
(9) Doc. on sourcing of raw materials(EV2)		(9) Environment -EV 2	(9) ISO 9001/1401,	(9) ISO 14001	(8)
(10) Doc. on the labor used in manufacturing the component, with an emphasis on child labor(SO1)		(10) Social (SO1)	OSHAS 18001	(10) Standard	(9)
(11) Certificate of liquid and gas emissions of the component and its effects on the environment(EV1)		(11) Environment -EV 1	(10) CR specified	(11) ISO 14001	(10)
			(11) CR specified		(11)
+					
(12) Risk assessment ISO 31000 standards (R2)		(12) Business contunity – Risk (R2)	(12) ISO 31000	(12) ISO 31000, Cl..	(12) Yes /No
(13) Plan for managing the impact of disruption (D6)		(13) Business continuity – Disruption (D6)	(13)CR specified	(13) ISO 31000, Cl..	13) Acceptable
(14) Alternative resources/components/channel (D7,8,9)		(14) Business continuity- Disruption (D7,8,9)	(14)CR specified	(14) ISO 31000, Cl.	14) Acceptable

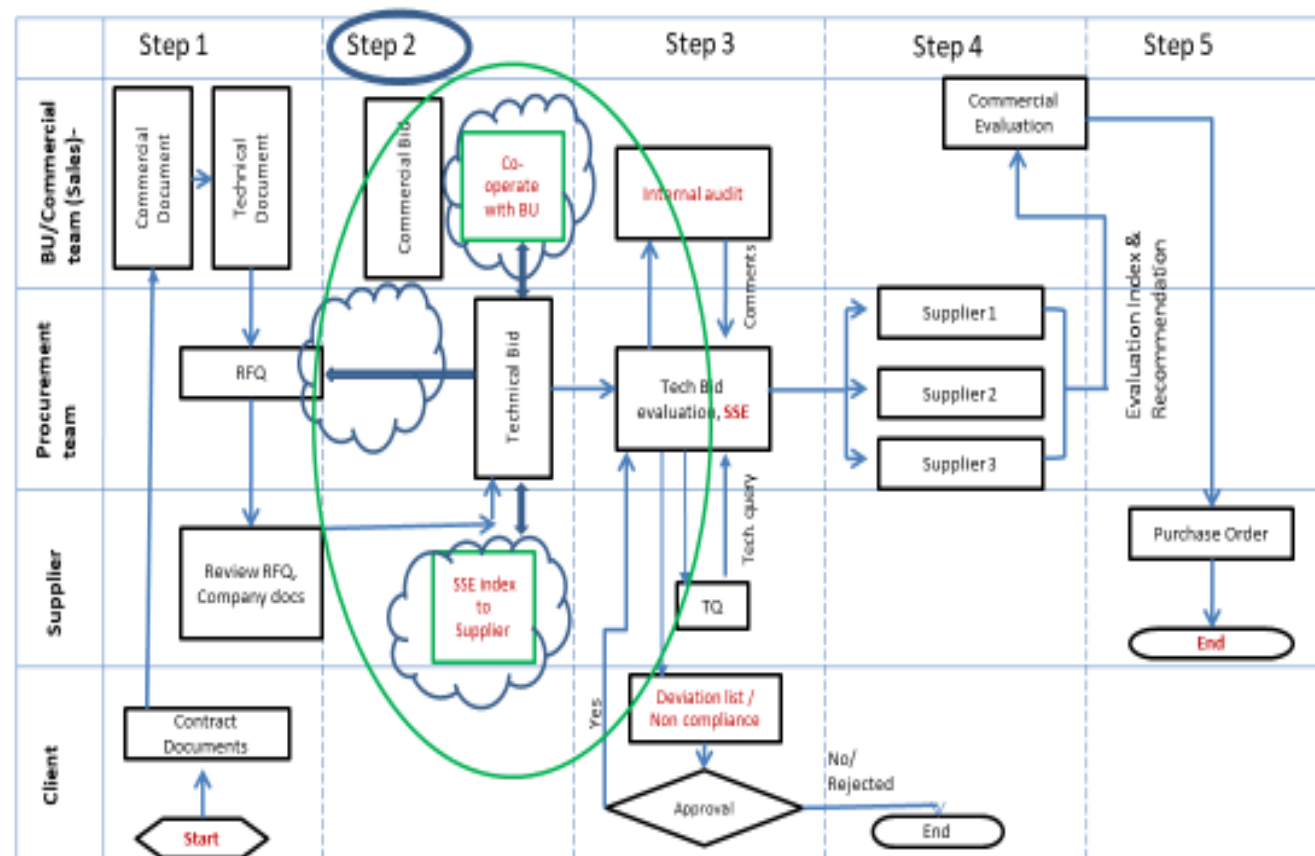


Figure 12. Proposed improvements to more focus on SSE part of Supplier Evaluation and Selection (SES) Process.

The feedback from the stakeholders indicate that the proposal can be used as a test pilot in the upcoming project for supplier sustainability evaluation without modifications as it was developed after a thorough discussion and involvement of the key stakeholders (Procurement Manager and BU-Manager). Also suggested to improve the process in two steps, through Pilots 1 & 2. In Pilot 1, Focused on building cooperation with the BU in an upcoming project a common list of focus areas for the SSE Index (Table 11) for the Engineering & Procurement team together with BU needs to be established and done before the Internal audit. And the Evaluation of introducing a commonly agreed SSE Index in a meeting with BU is to be done. It improves the preparation of the Procurement team to the Internal audit to reduce snowballing effect and also reduce time and effort.

Pilot 2 is focused on bringing change to supplier technical bid at the start of SES process. Further it includes the improved SSE Index to the supplier requested documents, as part of RFQ step (Figure 12) before bidding for the project. Suppliers could themselves fill in the SSE Index by inserting details (standards, certification results, etc.) and submit it as part of technical bid documents. This make the job of the Engineering and Procurement team more of comparing the results, in an efficient and reliable way.

7 Conclusions

This section summarizes the study and the proposal for the improved Supplier Sustainability Evaluation (SSE) as a part of the wider Supplier Evaluation and Selection (SES) process.

7.1 Summary

This study addresses one of the key shifts happening in the recent years: introduction of sustainability practices in business. This study started off by discussing sustainability in the case company and its inception from the triple bottom line that came as the key guidance for the industry at the end of the new millennium.

The thesis focuses on supplier sustainability evaluation. The objective of this thesis was to improve the Supplier Sustainability Evaluation (SSE) part of the Supplier Evaluation and Selection (SES) process conducted by the Procurement team of Oil and Gas Sector of the case company. The case company is one of the biggest EPCM (Engineering, Procurement, Construction and Management) companies in India that increases its focus on sustainability compliance of its suppliers. As part of the current supplier sustainability evaluation, this thesis suggested improvements to the current process and proposed to improve the existing Technical Bid Index into a SSE tool.

To achieve this objective, this thesis, first, evaluated the current Supplier Evaluation and Selection (SES) process conducted by the Engineering and procurement team and the Business unit, analyzing specifically the current Supplier Sustainability Evaluation (SSE) practices, which falls under responsibility of the Engineering and procurement team.

Based on the identified weaknesses, literature and best practice from energy companies were explored. The proposal for the improvements to the current supplier sustainability evaluation combined the findings from the current successful practices at that case company with the suggestions from literature and best practice, and further developed the improvements based on the key stakeholder's suggestions.

The outcome of this thesis is an improved Supplier Sustainability Evaluation (SSE) part within the wider Supplier Evaluation and Selection (SES) process at the case company.

Importantly, the study also contributed to the so-called Business continuity dimension, as a new part of supplier sustainability evaluation for the case company. In the recent years a growing trend of minor disruptions (such as employee strikes, etc.) and major disruptions (such as disasters, earthquakes, floods, etc.) had led to the need to foresee and plan the measures to quickly get back on track after such disruptions. Therefore, the notion of business continuity planning is strongly advocated for the case company in supplier sustainability evaluation, thus reducing vulnerability to such disruptions. Literature in the business continuity planning and sustainability showed that several aspects of risk and disruption management to be taken into account for keeping the business running during the disruption times. Thus, the outcome of this thesis resulted in proposing a fourth aspect in addition to the three aspects of sustainability for the case company: economic, environmental, and societal, and *business continuity*.

This study finds that two dimensions of business continuity are especially important for Oil and Gas sector in the case company: first, identification of risks, and second, defining the ways to mitigate these risks. It is proposed that suppliers should provide evidence and demonstrate that they are fully prepared and have a proposer business continuity planning.

The outcome was grounded in three rounds of data collection based on conducting semi-structured interviews and analysing the internal sustainability documents. The initial proposal was validated from the key stakeholders of the case company. It was carried out with the Procurement Head and Business Unit-Sales Vertical Head who also approved for the proposed pilots, so that to test and take feedback from the suppliers before the full-scale implementation. They stressed that the proposed improvements to the SES process and the Sustainability Index should reduce time and cost of supplier evaluation. This demonstrates the business impact for the case company.

As mentioned in the company's 'Sustainability report 2017', the company plans to implement the software for sustainability evaluation and implementation by 2020 (as part of the Supplier Evaluation and Selection process). This thesis work helps to achieve this target and also to meet the end customer requirements who are increasingly concerned with sustainability. Presently, supplier sustainability evaluation is a key aspect in driving the idea of sustainability to the supply chain partners. This thesis contributes to the overall improvement of the supplier evaluation and selection process by proposing a process change in the supplier sustainability evaluation, and a tool improvement.

7.2 Managerial Implications

Sustainability requirements in all industries are set to GROW in the future. The seventeen sustainable development goals recommended by the United Nations sets the tone for sustainability practices in business until the year 2030. This make the job of the Procurement team even heavier in part of the SSE, if the process improvement steps are NOT taken in advance.

Further, it is necessary to plan and strategize how risk management aspects are captured in the supplier's facility. *Business continuity* planning is a bridge that addresses these risk management practices. Therefore, as a strategy to meet the international sustainability requirements, and business continuity planning, the case company can investigate the implementation of the proposal as a pilot test for the upcoming supplier sustainability evaluation. The results and feedback of the pilot testing can be incorporated and further modified that best suits the buyer-supplier relationship.

As a way forward, in future projects, the company can launch a Supplier Evaluation application (App) where suppliers can fill in all related information themselves with the Technical Bid information, upload the necessary files (including SSE) in the overall SES. This make the job of the Engineering and Procurement team more of comparing the results, in an efficient and reliable way.

Further, as mentioned in the case company's 'Sustainability report 2017', the company plans to implement the software for sustainability evaluation and implementation by 2020(as part of wider Supply Evaluation and Selection process). This thesis work helps to achieve this target and also to meet Customers' requirements, who are increasingly concerned with sustainability.

7.3 Thesis Evaluation vs. Objective

The objective of the thesis is to provide a framework and process improvement in supplier sustainability evaluation. The case company has the process of supplier sustainability evaluation under the broader umbrella of Supplier Evaluation and Selection process. The thesis has addressed the objective as was planned in the research design.

This study is practically relevant to business managers in the case company in the oil and gas sector. First, this study provides an understanding of a broad picture of sustainability. Further, business continuity planning is linked to Sustainability in the current practices of the case company, thus providing linkages that helps managers realize the importance of business continuity planning for the company. Further, this thesis provides a process level perspective on the supplier sustainability evaluation that is directly relevant to the Procurement department and the Business unit, which make two key stakeholders in this process.

The pilot testing proposed in this study would provide the managers with a starting point to work further on business continuity planning. Eventually, in order to make the manager's job easier, the thesis suggests that - for future projects - the company can think of launching a Supplier Evaluation Application (App) where suppliers can fill in all related information themselves, with the Technical Bid information (including SSE part). This would significantly simplify the overall process, with simultaneously keeping SSE robust.

The present results should also trigger further improvements and a further round of assessment of the SES process in the case company. For this, the researcher has to rely on the current employees working in the case company, who can evaluate the proposed improvements after the pilots, which the author cannot do comprehensively as she has stopped working for the moment being on a maternity leave.

7.4 Reliability and Validity

The plan for evaluating validity and reliability in this thesis was presented in Section 2.4. The measures planned in Section 2.4 were mostly fulfilled during the cause of this study. As indicated, the plan for strengthening *validity* relied on the use of rich interview data from the interviews, internal documents, and observations as the main sources of data collection for the study. These multiple sources of data aimed to improve validity of the study through triangulation. All the interviews were recorded and field notes gathered for evidence trail. Furthermore, the transcribed notes are cross checked with the respondents of the interviews to provide an overall validity of the study. As external validity cannot be taken into consideration, the results are not checked in another business context.

As validity of the study is also evaluated based on the suitability and effectiveness of the chosen methods to reach the desired outcome, the selected methods - namely, the selected research approach and the pre-defined research design of this study – also helped to improve validity. The choice of methods was considered from a variety of qualitative research methods and pointed to the case study approach, as the case study approach suits well to understand the phenomenon of interest in its natural setting (Yin, 2003: 8). Further on, when assessing the construct validity of the study, the methods utilized in building the proposal and validation of the outcome, which were clearly documented, also contributed to ensuring validity.

In order to maintain high standards of *reliability* for this study, this thesis was developed through thorough understanding of the business challenge that exist in the real-life context. In addition, reliability was increased by selecting the key stakeholders that have a stake and influence the supplier sustainability evaluation, this the stakeholders were correctly found and interviewed. Moreover, the case company internal documents related to sustainability were carefully analyzed to increase the reliability of the study. The reliability of the study findings was also enhanced by documenting the data collected throughout the process. In addition, the best practice for conducting supplier sustainability evaluation was searched from recently published scholarly literature. This was used in building the proposal of this thesis.

However, as one of the limitation of this study, the proposal has not yet been piloted. To validate the improvements suggested for the supplier sustainability evaluation, the proposal would need to be tested. For this, and for the immediate next steps, the recommendations how to put the improvements into practice was proposed.

7.5 Closing Words

This thesis continues on the road towards to more mature supplier sustainability practices that the case company is actively pursuing. The sustainability evaluation process in general is highly dependent on the legislation and legal regulations, and therefore is a subject to continuous improvement. Moreover, it is also very much influenced by the feedback of the customers. This study made an effort to help the case company on this important road, with the view and hope for a good future, so that our children will enjoy sustainable planet and its rich resources, which are wisely used and carefully saved for them by their parents, who cares about sustainability now.

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Questions used in interviews (for Data 1 collection)

1. Is the current Supplier Evaluation and Selection process (SES) mapped?
2. Are the roles and responsibilities for SES clearly defined and documented?
3. Does the current SES process cover Supplier Sustainability Evaluation (SSE) part well? If so, how?
4. What tools do you currently use for SSE part?
5. Is the same SSE process used for new and existing suppliers?
6. Do you have dedicated manpower for sustainability evaluation?
7. What is the biggest risk in terms of sustainability evaluation in the current approach?

Questions used in interviews (for Data 2 collection)

1. What do you think about the strengths and weaknesses in the current SSE practices?
2. What kind of improvement would you suggest to the current SES process?
3. What else need to be improved (in the future)? - followed by further open discussion on the improvement suggestions.

Questions used in interviews (for Data 3 collection)

1. What do you think about the proposed improvements to the SSE part of the SES process? Could you please further open up these points?
2. What kind of improvements would still be needed for the proposal?
3. How they need to be implemented?
4. What is the future role of the SSE in the case company? - followed by further open discussion on the improvement suggestions and implications.

Appendix 1. Field notes, Interview (Data1)

Details		Telephonic interview with Procurement Manager 1 in the case company
Name (code) of the informant		Informant A
Position in the case company		Procurement Manager 1
Date of the interview		05/01/2018
Duration of the interview		60 MINS
	QUESTIONS	FIELD NOTES (excepts, those elements that are not confidential)
1	What is the current organisational structure related to the current Supplier evaluation of the company.	<p>Our company is a major player of energy sector involved in construction of various Oil and gas, Powerplant, Mining plants and water treatment plants. We have business in India and EMEA region. We have a procurement team in EPCM, (Engineering, Procurement, construction and management) who is responsible for supplier sustainability evaluation process. The procurement specialist liaison with Business unit for supplier finalization for each project.</p> <p>Presently, we are focusing more on supplier evaluation in engineering data and less focused on sustainability part. More over we are at tight work schedule to evaluate more than 400 suppliers from different part of world with in few weeks per project.</p> <p>The overall sustainability evaluation part needs to be revised to meet clients requirements.</p>
2	What needs improvement?	The sustainability part of supplier evaluation and selection process to be more efficient. The internal audit process, for example, during the supplier evaluation practice is time and effort consuming.

Details		Telephonic interview with Procurement Manager 2 and Business unit in the case company
Name (code) of the informant		Informant B, and C
Position in the case company		Procurement Manager 2, BU Manager
Date of the interview		20/01/2018
Duration of the interview		75 MINS
Document		Field notes
	QUESTIONS	FIELD NOTES (excepts, those elements that are not confidential)
1	What are the current steps and practices in the sustainability evaluation part in the case company?	<p>Presently, the procurement team is conducting overall evaluation including technical and sustainability area. The procurement team is evaluating social, environmental aspects of sustainability. And business unit is conducting economic part of sustainability evaluation. Th internal audit is conducted by BU manager for each project for supplier sustainability evaluation. If auditor identifies any criteria is not complied by supplier, the same have to elevate to supplier with Technical queries and record the response from supplier as</p>

		compliance. These are the major steps involved current sustainability evaluation practice.
2	What needs improvement?	The sustainability evaluation part needs a more efficient way of doing by reducing the overall time consumed during the preparation to the internal audit process. Since the current internal audit process is time and effort consuming, due to numerous mail communications from the Procurement team to supplier to get compliance of TQ, it really needs to be re-considered.

Details		Skype meeting with Procurement Manager
Name (code) of the informant		Informant A
Position in the case company		Procurement Manager
Date of the interview		12/02/2018
Duration of the interview		30 MINS
	QUESTIONS	FIELD NOTES (excepts, those elements that are not confidential)
1	What are the current steps and practices in the sustainability evaluation part?	Presently, the procurement team is conducting overall evaluation including technical and sustainability area. The procurement team is evaluating social, environmental aspects of sustainability. And business unit is conducting economic part of sustainability evaluation. The internal audit is conducted by BU manager for each project for supplier sustainability evaluation. If auditor identifies any criteria is not complied by supplier, the same have to elevate to supplier with Technical queries and record the response from supplier as compliance.
2	What needs improvement in the current practices?	I would say, the goal is to establish a template with critical standards and clause that could be implemented into the current process at the procurement team to do sustainability evaluation to capture all. And this help to pass internal audit and reduce the waiting time to get compliance mail from suppliers. This will help improving a process for the sustainability evaluation of new suppliers.

Details		Group interview with Procurement manager and Procurement Head– O&G
Name (code) of the informant		Informant A , B
Position in the case company		Procurement Manager, Procurement Head– O&G
Date of the interview		15/03/2018
Duration of the interview		50 MINS
	QUESTIONS	FIELD NOTES (excerpts, those elements that are not confidential)

1	Is the current supplier evaluation process mapped?	The current process is clear and the responsibilities are defined. The business segment is divided in engineering and procurement team and Business unit. The procurement team evaluating approx. 400 suppliers per projects and reduced as 30 based on Technical bid evaluation and sustainability evaluation score. There is a template available to compare and score the finalised 3 suppliers per equipment's.
2	What are the weaknesses of the current process?	Less focus on sustainability part, and excessive communication between procurement team and supplier leads to over delay in supplier evaluation and selection process.
3	What needs improvement in the current process?	If the supplier sustainability evaluation is improved with revised SSE Index, it reduce effort and time during the internal audit process.

Appendix 2. Field notes, Interview (Data2)

Details		Internal meeting with Procurement Head– O&G
Name (code) of the informant		Informant A
Position in the case company		Procurement Head– O&G
Date of the interview		25/02/2018
Duration of the interview		40 MINS
	QUESTIONS	FIELD NOTES (excepts, those elements that are not confidential)
1	What do you think of the strength of the current process?	<p>The current SSE was analysed by the stakeholders as very rigorous as it takes into account a wide variety of sustainability aspects. All the three dimensions of sustainability are covered very well (social, environment and economic), thus leaving no obvious gaps in the current evaluation parameters.</p> <p>The Index needs to be developed through adjusted normalization to smoothen the effects of supplier category, product type, cost of the product etc., into comparable number.</p> <p>This whole system should make a transparent process that would remove the influence of favourite supplier and other related unethical practices in supplier evaluation and selection.</p>
2	What do you think of the weaknesses of the current process?	<p>Presently, there is less focus on sustainability part (SES) in the existing SES process since sustainability is a minor part (20%) of current supplier selection.</p> <p>And, excessive communication between procurement team and supplier that leads to overdelay in supplier evaluation and selection process should be somehow reduced. It create overwork for every member of the team, especially procurement managers.</p>
3	What improvements would you suggest to the current process?	<ol style="list-style-type: none"> 1) If the supplier sustainability evaluation is improved with revised SSE Index, it would reduce effort and time during the internal audit process. 2) Why not to experiment and let suppliers themselves fill in the SSE Index by inserting details (standards, certification results, etc) and submit it as part of Tech. Bid documents to the procurement team, more reliable and efficient way of getting sustainability compliance from supplier in future. 3) If done, these proposed improvements can be evaluated by the outcomes in a meeting with BU during the Internal audit.

Details		Group interview with Procurement managers
Name (code) of the informant		Informant A , B
Position in the case company		Procurement Managers1, 2
Date of the interview		05/04/2018
Duration of the interview		60 MINS

	QUESTIONS	FIELD NOTES (excepts, those elements that are not confidential)
1	What should be improved?	<p>The current sustainability evaluation part of supplier evaluation and selection process are done with unstructured way and needs to propose an improvement for this process to eliminate unnecessary steps involved in this process to improve.</p> <p>Hence, it is suggested to revisit the overall process steps involved in process and to revise with more efficient way. Which in turns provides improvement in existing evaluation practices.</p>
2	What should be included in the improved SSE process, and especially in the SSE part?	<p>It is indicated that business continuity aspects are missing in the overall sustainability evaluation, to develop the Business continuity part, visible in two amendments: (1) first, the additional document(s) that the case company should formulate and add to the package of the 29 currently required documents that should relate to articulate and require to state the companies, (2) second, the additional standards/certificates from supplier as a evidence of compliance with business continuity , such as ISO31000</p>
3	Other points	<p>If the supplier sustainability evaluation is improved with revised SSE Index proposed, it would help to capture all critical standards and sections to capture sustainability compliance with respect to customer reequipments. And additional company documents with business continuity documents for RISK and DISTUPTION, provide complete evaluation of sustainability.</p>

Appendix 3. Field notes, Interview (Data 3)

Details		Group interview with Procurement Head
Name (code) of the informant		Informant A
Position in the case company		Procurement Head
Date of the interview		15/04/2018
Duration of the interview		2 hrs
	QUESTIONS	FIELD NOTES (excepts, those elements that are not confidential)
1	Overall:	The person interviewed for validation is same as who involved in proposal building stage. So after reviewed carefully, few valuable feedbacks are note and to be implemented in the next upcoming projects as a pilot. if this practice piloted in PILOTS 1&2 works well with the BU and suppliers, revise the Supplier Evaluation and Selection process to make it accepted practice.
2	Improvement:	Sustainability requirements grows in the future. This make the job of the Procurement team even heavier in part of the supplier sustainability evaluation if process improvement steps are NOT taken in advance. In future projects, the company can think of launching a Supplier Evaluation application (App) where suppliers can fill in all related information themselves, with the Tech. Bid information (including SSE). This makes the job of the Engineering and Procurement team more of comparing the results, in an efficient and reliable way
3	Other notions	As mentioned in Case company's 'Sustainability report 2017', the company plans <u>to implement the software for sustainability evaluation and implementation by 2020</u> (as part of wider Supply Evaluation and Selection process). This thesis work helps to achieve this target and also to meet Customers' requirements, who are increasingly concerned with sustainability