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Thesis

The impact of risk management and CSR on energy efficiency within supply chain : institutional organization management

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THE IMPACT OF RISK MANAGEMENT AND CSR ON ENERGY EFFICIENCY WITHIN SUPPLY CHAIN: INSTITUTIONAL ORGANIZATION MANAGEMENT

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GENERAL INTRODUCTION

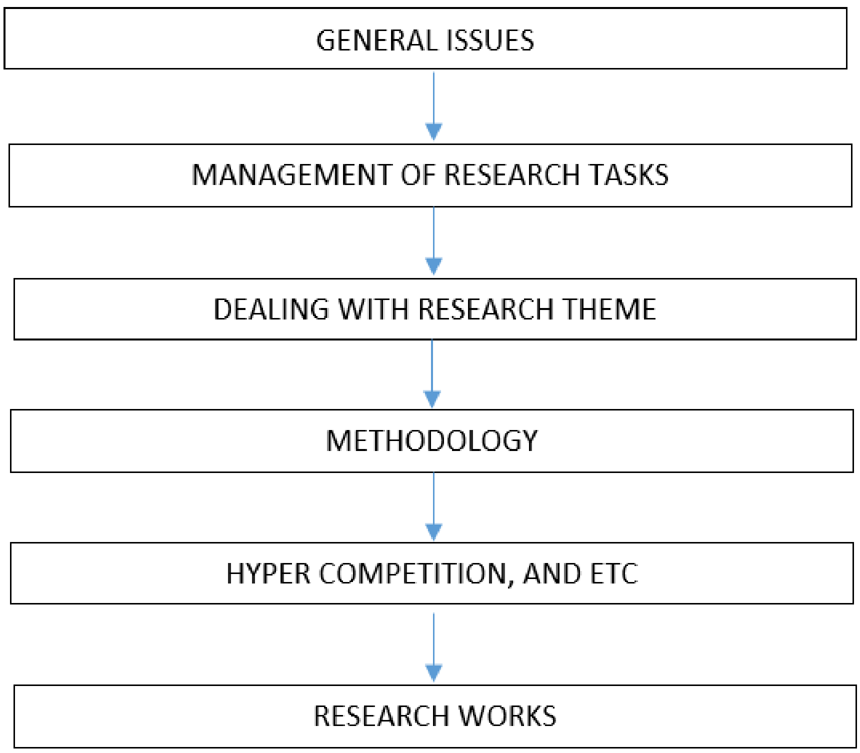
In this research, we investigate these functions at global level where the energy consumption is a major issue to maintain a high level of the several outputs, with the perspective of management science. However, we applied quantitative method to see all possibilities to know the level of energy efficiency.

We intend to develop and show how the concept of energy efficiency is critical for global supply chain. Many questions are possibly and legitimately to ask:

1. from economic side,
2. environmental side,
3. social side,
4. political and geopolitical side;

Therefore, based on the literature review and what they are the real life problems, my methodology aims at studying the concepts hey are figured out in this work. To figure out all these research questions, I have read a literature review to examine all the up to date references and bibliography in order to support the understanding and knowledge of the energy efficiency concept in the global supply chain. The logical arguments can be redesigned in all ways that are methodologically accepted. The path ways of our thinking can be described as follows:

Table 0.0.1.: The Basic Path of Think-Tank

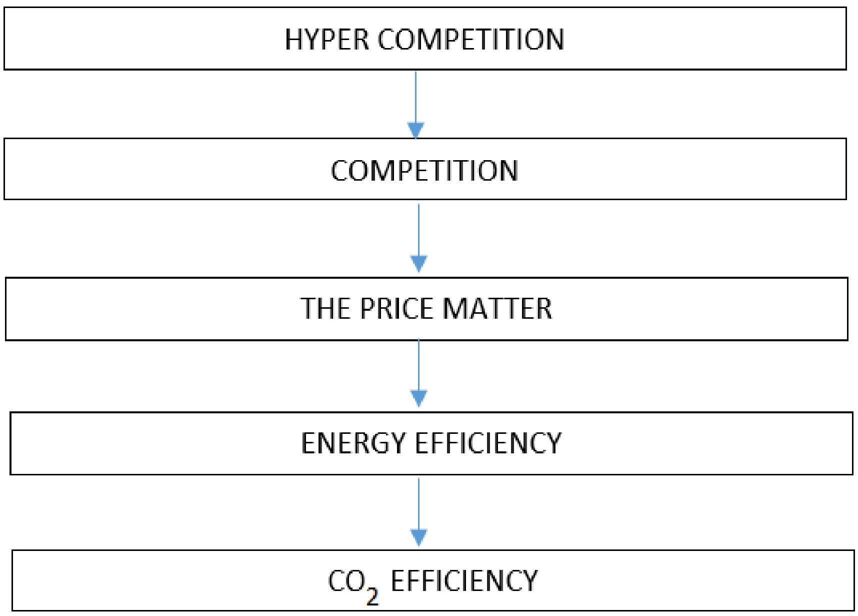


The general issues have been taken from real business cases and the literature reviews. However, there are a lot of arguments that can lead the energy efficiency on significant other methodologies and system requirements based on technology level.

The most challenging here is how to make an approval that energy efficiency has been approved in production, warehouse and transportation at global level.

The basic idea in the initial stage is to reduce the CO_2 pollution by reducing the amount of CO_2 emissions yearly. The indicator of CO_2 will decrease if there is energy management. The energy management shows on energy efficiency indicator. The efficiency indicator shows on single manufacture, region, national or international agreements. On the other hand, if there is efficiency energy in micro level then it would be more easier to meet with energy efficiency at national level, even at the international level. There are a lot of indicators showing how to know and to measure the energy efficiency. If an enterprise or a manufacture have been allocated all resources in efficiency ways, then the manufacture will create the price competitiveness. By the price competitiveness, the enterprise can create the competition. Starting from basic competitiveness in price scale, the enterprise can also go further up to hyper competition.

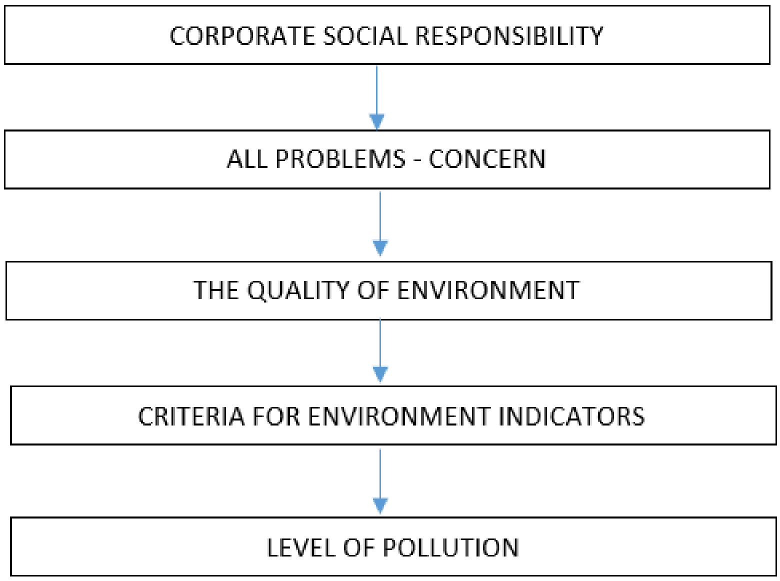
Table 0.0.2.: The General Idea on Hyper Competition



The hyper competition is built up from the basic matter, namely CO_2 efficiency or the so called minimizing the CO_2 pollution. The point is how to produce, to manage the storage and to deliver to the end users.

The purpose of CSR in responsibility level which is undertaken by the company to deal with the pollution level. It is explained which set of criteria for environmental indicators is to be consider. All requirements indicators could be energy resources type with regards to the method of product deliveries, etc. Every single product should be distinguished and considered as a potential pollutant for the environment which all the problems can arise from the enterprise operations and business activities. At the final enterprise operations, the company has also to deal with the corporate social responsibility. Otherwise, the future of business development will suffer from hyper competition and a big future prospect.

Table 0.0.3.: The Sample Work on CSR



It shows that from the dimension of production, transportation and warehousing, one can describe the energy efficiency scheme. The initial idea is that the production procedure has to be executed in efficient manner, and particularly from the energy efficiency point of view within the production process, followed by an efficient energy consumption within the warehouse management process and followed by an efficient transportation for delivering products.

Table 0.0.4.: The Framework

Efficiency of Production	+	**Efficiency Warehouse Management**	+	**Efficiency of Transportation**

=

Energy Efficiency in Global Supply Chain

In order to get better understanding the managerial level and technical level are necessary to explore them. Authors, Aminata et al. (2014c) applied and got closer to the gap of managerial and technical problems. So that, all research works approached by bibliography and related reference were intensively explored and exploited for the development of our research method.

One can also recall that many research works cleared get similarities and in various methods, used methodologically and procedures, White (2009), Wilson and Giligan (2005), p. 406.

The general purpose of literature review for some extent will provide conceptual development, research question based on the real condition and simulation possibilities, White (2009), Mouton and Marais (1996), and Hillier and Hillier (2003). The content of literature review, Ridley (2012):

1. prevent from duplication.
2. the general body of knowledge.
3. to help the design of original research.
4. to reveal the conceptual problem based on assumptions.

We used these methodologies, because all are useful and closer to three dimensions. Based on that arguments, all methodologies.

The Meaning of Energy Efficiency

There exist many kinds of definitions for energy efficiency. One can cite: (i) fuel efficiency, (ii) fuel economy and (iii) fuel consumption. Moreover, energy efficiency in transportation is a relative term used to describe how effectively fuel is used to move a vehicle. The fuel efficiency is connected to the amount derived from the used fuel. Fuel economy is expressed as miles per gallon of consumed fuel. Fuel consumption is the inverse of fuel economy. It refers to the fuel consumed by the vehicle or type of transport as it travels a given distance. Widely used in the Europe (expressed in liters per 100 km), this metric is a clearer measure of fuel than the fuel economy ("real future energy efficiency in USA", p.121). For wide source of study in energy efficiency, I traced many possibilities from previous research works, included related references. I noticed that all studies listed closer to energy efficiency development in certain perspectives.

Our research is discussing the energy efficiency in global supply chain in the three identified dimensions that are production, transportation, and warehousing. The objective is to formalize a model aiming at optimizing energy consumption throughout supply chain for a minimal environmental impact (energy efficiency). Referring to Wei et al. (2011), Varma and Clayton (2010), and Hall Dorson (2013) explained that efficiency means: "doing things in an optimal way, for example; doing it the fastest or inexpensive way and it was done by optimal ways. In other words: "efficiency refers to how well something is done. Effectiveness refers to how useful something for certain business purpose." For example, a car is a very effective form of transportation mode and able to move people across long distances, to specific places, but a specific car may not transport people efficiently because of the way how to consume the fuel. The driving style (eco-driving) is one of the important variable when utilizing vehicles.

To set the context of our research work, we, first, attempt to give a definition of global supply chain as follows: all process networks that procure raw materials, transform into intermediate goods, and produce final products at a global level. Then, to deliver the products to customers through a global distribution systems, Albino et al. (2002).

The aim of the dissertation is to achieve the link between supply chain, logistics and energy matter by management science. Some extents is how to organize well according to managerial level. To develop the concept based on the competition.

It is not only achieved by a good supply chain. But, also the energy matter is managed as an engine source of business development. However, the competition can be achieved in any other forms. Following the question also, how the energy efficiency work well in a global supply chain?

The major research question is how the energy efficiency strategy is applied to the three dimensions of global supply chain, therefore authors applied the research work on:

A. research design of the energy efficiency for the transportation function.

B. research design of the energy efficiency for the production function.

C. research design of the energy efficiency for the warehousing function.

Kotzab et al. (2005), explained that the research methodologies in supply chain management are mainly focusing on who, what, where, why, and how, this perspective is a part of one of my work to explain these issues.

Perlmutter (1969), has identified three positions on the globalism spectrum. Geo-centrism, as defined earlier, represents the highest degree of integration and the highest degree of globalization. Polycentrism is associated with a worldwide presence, but operations in the multiple locations are largely independent of one another. Ethnocentrism is also associated with a worldwide presence, but in this profile the focus of the organization is the home country. Other possibilities, regional operations that serve multiple countries.

Based on the three dimensions of global supply chain; we can distinguish the business activities connected to global value or not. This definition is the key aspect before we run down the best definition of global business as usual.

Dissertation's Objective

The research work detailed on the supply chain from top to bottom contains:

- efficiency production management,
- efficiency transportation management,
- efficiency warehousing management.

Three dimensions defines the objective that is the specification of the consumed energy. We need to specify how to manage energy consumption at (i) strategic level, (ii) logistics level, and (iii) operational level in order to drive the company to solve the problem directly linked to the core of the problem. For example, time windows scheduling, negotiating market price, dealing with technical problems.

Figure 0.0.1.: The Energy Efficiency in Global Supply Chain

ENERGY EFFICIENCY STRATEGY IN GLOBAL SUPPLY CHAIN

(Hyper Competition)

▽

▽

Operations Management (OM) and Global Operations Management (GOM)

▽

▽

Transportation Management (Efficiency)

Production Management (Efficiency)

Warehousing Management (Efficiency)

▽

▽

The energy efficiency could be seen from three dimensions:

▽

▽

Supply Chain Dimension (Strategical Level)

Logistics Dimension (Tactical Level)

Operator Management Dimension (Operational Level)

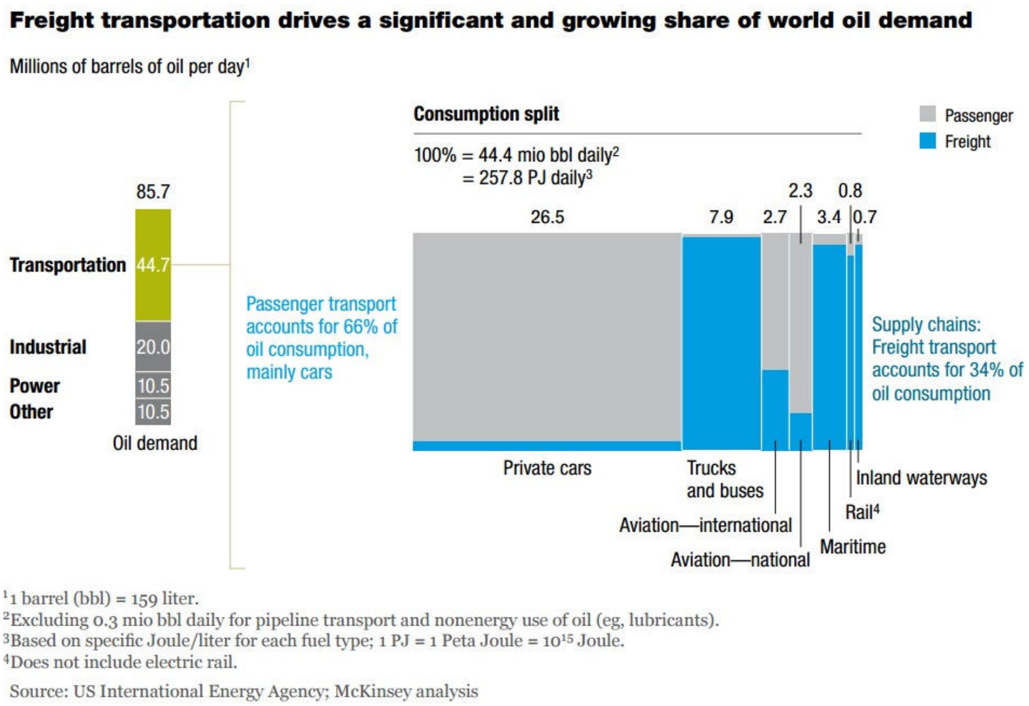
The most important one is how the flow of energy efficiency strategy in global supply chain can face hyper competition. Through, transportation, production, and warehouse. We can make identification of all competitors, collecting information data and focusing on the selection of energy sources. Therefore, the company can prepare anything before launching its capacity level on hyper-competition.

The link between backward and forward linkage process should be run in a very efficient method up to the product delivery to all end users, without any fail. Particularly, in the transportation it is interesting to show, that the total company sales volume influenced by the geographical market sales areas (distance), time, type of product, and speed of truck. Mapping all distance areas, total volume or total sales (price) are importance key factors. Another purpose is to argue that expensive product is more correlated with long distances. On these parameters, the company will run well in the competitiveness to sustain its business.

The research work gave a new perspective for transportation industries by setting up a new strategy on managing their own fuel consumption with a basis on the concept of energy efficiency. The work was based on the area of the transportation of oleo chemicals business as a case study. As a spotlight in this research, EU and particularly France should be more efficient in transportation performance and their availability to promote oleo chemicals business once some best practices are identified with regards to the energy efficiency in all transportation operations. For example, as follows:

To evaluate outcomes by the consensus agreement of stakeholders. Otherwise, the valuation can only be considered to be that of the experts and decision-makers alone:

Figure 0.0.2.: Freight Transportation



Source: Energy Efficiency: A Compelling Global Resources, McKinsey and Company, 2010, p.35

This idea refers to the fact that a technologically complex system is often embedded within a complex institutional structure. This added dimension of complexity is what makes the design and management of an engineering system a great challenge. More information studies can be found at company's perspective in energy efficiency in global supply chain[1]

Bertrand and Fransoo (2002), explained empirical scientific research should be carefully distinguished from axiomatic research results within the projects improvement. Therefore, improving the performance underlying process models are valid and the theoretical solutions are useful to solve

[1] It happened when there is cheap oil price, or based on oil price fluctuations, Tobias Meyer, 2014, McKinsey, Singapore. It is a report conclusion from "unlocking Energy Efficiency in US" (July 2009)

the problem. So, we can elaborate, the empirical scientific research tests to demonstrate the validity of the theoretical models.

The methodology's design has been constructed based on the development of existing research question and problem. Particularly, on energy efficiency in global supply chain. However, case studies can be an excellent study to test the existing problem. Because, by certain case studies we can looked up the progress of theoretical perspective and existing real problem, Bertrand and Fransoo (2002) and Aminata et al. (2014c).

Also, in the dimension of production gave us a lot of ideas and we can deliver case studies in various aspect and industrial sector. These works shows that in production dimension, authors easily found, constructed, and formulate the raw data base became ready for use for research purpose.

The nuclear power plant could be one of the best example here to produce electricity output. Providing global supply chain materials to support availability of electricity source by nuclear power is an excellent example, see IEA (2011); IEC MSB (2011), also see Dagpunar (2007); Depoues et al. (2015).

However, by input output analysis will be a strong analysis to promote the strength of backward and forward linkage, especially in manufacturing sectors. The availability of data base is one of indicator to successful on database construction, see Miller and Blair (2009) and Aminata et al. (2014e), also see Wood (2013); Wu et al. (2012).

To point out warehousing dimension refer to energy efficiency in global supply chain shows that authors a bit difficult to construct the data. Especially, real time data that connected to global connection. However, by latest technology and financial innovation the bitcoin mining (cryptocurrency) is the best example to construct the perspective within warehousing dimension, see Dagpunar (2007), also see Wilson and Giligan (2005).

Table 0.0.5.: The Flow Chart of Methodology - Part A

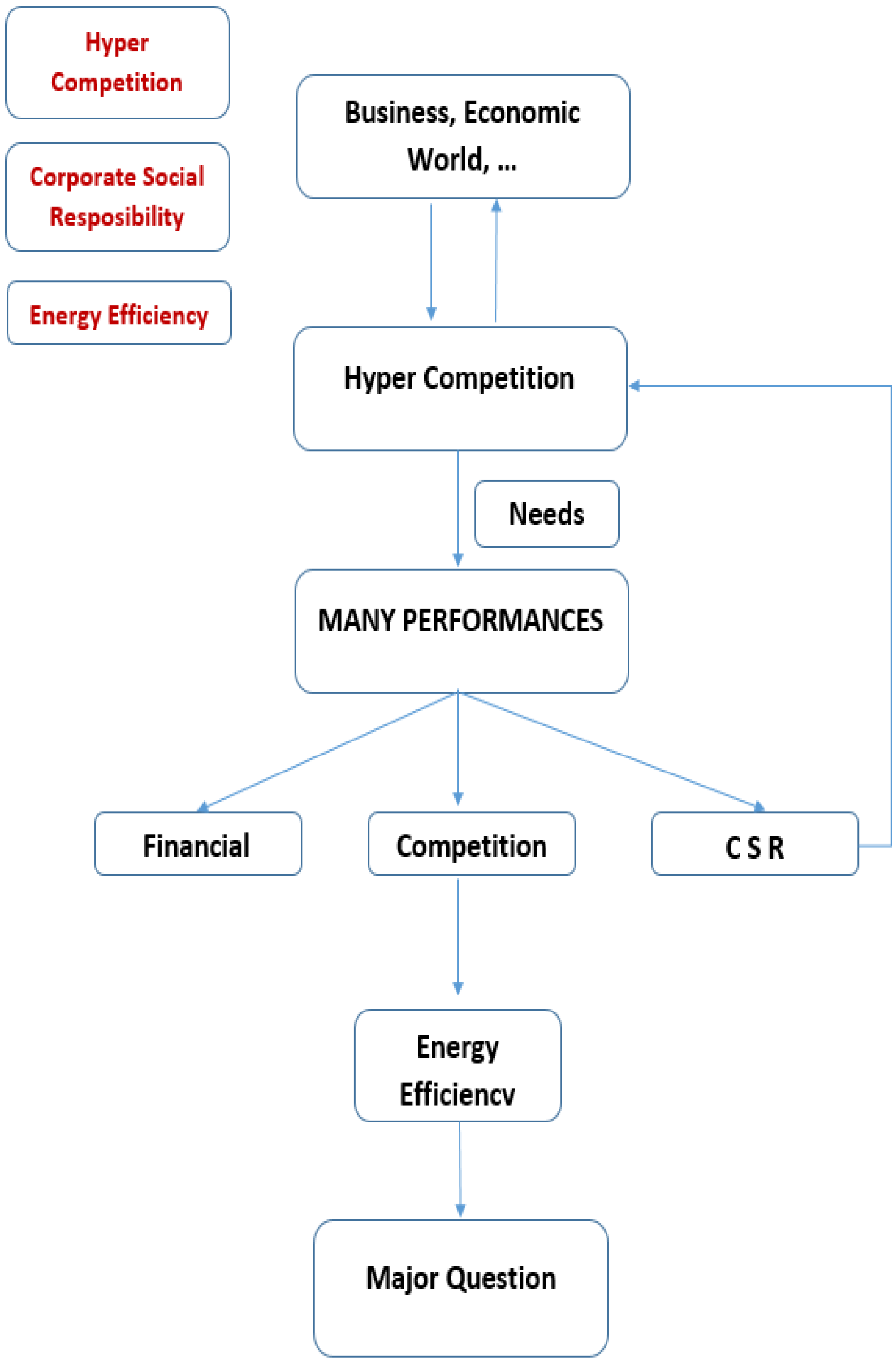
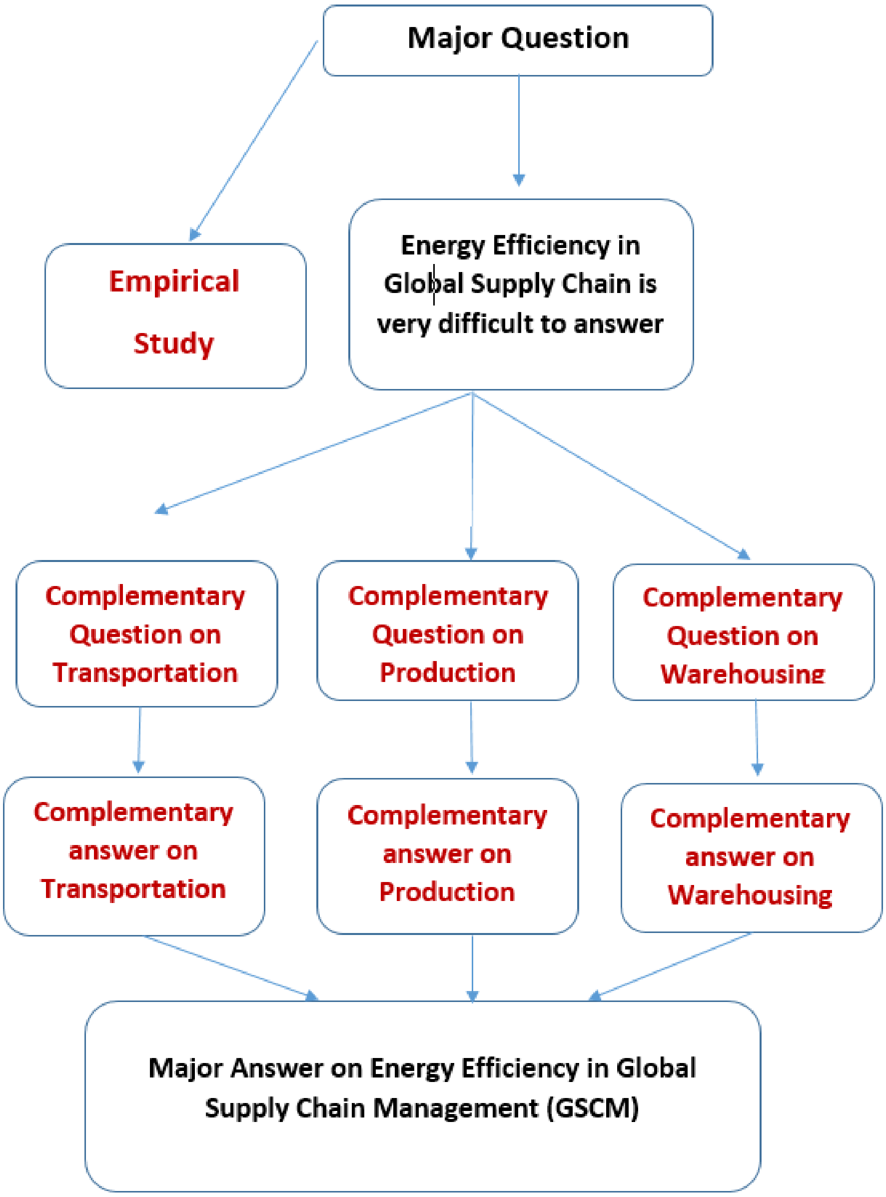


Table 0.0.6.: The Flow Chart of Methodology - Part B



The research question can be formulated as follows:

Major research question:

- how to formulate energy efficiency in global supply chain and its impact on the enterprise-business development (MNCs) ?

The energy efficiency gives impact in any sector of business activities. Based on the concept of efficiency by Archer (2010), explained that the future is now. Most of the people need efficient society, especially energy efficiency in global supply chain. To make answer the question of efficiency philosophy which is a need formulation of the harmony system in all type of business. Therefore, I constructed the major research question and minor research question.

Complementary research question:

- how to build up energy efficiency in a case of transportation in global supply chain and its impact on their enterprise-business development?

- how to build up energy efficiency in a case of production in global supply chain and its impact on their enterprise-business development?

- how to build up energy efficiency in a case of warehousing in global supply chain and its impact on their enterprise-business development?

Starting hyper competition discussion in energy efficiency within global supply chain. I delivered some approval from scientific papers done in previous years. Also, research work in global supply chain should be connected to hyper competition to know the real impact in business development, Grandval and al. (2009). First of all, dimension of energy efficiency could be seen from three dimensions, Sbihi and Eglese (2007); supply chain dimension (strategic level), especially in long term. Logistics dimension (tactical level) is in medium term. Operations management dimension (day to day term).

The competition level in transportation system, production, and warehouse system cannot be seen as part of business. For example production system in oleo chemical and electricity level. However, there is no single judgment that all kind of type business activities can be seen as hyper competition. All transportation in the first step making an offering to company for transportation services. Due to, there are a lot offers from many companies. The oleo chemical company offering the bidding system to find out the most cheapest price among them (ex: transportation services which provided by other supplier).

Hyper competition, Akhter (2003), Hulsmann et al. (2008), and Sandberg and Abrahamsson (2011), global supply chains (GSCs) are confronted with the phenomenon of hyper competition. For this reason, there seems to be an increasing necessity for GSCs to build up competitive advantage in order to survive. Strategic of flexibility is assumed to have positive effects on generating required competitive advantage by replicating and reconjuring competences to manage GSCs, while keeping GSCs stable, Sandberg and Abrahamsson (2011).

Using a theoretical framework, this research elaborates the link between operational, dynamic logistics capabilities and sustainable competitive advantage. The findings conclude that a sustainable competitive advantage is based on a combination of efficient and effective logistics operations, see more Shay and Rothaermel (1999), Hauswirth et al. (2004), Dentico (1999), Farahani (2009), and Bironneau et al. (2015).

Gereffi and Lee (2012), state that global supply chains have been a familiar part of the international business landscape for decades. From a management perspective, there are always issues connected with the efficient and timely distribution of goods that flow across supply chains. From an industry perspective, there are questions on how the industry is organized in terms of the size and ownership of major manufacturers and their suppliers, and where these companies are located. From a national competitiveness perspective, countries are concerned whether they can gain and maintain the production, sales and research capabilities needed to develop and make low-cost, high-quality or high-tech products (Pisano and Shih 2009).

As the ability of countries to prosper depends on their participation in the global economy, which is their role in global supply chains. Despite its relevance on many levels, the literature on global supply chains tends to appear in a specialized set of publications oriented to a business audience. However, since the early 2000s, the global value chain concept has gained popularity as a way to analyze the international expansion and geographical fragmentation of contemporary supply chains. Further studies on CSR and energy efficiency can be traced on Pirsch et al. (2006),Crowther and Aras (2008),Crowther and Aras (2009),Visser et al. (2010). Finally; Crowther and Aras (2008) stated the principles of CSR;

- on sustainability is means that all action based on all options available for future needs.
- on accountability is means that both internal and external responsibilities of organization.
- on transparency is means that all stake holders can access the information.

The research design in this section is to design all possibilities, how to work in an inter-firm and an inter-stakeholder, including how to manage the relationship with the local or regional government, moreover at national level. Collecting and delivering all questioners needs a team collaboration, that is the point to have a good degree of information. The degree is the score value collected from customer or all stakeholders.

As Persson (1991) stated; (i) the best competitor in strong competition is materials flow segment. It shows cost-effective in the business. (ii) the new competitor has a superior logistics performance. So that, the implication is the logistics performance can be seen as a strategy driver. This view is suitable in logistics service as a significant element and by developing effectiveness in basic operational capabilities.

Abrahamsson et al. (2003), exposed that in the type of three logistics towards external relations in the supply chain shows the link from producer to final customer. If production is used as a buffer stock. Therefore, logistics has to carry out a speculation stock to support marketing expansion, Also, Abrahamsson et al. (2003) p. 88, explained that if there is a change of size market the logistics need as a resource to support new marketing or production strategies.

The type of three logistics must be able to support the firm, then it can be formulated as strategic decision. Furthermore, the logistics function should be able to support kind of strategies such as: *broadening of assortment, additional marketing channels, geographical expansion, support global customers, expansion by company acquisitions and downsizing*. He has defined logistics platform in type three logistics which centrally manages and controls.

Table 0.0.7.: Methodology and Modeling - Type Logistics

	Type 1 Logistics	Type 2 Logistics	Type 3 Logistics
Main focus	Optimization of logistics activities	Logistics structure.	Dynamic capabilities
Priorities in Logistics	1). Internal efficiency and resource utilisation. 2). Customer service related to geographical distance to customers	1). Reduction of total logistics cost from economies of scale. 2)Customer service related to time to	1). Logistics as a resource base for new market positions and marketing strategies 2). Develop new offers to
Structure and Organisation	Logistics tightly connected to production or sales. 2). Decentralized responsibility for design and control.	1). Centralised logistics, organisationally separated from production anad sales. 2). Centralised resposibility for design and control of the logistics systel - high	1). Centralised logistics responsibility in relation to the business system rather than the logistics system. 2). Standardised process with adaptions to market segments.
Flexibility	Operational flexibility, ex. the ability speed operations aon a rush	Operational flexibility from ability to respond to unique customer	Strategic flexibility from ability to reposition faster and more cost-effective

Abrahamsson et al. (2003) and updated by Kihlen (2007).

The logistics platform included the concept of logistics operations, physical structure, processes and its activities as well as the information systems, operations and reporting. Abrahamsson et al. (2003) p. 104., delivered the scheme of design to formulate the energy efficiency intelligence for global supply chain transportation by empowering international logistics and its opportunity for promoting market and economic activities

Based on an assumption that improving industrial development will have impact on the environment, ie. pollution level ($C0_2$). Developing supply chain strategy will face on complexity problems and challenges for enhancing business development at global level. A lot of sociological aspects of
global business can be traced back to the article of Perlmutter (1969). Especially on his article referred to the evolution of the multinational corporation.

On multinational corporation existed worldwide approach in both headquarters and subsidiaries. The firm as a whole concentrate on worldwide objectives as well as local objectives. The point here is in each part contributes to the unique competence. Dickens (1998), providing the transport from their country of origin to the country of which market at international level.

They utilized six categories (*management teams, strategy, operations and products, R&D, financing and marketing*), which each of them consists of multiple dimensions. Also, Bartlett and Ghoshal (1989) defined multiple dimensions to identify a firms position on the multinational to complex global chain. Kanter and Dretlet (1998) attempted to define what global really means. Their approach is to identify six aspects:

- global is synonymous with international.
- global strategy means doing the same thing everywhere.
- globalizing means becoming stateless, with no ties to a home country.
- globalizing requires abandoning images and values of a home country.
- globalizing involves acquisitions without integration.
- a firm must engage in foreign country to be considered global.

The conclusion shows that all findings have significant results. Precisely, the management strategy should be the key concept for long period to promote three dimension in transportation, production, and warehouse. It has to refer on the concept of management in energy efficiency. Utilizing straight forward point analyzed for all cases studies shown that the point of global supply chain must be established by strong chain for each business activities. Furthermore, energy efficiency also push us for greening management strategy. Back to all dimensions in this works: I delivered some conclusion that matched with current issues of greening effort which matched to Mathers (2015):

1. by setting up the performance goals for improving the quality of environment via management approach.

2. by tracking logistics emission should as a reference for a standard practice. Also, improving the the tracking performance by various indicators and methodology.

3. by seeking and building the external factor so called a leadership practice.

Discussing in energy issues, particularly on energy efficiency which creating efficiency output level must be coherence and high linkages from backward and forward linkages. Especially for global market and global product should be traced. Focusing on energy used for each business activities is useful one. Therefore, all products assured by using energy intensity and global supply chain properly.

By optimizing energy source in proper way, it would be give minor impact on environmental. This is the main idea for increasing industrial intensity with small environmental impact. So that, using CSR's matrix will contribute the knowledge capacity to the global business and global community.

However, from the management side shows that the management strategy is a role play for promoting energy efficiency in scale and geographical areas. By establishing and constructing a strong logistics and well-connected global supply chain will enhance global supply chain performance.

Mathematical approach and statistical approaches shown technics on energy efficiency calculation. The innovation of this research is the discussion through corporate social responsibility and energy efficiency. It seemed that enterprises or small, medium even large size of company for future competition, as D'aveni (1995). It should be able to handle energy efficiency. Moreover, energy efficiency as one of tool to know company is efficient or not.

Finally, the energy efficiency in global supply chain shows that efficiency energy in global level could be perform by any type of product, mainly on energy matter. By focusing on how to transport them, the way of production system, and how to build warehouse system to keep source of energy become more efficient to serve inter-links of chain and end users.

The Impact of Risk Management and CSR on Energy Efficiency within Supply Chain: Institutional Organization Management

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Part I

General Introduction

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We used these methodologies, because all are useful and closer to three dimensions. Based on that arguments, all methodologies.

The Meaning of Energy Efficiency

There exist many kinds of definitions for energy efficiency. One can cite: (i) fuel efficiency, (ii) fuel economy and (iii) fuel consumption. Moreover, energy efficiency in transportation is a relative term used to describe how effectively fuel is used to move a vehicle. The fuel efficiency is connected to the amount derived from the used fuel. Fuel economy is expressed as miles per gallon of consumed fuel. Fuel consumption is the inverse of fuel economy. It refers to the fuel consumed by the vehicle or type of transport as it travels a given distance. Widely used in the Europe (expressed in liters per 100 km), this metric is a clearer measure of fuel than the fuel economy ("real future energy efficiency in USA", p.121). For wide source of study in energy efficiency, I traced many possibilities from previous research works, included related references. I noticed that all studies listed closer to energy efficiency development in certain perspectives. Our research is discussing the energy efficiency in global supply chain in the three identified dimensions that are production, transportation, and warehousing. The objective is to formalize a model aiming at optimizing energy consumption throughout supply chain for a minimal environmental impact (energy efficiency). Referring to Wei et al. (2011), Varma and Clayton (2010), and Hall Dorson (2013) explained that efficiency means: "doing things in an optimal way, for example; doing it the fastest or inexpensive way and it was done by optimal ways. In other words: "efficiency refers to how well something is done. Effectiveness refers to how useful something for certain business purpose." For example, a car is a very effective form of transportation mode and able to move people across long distances, to specific places, but a specific car may not transport people efficiently because of the way how to consume the fuel. The driving style (eco-driving) is one of the important variable when utilizing vehicles. To set the context of our research work, we, first, attempt to give a definition of global supply chain as follows: all process networks that procure raw materials, transform into intermediate goods, and produce final products at a global level. Then, to deliver the products to customers through a global distribution systems, Albino et al. (2002). The aim of the dissertation is to achieve the link between supply chain, logistics and energy matter. The developed concept is that the competition is not only achieved by a good supply chain. But, also the energy matter is managed as an engine source of business development. However, the competition can be achieved in any other forms. Following the question also, how the energy efficiency work well in a global supply chain? The major research question is how the energy efficiency strategy is applied to the three dimensions of global supply chain, therefore authors applied the research work on:

A. research design of the energy efficiency for the transportation function. B. research design of the energy efficiency for the production function. C. research design of the energy efficiency for the warehousing function.

Kotzab et al. (2005), explained that the research methodologies in supply chain management are mainly focusing on who, what, where, why, and how, this perspective is a part of one of my work to explain these issues. Perlmutter (1969), has identified three positions on the globalism spectrum. Geo-centrism, as de- fined earlier, represents the highest degree of integration and the highest degree of globalization. Poly- centrism is associated with a worldwide presence, but operations in the multiple locations are largely independent of one another. Ethnocentrism is also associated with a worldwide presence, but in this profile the focus of the organization is the home country. Other possibilities, regional operations that serve multiple countries. Based on the three dimensions of global supply chain; we can distinguish the business activities connected to global value or not. This definition is the key aspect before we run down the best definition of global business as usual.

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The research work detailed on the supply chain from top to bottom contains:

- efficiency production management, - efficiency transportation management, - efficiency warehousing management.

The figure 0.0.1 shows that the energy efficiency strategy concept can be derived to understand the global supply chain whole agenda and issues. Three dimensions defines the objective that is the specification of the consumed energy. We need to specify how to manage energy consumption at (i) strategic level, (ii) logistics level, and (iii) operational level in order to drive the company to solve the problem directly linked to the core of the problem. For example, time windows scheduling, negotiating market price, dealing with technical problems. The most important one is how the flow of energy efficiency strategy in global supply chain can face hyper competition. Through, transportation, production, and warehouse. We can make identification of all competitors, collecting information data and focusing on the selection of energy sources. There- fore, the company can prepare anything before launching its capacity level on hyper-competition. The link between backward and forward linkage process should be run in a very efficient method up to the product delivery to all end users, without any fail. Particularly, in the transportation it is interesting to show, that the total company sales volume influenced by the geographical market sales areas (distance), time, type of product, and speed of truck.

Mapping all distance areas, total volume or total sales (price) are importance key factors. Another purpose is to argue that expensive product is more correlated with long distances. On these parameters, the company will run well in the competitiveness to sustain its business. The research work gave a new perspective for transportation industries by setting up a new strategy on managing their own fuel consumption with a basis on the concept of energy efficiency. The work was based on the area of the transportation of oleo chemicals business as a case study. As a spotlight in this research, EU and particularly France should be more efficient in transportation performance and their availability to promote oleo chemicals business once some best practices are identified with regards to the energy efficiency in all transportation operations. For example, as follows: To evaluate outcomes by the consensus agreement of stakeholders. Otherwise, the valuation can only be considered to be that of the experts and decision-makers alone: This idea refers to the fact that a technologically complex system is often embedded within a complex institutional structure. This added dimension of complexity is what makes the design and management of an engineering system a great challenge. More information studies can be found at company's perspective in energy efficiency in global supply chain Bertrand and Fransoo (2002), explained empirical scientific research should be carefully distinguished from axiomatic research results within the projects improvement. Therefore, improving the performance underlying process models are valid and the theoretical solutions are useful to solve the problem. So, we can elaborate, the empirical scientific research tests to demonstrate the validity of the theoretical models. The methodology's design has been constructed based on the development of existing research question and problem. Particularly, on energy efficiency in global supply chain. However, case studies can be an excellent study to test the existing problem. Because, by certain case studies we can looked up the progress of theoretical perspective and existing real problem, Bertrand and Fransoo (2002) and Aminata et al. (2014c). Also, in the dimension of production gave us a lot of ideas and we can deliver case studies in various aspect and industrial sector. These works shows that in production dimension, authors easily found, constructed, and formulate the raw data base became ready for use for research purpose. The nuclear power plant could be one of the best example here to produce electricity output. Pro- viding global supply chain materials to support availability of electricity source by nuclear power is an excellent example, see IEA (2011); IEC MSB (2011), also see Dagpunar (2007); Depoues et al. (2015). However, by input output analysis will be a strong analysis to promote the strength of backward and forward linkage, especially in manufacturing sectors. The availability of data base is one of indicator to successful on database construction, see Miller and Blair (2009) and Aminata et al. (2014e), also see Wood (2013); Wu et al. (2012). To point out warehousing dimension refer to energy efficiency in global supply chain shows that authors a bit difficult to construct the data. Especially, real time data that connected to global connection. However, by latest technology and financial innovation the bitcoin mining (cryptocurrency) is the best example to construct the perspective within warehousing dimension, see Dagpunar (2007), also see Wilson and Giligan (2005).

The research question can be formulated as follows:

Major research question: - how to formulate energy efficiency in global supply chain and its impact on the enterprise-business development (MNCs) ? The energy efficiency gives impact in any sector of business activities. Based on the concept of efficiency by Archer (2010), explained that the future is now. Most of the people need efficient society, especially energy efficiency in global supply chain. To make answer the question of efficiency philosophy which is a need formulation of the harmony system in all type of business. Therefore, I constructed the major research question and minor research question. Complementary research questions:

- how to build up energy efficiency in a case of transportation in global supply chain and its impact on their enterprise-business development?
- how to build up energy efficiency in a case of production in global supply chain and its impact on their enterprise-business development?
- how to build up energy efficiency in a case of warehousing in global supply chain and its impact on their enterprise-business development?

Starting hyper competition discussion in energy efficiency within global supply chain. I delivered some approval from scientific papers done in previous years. Also, research work in global supply chain should be connected to hyper competition to know the real impact in business development, Grandval and al. (2009). First of all, dimension of energy efficiency could be seen from three dimensions, Sbihi and Eglese (2007); supply chain dimension (strategic level), especially in long term. Logistics dimension (tactical level) is in medium term. Operations management dimension (day to day term). The competition level in transportation system, production, and warehouse system cannot be seen as part of business. For example production system in oleo chemical and electricity level. However, there is no single judgment that all kind of type business activities can be seen as hyper competition. All transportation in the first step making an offering to company for transportation services. Due to, there are a lot offers from many companies. The oleo chemical company offering the bidding system to find out the most cheapest price among them (ex: transportation services which provided by other supplier). Hyper competition, Akhter (2003), Hulsmann et al. (2008), and Sandberg and Abrahamsson (2011), global supply chains (GSCs) are confronted with the phenomenon of hyper competition. For this reason, there seems to be an increasing necessity for GSCs to build up competitive advantage in order to survive. Strategic exibility is assumed to have positive effects on generating required competitive advantage by replicating and reconfiguring competences to manage GSCs, while keeping GSCs stable, Sandberg and Abrahamsson (2011). Using a theoretical framework, this research elaborates the link between operational, dynamic logistics capabilities and sustainable competitive advantage. The findings conclude that a sustainable competitive advantage is based on a combination of efficient and effective logistics operations, see more Shay and Rothaermel (1999), Hauswirth et al. (2004), Dentico (1999), Farahani (2009), and Bironneau et al. (2015). Gereffi and Lee (2012), state that global supply chains have been a familiar part of the international business landscape for decades. From a management perspective, there are always issues connected with the efficient and timely distribution of goods that flow across supply chains. From an industry perspective, there are questions on how the industry is organized in terms of the size and ownership of major manufacturers and their suppliers, and where these companies are located. From a national competitiveness perspective, countries are concerned whether they can gain and maintain the production, sales and research capabilities needed to develop and make low-cost, high-quality or high-tech products (Pisano and Shih 2009). As the ability of countries to prosper depends on their participation in the global economy, which is their role in global supply chains. Despite its relevance on many levels, the literature on global supply chains tends to appear in a specialized set of publications oriented to a business audience. However, since the early 2000s, the global value chain concept has gained popularity as a way to analyze the international expansion and geographical fragmentation of contemporary supply chains. Further studies on CSR and energy efficiency can be traced on Pirsch et al. (2006),Crowther and Aras (2008),Crowther and Aras (2009),Visser et al. (2010). Finally; Crowther and Aras (2008) stated the principles of CSR;

- on sustainability is means that all action based on all options available for future needs.
- on accountability is means that both internal and external responsibilities of organization.
- on transparency is means that all stake holders can access the information.

The research design in this section is to design all possibilities, how to work in an inter-firm and an inter-stakeholder, including how to manage the relationship with the local or regional government, moreover at national level. Collecting and delivering all questioners needs a team collaboration, that is the point to have a good degree of information. The degree is the score value collected from customer or all stakeholders. As Persson (1991) stated; (i) the best competitor in strong competition is materials flow segment. It shows cost-effective in the business. (ii) the new competitor has a superior logistics performance. So that, the implication is the logistics performance can be seen as a strategy driver. This view is suit- able in logistics service as a significant element and by developing effectiveness in basic operational capabilities. Abrahamsson et al. (2003), exposed that in the type of three logistics towards external relations in the supply chain shows the link from producer to final customer. If production is used as a buffer stock. Therefore, logistics has to carry out a speculation stock to support marketing expansion, Also, Abrahamsson et al. (2003) p. 88, explained that if there is a change of size market the logistics need as a resource to support new marketing or production strategies. The type of three logistics must be able to support the firm, then it can be formulated as strategic decision. Furthermore, the logistics function should be able to support kind of strategies such as: broadening of assortment, additional marketing channels, geographical expansion, support global customers, expansion by company acquisitions and downsizing. He has defined logistics platform in type three logistics which centrally manages and controls. The logistics platform included the concept of logistics operations, physical structure, processes and its activities as well as the information systems, operations and reporting. Abrahamsson et al. (2003) p. 104., delivered the scheme of design to formulate the energy efficiency intelligence for global supply chain transportation by empowering international logistics and its opportunity for pro- moting market and economic activities Based on an assumption that improving industrial development will have impact on the environ- ment, ie. pollution level (C02). Developing supply chain strategy will face on complexity problems and challenges for enhancing business development at global level. A lot of sociological aspects of global business can be traced back to the article of Perlmutter (1969). Especially on his article referred to the evolution of the multinational corporation. On multinational corporation existed worldwide approach in both headquarters and subsidiaries. The firm as a whole concentrate on worldwide objectives as well as local objectives. The point here is in each part contributes to the unique competence. Dickens (1998), providing the transport from their country of origin to the country of which market at international level. They utilized six categories (management teams, strategy, operations and products, R and D, financing and marketing), which each of them consists of multiple dimensions:

- global is synonymous with international.
- global strategy means doing the same thing everywhere.
- globalizing means becoming stateless, with no ties to a home country.
- globalizing requires abandoning images and values of a home country.
- globalizing involves acquisitions without integration.
- a firm must engage in foreign country to be considered global.

The conclusion shows that all findings have significant results. Precisely, the management strategy should be the key concept for long period to promote three dimension in transportation, production, and warehouse. It has to refer on the concept of management in energy efficiency. Utilizing straight forward point analyzed for all cases studies shown that the point of global supply chain must be established by strong chain for each business activities. Furthermore, energy efficiency also push us for greening management strategy. Back to all dimensions in this works: I delivered some conclusion that matched with current issues of greening effort which matched to Mathers (2015): 1. by setting up the performance goals for improving the quality of environment via management approach. 2. by tracking logistics emission should as a reference for a standard practice. Also, improving the the tracking performance by various indicators and methodology. 3. by seeking and building the external factor so called a leadership practice. Discussing in energy issues, particularly on energy efficiency which creating efficiency output level must be coherence and high linkages from backward and forward linkages. Especially for global market and global product should be traced. Focusing on energy used for each business activities is useful one. Therefore, all products assured by using energy intensity and global supply chain properly. By optimizing energy source in proper way, it would be give minor impact on environmental. This is the main idea for increasing industrial intensity with small environmental impact. So that, using CSR's matrix will contribute the knowledge capacity to the global business and global community. However, from the management side shows that the management strategy is a role play for promoting energy efficiency in scale and geographical areas. By establishing and constructing a strong logistics and well-connected global supply chain will enhance global supply chain performance. Mathematical approach and statistical approaches shown technicals on energy efficiency calculation. The innovation of this research is the discussion through corporate social responsibility and energy efficiency. It seemed that enterprises or small, medium even large size of company for future competition, as D'aveni (1995). It should be able to handle energy efficiency. Moreover, energy efficiency as one of tool to know company is efficient or not. Finally, the energy efficiency in global supply chain shows that efficiency energy in global level could be perform by any type of product, mainly on energy matter. By focusing on how to transport them, the way of production system, and how to build warehouse system to keep source of energy become more efficient to serve inter-links of chain and end users.

Chapter 1

Framework

Three main supply chain functions that are production, transport and warehousing at global level where the energy consumption is a major issue to maintain a high level of several outputs. We intend to develop and show how the concept of energy efficiency is in critical pressure for energy global supply chain. Because, the sustainability of energy supply chain is the key part of business activities, moreover for human needs.

1.1 CSR - Risk Management Concept

Friedman, 1970 stated an example about investment in the local community:"It will be in the long run interest of a corporation that is a major employer in a small community to devote resources to provide amenities to that community or to improve its government.

That makes it easier to attract desirable employees, it may reduce the wage bill or have other worthwhile effects.

Concerning the CSR and risk management theory and its application must be interconnected well. Because, in the long term the company will take care of action which correlated with all consequences by all business activities. These activities, particularly in CSR aspect gave much influenced on environmental aspects mainly in the business of natural resources. Why do we concerned for these matters, due to business in natural resources exploited a lot of environmental impacts. Both positive and negative actions and their impacts on communities, company and regional development.

Naturally, risk management concept delivered to clients even to stake holders before launching the project or business project. The aims is to know more about the size of impact. Also, how much the business action can be sustain to maintain their business sustainability.

However, it can not be neglect by any company which concern about their sustainability and high competition level. So that, in table, below shows about the CSR theories and approaches to enhance about management strategy and what kind of action to compete with other companies based on strategies and existing conditions.

Table 1.1: CSR Theories and Approaches-1

Types of theory	Approaches	Short description	Some key references
Instrumental theories (focusing on achieving economic objectives through social activities)	Maximization of shareholder value	Long-term value maximization	Friedman (1970), Jensen (2000)
	Strategies for competitive advantages	• Social investments in a competitive context	Porter and Kramer (2002)
		• Strategies based on the natural resource view of the firm and the dynamic capabilities of the firm	Hart (1995), Lizt (1996)
		• Strategies for the bottom of the economic pyramid	Prahalad and Hammond (2002), Hart and Christensen (2002), Prahalad (2003)
	Cause-related marketing	Altruistic activities socially recognized used as an instrument of marketing	Varadarajan and Menon (1988), Murray and Montanari (1986)
Political theories (focusing on a responsible use of business power in the political arena)	Corporate constitutionalism	Social responsibilities of businesses arise from the amount of social power that they have	Davis (1960, 1967)
	Integrative Social Contract Theory	Assumes that a social contract between business and society exists	Donaldson and Dunfee (1994, 1999)
	Corporate (or business) citizenship	The firm is understood as being like a citizen with certain involvement in the community	Wood and Lodgson (2002), Andriof and McIntosh (2001) Matten and Crane (in press)
Integrative theories (focusing on the integration of social demands)	Issues management	Corporate processes of response to those social and political issues which may impact significantly upon it	Sethi (1975), Ackerman (1973), Jones (1980), Vogel, (1986), Wartick and Mahon (1994)
	Public responsibility	Law and the existing public policy process are taken as a reference for social performance	Preston and Post (1975, 1981)
	Stakeholder management	Balances the interests of the stakeholders of the firm	Mitchell et al. (1997), Agle and Mitchell (1999), Rowley (1997)
	Corporate social performance	Searches for social legitimacy and processes to give appropriate responses to social issues	Carroll (1979), Wartick and Cochran (1985), Wood (1991b) Swanson (1995)

Source:Journal of Business Ethics 53: 51–71, 2004. Kluwer Academic Publishers.

Table 1.2: CSR Theories and Approaches-2

Types of theory	Approaches	Short description	Some key references
Ethical theories (focusing on the right thing to achieve a good society	Stakeholder normative theory	Considers fiduciary duties towards stakeholders of the firm. Its application requires reference to some moral theory (Kantian, Utilitarianism, theories of justice, etc.)	Freeman (1984, 1994), Evan and Freeman (1988), Donaldson and Preston (1995), Freeman and Phillips (2002), Phillips et al. (2003)
	Universal rights	Frameworks based on human rights, labor rights and respect for the environment	The Global Sullivan Principles (1999), UN Global Compact (1999)
	Sustainable development	Aimed at achieving human development considering present and future generations	World Commission on Environment and Development (Brutland Report) (1987), Gladwin and Kennelly (1995)
	The common good	Oriented towards the common good of society	Alford and Naughton (2002), Melé (2002) Kaku (1997)

Source:Journal of Business Ethics 53: 51–71, 2004. Kluwer Academic Publishers.

Jensen (2000) has proposed what he calls ‘enlightened value maximization’. We can conclude that most of current CSR theories are focused on four main aspects:

1. using business power in a responsible way

2. integrating social demands

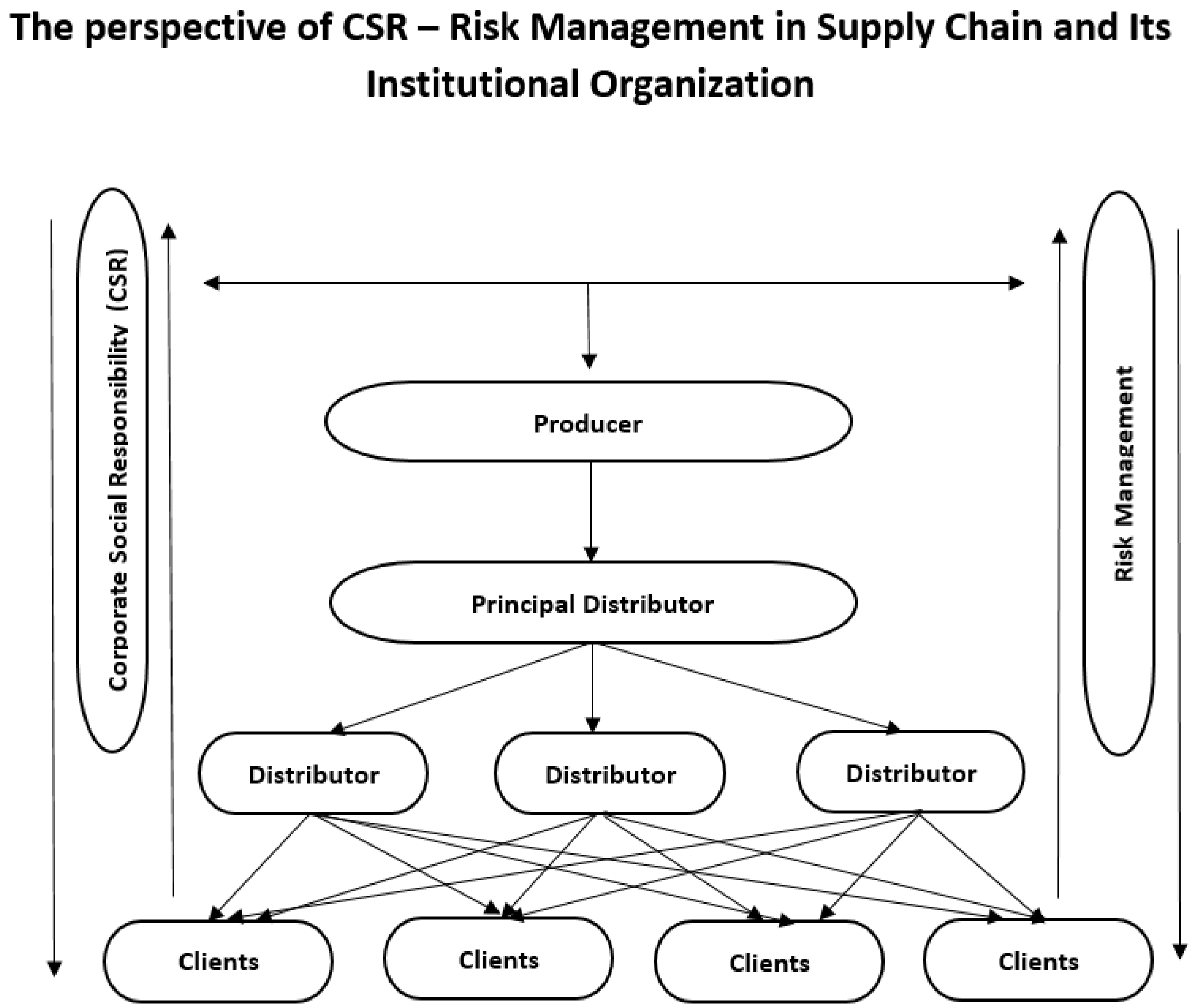
3. long term profits oriented

4. contributing to a good society. The most relevant theories on CSR and related concepts into four groups; instrumental, political, integrative and value theories.

Overview: The energy consumption is a major issue to maintain a high level product. The concept of energy efficiency is the principal part in global supply chain, . Many questions are possibly and legitimately to ask:

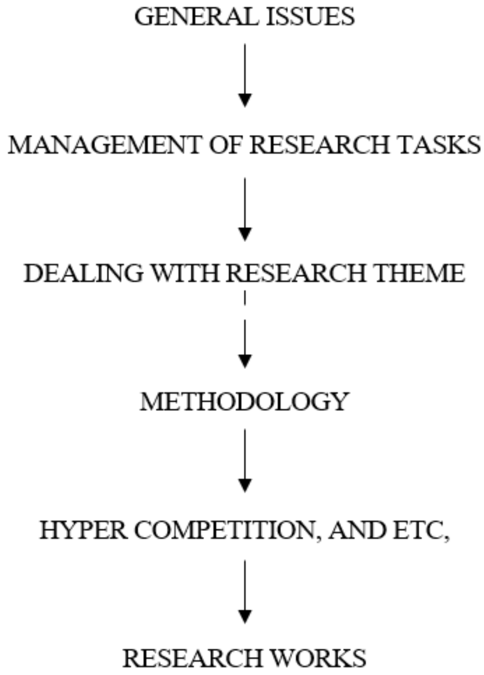
1. Economic side,
2. Environmental side,
3. Social side,
4. Political and Geopolitical pattern.
5. Tax Policy

Figure 1.1: The Whole Framework for Institutional Organization



Therefore, based on the literature review and what they are the real life problems, my methodology aims at studying the concepts are figured out in this work. To figure out all these research questions, I have read a literature review to examine all up to date references and bibliography in order to support the understanding and knowledge of the energy efficiency concept in the global supply chain. The logical arguments can be redesigned in all ways that are methodologically accepted. The path ways of our thinking can be described as follows:

Figure 1.2: The Way of Thinking



The general issues have been taken from real business cases and the literature reviews. However, there are a lot of arguments that can lead the energy efficiency on significant other ways.

The most difficult here is how to make an approval that energy efficiency has been approved in production, warehousing and transportation.

The basic idea in the initial stage is to reduce the CO2 pollution by reducing the amount of CO2 emissions yearly. The indicator of CO2 will decrease if there is energy management.

The energy management shows on energy efficiency indicator. The efficiency indicator shows on single manufacture, region, national or international agreements. On the other hand, if there is efficiency energy in micro level then it would be easier to meet with energy efficiency at national level, even at the international level. There are a lot of indicators showing how to know and to measure the energy efficiency.

If an enterprise or a manufacture have been allocated all resources in efficiency ways, then the manufacture will create the price competitiveness. By the price competitiveness, the enterprise can create the competition. Starting from basic competitiveness in price scale, the enterprise can also go further up to hyper competition.

The hyper competition is built up from the basic matter, namely CO2 efficiency or so called minimizing the CO2 pollution. In a general point of view, is how to produce, to manage the storage and to deliver to the end users. This argument is also supported by the concept of the social responsibility of the enterprise.

The purpose of CSR in responsibility level is undertaken by the company to deal with the pollution level.

Also explains which set of criteria for environmental indicators is to consider. All requirements indicators could be energy resources type with regards to the method of product deliveries, etc. Every single product should be distinguished and considered as a potential pollutant for the environment which all the problems can arise from the enterprise operations and business activities. At the final enterprise operations, the company has also to deal with the corporate social responsibility. Otherwise, the future of business development will suffer from hyper competition and a big future prospect.

Figure 1.3: The Flowchart of General Idea

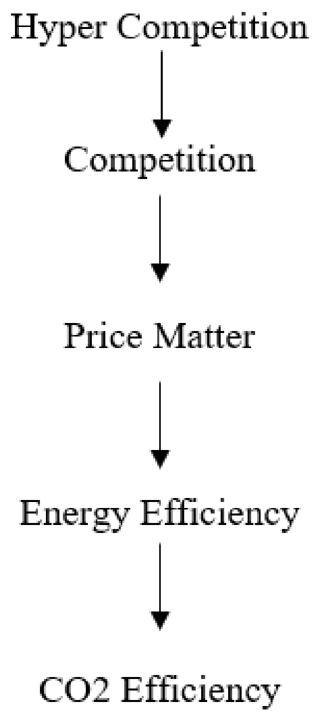


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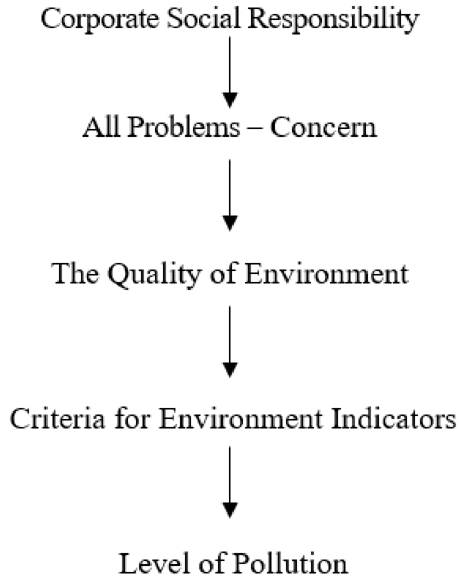
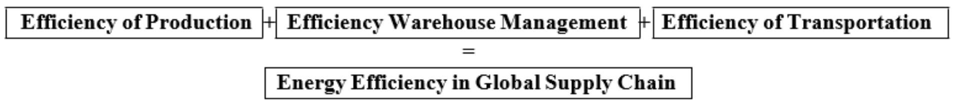
Figure 1.4: The Sample Work on CSR



It shows that from the dimensions of production, transportation and warehousing, one can describe the energy efficiency scheme. The initial idea is that the production procedure has to be executed in efficient manner, and particularly from the energy efficiency point of view within the production process, followed by an efficient energy consumption within the warehouse management process and followed by an efficient transportation for delivering products.

Figure 1.5: The Framework of Energy Efficiency



1.2 Organization of CSR Management

In order to get better understanding the managerial level and technical level are necessary to investigate them. Authors applied and got closer to the gap of managerial and technical problems. So that, all research works approached by bibliography and related references were intensively explored and exploited for the development of our research method. One can also recall that many research works cleared get similarities and in various methods, used methodologically the procedures, White (2009), Wilson and Gilligan, (2005), p. 406. The general purpose of the literature review for some extent will provide conceptual development, research question based on the real condition and simulation possibilities, White (2009), Mouton and Marais (1996), and Hillier and Hillier, (2003). The objective of the of literature review is Ridley (2012): 1. to prevent from duplication, 2. the general body of knowledge, 3. to help the design of original research, 4. to reveal the conceptual problem based on assumptions.

In general, there are many kinds of definitions for energy efficiency. One can cite: (i) fuel efficiency, (ii) fuel economy and (iii) fuel consumption. Moreover, energy efficiency in transportation is a relative term used to describe how effectively fuel is used to move a vehicle. The fuel efficiency is connected to the amount derived from the used fuel. Fuel economy is expressed as miles per gallon of consumed fuel. Fuel consumption is the inverse of fuel economy. It refers to the fuel consumed by the vehicle or type of transport as it travels a given distance. Widely used in the Europe (expressed in liters per 100 km), this metric is a clearer measure of fuel than the fuel economy ("real future energy efficiency in USA", p.121). For wide source of study in energy efficiency, I traced many possibilities from previous research works, included related references. I noticed that all studies listed are closer to energy efficiency development in certain perspectives.

Our research is discussing the energy efficiency in global supply chain in the three identified dimensions that are production, transportation, and warehousing. The objective is to formalize a model aimining at optimizing energy consumption throughout supply chain for a minimal environmental impact (energy efficiency). Referring to Wei et al. (2011), Varma and Clayton (2010), and Halldorsson and Svanberg (2013) explained that efficiency means: "doing things in an optimal way, for example; doing it the fastest or inexpensive way and it was done by optimal ways. In other words: "efficiency refers to how well something is done. Effectiveness refers to how useful something for certain business purpose?" For example, a car is a very effective form of transportation mode and be able to move people across long distances, to specific places, but a specific car may not transport people efficiently because of how it is consuming fuel. The driving style (eco-driving) is one of the important variable when utilizing vehicles.

To set the context of our research work, we, first, attempt to give a definition of global supply chain as follows: all process networks that procure raw materials, transform into intermediate goods, and produce final products at a global level. Then, to deliver the products to customers through some global distribution systems, Albino et al.(2002).

The aim of the dissertation is to achieve the link between supply chain, logistics and energy matter. The developed concept is that the competition is not only achieved by a good supply chain, but, also the energy matter is managed as an engine source of business development.

1.3 Institutional Organization

However, the competition can be achieved in any other forms. Following the question also, how the energy efficiency works well in a global supply chain? The major research question is how the energy efficiency strategy is applied to the three dimensions of global supply chain, therefore we have applied the research work on:

- research design of the energy efficiency for the transportation function,

- research design of the energy efficiency for the production function,
- research design of the energy efficiency for the warehousing function.

Kotzab et al. (2005), explained that the research methodologies in supply chain management are mainly focusing on who, what, where, why, and how. This perspective is a part of one of my work to explain these issues.

Perlmutter (1969), has identified three positions on the globalism spectrum. Geocentricism, as defined earlier, represents the highest degree of integration and the highest degree of globalization. Ethnocentrism is associated with a worldwide presence, but operations in the multiple locations are largely independent of one another. Ethnocentrism is also associated with a worldwide presence, but in this profile the focus of the organization is the home country. Other possibilities, regional operations that serve multiple countries.

Based on the three dimensions of global supply chain; we can distinguish the business activities connected to global value or not. This definition is the key aspect before we run down the best definition of global business as usual.

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- efficiency production management, - efficiency transportation management, - efficiency warehousing management.

The figure 0.0.1 shows that the energy efficiency strategy concept can be derived to understand the global supply chain whole agenda and issues.

Three dimensions defines the objective that is the specification of the consumed energy. We need to specify how to manage energy consumption at (i)strategic level, (ii)logistics level, and (iii)ope- rational level in order to drive the company to solve the problem directly linked to the core of the business model. For example, time windows scheduling, negotiating market price, dealing with technical problems.

The most important one is how the flow of energy efficiency strategy in global supply chain can face hyper competition through transportation, production, and warehouse. We can make identification of all competitors, collecting information data and focusing on the selection of energy sources.

Therefore, the company can prepare anything before launching its capacity level on hyper-competition. The link between backward and forward linkage process should be run in a very efficient method up to the product delivery to all end users, without any fail. Particularly, in the transportation it is interesting to show, that the total company sales volume influenced by the geographical market sales areas (distance), time, type of product, and speed of truck. Mapping all distance areas, total volume or total sales (price) are importance key factors. Another purpose is to argue that expensive product is more correlated with long distances. Based on these parameters, the company will run well in the competitiveness to sustain the business.

The research work gave a new perspective for transportation industries by setting up a new strategy on managing their own fuel consumption with a basis on the concept of

Figure 1.6: Energy Efficiency in Global Supply Chain

ENERGY EFFICIENCY STRATEGY IN GLOBAL SUPPLY CHAIN
(Hyper Competition)
▽
▽
Operations Management (OM) and Global Operations Management (GOM)
▽
▽
Transportation Management (Efficiency)
Production Management (Efficiency)
Warehousing Management (Efficiency)
▽
▽
The energy efficiency could be seen from three dimensions:
▽
▽
Supply Chain Dimension (Strategical Level)
Logistics Dimension (Tactical Level)
Operator Management Dimension (Operational Level)

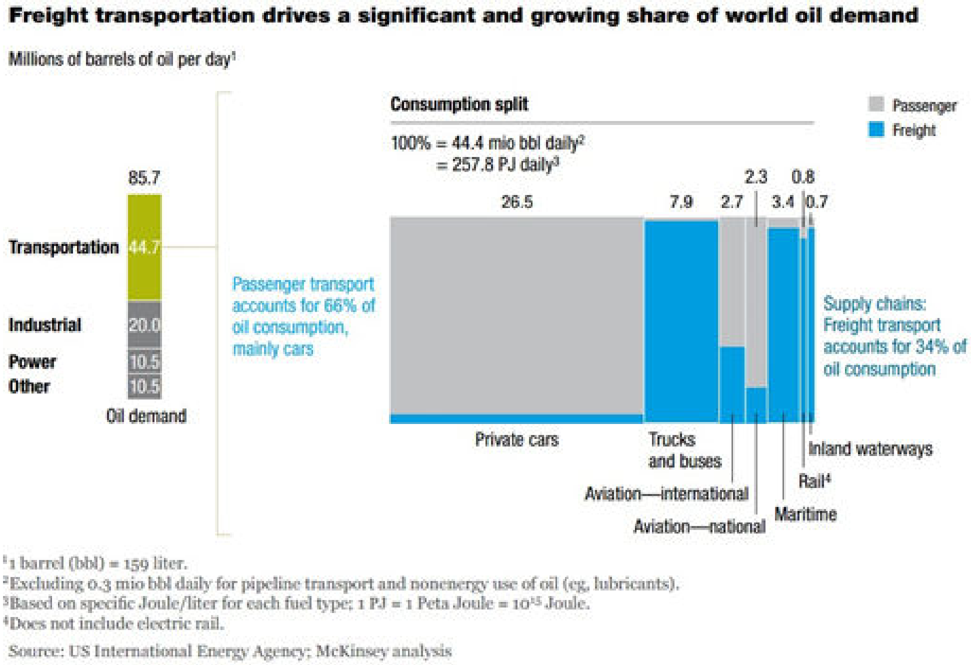
energy efficiency. The work was based on the area of the transportation of oleo chemicals business as a case study. As a spotlight in this research, EU and particularly France should be more efficient in transportation performance and their availability to promote oleo chemicals business once some best practices are identified with regards to the energy efficiency in all transportation operations. As in Energy Efficiency: A Compelling Global Resources, McKinsey, 2010, p.35.

This idea refers to the fact that a technologically complex system is often embedded within a complex institutional structure. This added dimension of complexity is what makes the design and management of an engineering system a great challenge. More information studies can be found at company's perspective in energy efficiency in global supply chain.

Bertrand and Fransoo (2002), explained empirical scientific research should be carefully distinguished from axiomatic research results within the projects improvement. Therefore, improving the performance underlying process models are valid and the theoretical solutions are useful to solve the problem. So, we can elaborate, the empirical scientific research tests to demonstrate the validity of the theoretical models.

The methodology's design has been constructed based on the development of existing research question and problem. Particularly, on energy efficiency in global supply chain. However, case studies can be an excellent study to test the existing problem. Because, by certain case studies we can have looked up the progress of theoretical perspective and existing real problem, Bertrand and Fransoo (2002).

Figure 1.7: Freight Transportation



Also, the dimension of production gave us a lot of ideas and we can deliver case studies in various aspect and industrial sectors. These works shows that in the production dimension, authors easily found, constructed, and formulate the raw data base that becomes ready for use for research purpose. The nuclear power plant could be one of the best example here to produce electricity output. Providing global supply chain materials to support availability of electricity source by nuclear power which an excellent example, see Board (2011), also see Dagpunar (2007); Depoues et al. (2015).

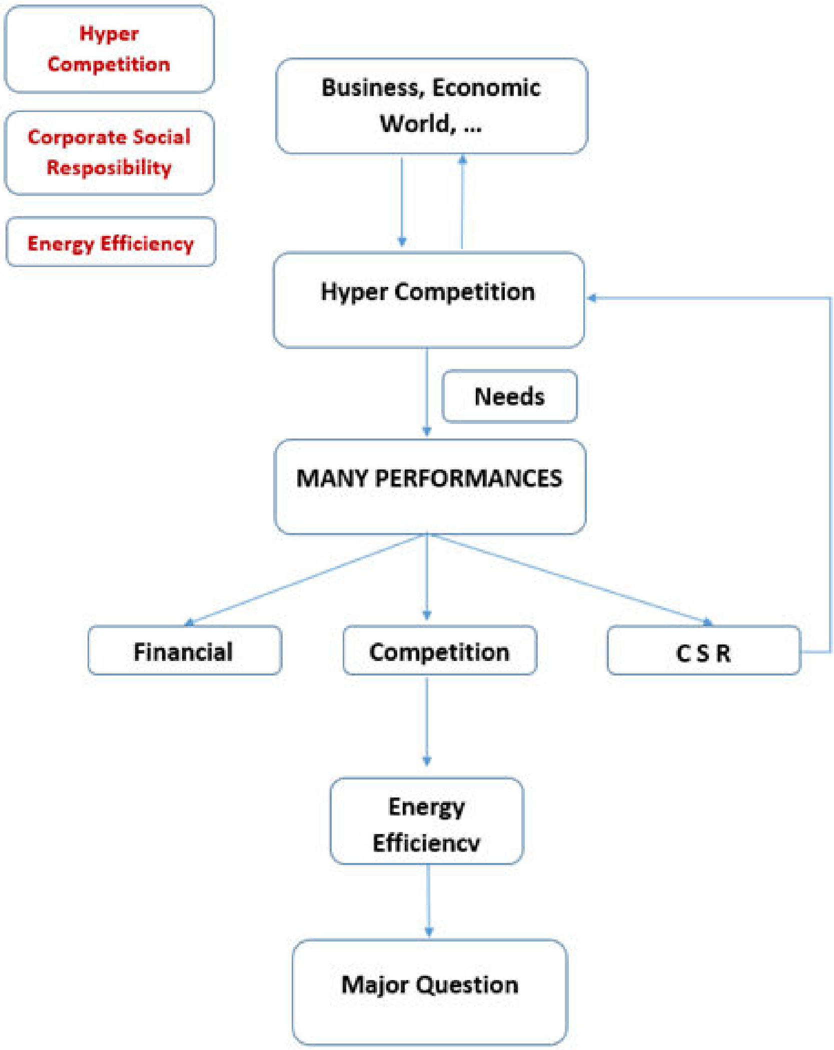
However, input output analysis will be a strong analysis to promote the strength of backward and forward linkage, especially in manufacturing sectors. The availability of data base is one of indicators to successful database construction, see Miller and Blair (2009) and, also see Wood (2013); Wu et al. (2012).

To point out warehousing dimension referring to energy efficiency in global supply chain shows a big difficulty to construct the data. Especially, real time data is linked to global connection. However, by latest technology and financial innovation the bitcoin mining (Cryptocurrency) is the best example to construct the perspective within warehousing dimension, see Dagpunar (2007), also see Wilson and Giligan (2005). However, bitcoin mining is still close to the dimension of production (part of warehousing which consumed electricity).

We tried to deliver for initial research work intra region in France, especially energy efficiency among hypermarket warehousing. So that, we proposed this possibility at intra-region, see Mannino et al. (2008) and Gokce and Gokce (2013). Because, at this moment we had difficulty for data construction at global level.

We have to create conceptual model to understand the details of refresh processes including constraints on data sources and data ware-houses. In related work is notable to emphasis on data quality. These conceptual representations and architectures provide the proper size of hypermarket size. By proper sizing the evaluating operational efficiency can be identified. Younger (1995), Pope (2010), We delivered here the type of surface and also we gave the definition: 1).hypermarket, 2). gallery, 3).supermarket, 4).magazine.

Figure 1.8: The Flow Chart of Methodology-Part A



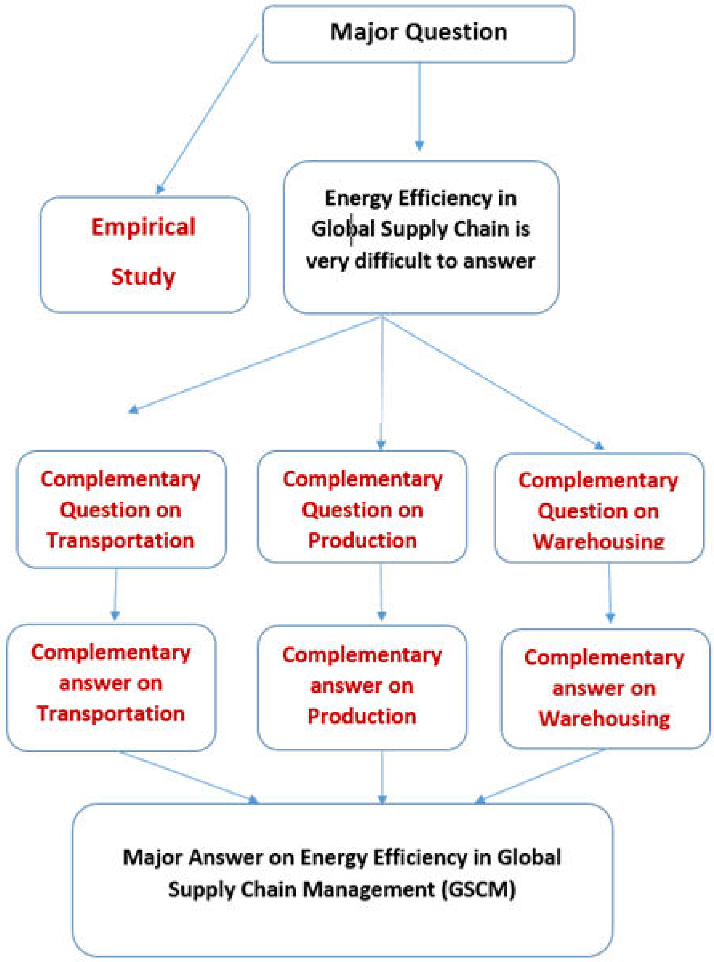
The research question can be formulated as follows: **Major research question:** - how to formulate energy efficiency in global supply chain and its impact on the enterprise-business development (MNCs)?

The energy efficiency gives impact in any sector of business activities. Based on the concept of efficiency by Archer (2010), explained that the future is now. Most of the people need efficient society, especially energy efficiency in global supply chain. To make answer the question of efficiency philosophy which is a need formulation of the harmony system in all type of business. Therefore, I constructed the major research question and minor research question.

Complementary research question:

- how to build up energy efficiency in a case of transportation in global supply chain and its impact on their enterprise-business development?

Figure 1.9: The Flow Chart of Methodology-Part B



- how to build up energy efficiency in a case of production in global supply chain and its impact on their enterprise-business development?
- how to build up energy efficiency in a case of warehousing in global supply chain and its impact on their enterprise-business development?

Starting hyper competition discussion in energy efficiency within global supply chain. I delivered some approval from scientific papers done in previous years. Also, research work in global supply chain should be connected to hyper competition to know the real impact in business development, Grandval (2009). First of all, dimension of energy efficiency could be seen from three dimensions, Sbihi and Eglese (2007); supply chain dimension (strategic level), especially in long term. Logistics dimension (tactical level) is in medium term. Operations management dimension (day to day term).

The competition level in transportation system, production, and warehouse system cannot be seen as part of business. For example, production system in oleo chemical and electricity level. However, there is no single judgment that all kind of type business activities can be seen as hyper competition. All transportation in the first step making an offering to company for transportation services. Due to, there are a lot offers from many companies. The oleo chemical company offering the bidding system to find out the cheapest price among them (ex: transportation services which provided by other supplier).

Hyper competition, Akhter (2003), Hulsmann et al. (2008), and Sandberg and Abrahamsson (2011), global supply chains (GSCs) are confronted with the phenomenon of hyper competition. For this reason, there seems to be an increasing necessity for GSCs to build up competitive advantage in order to survive. Strategic exibility is assumed to have positive effects on generating required competitive advantage by replicating and reconquering competences to manage GSCs, while keeping GSCs stable, Sandberg and Abrahamsson (2011).

Using a theoretical framework, this research elaborates the link between operational, dynamic logistics capabilities and sustainable competitive advantage. The findings conclude that a sustainable competitive advantage is based on a combination of efficient and effective logistics operations, see more Shay and Rothaermel (1999), Hauswirth et al. (2004), Dentico (1999), Farahani (2009), and Bironneau et al. (2015).

1.3.1 Management Strategy on CSR and Risk Management

Gereffi and Lee (2012), state that global supply chains have been a familiar part of the international business landscape for decades. From a management perspective, there are always issues connected with the efficient and timely distribution of goods that flow across supply chains. From an industry perspective, there are questions on how the industry is organized in terms of the size and ownership of major manufacturers and their suppliers, and where these companies are located. From a national competitiveness perspective, countries are concerned whether they can gain and maintain the production, sales and research capabilities needed to develop and make low-cost, high-quality or high-tech products (Pisano and Shih 2009).

As the ability of countries to prosper depends on their participation in the global economy, which is their role in global supply chains. Despite its relevance on many levels, the literature on global supply chains tends to appear in a specialized set of publications oriented to a business audience. However, since the early 2000s, the global value chain concept has gained popularity as a way to analyze the international expansion and geographical fragmentation of contemporary supply chains. Further studies on CSR and energy efficiency can be traced on Pirsch et al. (2006),Crowther and Aras (2008), Crowther and Aras (2009), Visser et al. (2010). Finally; Crowther and Aras (2008) stated the principles of CSR; • on sustainability is means that all action based on all options available for future needs. • on accountability is means that both internal and external responsibilities of organization. • on transparency is means that all stake holders can access the information. The research design in this section is to design all possibilities, how to work in an inter-firm and an inter-stakeholder, including how to manage the relationship with the local or regional government, moreover at national level. Collecting and delivering all questioners needs a team collaboration, that is the point to have a good degree of information. The degree is the score value collected from customer or all stakeholders.

1.3.2 Organization Management to Support CSR - Risk Management

As Persson (1991) stated; (i) the best competitor in strong competition is materials flow segment. It shows cost-effective in the business. (ii) the new competitor has a superior logistics performance. So that, the implication is the logistics performance can be seen as a strategy driver. This view is suitable in logistics service as a significant element and by developing effectiveness in basic operational capabilities. Abrahamsson et al. (2003), exposed that in the type of three logistics towards external relations in the supply chain shows the link from producer to final customer. If production is used as a buffer stock. Therefore, logistics has to carry out a speculation stock to support marketing expansion, Also, Abrahamsson et al. (2003) p. 88, explained that if there is a change of size market the logistics need as a resource to support new marketing or production strategies. The type three logistics must be able to support the firm, then it can be formulating as strategic decision. Furthermore, the logistics function should be able to support kind of strategies such as: broadening of assortment, additional marketing channels, geographical expansion, support global customers, expansion by company acquisitions and downsizing. He has defined logistics platform in type three logistics which centrally manages and controls.

Figure 1.10: Type of Logistics Model

	Type 1 Logistics	Type 2 Logistics	Type 3 Logistics
Main focus	Optimization of logistics	Logistics structure.	Dynamic capabilities
Priorities in Logistics	1). Internal efficiency and resource utilization. 2). Customer service related to geographical distance to customers	1). Reduction of total logistics cost from economies of scale. 2). Customer service related to time to customer and availability.	1). Logistics as a resource base for new market positions and marketing strategies 2). Develop new offers to key accounts.
Structure and Organization	Logistics tightly connected to production or sales. 2). Decentralized responsibility for design and control.	1). Centralized logistics, organizationally separated from production and sales. 2). Centralized responsibility for design and control of the logistics style - high degree of standardization	1). Centralized logistics responsibility in relation to the business system rather than the logistics system. 2). Standardized process with adaptions to market segments.
Flexibility	Operational flexibility, ex. the ability speed operations on a rush order.	Operational flexibility from ability to respond to unique customer requirements.	Strategic flexibility from ability to reposition faster and more cost-effective than competitor.

Abrahamsson et al. (2003) and updated by Kihlen (2007).

The logistics platform included the concept of logistics operations, physical structure, processes and its activities as well as the information systems, operations and reporting. Abrahamsson et al. (2003) p. 104., delivered the scheme of design to formulate the energy efficiency intelligence for global supply chain transportation by empowering international logistics and its opportunity for promoting market and economic activities.

Based on an assumption that improving industrial development will have impact on the environment, ie. pollution level (C02). Developing supply chain strategy will face on complexity problems and challenges for enhancing business development at global level. A lot of sociological aspects of global business can be traced back to the article of Perlmutter (1969). Especially on his article referred to the evolution of the multinational corporation.

On multinational corporation existed worldwide approach in both headquarters and subsidiaries. The firm as a whole concentrate on worldwide objectives as well as local objectives. The point here is in each part contribute to the unique competence. Dickens (1998), providing the transport from their country of origin to the country of which market at international level.

They utilized six categories:

1. management teams,
2. strategy,
3. operations and variation of products,
4. R and D,
5. financing and marketing.

Bartlett and Ghoshal (1989) defined multiple dimensions to identify a firm's position on the multi-national to complex global chain. Kanter and Dretlet (1998) attempted to define what global really means. Their approach is to identify six aspects:

- global is synonymous with international,
- global strategy means doing the same thing everywhere,
- globalizing means becoming stateless, with no ties to a home country,
- globalizing requires abandoning images and values of a home country,
- globalizing involves acquisitions without integration,
- a firm must engage in foreign country to be considered global.

Chapter 2

Literature Review

In this research, we investigate three main supply chain functions that are production, transport and warehousing at global level where the energy consumption is a major issue to maintain a high level of several outputs. We intend to develop and show how the concept of energy efficiency is critical for global supply chain. Many questions are possibly and legitimately to ask and investigate even in interdisciplinary approaches.

2.1 Overview

Martin (2005) stated; "logistics is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory through the organization and its marketing channels. In such a way that current and future profitability are maximized via cost-effective of orders."

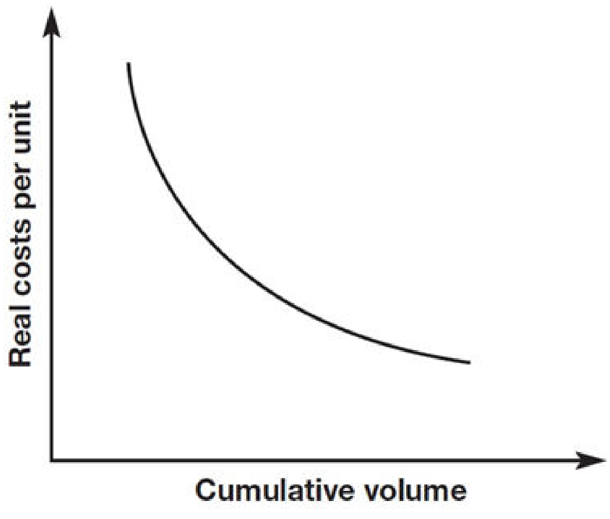


Figure 2.1: The Experience Curve, Source: Martin M., 2005

Some literatures review listed below shows evidents:

1. William Stanley Jevons, (1865), the objective is observed that technological improvements that increased the efficiency of coal-use led to the increased consumption of coal in a wide of range of industries. He argued that, contrary to common

intuition of technological progress couldn't be relied upon to reduce fuel consumption. Study focus: Consumption rebound effect from improved energy efficiency. Key findings: Technological progress that improves energy efficiency will tend to increase overall energy use. People will make and buy new products as efficiency improvement enables "progress" to spread to other industries. Any sort of efficiency gains, at least the same amount of flour, worker, energy, ability, and tools remain. Paralleling "Jevons profitability" argument, he notes that capital gets formed only if greater production and capital formation is a fact.

2. Joseph Schumpeter, (1911), objective is how to describe or making a new combination are condition for profitability. Study focus: efficiency and profitability. Methods: using Lauderdale's example of the loom. Key findings: Surpassing single-sector analysis and taking the marginal consumer seriously. The demonstration growth effects of the "perfectionism de les arts". the findings shown paradoxical matter which the augmentation of "employment and population".

3. M.G. Patterson, (1911), the objective is energy efficiency and its conceptual. Study focus: What is energy efficiency: concepts, indicators and methodology. Methods: Methodological issues. Key findings: The role of value judgments in the construction of energy efficiency indicators, the energy quality problem, the boundary problem, the joint production problem and the question of isolating the underlying technical energy efficiency trend from the aggregate indicator.

4. Blake Alcott, (2005), the objective is Jevons paradox. Methods: Survey. Key findings: Today ecological economics must give advice on this surely not un answerable question. The impact growing rapidly, but a firm consensus is lacking. Certainly, theoretical work must see whether the environmental "efficiency strategy" is reconcilable with standard growth theory. One conclusion can be delivered if Jevons is right. Then efficiency policies are simply counterproductive. Even taxes on fuel or CO2 will be compensated by efficiency increases, and moreover they face the problem that tax revenue also gets spent on material and energy. Additional critics: "Inelastic Demand for Work. A doubling of fuel efficiency does not double work demanded, the amount of fuel used decreases. Jevons paradox does not occur".

5. Capehart et all, (2007), the objective is to guide energy management. Study focus: improving energy management. Methods: survey. Key findings: covers many operations from services to product and equipment design through product shipment.

6. Steve Sorrell, (2009), the objective is Jevons paradox revisited: the evidence for backfire from improve energy efficiency. Methods: historical and empirical studies. Key findings: "Jevons paradox is extremely difficult to test empirically, but could have profound implications for energy and climate policy. While the evidence in favor of "Jevons Paradox" is far from conclusive, it does suggest that economy - wide

rebound effects are larger that conventionally assumed the energy plays important role in driving productivity improvements and economic growth.

7. Nick Hanleya, Peter G, McGregorb, C., J.kim swalesb, c., and Karen Turner, (2009), the objective is to take a responsibility that energy efficiency is a role aspect for sustainability. Study focus a computable general equilibrium (CGE) model of the scottish economy. Methods: Computation and CGE modeling. Key findings: The economic factors underpinning rebound effects are straight forward, energy efficiency improvement result in an effective cut in energy prices, which produces output, substitution, competitiveness and income effect that stimulate energy demands. However, the presence of strong rebound or even backfire does not mean that efficiency enhancing policies are irrelevant: rather just suggest that such policies operating alone are insufficient to generate environmental improvement. The implication is that a coordinated portfolio of energy policies is required.

8. Timothy M. Smith and Jennifer Schmitt, (2011), the objective is global supply chain energy efficiency in small and medium sized enterprises. study focus: global supply chain energy ef- efficiency in small and medium enterprise. Methods: survey. Key findings: to evaluate the role of private sector companies in delivering cost effective energy savings to end users across the supply chain. Such as energy service companies (ESCO) are devising innovative methods to deliver complete packages of technologies, operational support and financing to clients. The optimization function from cost reduction or profit maximization to a multi criteria approach. Implementing this transition will require an additional set of supplier external to the material supply chain implementing energy efficiency upgrades and legitimizing carbon reduction strategies: suppliers assembled and coordinated toward identifying, assessing, accrediting, financing, and implementing energy and carbon improvement.

9. Aminata et al. (2013); the objective logistics a,d supply chain in economics and management. study focus: energy efficiency in global supply chain. Method: optimization and management approaches. Key findings: energy efficiency in global supply chain should be reviewed from three dimension; transportation, production, warehouse to link supply chain integration and creating a new “link” global supply chain according to new type of resource of energy. for example, nuclear power plant (electricity production), transportation (a new technology for chemical transport vehicle) and production technical improvement in manufacturing industries).

Starting hyper competition discussion in energy efficiency within global supply chain. I delivered scientific papers which have been done in previous years. Also, research works in global supply chain should be connected to hyper competition, to know the real impact in business development, Grandval (2009). First of all, dimensions of energy efficiency in global supply chain could be seen from three dimensions; supply chain dimension (strategic level), especially in long term. Logistics dimension (tactical level) is in medium term. Operations management dimension (day to day term). It will address to the real world of business and moreover in scientific manner should have any proven research works and necessary simulations. For example; production system in oleo chemical and electricity level. However, there is no single judgment that all kind of type business activities can be seen as hyper competition. for instant, so called monopoly. In many ways the oleo company has been providing oleo's transport with specific carrier. In their oleo's transportation system, at the first step asked to transport agent to provide special transport services. In other cases, the oleo chemical company offering the bidding system to find out the cheapest price among them.

Hyper competition, Akhter (2003), Hulsmann et al. (2008), Sandberg and Abrahamsson (2011), global supply chains (GSCs) are confronted with the phenomenon of hyper competition. For this reason, there seems to be an increasing necessity for GSCs to build up competitive advantage in order to survive. Strategic is assumed to have positive effects on generating required competitive advantage by replicating and reconquering competences to manage GSCs, while keeping GSCs stable. This research elaborates on the link between operational, dynamic logistics capabilities and sustainable competitive advantage. The findings conclude that a sustainable competitive advantage is based on a combination of efficient and effective logistics operations and well-functioning. The role of companies' strategies, development behavior, and management style are keys role for business development.

In major theoretical discussions of market-driven management, the management of information flows has always been of crucial points. For example, Kohli and Jaworski (1990), defined a market orientation as a company's ability to generate, disseminate and use better information for its customers and competitors. According to the authors, the key processes are the implementation of market intelligence mechanisms and the continuous dissemination of the data acquired; their analysis and processing; and finally, adequate and anticipated satisfaction of the market's needs. Narver and Slater (1990) retained that as well as orientation to demand and to competition, a market-driven company has a degree of inter-functional coordination that can optimize the acquisition of information customers and rival companies, and spread it to the entire organization. Shay and Rothaermel (1999), the two synergistic relationship can be divided:

1. combining strategic management process,
2. strategic models analysis consists of a variety levels of analysis (industry, product, and firm),
3. the interconnection of strategic analysis models to enrich discussion strategic management model,
4. strategic management interrelationship between variables in competing strategic analysis models,

5. examining firm-specific competencies as well environment through other model possibilities.

Furthermore, for some extension, Shay and Rothaermel (1999), said; a multi perspective and dynamic competitive strategy model consist of:

- combination of competitive advantage,
- service quality, and increasing consumer demand,
- the competitive nature in industry which their products compete each other's,
- portfolio of product and service guarantee,
- comprehensive perspective,
- strategic degree of freedom, key success factors, and aggressive initiatives,
- relative superiority.

Collaboration issues, Hauswirth et al. (2004), Dentico (1999), explained the game by using process simulations to develop collaborative and leadership. Moreover, leadership in the industrial age has consisted of a hierarchical, command, and control structure. In industrial environment, a production-line led to stable processes by a clearly defined power structure. At the top owned and controlled the system and the information. In the hierarchical model, people at the bottom of the organization were rewarded for hard work and loyalty by the potential to move up in rank and seniority.

A network of connected and interdependent organizations mutually and cooperatively are working together to control, to manage, and to improve the flow of materials and information from suppliers to end users. "logistics and supply chain management can provide a multitude of ways to increase efficiency and productivity and to reduced unit costs."

Porters framework is useful only if the competitive forces represented by competitors, suppliers, buyers, and substitutes are relatively stable and independent. A company can find an appropriate strategy for each industry configuration and barriers for protecting this strategy. The traditional sources of competitive advantage, economies of scale, product differentiation, capital investments, switching costs, access to distribution channels, and government policy.

Jonker and Pennink (2010). There are three positions on the globalism spectrum. Geo centrism, as defined earlier, represents the highest degree of integration and the highest degree of globalization. Poly-centrism is associated with a worldwide presence, but operations in the multiple locations are largely independent of one another. Ethnocentrism is also associated with a worldwide presence, but in this profile the focus of the organization is the home country. Region centrist involves regional operations that serve multiple countries.

This is a compromise position that offers some central control, see Yi-chen and Bhuvan (2006) who identified five strategy levels for global level:

1. list of countries to conduct business and the market share level,
2. products and services across countries,
3. location and R and D,
4. marketing activities in different countries,
5. global competitive strategy.

Zhua 2007, Dul and Hak (2008) identified, the issue of globalization in and its applications to supply chain management (SCM) which have been presented difficulties on supply chain management by regarding:

1. geographic distances,
2. forecasting barriers,
3. exchange rates and national economic policies,
4. infrastructure inadequacies.

Scientific management, Taylor (1911) said that it can be considered as the root of the development of quantitative OM, although not only the root of quantitative OM. Also Bertrand and Fransoo (2002) said; the essence of scientific management was the analysis of instances of real life operational processes, based on systematic observations and measurements of these process instances, and the re- design of these processes in order to improve quality and productivity.

Furthermore, Taylor's said; "scientific management fundamentally consists of certain broad general principles, a certain philosophy, which can be applied in many ways, and a description of what any one man or men may believe to be the best mechanism for applying these general principles should in no way be confused with the principles themselves." See Rosenau (1997), for further related discussion and its development.

D'aveni (1995); on his frameworks for competitive strategy based on input-output economics, then by Porters model, emphasize the important role of industry structure in determining a firm's strategy. Other competing frameworks question the determinism implicit in this approach and focus instead on the firm. D'aveni proposed new 7S framework to deal with the fleeting nature of competitive advantage. At its essence, the framework assumes that every new strategy will be quick competitive retaliation. A strategy that is continually seeking to change the rules of the game, even when a firm is successful and ahead of its competitors.

2.1.1 Management Strategy on Competition

McClellan (2000); said “there are many faces to this idea, but the most significant is the change of business buy and sell roles, from relationships to cooperative and then collaborative arrangements, based on identified elements of mutual interest and trust. The concept of collaboration means that participants contribute something the whole. The relationship changes from traditional business rules to those based on mutual trust; these are enhanced by performance and contribution. The global sup- ply chains (GSCs) are simplified by the phenomenon of hyper competition. An increasing necessity for GSCs to build up competitive advantage as survival guide. Strategic flexibility is to have positive effects for competitive advantage by replicating and re-configuring competences to manage GSCs. Autonomous cooperation and control as a management approach may contribute to achieving flexibility in GSCs. for independence and an effort for energy efficiency procedure should follow hyper transparency procedure.

Competition in Global Supply Chain

Time constrains for delivering the product and efficiency during loading and unloading product is an important issue in oleo-chemical industries. For instance, one plant produces more than hundreds tons per day which will have impact on energy consumption. Moreover, it will influence on the level of stock, logistics and supply-chain operations, Sbihi and Eglese (2007). This is crucial for sustainability of multinational companies, because if there is mistake in calculation, stock planning will take costly for all business operations. Connecting to energy matter, there is a question; why energy efficiency is important for all aspect? By improving the energy efficiency, its efficient consumption will be leading to a better security, a quality improvement of the concerned industry. Also, by increasing the energy security (supply, accessibility, and etc.), competitiveness and profitability will increase and contribute to reducing the overall impact global warming.

The oleo chemicals industries must choose a good transport service to handle efficiency energy matter and extended existing problems, see Commission (2013). The main problem is to provide a best choice of transport service which is a challenge one in the range of simple business up to complex business activities. Almost oleo chemicals industries activities are supporting by transport service companies to help delivering product. They have to assure that the product will arrive safely to all clients around the world. With regards to the environmental impact, all companies which is included the transport service must be careful with concern the environmental.

The report of Ademe, (2012), showed that between 2000 and 2007 from road transport statistics, there was energy efficiency improvement. It could be happened by management transportation and eco-driving when the car uses on the road. Precisely, the efficiency of vehicles (measuring by the ratio ton/km) is efficient, year by year. The management transport shows by the increasing of the ratio ton-km/vehicle. According to the legislation, the oleo chemicals industries are one of the most dangerous output products. How to produce, to maintain the product, to process, and to deliver all products is connected well in global supply chain system. It is not only in the industrial supply chain system but follow the conduct of regional law and national law for some circumstances. The storing and transporting the oil in oleo chemicals industries are really heavy treatment by the company and their global supply chain network, to make a guarantee of best quality product.

The reduction of company's cost is derived from transport cost lower when delivering the product; energy consumption within in industries which is appears in product processing. See, Sbihi and W.Eglese, (2007), delivered the research finding; the relationship between vehicle routing, scheduling, and green logistics. The proposed CO2 calculation here is used CO2 efficiency by using an intensity calculation, in order to get energy efficiency, Sbihi and Eglese (2010).

Moreover, for airline industries within global supply chain at glance will cover the one of key success is how measure the sustainability of this industry. Focusing on global supply chain that would be interesting and important one, in this matter. We can describe that will be minimum awareness to be successful:

1. the level of responsiveness and efficiency factor for whole business schemes,
2. the measurement of efficiency supply chain and energy used or kerosene used is efficient enough due to the fluctuation of kerosene price (energy price),
3. supporting IT system,
4. demand side and supply side from company to provide service and regular maintenance,
5. supply chain management is to promote non value added activities that will give much influence for this business.

Wei et al. (2011), p. 60; "due to nature of their manufacturing operations, many chemical manufacturers have to coordinate their inbound and outbound transportation of materials (raw materials and finished products) in bulk. They employ a wide variety of transportation modes which include pipelines, tanker ships, tanker rail cars and tanker trucks to support the movement of their materials. The latter are usually hazardous in nature and their movement is usually governed by regulatory policies (that are legislated to address environmental, safety and security concerns) such as those imposed on the movement and tracking of hazardous materials.

Sbihi and Eglese (2007); the increasing of globalization spectrum is underlying on reducing cost of procurement system and decreasing the risk of purchasing activities. Moreover, it must be respectful for the global climate change. The amount of emitted CO2 that has been produced in the plant, warehousing or even supplier warehousing up to deliver the product to all consumers must be taken into account more than carefully.

The absences of regular transport though the special haulier services availability giving the performance of the companies in some extend. It's quite often the location of the oleo chemicals plant in remote areas, in order to keep the environment clean and reduce the emission factors. In normal condition, the direct impact of plant location in remote areas is lowering the production cost, increased the producer price, and there is a probability increasing the investment level. Discussing efficiency energy is continuous role in global business sustainable showed, Karlheinz (2000).

The specific research in transportation palm oil is very limited. Though, there are previous significant researches in the previous time. The proposed CO2 calculation here is used CO2 efficiency by using an intensity calculation, in order to get energy efficiency.

To get better understanding, there are terminologies to find an appropriate list of description: supply chain terminology is one of the contentious issues in the supply chain literature is the difficulty in defining the boundaries of the supply chain concept since there are so many different interpretations.

It has been suggested by Farahani, (2009), nevertheless, there are four major themes which have been identified in the interpretations of the supply chain which revolve around the following: distribution, production, strategic procurement and industrial organization economics.

- distribution is a combination of distribution, logistics and marketing perspectives combining upstream and downstream supplier management of materials and information flow, as best exemplified by various definitions, including those, see Martin (2011).

- production is the lean production and materials and work flow in organizations; on production approach and the lean construction, see Aminata (2012).

- strategic procurement management is an organizational strategy management of their suppliers for competitive advantage, see Sandberg and Abrahamsson (2011).

- industrial organization economics is a wide industry or market perspective on the research problem; as best exemplified in construction, an early attempt by London (2008) on supply chain procurement modeling.

- logistics is essentially a planning orientation and framework that seeks to create a single plan for the flow of product and information through a business and that supply chain management builds upon this framework and seeks to achieve linkage and coordination between processes of other entities in the pipeline, that is, suppliers and customers and the organization itself, see M. et al. (1999).

- other supply chain management definition is the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole, see Martin (2005).

To distinguish between supply chain management and the supply chain, the following definition was provided:

- supply chain definition is the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer. The modified definition explicitly declares the councils position that logistics management is only a part of supply chain management, see Rushton and Walker (2007).

- alternative supply chain management definition can be explained as the integration of key business processes from end user through original suppliers that provide products, services and information that add value for customers and other stakeholders, see Rizet et al. (2008).

Lesson learned from COOP 21, Paris: the agreement establishes an obligation for industrialized countries to fund climate finance for poor countries, while developing countries are invited to contribute on a voluntary basis. Tracking commitments, which allows developing countries a certain amount of flexibility, has also been set up in order to keep track of everyones efforts, see Depoues et al. (2015).

For detailed one the information from COOP 21 can be summarized as follows: Belong to the energy union means:

- to reduce the dependence on single suppliers and fully relying on their neighbours, with more transparency.

- energy flows are free flow of energy across borders and strictly enforcing the current rules in areas such as energy unbundling and the independence of regulators. Taking legal action if needed. Redesigning the electricity market, to be more interconnected, more renewable, and more responsive.

- energy efficiency referred to rethink and treating its own right so that equal to generation capacity.

- transition to a low-carbon society aimed to ensure that locally produced energy, including from renewable which can be absorbed easily and efficiently into the grid. Also, promoting EU technological leadership through companies expand exports and compete globally. Energy should be secure and sustainable with more competition and a good choice for every consumer.

Key figures The EU:

1. the largest energy importer in the world, importing 53 percent of its energy, at an annual cost of around 400 billion.

2. 12 EU member states do not meet the EU's minimum interconnection target that at least 10 percent of installed electricity production capacity be able to cross borders.

The EU has listed 137 electricity projects, including 35 on electricity interconnection: between them, these projects could bring that figure from 12 down to 2 member states. An appropriately interconnected European energy grid could save consumers up to 40 billion a year.

3. 6 EU member states are dependent on one single external supplier for all their gas imports.

4. 75 percent of our housing stock is energy inefficient; 94 percent of transport relies on oil products, of which 90 percent is imported.

5. over 1 trillion needs to be invested into the EU energy sector by 2020 alone.

6. wholesale electricity prices in Europe are 30 percent higher, and wholesale gas prices over 100 percent higher, than in the US.

7. European renewable energy businesses have combined annual turnover of 129 billion. The challenge is to retain Europe's leading role in global investment in renewable energy. EU greenhouse gas emissions fell 18 percent in the period 1990-2011. By 2030, the EU aims to cut.

greenhouse gas emissions by at least 40 percent, boost renewable energy by at least 27 percent, and improve energy efficiency by at least 27 percent.

By setting out the measures needed to achieve the target of 10 percent electricity interconnection by 2020. The minimum necessary for the electricity to flow and be traded between member states. It shows which member states currently meet the target which projects are necessary to close the gap by 2020 .

The Dynamics of Innovation

By examining the social structure of coo-petition and internal knowledge sharing within a multi-unit organization, this research suggests possible ways for coordinating organizational units to achieve synergy that is valuable to the organization as a whole. Knowledge is distributed asymmetrically across different units inside an organization. Without effective coordination, knowledge may not spread evenly across units within the same organization. Reducing hierarchical constraints and increasing inter unit social interaction are the directions that managers may pursue to encourage internal knowledge flows and enhance the capabilities of their organizations. For innovation dynamic should be take a look supply chain and logistics in national, international and governmental environment concepts and models, Farahani (2009).

General Studies in Energy Efficiency

Previously by Harod Hotelling, (1931), and then by Vine et al. (2003) shows that how the management of energy system will be manage by just return to the classical theory of monopoly, duopoly and free competition. The discussion will be extensively running out from the basic theory and its future planning and regulation through the characteristics of each countries or problem may arise from existing problem.

Mohan Munashinge, 1980, in most of developing countries in oil, gas, refining, coal mining and its distribution still has many problems. In most cases, energy prices influence exploration agreement, royalty charges, and profit sharing scheme. Special policies; import subsides, export bonus, government loan or grants, concession and kind of taxes.

However, the energy efficiency, global environmental problems, fast growing energy demand related studies are in discussing intensively year by year. The energy use is the total primary energy uses per unit of gross domestic product, aggregate indicator of energy use efficiency.

Shadow price theory has been developed particularly for cost benefit analysis. The investment decision in energy sector related to get an appropriate of energy price. Instead of market price, shadow price can be one of alternative to describe economic opportunity cost. Using shadow price, for example opportunity cost. If capital, shadow wage rate, marginal cost, interventions in the market process, taxes, import duties, and subsidies.

The new directions for the future should be taken from interrelations between commercial energy and traditional energy. Energy forecasting and policy decision should be taking in both ways in commercial energy and traditional energy.

In energy policies were explained that market philosophy still difficult in application, for instant; coal systems seems likely to remain in public sector for indefinite future. Further development is toward a competitive for market for energy. Energy policies in many countries face on difficulties to do so that, it must be underlying on market failure and government failure. More over we need to focus on natural monopoly and artificial monopoly.

In action for it, the regulation is needed to make for natural monopoly and competition policy to ensure that there is fair competition among them. In effect there is nationalization to find out the proper approach in issues of natural monopoly, by using maximization to pursue the profit maximization and social welfare. In better condition will be urgent to set up the competitive entry and efficiency in many ways.

The common competition is rise up from within industries, between industries and international competitor. In within industries, the structure and pricing is main factor, in between industries is in unregulated and in certain market only and better understanding industrial structure, regulatory system, information system. There is need high attention from government for energy market; the influences of monopoly and its combinations in an economy especially in economics of energy concern with pricing, producers, consumers, and etc. Energy use in developing country fails to show the fuel substitution process and structural shift in their economies.

GDP statistics, often large subsistence non-market sectors, are important gap between rich countries and poor nations. To convert a common currency, they using market exchange rate, purchasing power parity. But also, using national income to international dollar to avoid the volatility of exchange rate, and moreover to give the sign the difference price of level. Using, PPP converted to GDP values. Comparing the differences between energy/GDP ratios using exchange rate-based and PPP adjusted GDP.

Vose (1997) and previously by Amulya K.N. Reddy, 1991 said that there are four essential factors that will help to facilitate the dissemination of efficiency energy measuring the barriers of energy efficiency, employment policy, market mechanism, and technological innovation. If there are barriers may consist of several of small barriers or sub barriers. So that, combination or a package program will improve the energy efficiency. This is referring to Bergs theorem; the introduction new technologies will create uncertainty and vested interest for seeking “status quo”. A package is consisting of combination of fiscal incentives, price control, technical R and D, publicity, education, legislation encompassing public and private sectors, individuals and organizations.

In this article, I found that energy services company should have combination package because they are single window agencies for implementing all component of energy-efficiency programs for example; providing information, assessing requirement, financing, organization contractor, etc. Then, to be successful in large-scale program will capture all economic potential for conservation: dealing with high consumer discount rate problem, it will be profitable for companies to be involved. Avoiding penalizing non participant, and ensure that estimated saving are close to actual saving.

Three type of potential for energy consist of efficiency improvement:

1. the market potential much less than the economic potential because of market distortions and high discount rate.

2. the economic potential is less than technical potential because the level of technologies have not yet been made cost-effective and economically and happened in developing countries

3. if the level of price is well done will improve energy efficiency so why promoting innovation will be successful with occur price, see Waters and Donald (1999).

A theoretical frame work, delivered by White (2009) shows that natural resources and the macro economy. The large scale of exploitation of natural resources is a real than a monetary shock to an economy. Why, because it will give particular impact on real income and inter sectoral allocation of factor of production. All impact on natural resources can be determined as follow:

- an analyzing the consequences, the real model and monetary approach regarding to natural resources discoveries,

- using a simple framework to examine all increasing economic activity correlated with relative prices,

- analyzing inter temporal allocation of resources,

- the Implications of macro economy policy and exchange rate fluctuation.

From this article can be drawn some interesting point of view; de-industrialization as the impact of declining output and employment in manufacturing sector. Focusing on foreign competition, such thing of policy is not easy to be done to reach up the new policy or set up the new equilibrium. For the case of Indonesia to run new discoveries is exploitation oil and gas in the ocean and geothermal sources is more challenging. Comprehensive strategy should be done here because measuring in isolated ways at the policy level is insufficient.

Also considering with decentralized source and centralized supplies. Making a treatment both supply side and demand side. For instant, vehicle with petroleum product; consider with; technological improvement, reduction vehicle miles traveled, using alternative fuels product. India has been successful in these matters; shifting passenger from personal to public transportation, efficiency improvement in the use of petroleum product.

The more effectives energy efficiency, the less requirement of energy, the lower price of energy then, the less demand for energy efficiency. What does it means? it means that the price mechanism will not work alone, and market forces by themselves cannot achieve efficiency energy (one of the paradox energy efficiency).

It is need policy assisted. Why, marginal cost pricing and regulations making conservation investment profitable. Dentico (1999) globally has been explained, there are energy policies and its mechanism for running better energy restructuring (even by leadership practice);

- encouraging competition and establishing legal and regulatory framework,
- capital market discipline, privatization and de-privatization,
- monitoring state owned industries,
- international issues and environmental issues; for the cost of energy,
- an effort for wider ownership and risk on exploration,
- promoting energy efficiency.

Hobbs and Meier (2000) discussed the energy industries and has tried to analyze its significance the economics with energy production and consumption. For example; coal, oil, natural gas, electricity utility, nuclear power and alternative industries areas. Combination with analytical concept; Nathan Rosenberg, energy and economic growth, the relations between energy and economic growth. The most important and the point of view itself is the growing of utilization of energy and economic growth. In this article said that technological competence.

Some issues in transition of energy use, known as inter fuel substitution existing production isoquant. The technology level is a very competitive in energy sector and tends to be high technology. R and D process should hire here and sometimes high cost economy.

It is important to know well capacity of flexibility not only the level technology but also the research of it. The diversification of the energy research portfolio is needed.

Kursunoglu et al. (1996); stated in economics and politics of energy, p.152; "a must works to ensure the safety of nuclear power plants throughout the world. In the U.S., NRC regulation and institute of nuclear power operations (INPO) operations and training standards continue to set the standards for the rest of the world. This same level of standards has not been utilized by the rest of the world in the development of their nuclear programs. Regarding to the operating Soviet-designed reactors in the former Soviet Union and Eastern Europe.

In addition, the safety of the existing plants in the U.S. needs to be assured as these plants age. In 1986, the dramatic accident at the Chernobyl nuclear power plant in Ukraine focused international attention on Soviet-designed nuclear power plants, which currently operate in Central and Eastern Europe and the new independent states. The department works cooperatively with these countries, other countries with advanced nuclear power programs, and international organizations to improve the safety of operating Soviet-designed nuclear power plants. The United States' program originated with commitments made in 1992 involving the older Soviet-designed power plants.

Horace (2006) stated that the trend of foreign investment in any scheme ought to be full attention in institutional arrangement; the planning and practical framework has to be fully understood. Economically, politically, and technologically is not enough to manager energy system, Institutional system both domestic system and International system respectfully. The ownership and production are points of views in the perspective of vertical integration particularly in oil and gas industries.

The competitive strategic from any firm will influence the price and perhaps under the normal rate. In international level, vertical integration will cross national frontiers, difference level of production and could be stuck in political level (The Journal of Development Studies, volume 1 no 3, April 1965). The energy conservation especially for government's understanding is energy sector justified by market imperfections and externalities. Then, how the mechanism of competitive market would ensure that energy conservation measures are implemented optimally? (Source part II conservation, handbooks energy economics volume I). In latest basic phase of study, there are the fives keys or feature of statements in management and economics of energy industries see Aminata et al. (2014b), also see more an article written by Atkinson and Dorfman, 2005 as follows:

- the paradox of energy efficiency=sources-technology development,
- energy-infrastructure and environment and in less-developing countries,
- firm behavior-strategic and regulation = government, private, joint venture (ownership), externalities (+/-); CSR etc development management,
- pricing=pricing policy and competition,
- local/regional, national and international trade-financial market.

Fliszar. (2009) explained the atomic charges, bond properties, and molecular energies, p.5; “The difficulties encountered in the direct calculation of bond energies can be overcome with hard labor and some approximations in only a few cases, but the good news is that only a few reference bond energies need to be calculated for model systems. Those determined for the CC and CH bonds of ethane, for example, are sufficient for the description of saturated hydrocarbons; the addition of the reference bond energy describing the double bond in the range of applications. It is thus well worth the trouble to calculate a few reference bond energies which can be done with reasonable accuracy”. Wei et al. (2011) on their article explained CO2 emissions in China; “chemical supply chains possess several characteristics which are distinctively different from those of supply chains in other industries.

Clearly, understanding of these distinctive characteristics enables supply chain practitioners to appreciate the unique set of constraints and challenges that they have to contend. This is extremely crucial prior to the formulation and execution of any strategies that aim to manage chemical supply chain efficiently and effectively. Based on their areas of impact on supply chain decisions, we classify these distinguishing chemical supply chain characteristics into four main categories, namely material sourcing, manufacturing operation, demand and transportation management. For each of these categories, we now describe concisely the distinguishing characteristics of chemical supply chains.”,Guizot (2007).

In the book of fundamentals of risk analysis and risk management, on Monte Carlo risk analysis modeling, Ch.14”, Vose (1997) said: Monte Carlo risk analysis should not be thought of as the only technique for evaluating risk and uncertainty. There are a number of other numerical tools available for analyzing risks, and other, non-quantitative aspects will usually need to be considered also. The decision maker should use monte Carlo risk analysis as one of several complementary inputs to the decision process.

Connected to nuclear energy and the international community that they have contribution significantly to an improved nuclear safety awareness and culture in many of the countries. For example, in Russia and Ukraine, as part of our cooperative activities, advanced nuclear training centers have been established to assist those countries in developing and implementing modern staff training programs. At the Ignalina nuclear power plant in Lithuania, there was contribution for the first-ever probabilistic risk assessment of an RBMK type reactor.

The information gained from this risk assessment is now being used in the development of emergency operating instructions for the Ignalina plant, and will contribute to other safety improvements. The United States established a nuclear safety culture and infrastructure in the countries that operate “Soviet-designed” nuclear power plants is vital to our own national interests for several reasons:

-first, the stability of these emerging democracies would be threatened by the social, economic and environmental impacts of another serious nuclear accident, such as the one that occurred at Chernobyl.

-a serious accident could have many direct environmental and economic impacts on our European allies. Third, a severe nuclear accident could dramatically affect the viability of nuclear

power throughout the world. And finally, a serious nuclear accident could place at risk rapidly expanding U.S. commercial investments in these countries". Smida and Ben Romdhane (2004), related to culture dimension and practice for management strategy. Conkling (2011) on his article about energy pricing: economics and principles, p.232; "when questioned the emphasis that the company placed on light bulbs in contrast to increasing the energy- efficiency of equipment in industrial plants and commercial buildings, and selling more air-conditioning that provided a faster and cheaper result.

In transportation; vehicles hybrid and battery-powered vehicles themselves generate low or no emissions, but they need electricity generated by power plans. The company AT and T spent up to 565 million US dollar over 10 years in alternative-fuel vehicles. The federal government sets a standard of 25 mpg for new vehicles to apply in 2016. There are two types of hybrids (full and mild) and two types of power train configurations (series and parallel). Full hybrid: can go short distances on electric motor; after the charge is used or the vehicle reaches a certain speed, gas engine turns on, driving wheels and recharging. Mild hybrid: electric motor supplements gas engine, acting as a stop start system. Series hybrid: propulsion entirely from electric motor; outboard gas engine generates electricity directly for motor and batteries. Parallel hybrid: uses both gas and electricity for propulsion", see Herdman (1993).

Kovacevic et al. (2013) stated on his handbook of risk management in energy production and trading, p.73; "risk management for energy production and trading affects short-term and long-term decision making. A long-term decision is how to invest in energy generation and transmission facilities. A shorter-term decision is how to operate facilities and to trade energy. The decisions are linked: The expected profit of operation and trading influences the investment decision for a facility, and the uncertainty in operation and trading increases the uncertainty of the return of the investment.", see Garp (2009).

Carley and Lawrence (2014), stated energy based economic development: how clean energy can drive development and stimulate economic growth, p.25; "the goal of energy efficiency is to use less energy to achieve the same purpose. Energy efficiency efforts generally encourage energy consumers (i.e., households, businesses, and governments) to use less energy to receive the same level of energy output. Energy efficiency, which fits under demand-side management. Generally, involves lighting, heating, and cooling.

Efficiency efforts on energy-generating technologies, where the technology is improved to use less fuel inputs to generate energy outputs, or transmission technologies. However, less power is lost through the electrical transmission and distribution process. Finally, efficiency is possible in the transport sector through refinements to the internal combustion engine or the introduction of other innovations such as electric vehicles. Efficiency improvements offer several benefits, Carley and Lawrence (2014):

- assuming that the cost of improving efficiency of some good is less than the savings associated with reduced energy use, efficiency efforts save money, which can be applied toward other goods, services, or development opportunities,

- reduction in energy consumption directly through reduction of emissions and other environ- mental pollutants,

- improved electricity efficiency can reduce grid congestion and thereby save money on grid management and new energy construction. The improvement of technological efficiency other energy-related goals as well.

A variety of energy efficiency programs are being deployed across the world, in both the public and private sector and also national and local levels. These activities include the incorporation of energy efficient materials and products in building operations (e.g., light-emitting diode [LED] light bulbs, double insulation window panes, or recycled stone, metals, industrial materials, and other green building products) or methods such as smart-controls or targeted maintenance. These types of energy efficiency activities have the potential to reduce energy use and costs to businesses and residents for heating, cooling, and power. As a more concrete example, the rapidly growing city of Abu Dhabi is pushing the limit of water and electricity use as it continues to develop.

The government understands that it must focus on conservation as it considers new production capacity and, as a result, is working to evaluate the country's demand for water and electricity and eliminate inefficient uses of these resources to save money and extend power and water supplies", Midttun (1997). Franke et al. (2015) explained for improving energy decision, towards better scientific policy advice for a safe and secure energy system, p.37; "An analysis of measures in the European Union showed that the EU has made some progress in the direction of climate change protection and an energy transition. However, while ambitious targets have been set by its 20-20-20 by 2020 goals 20 percent improvement in energy efficiency, 20 percent renewable energy, and 20 percent reduction in greenhouse gas emissions by 2020, as compared to 1990 levels), further reforms will be needed. Emission trading is a key policy measure for meeting European reduction goals regarding greenhouse gas emissions. However, the major problem is in practice. The emission trading is not bringing the significant effect. The separate support schemes is the import of certified emission reductions (CER) in the context of the clean development mechanism (CDM).

Conclusion

Wittmann (2008) also by Wenpin Tsai, (2002), in social structure of "coopetition" within a multi unit organization: coordination, competition, and intra organizational knowledge sharing organization science. The results of this research allowed conclusions at two levels. First, it appears that both formal and informal coordination mechanisms influence intra firm knowledge sharing. At a second level, the results indicate that the organizational capability view of the firm should be extended to include a moderating role for intra organizational competition. The findings of this research are particularly noteworthy given that inter unit knowledge sharing can enhance overall organizational capabilities through collective learning and synergistic benefits generated from the processes of exchanging information, know-how, or local expertise among competing units.

2.1.2 Review on Transportation: CSR and Risk Management

General Review on Transportation Case in Global Supply Chain, from Own Perspectives

The role of transportation in global supply chain is the main key factor for success whether for initial phase at local level up to higher level. In transportation section, I explored on oleo chemicals transport and airline transport. Surely, for each sector both type of industry and tools of transport are different. The point of this review has tried to understand and to connect well studied for transport development.

Particularly for transport which supporting global supply chain business. The aim of research on transport in global supply chain is to know the consumption of energy or so called fuel consumption. If we traced on initial phase of oleo chemical industries in origin country ex. Malaysia and Indonesia are needed to evaluate business and economic impact. It's so important to measure the environmental impact.

For inter-continental transport, oleo chemical industries utilizing shipping transport. To reach Europe from Singapore the big vessel takes around six months via Rotterdam, Netherlands. Then, from Netherlands to France and Germany utilizing train in a specific mode of transport. The main plant in Europe are located in Germany and France. The field research focused on case studies which well connected to literature review, the real problem in business development, all application methodology and its tools, and also the alternative solution in managerial level and solving problem based on business challenges.

Nothing is impossible in business development. The information system and all strategies behind the professional to develop global supply chain will be evaluating by customers. The direct and indirect approach to measure efficiency of running business in current decade is complex one. The parameter of energy efficiency is one of the good indicator to evaluate certain business which connected to global market.

The market shares of Indonesia and Malaysia for oleo chemicals product hold around 85 percent in global market. By this those percentage, both countries are taking important role in global market. What happened in those real business is much expected by all actors in this sector? moreover the origin of the ownership for palm oil plantation is also interesting one to investigate for further research. However, this research work focus on energy consumption.

In case of the European, its need all approvals that for every step of product processing has been treating properly. No doubt, E-U has been trying to protect their industries to be survival in global business. Therefore, the issue of labeling for minor environmental impact become the urgent one. The most interesting one to explore this research work used the real time data or original data that can be viewed as what's going on in real business.

The linked with core problem, research question, methodology, and result findings: Hyper com- petition in the context of energy efficiency on transportation within global supply chain is the main parameters on current business development. The world slow-down of economic performance should be understood as a situation of global supply chain which happened in china. The indicator of supply chain measurement can be as an indicator performance for business. Even though just in an initial phase, through medium, and to distribute the final product to clients.

All literature reviews focusing on how to deal with core problem, research question, methodology, and certainly with comprehensive result findings on this research work. The hyper competition can be seemed as price matter only but how the supply and demand meets on their business transactions. Solmes (2009), however to fulfill the satisfaction of customer we have to engage closely with them. The business solution with optimized the satisfaction of customer can be reach by multi purposed of business goals. It will help to efficiency matters. For examples; accounting system, risk transfer, minimizing energy budget, the combination policy to reach upper technology, implementation, and ownership. By creating a good performance of risk management approach energy business strategy: Data, functions, and communication as recommendations for a new energy information age, Thollander et al. (2010).

Figure 1.2.1.: Energy Business Strategy Data Functions and Communication

Source: Thollander, p.176, Energy business strategy: Data, functions, and communication as Recommendations for a New Energy Information Age.

The question here is how to design the energy industry IT solution to be critical to achieve the successful implementation of energy systems efficiency?

For building the sustainability of energy infrastructure as common that not only includes the stake- holders but also included equipment manufacturers, fuels suppliers, engineers, equipment manufacturers, procurements specialist, and many others criteria of stakeholders.

Oleo Transport

Oleo Chemical Transportation

This paper focused on global oleo chemicals supply chain. Mostly, in France and Europe for general case cases, Wu et al. (2012). One must take into account some additional issues relating to national legislation to deliver the specific product in specific time windows, particularly for the hazardous products. The research work will give a new perspective for transportation industries by setting a new strategy on managing their own energy consumption with a basis on the concept of energy efficiency and oleo chemicals business scheme, Larsen et al. (2013).

Among independent firms cleared that the fact of production is increasingly fragmented. They are spatially dispersed and responsible for different steps of the production process. As Marchi et al. (2013); stated particular challenges to firms that seek to increase the energy efficiency of the supply

chain Varma and Clayton (2010). Especially, its located in countries that characterized by different environmental standards. Such kind of global supply chain and business challenges. It will get in connection to India, China, and European consumers who are the main consumers of palm oil.

According to global supply-chain management which is importance in global business trading. One things can be asking here; how to make sure that global supply chain is efficient for all aspects of business. Because, the efficiency of business cannot be seen as a part of each activity itself. Therefore, it should be taken as a whole of business framework.

The increasing of globalization spectrum is underlying on reducing cost of procurement system and decreasing the risk of purchasing activities. Moreover, it must be respectful for the global climate change, Hu and Hsu (2010). The amount of emitted CO2 that has been produced in the plant, ware- house or even supplier's warehouse up to consumer's place. It must be taken into account more than carefully Varma and Clayton (2010), Halldorsson and Svanberg (2013). Based on this perspective and global scenario, the efficiency is looked for backward and at the end of forward linkage itself, moreover should be more considered for all business link activities, Sbihi and Eglese (2007).

Time constrains for delivering the product and efficiency during loading and unloading product is a crucial part in oleo-chemical industries. For instance, one plant produce more than hundreds tons per day which will have impact on energy consumption. It will influence on the level of stock, logistics and supply-chain operations. This step is to promote sustainability of multinational companies. Due to, if there is a mistake in calculation, stock planning will take costly for all business operations.

Connecting to energy matter, there is a question; why energy efficiency is important for all aspect? By improving the energy efficiency which will lead a better security and environment. Also, by increasing the energy efficiency (supply, accessibility, etc...), competitiveness and profitability will increase and contribute to reduce the overall impact global warming. Oleo chemicals industry must choose a good transport service to handle energy efficiency matter, see Commission (2013). The main problem is to provide the best choice of transport service which is a challenge in the range of simple business up to complex business activities, see Smida (2006).

All business activities in transportation department is supporting by transport service companies. They have to assure which is the product will arrive safely to all clients, around the world. By regarding to the environmental impact, all companies which is included in transportation service must be careful with environmental problem. However, the report of Ademe. (2012), showed that between 2000 and 2007 from road transport statistics, there was energy efficiency improvement. It could be happened by management transportation and Eco-driving when the car uses on the road. Precisely, the efficiency of vehicle (measuring by the ratio ton/km) is efficient, year by year. According to the legislation, the oleo chemicals industries are one of the most dangerous output products. It is not only in the industrial supply chain system but following the conduct of regional law and national law for some circumstances. The storing and transporting the oil in oleo chemicals industries are really heavy treatment by the company and their global supply chain network, to make a guarantee of best quality product, see Liu et al., (2010), El Amraoui et al., (2008), El Amraoui et al., (2010), El Amraoui and Mesghouni, (2014).

Chapman, (2006) showed the reduction of company's cost which is derived from transport cost lower when delivering the product. As in real plant operations, energy consumption appears in product processing. The absences of regular transport through the special haulier services availability giving the performance of the companies in some extend. It's quite often the location of the oleo chemicals plant is in remote areas, Carapetis et al., (1984).

The Oleo-Chemicals Transnational Transportation

The research question of this research work pointed out:

how to calculated the CO2 efficiency (based on formula of CO2 Efficiency, shows in equation N.1, as of intensity calculation on transportation efficiency) in oleo chemicals transportation which is used truck with high viscosity products by crossing the European Union?

how to calculate the concentration ratio of product (E and S France product) by complex management strategy which faced on CO2 efficiency problem (basically, based on formula of CR4, shows in equation No.2, as of Tirole (1998)?

The distance has been calculated in detailed to know the most efficient energy consumption and minimum horse power of the truck. It can be allowed through the legislation of road and driving rules. Especially, for the big container which carries oleo-chemical products.

According to France's law and E-U law that are no more 40 tones allowed to pass the national or regional roads. They should be carrying out less than 40 tones. The company has to treat build a method and selects the truck in very efficient ways. In the real business, the consumer needs the maximum one (the maximum level of truck load capacity). In this activity, loading and unloading factor is the main problem. More time they need for loading and unloading more expensive or extra money will pay for transportation, electricity, workers, additional invoice from the transport agents.

Wei et al. (2011), p.69; "Current chemical supply chain management issues shows that the new trends among the chemical supply chains connected to socio political environment over the years. Essentially, these issues are not new and many of them have existed for a long time. However, the new business environment which has forced several issues among supply chain practitioners."

Financing the Energy Efficiency

The energy efficiency in transportation is how to make energy consumption or fuel less than usual operations business. The energy efficiency could be determined by the level of technology, the work method or organization system, time windows, and more specifically is information system. The high quality of information system is used extensively in MNC (multinational company) or global company which faced on time-line competitive level. By good handling in management strategy in the energy efficiency project can reached billions dollars during three to five years. Thumann and Wooddroof, (2005) stated that with some purposed of capital in co-working mechanism between private and public stakeholders will create useful linkages.

For example: 1. green ginnie mortgage backed securities, 2. building energy efficiency, a standardized asset class, 3. CO2to energy efficiency.

Financing Issues

The energy efficiency gives impact in any sector of business activities. Based on the concept of efficiency itself by Akhter (2003), explained that the future is now. Most of the people need efficient society. To make answer the question of efficiency philosophy is how we formulate the harmony in all type of business. The global efficiency here is the critical point in energy efficiency in global supply chain in three dimensions of logistics. The dimension could reach by transportation, production, and warehousing within global supply chain framework. The direct impact of plant location in remote areas is lowering the production cost and a probability to increase the investment level. Discussing efficiency energy is continuous role in global business sustainable, see Grandval and Soparnot (2005, 2008), also Martin (2005). The specific research in transportation palm oil is very limited. Although, there are previous significant researches in the previous time.

Airline Transport

Global Supply Chain Management

This section discussed aviation spare parts and all possibilities within its global supply chain management. There are complexities on aviation spare part supply chain; for example: procurement level (picking zone, initial provisioning, inventory management), inventory management (monitoring stock turnover, order and re-order spare part). Logistics problem-solving: Individual part shipments to reduce lead times and third party logistics companies for certain spare part.

The triangle approaches are well connected and supported by each other. To do so, the competitive strategy can be promoted by supply chain strategy. Both competitive strategy and supply chain strategy should be maintenance well, in order to get strong mechanism. The strong mechanism will create

Figure 1.2.2.: The Supply Chain Strategy: A Critical Success Factor for Sustainability

sustainability in the long run. Furthermore, in these cases many factories which are involved in aircraft industry. In the case of global supply chain aircraft industries is a good example. However, it is difficult to calculate energy efficiency in global supply chain for this case study. But, the efficiency of aircraft engine has been formulated by engineers.

The most important point is time to time their technological improvement. In the case of low cost aircraft carrier model captive at least 45 percent market share in Indonesia. A country spread across around 6,000 inhabited islands with a population of 250 million people. There is the willingness to get international strongest at global supply chain level.

It should be take a think for very prospectus regional development, especially for Indonesia's future development. To execute the plan at regional level must be closer to Singapore areas. To develop the idea has been constructed BATAM authority. It is successful one for regional development which is main part of global supply chain industries. The BATAM region so called "Free Trade Area". The Indonesia's authority and international stake holder should take this chance. It would be importance one, if this chance could be realized one. Due to, the biggest competitor is just in front of Indonesia and Malaysia territory. The price of service delivery and time cost and supplier distance is almost closer to Jakarta. Since the point of this business is going to get closer to Jakarta without ignoring the international part.

The airline company is a good example, so called LION AIR has been proposed for this initial stage of global supply chain. Private airline company (Lion Air) made a huge business contract with Airbus. The next challenge is how to provide global supply chain by managing international barriers. Such as: geographic challenges, time constraints, and or distance constraints. The appropriate location proposed according to supply chain issues will be located in Batam island authority. If the new factory efficient and keep the level of competition with others, it will be better for Indonesia. Both for private sector and government sector, see Hauswirth et al., (2004), also see Swanson, (2015).

Figure 1.2.3.: Overview the Energy Efficiency of Technology by Mode of Transport

Source: Bill Roberson, 2012.

According to fuel used and CO2 result from each trip is explained well in graphic. Energy efficiency related to time, airplane operation and cost fuel (by Bill Roberson, 2012). The value of cost index related to relative effect cost on overall trip as compared to time related direct operating costs. However, to find out the data from aircraft industry is not easy at all. It might be possible one when we have research project with them.

2.1.3 Review on Production: CSR and Risk Management

General Review on Production Case in Global Supply Chain, From Own Perspective

The general review in production within global supply chain explored how to pointed out how the production system contribute in energy efficiency. All product has been produced have a significant impact to handle energy efficiency during production process. Its cleared that energy efficiency will be hard to measure through global supply chain. Our studies well explained for this issues, however the energy efficiency measurement can be traced from global level down to local level. Therefore, all products could be traced well whether the product has been product by international standard or not. This is indicated on foot wear production section for coming challenges the evaluator or stake holders should take an examination how the product originally has been manufactured. One of solution is by putting labeling system on each product. The product shows crossed from several examination and well treatment, particularly produced by energy efficiency manufacturing system. This part will much easier to understand by look up at case study on foot wear production. different method. Production in global supply chain, this section is not possible to see whether exit or not exist in global supply chain scheme, Bullard et al. (1978).

Production Efficiency in Manufacturing Industries

Openness and Production's Strategy

Generally, the openness level and production strategy within trade liberalization are keys role for some studies use plant and industry level data to know well productivity level. Moreover, openness in trade refers to the degree to which countries or economies permit to have trade with other countries or economies. This issue includes; foreign direct investment, borrowing, lending and repatriation of certain fund from abroad, Bueno Merino and Grandval, (2012). Normally, open economies have greater market for opportunities. However, at the same time they have great competitor at same sector in other countries, too. The production strategy is where products ordered by customers and sending by enterprises or transport agent to client, directly. The productive firms are which for those able to have competence and survive from competition, also contribute to openness level. This information provides for firms to compete abroad, see Grandval (2009) and Grandval (2011).

As well, outsourcing and off-shoring are changing the nature of the firm, presenting internalization or externalization decisions for international managers, and producing unprecedented international relocation of economic activities, McClellan (2000). Its noted that the historical trend in the atomization of the supply chain of the MNC in the world involving the removal of the business activities of the center of MNCs strategy decision. The division of the company's value chain into smaller activities (micro-analysis) and as an increasing in outsourcing locations which expanding the interaction with external companies.

Thus, the recent willingness to divide all activities of the value chain: - Increasing the proportion of the value added outside the organization; - Increasing the percentage of transactions carried out abroad, McClellan, (2000) - Impact overall costs in total.

The disintegration of the supply chain and the dispersion of the global business of the MNC activities involve more complexity to manage that can generate the progress of coordination costs. In this case, the costs of coordination and transactions may outweigh the benefits of the gradual disintegration and the disintegration of the supply chain Kotzab et al. (2005). The task of the overall strategy is to determine the optimal level of disaggregation of the supply chain, see Kotzab et al., (2005).

The costs of complexity and coordination have still been contained for two main reasons: Benefit from an experienced effect in the management and operation of a global network of activities in the supply chain. The emergence of more sophisticated techniques and management tools to retain the benefits of the expansion of a global network of suppliers for keeping costs at a low level through ICT and ERP software, Mack, (2014).

According to D'aveni, (1995), the development of outsourcing and off-shoring observed in recent years should lead to a greater degree of openness and a greater exchange of the Indonesian economy with the rest of the world. Authors realized that this historical study of the most significant period of these changes in corporate strategy for the period of 1975-1995. According to Aminata (2012), principally, all kind of business activities are based on where they can get the profit higher than other place".

Manufacture Productivity

Miller and Blair, (2009) advised: to know the capacity of physical production in manufacture; (1) measuring variations in the amount of labor and capital, and (2) defining what relationships between labor, capital, and product. Making product differentiation to make product more fascinating and satisfy consumer desired. The current condition is in order to strengthen competitiveness.

A must to employ current best manufacturing technique, including plant layout, inventory control, and improving machine reliability. The production inefficiency is not because of not lack of manufacturing infrastructure but technological capabilities, also. Government should make the non-discriminatory policy and select profitable industries.

Government and private firm have to work simultaneously each other in order to achieve higher productivity for all sectors. Government and private sector should build the network and center of education to create high level of productivity.

Industrial Development Efforts

Market intervention by policy makers to make change and to improve supply chain performance can be considered. All comparisons can be made across related supply chains with similar features. Then, how we consider overall properties of a supply chain and whether or not we can find structural and behavioral appearances associated with different types of supply chains: protectionist trade regimes are also more likely to favor large firms, both because these firm's products compete more directly with imports, and because sectors with large, capital-intensive firms lobby the government more effectively Taudes, (2005).

According to Perlmutter, (1969), firm performance is based on economic efficiency, which is com- posed of two components; (1) Technical efficiency, defined as capacity to produce maximum possible output from a given set of inputs and technology. (2) Allocative efficiency, defined as the ability to equate marginal value products with marginal costs. Outsourcing is used to describe all the subcontracting relationships between firms, and the hiring of workers in non-traditional jobs.

For some extensions, Perlmutter, (1969) wrote that; following current issue is knowledge for geography matters; economic interactions, it because of transport costs, time costs, fixed costs of entering new markets, and informational barriers also, then how to manage remote supply chains or production operations. As a note the agglomeration approach that we learned for profitable oriented, however the benefits coming from demand and supply chain linkages, from pools of labour market skills, or from technical spill overs.

In addition, the matter of supply chain is the key role to sustain manufacture development. London, (2008) stated: supply chain explores the market fragmentation concept through the degree of firm integration along the supply chain in productive functions, and structural fragmentation in numerous firms which in a highly level of competitive environment. The results, we might like to improve profitability, efficiency, productivity or innovation? The policies of governments towards supply chain management have been of a direct and indirect type and have focused upon improvement of performance for small to medium-sized enterprises (SMEs).

Supply chain management was evident at the manufacturing end of the chain, although in varying degrees. Supplier development and co-ordination is evident, although supply chain management is less. All possibilities for global supply chain which those industries are profitable particularly as follows: food and beverages product, garment and textiles product, paper and paper products, other chemical products, non-metallic mineral product, basic metallic products and other, machinery except electrical, electrical machinery apparatus, transport equipment product, and other industrial products, see Herring, (1996).

Review on Foot Wear Production

Mostashari, (2011) explained, the exploration of current condition in global network and framework. All companies have to promote the better machine by modern equipment, and modern components assembling. Factory layout and internal management problems are key factors to reach energy efficiency, by direct or indirect impact.

Figure 1.2.4.: The Continuous Development in the Energy Efficiency System

- Continuous Improvement
- Management Review
- Surveillance Action
- Implementation and Execution
- Planning
- Energy Policy

Source: Diagram adapted from ISO 14001

For continuing energy policy step by step, one should use a stable execution plan. Energy policy can be implemented by planning and execution. Following this phenomenon, it is urgent to use surveillance (control) and remedial action to get a good perspective in management review. Well organized and well information systems are really needed to back up resistant problem in company and related stake holder. The customer satisfaction is number one to get as many clients and captive market share increasing, and yearly.

Review on Long Range Energy Application Planning Model, LEAP

To estimate the demand of energy in the future, this research applies LEAP (Long Range Energy Alternative Planning System) software. LEAP is useful to:

- identify or estimate the pattern of energy supply and demand in the future,
- identify the potent of problems,
- detect the impact of energy policy,
- it's useful for analyzing various project and technology program,
- it's useful analyzing other energy program initiative.

By using LEAP, the user will be able to calculate easily, with the aim to create comprehensive simulation, including creation of data structure. Different from macro economy model, LEAP does not estimate the effect of energy policy toward labor sector or its impact toward GDP, though the model can be combined with LEAP. In other words, LEAP does not automatically make a scenario of market equilibrium. It can be applied to identify the scenario of micro cost. It is necessary to consider the advantage of the use of LEAP, that is the rate of its usage flexibility, where the decision maker is allowed to quickly switch their decision from the idea of policy into policy analysis without changing the model fundamentally or changing the modeling principles that have been established.

2.1.4 Review on Warehouse: CSR and Risk Management

General Review on Warehouse Case in Global Supply Chain, From Own Perspectives

In this part, the research work focused on warehouse in global supply chain. The warehouse here it means indicated that the warehouse is well being connected to global supply chain management. The purpose of building research work on warehouse in global supply chain is to get better understanding the impact of local business or project will deliver specific impact to international business. Energy efficiency policy as of Anderson, (1993); warehouse management should take care of inter-national, national and international regulation.

Review on Nuclear Warehouse Power Plants

Theoretical Review

Most of theoretical review in this section used input-output analysis and RAS method for projection method, see Leontief, (1986) and Albino et al., (2002).

Energy Global Supply Chain

Four pillars of support for a fast globalizing nuclear industry focused on the nuclear industry's regulatory and policy environment Engage efficiently in nuclear commerce, a global industry now representing nearly 15,000 reactor-years. International supply chains for reactor new-build and ongoing nuclear operations Comprehensive presentation of the facts on nuclear energy worldwide (public education). A threefold categorization of the competencies necessary to run a nuclear power plant can be drawn, which includes:

- nuclear people with a specialized formal education in nuclear subjects (e.g. nuclear engineering, radio-chemistry, radiological protection, etc.);

- nuclearized people with formal education and training in a relevant (non-nuclear) area (e.g. mechanical, electrical, civil engineering, systems) but who need to acquire knowledge of the nuclear environment in which they have to apply their competencies;

- nuclear-aware people requiring nuclear awareness to work in the industry (e.g. electricians, mechanics, and other crafts and support personnel).

Figure 1.2.5.: Typical of Power and Equipment

Sector Typical Equipment and Service Requirements Power Generation Reform and New Build and Power Network Boilers Soot blowers, burners, waste handling, large pumps, Compressors, Pipework, pressure vessel fabrication, Pollution, Control and Monitoring.

Transmission Power Networks Switch Gear, Substations, Cables, Connectors, Pylon, Fabrication and Installation, Heavy Duty Fuse Boxes. Smart Sensors, Electronic Control Systems, ICT Equipment, Services, Power Inverts, Grind Scale, Small Scale Energy Storage Systems. Save Project (2012) and Wood (2013)

Economic Base Theory

The economic base theory stated that the main factor for economic growth correlated to supply and demand for goods and services from out of region or border. The industrial growth use local resource for example labor, raw materials and job creation.

Location Theory

The location theory explained how to expand the industrial location. The corporate tend to minimize all cost by choose the best location and get closer to the market. In the reality, industrial development is trying to get lower cost between production factor (wages, energy cost, supply chain product end service, and communication) availability in the market.

The corporate with difference of type need difference combination for production factors, especially to get lowest price. The one of limitation is technology level. By modern communication contribute for production activity and good distribution. Principally, all kind of business activities are based on where they can get the profit higher than other place. Seemingly, the household looking for the suitable place based on the level of opportunity to get a job.

Review on Electricity Warehouse Power Plants

Enrico (2013) in his book “the Monte Carlo simulation method for system reliability and risk analysis”. It’s more cleared on introduction to simulation analysis which is a simulation is the imitation of the operation of a real world process or system. The behavior of a system is studied by generating an artificial history of the system through the use of random numbers, Enrico (2013). These numbers are used in the context of a simulation model, which is the mathematical, logical and symbolic representation of the relationships between the objects of interest of the system. For further studies ex; “simulation and Monte Carlo with applications in finance and MCMC explained” by Dagpunar, (2007).

The effects of changes in the environment on the system, or the effects of changes in the system on system performance can be predicted using the simulation model. Gnumeric includes a facility for performing Monte Carlo Simulation. Monte Carlo simulation involves the sampling of random numbers to solve a problem where the passage of time plays no substantive role. This is in contrast to discrete event simulation or continuous simulation where the results from earlier in the simulation can effect successive samples within a simulation experiment. The Monte Carlo simulation will be enabled through the use of the random number functions as described in Gilks et al., (1996), and Fishman (1996), and the results presented along with statistics for use in analysis, Kalos and Whitlock, (1996), and Kehr and Prasad, (2000). More detailed can be traced on articles and books written by Taudes, (2005), Carriero, (2009), Kennedy, (2009), Suzuki, (2010), Carrera, (2010), Zhua, (2007), Save Project, (2012), Manzini, (2011), Lan and Unhelkar, (2006).

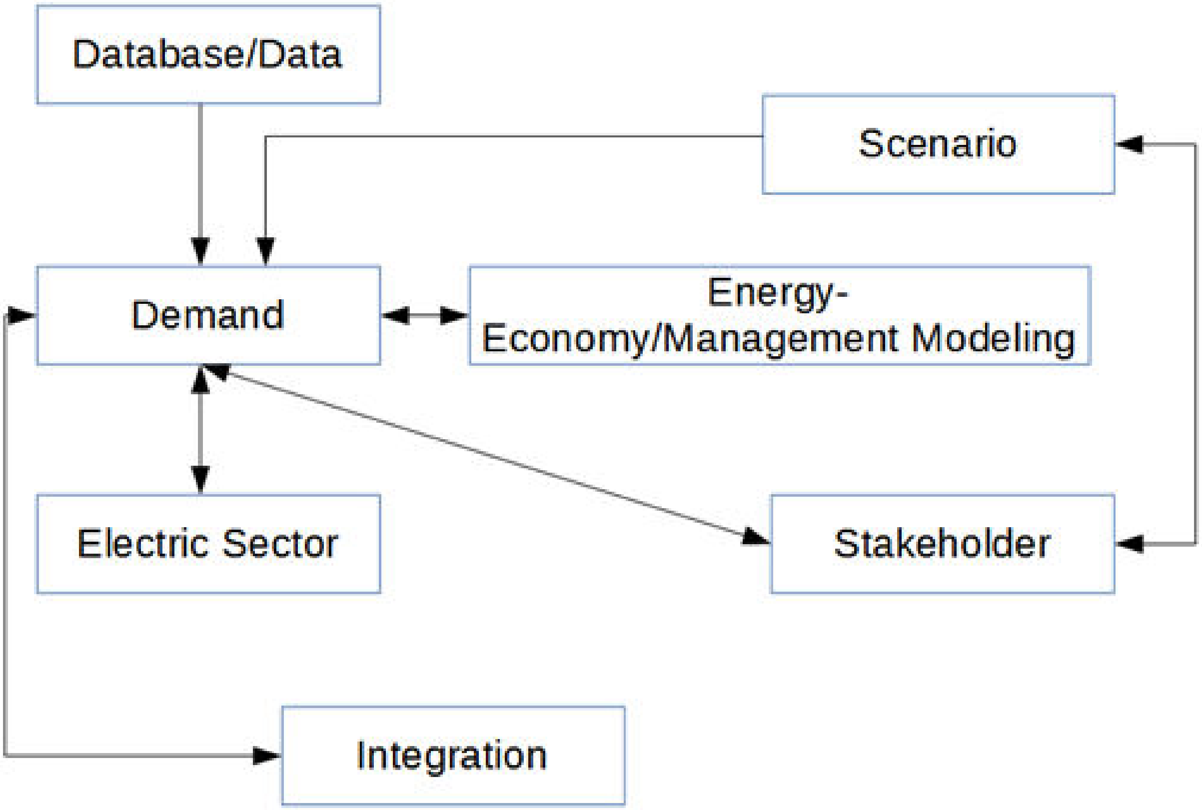
Conclusion

The point is the competition become a new form of collaboration era to make the world of efficiency in many business aspects following those phase on competition, we should get in touch on innovation. Because, if there is no comprehensive innovation the demand of clients and necessity of human can not be well provided.

Everything should be managing carefully at any part of supply chain with intention to global market, Aminata (2012). In overall company strategies in the long term policies energy strategies should be the main part of company mission strategy. It could be an increasing the use of renewable energies. there are the following energy strategies: F. J. M. van Houten, Twente University of Technology, Netherlands by H. J. J. Kals, “Strategy in Generative Planning of Turning Processes”; Annals of the ClRP Vol. 35/1/1986; passive strategy: “there is no systematic planning”.

The issue of energy and environmental management is not perceived as an independent field of action. The organization only deals with the most essential subjects. The European Union has clear instructions for its members. The “20-20-20-targets” include, that the member states have to reduce greenhouse gas emissions by 20% below 1990 levels, increase energy efficiency by 20% and achieve a 20% share of renewable energy in total energy consumption by 2020.

Figure 2.2: Interaction Project Partners and the Stakeholders



Ethical and normative basis of the energy strategies. The basis of every energy strategy is the corporate culture and the related ethical standards applying in the company. Ethics, in the sense of business ethics, examines ethical principles and moral or ethical issues that arise in a business environment. Ethical standards can appear in company guidelines, energy and environmental policies or other documents.

Existing Current Problems

The current existing problem is managing the energy trilemma. It is to answer the current existing challenges and problems rose around the world. The challenge is so called energy trilemma that consist of energy equity, energy security, and energy sustainability.

Supply Chain Set Up			Transport Assets		
1	2	3	4	5	6
Increase Value Density	Reduce Average Transportation Distance.	Change The Mix Of Transportation Modes	Address Asset Technology (Eg, Rail, Tanker, Trucking)	Assess Usage Of Individual Assets	Assess Usage Of Collective Assets

Figure 2.3: Supply Chain Construction

Theory and Its Extension

Thumann and Wooddroof (2005); "Handbook of Financing Energy Projects", p.120; "Energy effi- ciency project developers claim the benefits associated with reduced emissions from the implementation of energy efficiency projects:

1. importance of standardization to gather data and report savings,
2. development of a baseline model to distinguish between average and marginal energy consumption,
3. length of baseline period; how to deal with all the uncertainties,
4. discussion on additional criteria vis-à-vis EE projects, the application of appropriate emission factors to convert units of energy saved to units of emissions saved", William (2010).

Thumann, (2002) and Thumann and Dunning, (2008), deliver about plant engineers and managers guide to energy conservation, p.16-22; "energy management is now considered part of every plant engineers job. The plant engineer needs to keep abreast of changing energy factors which must be incorporated into the overall energy management program. The accomplishments of energy management have indeed been outstanding. Safety, maintenance and now energy management are some of the areas in which a plant engineer is expected to be "knowledgeable". A multi-divisional corporation usually organizes energy activities on a corporate and plant basis.

On the plant basis, energy activities are in many instances added on to the duties of the plant manager. The other simplest definition for an energy assessment; "An energy assessment serves the purpose of identifying where a building or plant facility uses energy and identifies energy conservation opportunities", Meyers and Laskowski (2001). Also, Eliasson and Lee (2003), Integrated Assessment of Sustainable Energy Sys- tems in China, The China Energy Technology Programs: A Framework for Decision Support in the Electric Sector shandong Province.

Overview Energy Management in Global Supply Chain

World Energy Council, (WEC); reporting highlight the massive challenge to achieve harmony at the level world energy system management. As world energy congress, Daegu, Korea, October 14th, 2013. The world is set to face several significant challenge for balancing global energy needs. At final stage, the energy trilemma that over four decades has been focusing for construct energy future 2050. Total primary energy supply chain is to set 2050 by between 61 percent and 27 percent, with fossils fuels remain the dominant energy source by supplying 77 percent to 59 percent from the total of energy mix. The WECs scenario exploring what happening in the world for current existing problem. In the future, the real impact of today's choices on tomorrows energy landscape, (infrastructure, open source scenarios project will distribute the well assessment output).

Conclusion

Strategy of short-term profit maximization: The management is concentrating exclusively on measures that have a relatively short payback period and a high return. Measures with low profitability are not considered. Strategy of long-term profit maximization: This strategy included a high knowledge of the energy price and technology development. Moreover, these measures can help to improve the image and increase the motivation of the employees. Realization of all financially attractive energy measures: This strategy has the goal to implement all measures that have a positive return on investment. Maximum strategy; for the climate protection one is willing to change even the object of the company. In reality, all hybrid forms applied by different strategies.

Energy strategies of companies show that many companies are trying to promote its image and time protect the climate through a proactive and public energy strategy. Furthermore, they have six principles: e.g. restoring and preserving the environment, reducing waste and pollutants, educating the public environmental conservation, collaboration for the development of environmental laws and regulations.

When looking at the energy strategies of companies it is important to have the topic green washing in mind. This is a form of propaganda in which green strategies are used to promote the opinion that an organization's aims are environmentally friendly.

2.1.5 Sample on Energy Resource Management

It shows of all research works' position and all complex interaction. All categories can be summaries as in primary source, energy type, energy market, and demand for energy. For transportation section, the energy primary source used solar, for electricity warehouse used uranium for energy production (paper work published). Theme is based on the energy efficiency of the global supply chain in production, transportation and storage of products. The objective is optimizing energy throughout the supply chain for a minus impact on the environment.

1. supply chain set up via chain efficiency can be examined under there scenarios, based on low costs,

2. reduce average transportation distance,

3. change the mix of transportation modes,

4. carrier should influence the priorities of manufacturers by clearly communicating their needs and helping get energy efficient assets up to scale by pooling orders,

5. individual assets; applying load factor, maintenance regime, and route planning,

6. assess usage of collective assets; avoiding congestion, upgrading infrastructure, or engaging in smart traffic management".

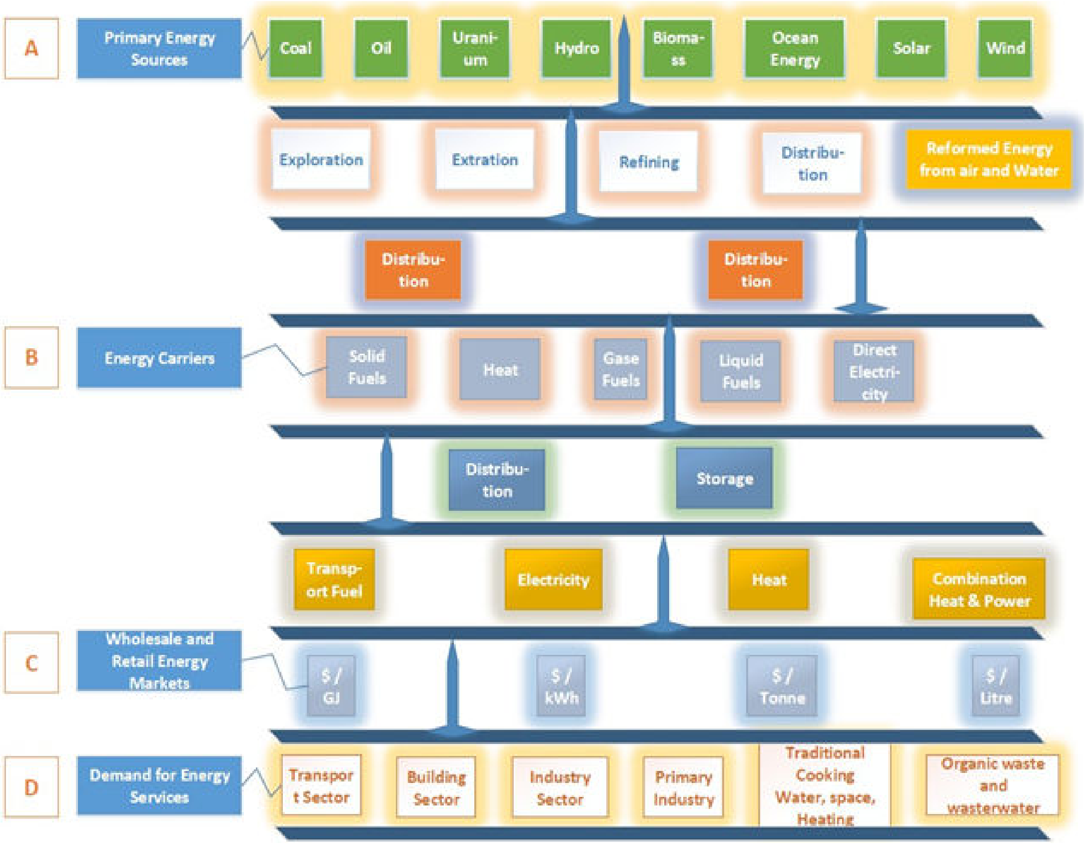


Figure 2.4: Primary Energy Sources and Energy Carriers

The most relevant ethical ideas for the energy management are utilitarianism. This form of ethics has good or right, whose consequences are optimal for the welfare of all those affected by the action (principle of maximum happiness). The energy management concerned for the existing of external costs. They do not directly affect those who profit from the economic activity but non-participants like future generations. This error in the market mechanism can be solved by the internalization of external costs. The fundamental ethical idea says that "everyone who is affected by the decision, must be involved in decision making. This is done in a fair dialogue; the result is completely uncertain. The de-ontological ethics assigns individuals and organizations certain obligations. A general example is the golden rule: "One should treat others as one would like others to treat oneself". Listing related references: Darnell, (1994); Wickeren, (1973); Twiss and Weinshall, (1980); Booth, (1980); Ethridge, (2004); Gujarati, (1999); Malinvaud, (1980); Hal, (1996, 1997); Codaret, (2004); Verbeek, (2000); Magidson, (1981); Steven, (2004); Bergh, (2002).

Chapter 3

Problem of CSR and Risk Management

3.1 Introduction

Logistics activities include the transport, storage, and handling of products as they move from raw material, to goods in process, and finally to finished goods ready to be moved to the final point of sale for consumption. Despite its high contribution to the economic development, it is only in the last fifty years that logistics started to be regarded as a major determinant of business performance and a main field of academic study. During this period, logistics activities were structured to maximize the profitability of all firms in the supply chain. However, this calculation of profitability included only economic costs while ignoring social and environmental costs. For the last fifteen years, public and governmental concern about social and environmental impacts of logistics firms has increased, as has the pressure to reduce these impacts (McKinnon, 2010). The following section presents the background of the topic in interest. It outlines the social and environmental impacts resulting from logistics operations, a definition of Corporate Social Responsibility (CSR), the development of CSR, the growth of CSR reporting, and the development of the Triple Bottom Line Theory. These will be followed by a discussion of the problem at hand, which will lead to the purpose of this paper and the main research questions. The introduction chapter will be wrapped up with the outline of the thesis. Logistics Impacts, concerning environmental impacts of logistics firms, distribution activities of goods cause harm to the air quality, generate noise, cause accidents, and contribute to global warming (McKinnon, 2010). Freight transport accounts globally for almost 8 percent of CO2 emissions while warehousing and material handling contribute a 2-3 percent to this total. The energy consumed by freight transport is increasing at a faster rate than the energy used for cars and busses (Ribeiro & Kobayashi, 2007). Although governments are working on cutting down CO2 emissions from their national economies, shipping alone could account for up to 50 percent of the total CO2 emissions by 2050 (Committee on Climate Change, 2008). On the other hand, the social impacts of logistics firms according to Carter and Jennings (2002) are associated with three main activities which are purchasing, transportation, and warehousing. The social impacts of purchasing management include purchasing from minority suppliers; and collaborating with suppliers who use sweatshop labor, child labor, offer low "living wage", and operate in unsafe locations. The social impacts of transportation activities can include the non-use of minority carriers, hiring and promoting unequally, long operating schedules for drivers, and payment of inadequate wage. The social impacts of warehousing management consist of hiring and promoting unequally, dealing weakly with family issues such as helping employees find child care, offering poor training programs to employees that teach them how to use equipments safely, and not providing necessary equipment to workers such as gloves, hardhats, and hard-toed shoes.

3.1.1 CSR Organisation

Mission of the network, CSR Europe's Network of National Partner Organisations (NPOs) works with over 10,000 companies and key stakeholders in 30 countries across Europe to raise awareness, build capacity, promote and support the development and implementation of CSR practices. Through collaborative action and membership services, we strive to lead a local, national and European movement towards responsible and sustainable business. CSR Europe and its national partners work together on collaborative projects under the European Pact for Youth, collaborative project on Business and Human Rights and the European CSR Award Scheme. Members of the network actively collaborate on development of CSR publications, share experience as well as inspiration during joint meetings and events.

3.2 Problem of CSR

Today, many of the multinational corporations are trying to decrease stakeholders' pressures by ensuring that their suppliers comply with social and environmental standards. This is achieved by using various codes of conducts (Andersen \{}& Skjoett-Larsen, 2009). A code of conduct is a document stating a number of social and environmental standards and principles that a firm's supplier are expected to fulfill (Mamic, 2005).

3.2.1 CSR and Energy Management on Decision Sciences

The finding strategic of CSR's matrix on business-economic, and social perspective simulation:

1). formal and informal coordination mechanisms for knowledge sharing, 2).the organizational capability views of the firm should be extended to include a moderating role for intra organizational competition, 3).inter unit knowledge sharing can enhance overall organizational through collective learning and synergistic benefits from the processes of exchanging information, know-how, 4).reducing hierarchical constraints and increasing inter unit social interaction are the directions that managers may pursue to encourage internal knowledge flows and enhance the capabilities of their organizations.

The point is how to develop inter relationship inter-stake holders, closely. The analytic hierarchy process (AHP) is a mathematical theory for measurement and decision making that was developed by Saaty (2000),1970's when he was teaching at the Wharton Business School of the University of Pennsylvania.

Applications of the analytic hierarchy process can be classified into two major categories:

1. the evaluation or prioritization of alternative courses,

2. the evaluation of alternative future outcomes (forecasting).

A decision support tool developed by Saaty (2000) in a theory and methodology for modeling problems in the economic, social and management sciences. A problem solving framework used for determining the best of several alternatives of each of the criteria. expert choice is one commercial software tool based on the AHP. The process of AHP, see the appendix A.3.

3.3 Problem of Risk Management

EU multi stakeholder forum on corporate social responsibility, (2015), stated that the commission has defined CSR as the responsibility of enterprises for their impact on society. CSR should be company led. Public authorities can play a supporting role through a smart mix of voluntary policy measurement. Companies can become socially responsible by:

- following the law,
- social,
- integrating social,
- environmental,
- ethical,
- consumer,
- human rights concern into their business strategy and operations.

In the interest of enterprises shows that CSR is important:

1. CSR provides important benefits to companies in risk management, cost savings, access to capital, customer relationships, HR management, and their ability to innovate.

2. CSR makes companies more sustainable and innovative, which contributes to a more sustain- able economy.

3. in the interests of society - CSR offers a set of values on which we can build a more cohesive society and base the transition to a sustainable economic system.

The EU's policy is built on an agenda for action to support this approach. It includes:

1. enhancing the visibility of CSR and disseminating good practices.

2. improving and tracking levels of trust in business improving self and co-regulation processes.

3. enhancing market rewards for CSR.

4. improving company disclosure of social and environmental information, then integrating CSR into education, training, and research.

5. emphasizing the importance of national and sub-national CSR policies.

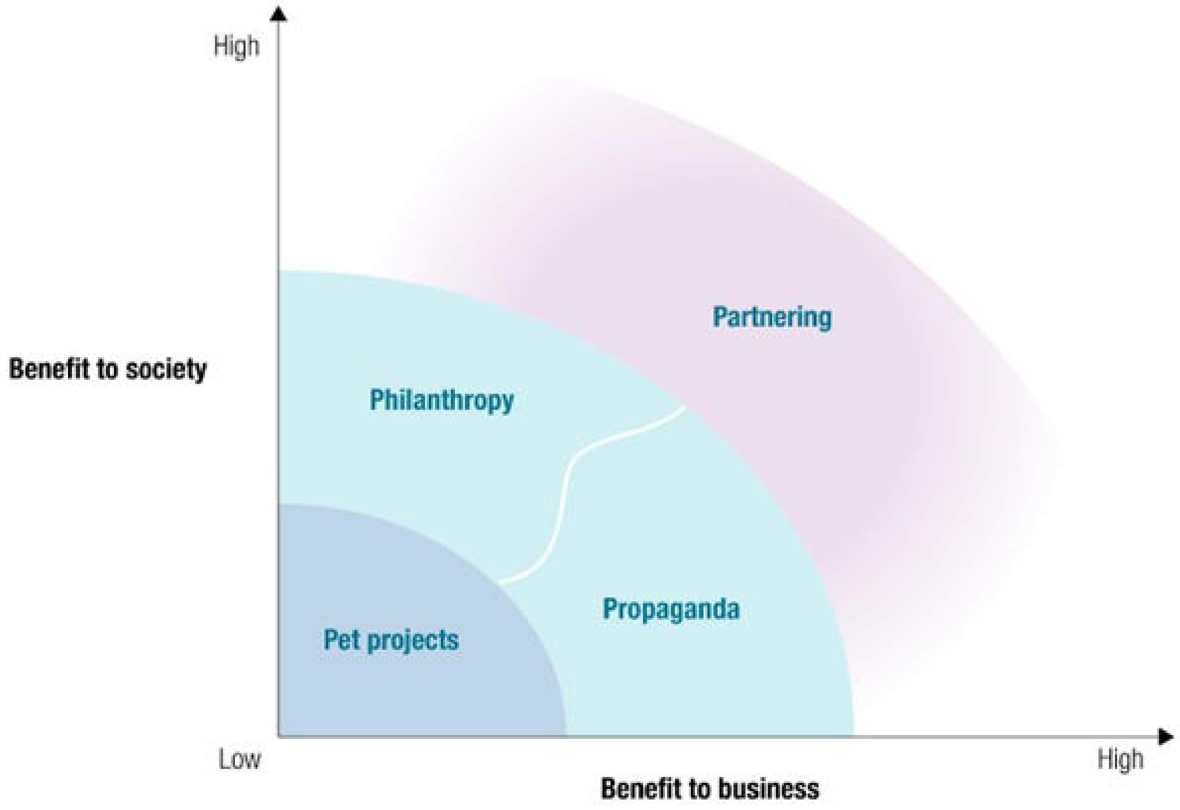
6. better aligning European and global approaches to CSR. To evaluate the CSR strategy, the commission launched a public consultation on CSR 2011-2014.

Keys and Graaf (2009), on their article said that the CSR's issue for some leaders have started to perform at it as a creative opportunity to strengthen the businesses while contributing to society at the same time. CSR as central to their overall strategies, and key business issues. The lesson learned which can be taken from enterprise performance which connecting to CSR within a practical way directly to the leaders to assess the right opportunities of CSR.

Mapping of the perspective of CSR for society and business are important one. For example, here is the pet project. Its indicated low impact for business and society. The philanthropy tends to be an action how the enterprise gave donation and on propaganda is the way how enterprise shows the effort of advertising. The best positioning is partnering which delivering maximum benefit to society and business.

Finally, the energy efficiency in global supply chain shows that efficiency energy in global level could be perform by any type of product, mainly by type of energy used. By focusing on how to transport them, the way of production system, and how to build warehouse system to keep source of energy become more efficient to serve inter-linked of chains and end users. To point out the link between the subject and management. This work explained the hyper competition which should lead the supply chain for energy efficiency to which is added the CSR pressures to lower environmental impact. First of all, the management strategy is a key role in hyper competition. The hyper competition can be performing by energy efficiency. Because, each enterprise should each step of activities in efficient manner. Included, the energy consumption and choice the type of energy. The management of energy efficiency depends on the ability and capacity of performance of each enterprise. The choice of energy source, type of energy used, and production technology is the part of management strategy. Regarding the capacity of managerial

Figure 3.1: Mapping of the Perspective of CSR for Society and Business, Source: Keys and Graaf, 2009.



level for winning the competition in hyper competition. All managers should take all decision for all sources in well-organized norm.

On this case, we put energy efficiency which is a leading issue in global supply chain management. To handle all this things, especially for assessing the energy efficiency which giving lower environ- mental impact. This action related to the managerial level. To do this work, the analytical hierarchy process can be a tool for managerial decision. The manager become independent to take the decision. Applying the the analytical hierarchy process as a tool for decision in term of which type of energy and production process is important one. We can propose on it, which one giving us lower environmental impact.

There are additional advantages for managerial decision when applied analytical hierarchy process instead of ordinary questioner, Saaty (2000). Concerning integral policy, Turner (2001) and Herring (1996) indicated that an ideal solution may be an integrated policy of carbon taxes, energy efficiency and renewable to pressure corporate social responsibility. All type of enterprise covered small, medium and large size have to follow the CSR regulation. The CSR regulation can be identified as aptitude of enterprise. The regulation of CSR can be regional, national, and international level. The CSR performance as the guarantee of the enterprise to show that has capacity and ability concerning their activities to do kind of responsibility to the community and environment. In the future, the company's CSR will be an advertisement. To do so, the company must create the annual report of CSR for showing their capacity that responsible enough to the community. The business activity particularly for industrial manufacture has environmental concern. To do this purpose the enterprise follow their own regulation and the regulation of government. In term of international aspect must follows Kyoto protocol and the latest one each enterprise or country level must respect the COP 21, 2015, Sbihi, 2015. In order to increase the production level which at the same time reducing the smaller environmental impact applying energy efficiency is the key solution. By the CSR scheme, the enterprise will take an action for keeping energy efficiency at any business activities (transportation, production system, and warehousing management). D'aveni (1995), stated that each enterprise should be able to handle energy efficiency. Moreover, energy efficiency as one of tool to know that the company efficient or not. The parameter of energy efficiency as the lead factor for hyper competition, Horace (2006), and D'aveni (1995), because, without optimizing the capacity of managerial level, competitiveness level, and following regulation the global supply chain strategy cannot be reached by enterprise. Normally, by enterprise which already known internationally or so called, multinational company.

Widely Used AHP:

1. cost-benefit analysis,
2. strategic planning R and D,
3. priority setting and selection technology choice,
4. investment priority for developing tourism,
5. evaluation of for new telecommunications services,
6. other evaluation of alternatives.

In certain activities; Zorzoli, (1988), in a near future the wider and cheaper availability of expert systems will also help the management of utilities in industrial plants. Last but not least, the development of new sensors and sensor applications will improve the capability of optimizing the management of such utilities.

The potential of these techniques is well illustrated by a tunable laser system, which is measuring in real time the chemical composition inside a combustion chamber.

3.3.1 CSR in Supply Chain and Its Organization

Definition of Corporate Social Responsibility

If we took a look for the definition of CSR which is a concept of companies integrate social and environmental. Concerning in their business operations and in their interaction with their stakeholders on a voluntary basis. Being "socially responsible" means not only following law or legal expectations, but also refer into human capital, the environment and the relations with stakeholders" (As noted in Commission of European Communities, 2001, p.6).

Development of CSR

Since 1950s, its cleared that the concept was SR(social responsibility) instead of CSR (corporate social responsibility), it caused of the absence of modern corporations (Carroll, 1999). In 1953, Bowen started writing about SR after realizing that activities and decisions making in large businesses affect the lives of citizens, and that managers (businessmen back then) should be responsible for the consequences of their actions. Bowen defined SR as “the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society.” Research on CSR continued to grow gradually between 1950s and 1990s. In 1994, Carroll conducted with academic leaders concerning social topics where the question was “What topics do you see as most important for research in the social issues?” CSP (corporate social performance) was rated third out of twelve issues; business ethics was first and international social issues was second. Moving to the twenty-first century, Carter and Jennings (2004) indicated that CSR is not limited only to business ethics, but it rather extends to include community, philanthropy, safety, workplace diversity, human rights, and the environment. Also because the nature of business relations is changing from national to multinational due to integrated supply chains, the concept of CSR is also transforming. Not only do companies have to be socially and environmentally responsible on the national level, but also in relation with their global partners such as suppliers, intermediaries, and third party logistics. The pressure exercised on these multinational firms comes from various stakeholders such as customers, employees, unions, shareholders, government, NGOs,and media who’s concern about social and environmental conditions in off-shore production sites is increasing (Maloni & Brown, 2006). This concern has largely resulted from multimedia communication that continuously shows irresponsible practices such as violation of union rights, use of child labor, unsafe work conditions, pollution, and discrimination. Famous examples that have been followed by media are Nike, Gap, H&M, and Wal-Mart (Frost & Burnett, 2007).

Transportation

In example of Corporate Social Responsibility, the one of company operated in time of dynamic change in the TFL market. In order to meet ever-increasing customer expectations, we do not limit our proposal to an attractive service price but we also engage in community-oriented activities. When a customer buys a service from us, they can be sure that its best quality is coupled with ”ethical background”. Corporate Social Responsibility is actually at the core of SKAT Transport’s comprehensive business management philosophy. CSR is not a strictly defined and finally shaped concept but rather a process and a conscious attitude. What is valuable for the organizational culture of SKAT Transport is the fact that formal top-down activities are supplemented by community involvement of employees themselves. As a socially responsible company, we pay attention to check our business partners – in terms of reliability but also as regards their respect for labour rights, OHS rules and fair competition. In this way, we encourage other companies to raise their own standards of business.

Basically, CSR activities consist in: community giving – mainly through sponsorship and charity employee involvement.

As part of community giving projects, the Management Board sponsors or charitably supports community welfare organisations and various events. These activities have been conducted for several years now. The highlights include: We have had the pleasure of being involved in a tour of the Stena Vision ferry, organised by our company and our business partner, Stena Line Polska, for a group of Kazakh children of Polish origin. Everyone enjoyed themselves, and the captain of the ferry was even kind enough to let the children wear his captain's hat! We also arranged a tour of the Tricity's museums and the most recognisable historical sites. We believe that every one of the 20 children will fondly remember this great adventure for the rest of their lives, and perhaps visit us again one day.

Production

Corporate social responsibility (CSR) reporting, sometimes referred to as the triple bottom line (for "people, planet and profit"), has seen significant growth in the past five years, nearly tripling from 2,000 in 2007 to almost 6,000 in 2011, according to Corporate Register. Manufacturers in particular have taken to releasing these reports, if for no other reason than to keep their customers happy or at least informed about the nature of their sustainability initiatives. Companies are expected to be able to track the carbon footprint not only of their own manufacturing activities, but also their transportation, distribution and procurement activities, while monitoring the related activities of their extended supply chains as well. They're also expected to adhere to diversity and inclusion in their hiring practices.However, such is the momentum toward full disclosure that even the biggest and most successful companies are being held accountable by stakeholders for incomplete reporting. "If there is a production process that can be made safer, we seek out the foremost authorities in the world, then cut in a new standard and apply it to the entire supply chain."

3.4 Conclusion

This text, however, goes beyond case studies. In it, the author analyzes, with masterly skill, the fundamental concepts of data warehousing, data marts, and online analytical processing (olap). He also devotes his attention to such important topics as data mining, how to build a data warehouse, and potential applications of data warehousing technology in government. This compact and well-organized text is intended for postgraduate students of engineering (m.tech.) and computer applications (mca) as well as for software professionals and database practitioners. The book, which beautifully blends the principles and real-life case studies, should be cherished both by the student and the professional for its clarity of exposition and its contemporary approach.

3.4.1 Application AHP Matrix on Energy Management

Thollander and Palm (2013), industrial energy management is perhaps the most important factor in overcoming barriers to energy efficiency and closing the energy efficiency gap. Energy management has been little emphasized in research or policy touching on industrial SMEs, and is accordingly under developed in research and practice. Companies need to address energy strategically to reduce the energy efficiency gap. Industrial companies that take a strategic approach by adopting energy management practices may reduce their total energy use by up to 40 % .

How successful ideas and values become established in companies, however, is not so well documented, possibly because interviews and questionnaires have generally been used in earlier research. Combining these methods with observational approaches would foster better knowledge of these issues. Observational methods would also deepen our understanding of energy management in general and introduce a more complex system analysis, see Aminata et al., (2002), Aminata, (2012), Aminata et al., (2014c,e,f,a,d,b), Berglund and et al. (2011).

3.4.2 Conclusion

There are a lot of decision analysis tools that can be done in this research. However, the AHP has been chosen with a strong proof of concept from the theoretical background up to research application for all customers. The CEO of the company can be a role player to serve all clients' needs or existing complain by delivering questioner built up by interaction. For example, between company, government and other stakeholder to find the best solution to promote corporate social responsibility. The CEO will lead the evaluation team on making or break decision for the company. So, all decision is well known by all members or stakeholders, fairly. This way can lead to follow up the research progress or better service for customer. The result will prove the strong case studies since all data based on questionnaire or by judgment of all clients how to improve all categories or all variables in research or report analysis.

3.5 Energy Efficiency Management

Regarding energy efficiency development for global supply chain enterprises, it must be an agreement for all stake holders to maintain and to improve the quality and quantity energy efficiency to decrease of CO2 emission. Therefore, to make law enforcement and make it real in business activities must be create in global supply chain.

By tracking supply chain until to the origin of first supplier which the first product has been supplied by first enterprise. Respecting this current views, that there are many regulation and agreement to do so. The real time simulation is to optimize the global supply chain management and supply relationship management for the future research possibilities, for example times series, cross section, and real time data development to promote global business. Building up the effectiveness of supply chain from local to global market vice versa and its impact for business development.

Why do we have to study the global supply chain that could be seen from transportation production and warehouse perspectives? Because, of its function as well as the definition of "supply chain management is a cross-functional approach that includes managing the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and the movement of finished goods out of the organization and toward the end consumer.

As organizations strive to focus on core competencies and becoming more flexible, they reduce their ownership of raw materials sources and distribution channels. These functions are increasingly being outsourced to other firms that can perform the activities better or more cost effectively. The effect is to increase the number of organizations involved in satisfying customer demand, while reducing managerial control of daily logistics operations. Less control and more supply chain partners led to the creation of the concept of supply chain management. The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and the velocity of inventory movement", Lambert, (2008). It would be more clear one as figure 2.2.1:

The strategy establishes risk management as one of the key guiding principles of our approach to promoting a secure, safe, efficient, and resilient supply chain system. The first step to effective risk management is to identify and understand risks across the system as a whole. The evolving and dynamic nature of threats and vulnerabilities make this a challenging task, complicated further by the scope and complexity of the system itself, White, (2013).

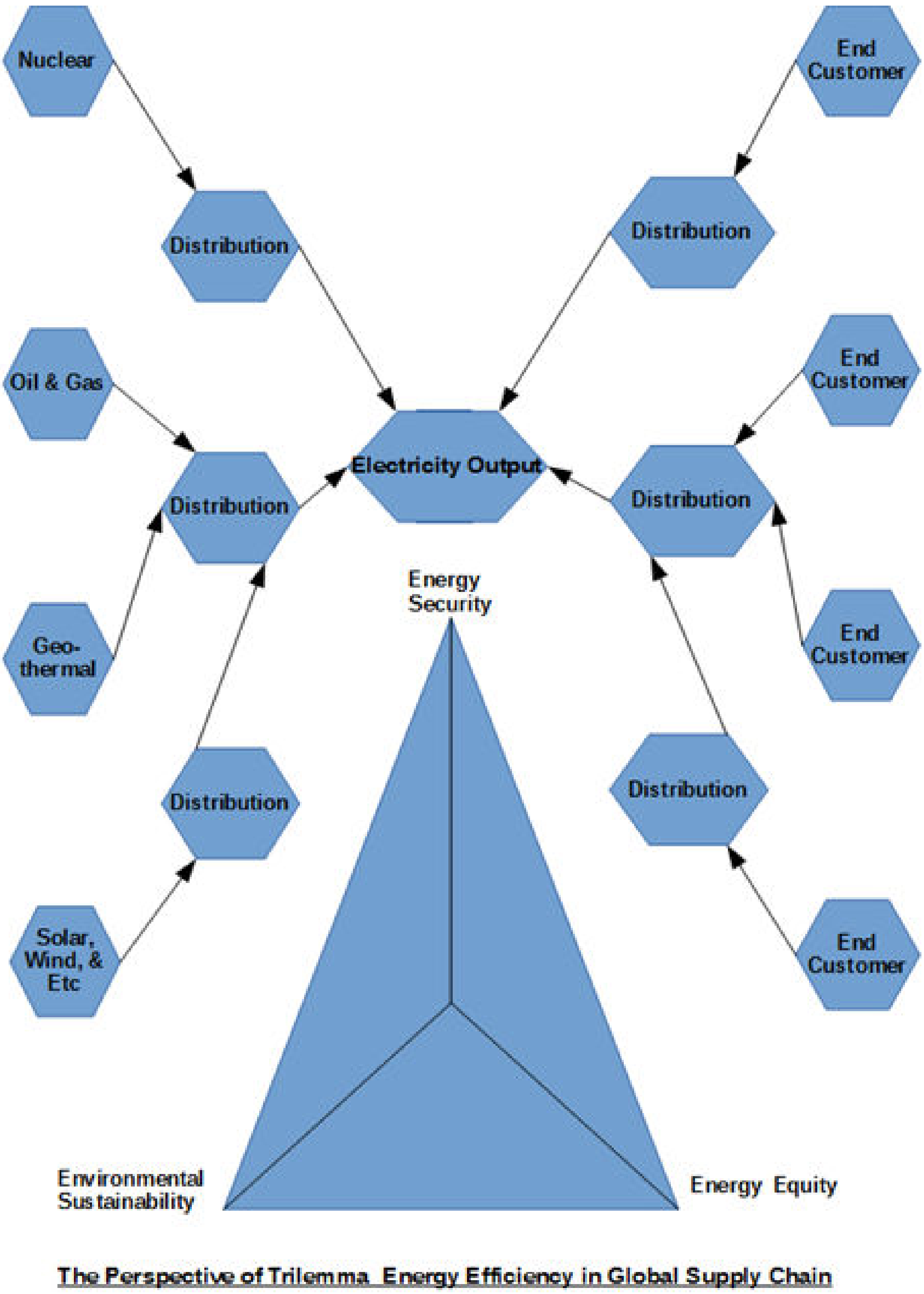


Figure 3.2: The Perspective of Trilemma for Managing Complex and Dynamic Supply and Demand Networks

Chapter 4

Risk Management in Supply Chain Organization

4.1 Introduction

In this research, we explored transport energy efficiency in global supply chain perspective. Emphasizing on sales, based on geographical areas. Because, until now the company group has been exporting the medium and final products to worldwide network. With key markets in Asia Pacific, North of America, Latin America, and Europe.

Wei et al., (2011), p. 60; "due to the nature of their manufacturing operations, many chemical manufacturers have to coordinate their inbound and outbound transportation of materials (raw materials and finished products) in bulk. They applied a wide variety of transportation mode which include pipelines, tanker ships, tanker rail cars and tanker trucks to support global supply chain materials.

For hazardous products in nature usually is governed by regulatory policies (that are legislated to address environmental, safety and security concerns) such as on the movement goods and tracking system of hazardous materials. In addition, also it means that transportation system has chosen to deliver the product in order to maintain required documents such as cleaning inspection system. In wide broad perspective must respect the environment law which which shows in CSR documents. In contrast, most manufacturers from non-chemical industry deal with raw materials and finished product which are subjected to the regulatory institution and maintenance requirements. Moreover, their inbound and outbound transportation of materials are usually undertaken in certain volume. Surely, transportation management of products in global oleo chemicals supply chains is complex than supply chains in non-chemical industry."

4.1.1 All case studies Concern to CSR and Its Risk Management

we investigate three main supply chain functions that are production, transport and warehousing at global level where the energy consumption is a major issue to maintain a high level of several outputs. We intend to develop and show how the concept of energy efficiency is critical for global supply chain. Many questions are possibly and legitimately to ask

4.2 Transportation

In climate change issue, there is a need for logistics solutions for supply chains optimization based on energy efficiency problem, Halldorsson and Kovacs, (2010). The idea of article drew the questioning of the optimization practice in the palm oil sector. A little empirical work has been carried out on the process by the firm to implement global perspective of global transportation. According to Halldorsson and Kovacs, (2010), energy efficiency has been largely neglected in logistics and SCM.

Energy efficiency required the important aspect of operational level, Dey (2011). For example, supply chain management must perform new performance measurement that included energy efficiency indicator. In order to adapt the environmental law, see Halldorsson and Svanberg, (2013), Adeli and Karim, (2001), p.48.

CSR - Efficiency Risk Management in Global Oleo Chemicals

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Global Transportation

World Energy Council (WEC), stated that transportation policies and potential developments both fuels and technologies as driving force to examine and to combine transportation scenarios, so called "freeway" and "tollway". The main difference between these two scenarios are the degree and style of government intervention to regulate future transport markets (WEC report, p.6, 2011):

- The freeway scenario envisages a world where pure market forces prevail to create open global competition

- The tollway scenario describes a more regulated world where governments decide to intervene the market and to promote technology, moreover infrastructure development.

Furthermore, freeway and tollway scenarios describe the extreme ends of the potential future problem. The reality exposed these two scenarios with differences playing major role. Regarding the initiatives to restructure the manufacturing sectors are by making the priority for intermediate goods. The high impacts between backward and forward linkages are such as textiles, pulp-paper, food processing, rubber and wood-based products. Rationalizing trade policies and industrial regimes will create market, efficiently and transparently, McClellan (2000). By helping small and medium enterprises will generate employment and benefit consumers as well as to expand the distribution system.

Foreign direct investment had a moderate impact on the development of supplier and supporting industries in Indonesia, due to foreign firms brought more than half of their input from abroad. The government should continue all efforts to lower transaction cost and to reduce unnecessary administrative and bureaucratic procedures to speed up the approval of investment, Larsen et al. (2013). The important things are formulation and implementation of the effective global trade strategy for any products, WTO, 2010.

An Energy Efficiency on Transportation in Global Supply Chain Framework

This research identified the way of efficiency in oleo chemical transportation within global supply chain perspective. By emphasized on sales this based on geographical areas. The company group has been exported the medium and final products to worldwide network. The field research located in France and European customers. One must take into account for some additional issues relating to national legislation to deliver the specific product in specific time windows, particularly for the hazardous products.

The research work will give a new perspective for transportation industries by setting up new strategy on managing energy (fuel) consumption with basis of the concept of energy efficiency in oleo chemicals business scheme. So, it will give an advantage to the transporter and oleo chemicals company itself by set up energy efficiency in various methods and strategies.

Energy Efficiency in Global Supply Chain

Wu et al., (2012), energy efficiency, fuel efficient, and fuel saving are the most mentioned keywords on the study of green supply chain management practices among large global corporations. It has been taken by the company for paying attention environmentally responsible (corporate social responsibility) and cost saving measures.

The Meaning of Energy Efficiency

To promote the advantage of energy efficiency is based on business development. We focused on literature review and also, all possibilities on previous research works and related articles. There are many kinds of definition of energy efficiency. It could be distinguished on fuel efficiency, fuel economy, and fuel consumption. So, energy efficiency in transportation is a relative term used to describe how effectively fuel is used to move a vehicle. The fuel efficiency is connected to the amount derived from fuel used. The fuel economy is ex- pressed as miles per gallon of fuel consumed ("taken from the book of Real Future Energy Efficiency in USA", 2010). It refers to the fuel consumed by the vehicle as it travels a given distance. European case is expressed in liters per 100 km").

Energy Efficiency: Cost Saving Issues

Energy efficiency in transportation is how to make energy consumption or fuel less than usual method or within normal business operations, see Varma and Clayton (2010). The energy efficiency could be determined by the level of technology, the work method or organization system, time windows, and more specifically is information system.

The high quality of information system is used extensively in MNC (multinational company) or global company which is most of them on time line competitive level. By good handling in energy efficiency management project reached billions dollars during three up to five years. Bertrand and Fransoo (2002), gave an idea for co-working mechanism between private and public stakeholders. For example:

1. green ginnie mortgage backed securities,
2. building energy efficiency as standardized asset class,
3. CO2 to energy efficiency.

Time constrains for delivering the product, also efficiency during loading and unloading product are crucial parts in oleo-chemical industries. For instance, one plant produce more than hundreds tons per day which will deliver huge impact on energy consumption. Influencing the level of stock, logistics and supply chain operations. In this step, promoting the sustainability of multinational companies is the key point. because, if there is a mistake in calculation, stock planning will take costly for all business operations.

Connecting to the energy matter, there was the question why energy efficiency is important for all aspect? which is to improve energy efficiency which leads better security environment aspect. Also, by increasing the energy efficiency (supply, accessibility, and etc.), competitiveness and profitability will contribute to reduce the overall impact global warming.

Oleo chemicals industry must choose a good transport service to handle energy efficiency matter, Aminata et al. (2013). The main problem is to provide the best choice of transport service which is a challenge in complex business activities. All business activities in their transportation section or department is to support sustainability of business. They have to assure the product will arrive safely to all clients, around the world. Refer to the environmental impact, transportation service must be careful with environmental aspect. However, the report from Ademe, (2012) showed that between 2000 and 2007, the road transport statistics, shows efficiency improvement. It happened by management transportation and eco-driving when the car used on the road. Moreover, the efficiency of vehicle (measuring by the ratio ton/km) is efficient, time to time.

According to the legislation, the oleo chemicals industries are one of the most dangerous output products. It is not only in the industrial supply chain system but following the conduct of regional law and national law for some circumstances. The storing and transporting the oleo chemicals product are really treated in secure system. So that, the company and their global supply chain network have to make a guarantee that inter country fulfilled the minimum requirements for keeping the best quality of product, Liu et al., (2010). see, Aminata et al., (2013) shows that by procurement system reduced the company's cost when they delivered the products.As it happened in daily plant operations.

The absences of regular transport through the special haulier services availability gave impact on company's performance in some extension. It's quite often the location of the oleo chemicals plant in remote areas. The point located in remote areas is to reduce the production cost and to increase the investment level. The specific research in transportation palm oil is very limited. The significant research work by Sbihi and Eglese (2007) delivered the findings; "the relationship between vehicle routing, scheduling, and green logistics".

The oleo Chemicals Transnational Transportation

The research question of this research work pointed out:

- how to calculate the CO2 efficiency in oleo chemicals transportation which used truck with high viscosity products by crossing the European Union? (based on formula of CO2 efficiency, shows in equation no.01, as of intensity calculation on transportation efficiency)

- how to calculate the concentration ratio of product (ES France's product) by complex management strategy (basically, based on formula of CR4, shows in equation No. 2, as of Tirole (1998))?

The distance has been calculated in detailed which is to know the most efficient energy consumption and minimum horse power of the truck used. It can be allowed through the legislation of road and driving rules. Especially, for the big container which carries oleo-chemical products.

According to France's law and E-U law that no more 40 tones allowed to pass the national or regional roads. They should carry out the products less than 40 tones. The company has to select the truck's technology in very efficient ways (procurement system). In the real business, the consumer needs the maximum one (the maximum load level of truck's capacity). In this activity, loading and unloading factor is the main problem. More time they need for loading and unloading more expensive or extra money will be paid by the company and stated on additional invoice from the transport agents. The application in transportation case is really depends on which transportation mode. (ie. air transport, mass transportation, maritime transport, etc.), see Varma and Clayton (2010) and Clay and Shanahan (2006) said that mapping the business plan is a must for successful business. However, the oleo chemicals company need at least one year for creating success global supply chain (annual schedule time).

CO2 Efficiency : Intensity Calculation

It is a common sense that in oleo- chemical industries at initial phase faced on difficulties to deliver the product. Refer to CO2 efficiency, we use formula in equation No.1 to know the intensity of CO2 efficiency. As information, the final product of oleo chemicals industries is still can be used for more than one year, after final processing. Using the method of calculation shows of method-CO2 efficiency[1], so called intensity calculation:

$$CO2\ Efficiency \ = \ (D * V/100) * 2.63)/(1000 * M * D * V) \tag{4.1}$$

Definition:

- L: fuel use in liters/100 km. D: distance in km. V: empty running Factor. M: tons of loaded trip.
- 2.63: emission factor for CO2 emission per liter diesel fuel and the CO2 efficiency is in gram of CO2 per tons' kilometer.
- *Note: Compiling basic data is used for estimation. The data base has been taken from real daily business*

The European commission intends to reduce the average carbon dioxide which is for the car 140 gram per km for 2008. It has been increased by 120 grams per km in year 2005, and 2010. Furthermore, there was a good example that Great Britain applied the tax of congestion. This policy influenced by the tax income. Many of foreign ambassadors must pay additional tax for the fee of congestion.

Measuring fuel consumption with differentiation of eco-driving, distance, and calculating system will give impact on difference result of CO2. The cost assessment is difficult; sometimes its depend on public infrastructure and the quality of vehicle itself.

The average emissions per 1,000 km is approximately 0.18 - 0.25 tons. The targets of 0.12 tons per 1000 km would deliver savings of around 24 tons per vehicle during its lifetime (250,000 km)[2].

Concentration Ratio

It is allowed to develop concentration ratio calculation, see Aminata et al., (2013). We identified concentration ratio to measure total products which have produced in this

[1]Source: Univ. Westminster, UK, INRETS, FR, and adapted by SBIHI. A, 2012
[2]Real Future Energy Efficiency in USA,2010

industry. Usually, this concentration ratio method is to show market control of the largest firm in the industry and to illustrate the industrial sector is "oligopoly" or not.

The basic idea is the proportion of total output in industry which produced four largest firm output in an industry. Commonly, there are CR 4, CR 8, and CR 16 which belong to the aim of the research. As mentioned above, basically concentration ratio is only providing an indication of oligopolies nature and the degree of competition itself. These structures are based on market share. The methodology is well known by economist, business strategies and the government agent, see Tirole (1998). The formula of concentration ratio (CR):

$$CR4 \;=\; (4\ largest\ Output)/(Total\ output\ within\ industries) \tag{4.2}$$

Definition:

- CR 4: Concentration ratio by size of 4 largest categories.
- 4 largest Output: The 4 largest product or variable selected in plant.
- Total Output: Total output within industries.

The aim of this formula is to show the concentration ratio of output within industries which have four largest in percentage within industry output. So, the top rank of product within company or industries can be identified. As Tirole (1998) said; both in economics or business management, a concentration ratio is a measure of the total output produced in an industry by a given number of firms in the industry.

4.2.1 The Oleo Chemicals Market and Supply Chain

For additional information, some products can be produced by combining existing products. Mostly, the problem in oleo chemical industries is the cost of production process. The cost unit per output becomes higher rather than import specific raw material.

In different countries the estimated oleo chemicals and detergent alcohol Malaysia is the highest one, the following by Indonesia and China. However, the estimation for Africa and Middle East is similar with India. Almost from the country listed for estimation of supply of oleo chemicals and detergent alcohol are not so different from country to country.

Backward linkages as the case of automotive industry, growth of the steel industry promotes the growth of the automotive industry, which will lead to higher incomes for steel producer. Forward linkages happened when the growth of an industry leads to the growth of other industries that used output as input. Then, on the scheme of business development, the final product goes to consumers through retailers, minimizing or manage the role of retailers in the transmission channel process.

The global supply chain has existed, from providing raw material, processing material, producing the intermediate output, then delivering the output to the customer. Schedule plan is the main problem for oleo chemical industries. How to estimate product need for

Table 4.1: Global Oleo Chemicals Production 2009, (000 tons)

Country	Fatty-Acid	Fatty Alcohol
Malaysia	2204	471
Indonesia	1010	375
Philippine	-	130
Thailand	104.5	100
Japan	256	.
Korea	45	.
India	153	160
China	1296	777
Europe	1500	.
USA	1000	.
Australia	100	.
Total	7668.5	2013

Table 4.2: Estimated Oleo-chemical and Detergent Alcohol Capacity Additions

Country	Supply
Africa/Mid East	200
China	300
India	200
Indonesia	450
Malaysia	350
Total	1500

daily business operation based on three and six months precise forecasting. The plan is the importance one in order to be accurate on providing service to clients. The storage problem and the fluctuation of demand tend to be challenging within certain periods. Here, the transportation availability is one of the businesses obstacles. Mainly, it is for high viscosity products. The temperature of product should be maintaining on average is not more than 23 degree Celsius. Especially, during loading and uploading products. All delivering system has been approval by product control quality and authorized by plant site.

an example for all products interconnected with ES France is sugar alcohols, unsaturated fatty alcohols, primary fatty amines, special esters, fatty alcohols, refined glycerin, and lubricant applications. Especially, for France the company concentrated on fatty Alcohols, so called LOS 2 N 70. This product is one of the most marketable and nominated product for France's branch office.

The complex system of agriculture system up to manufacturing process is under control by each product quality control. The product sent to international market via quality control (especially in Singapore as international branch office, even though the plantation located in Indonesia and Malaysia). Product processing provided by high technology level. The main problem is how to maintain the standard of quality control. The claim of customer will deliver by formal notice. Due to, if there is lower quality all products must be re-evaluated, properly. The problem is all about finance and the competitiveness level, particularly for business sustainability.

The pioneer of this actor in oleo chemical business is USA. After several decades, the successful of such kind of business has been running well in Europe, and Japan. Japan was combining the traditional industry leader to be stronger in international market.

The future prospect is to improve the technologies level. The rapid expansions of several companies offered rapid improvement indicators. Mainly, it can be found in the bio-diesel, and esterification technologies. The pioneer of this actor in oleo chemical business is USA. After several decades, the successful business has been running well in Europe, and Japan. Japan delivered business strategy which shows the traditional industry leader tend to be stronger in international market. See Gold et al. (2012), Larsen et al. (2013), Marchi et al. (2013), Hu and Hsu (2010), Wu et al. (2012), Aleman and Sandilands (2008), Martin (2005).

Table 4.3: Synthetic Fatty Alcohols

Company	Raw Materials
Shell	Linear Olefin
Shell	Me-braced Olefin
Sasol	Ethylene
Sasol	Linear Olefin
Exxon	Branched Olefin

There three companies are dominant here are Shell, Sasol, and Exxon. Shell is a main distributor for E and S France. They have own technology how to produce synthetic fatty alcohols. So, by newly technology companies are not really depend on raw materials, (typically is ethylene processing scheme), Kaiser and Hurstel, (1988).

Taking care of transportation system will make sustainable of this business. This method applied by Rockefeller company in years ago. It has been handled for the big oil company and related industry. The company won the competition due to held the transportation system in their owned (the case of oleo chemical products within USA).

The increasing of oleo chemical business activities has been involving to the degree of environ- mental level. So those, for better transportation and respect for the environment need to specify the vehicle labeling (OECD/IEA 2010). Labeling here that its means that for oleo-chemical industries need specific transport. For example: for dangerous product should be label as ADR and no dangerous product as NON-ADR. The label itself must be put on the truck or put on the drum for small quantities, maximum deliveries is only 24 tons. The product with specific label is important one when crossed European border.

The environment aspect and labeling influenced the market price and demand volume. Most of consumer are not really aware for their choice. But in oleo-chemical industries, the specific or specimen of product are based on high treatment and pass from the laboratory control system, strictly. There is double checked on input-output system. So that, fuel economy and CO2 emissions labels were combined with fiscal incentives, as was done in the Netherlands and the United Kingdom.

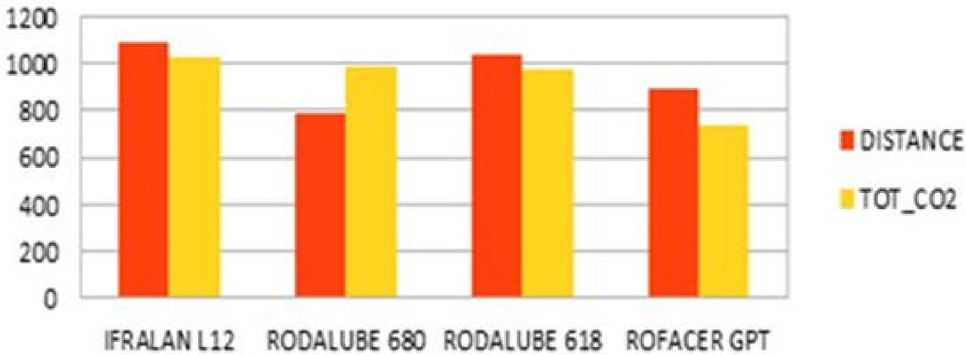
In the policy context and targets in an oleo-chemical transportation case shows that the vehicle utilization here is how to measure the efficiency of the vehicle by using fuels consumption from the company origin until to the final destination. These issues covering the distance and the weight of vehicle. However, eco-driving style is the main aspect, also. Many countries were applying for eco-drivingd include France and E-U members. The legislation is not allowed for ADR (dangerous product is prohibited out of France after 19:00 pm, without any exception). But for Non-ADR could be maintain for delivering entire France, after 17:00 pm, then delivering for next schedule.

In logistics term should respect for delivery the product within day A to B or depending on the availability of product and final destination. In term of transportation, vehicle utilization can be improved by using empty running and capacity maximum that carry out the product in maximum way. The efficiency can be measure by fewer vehicle movements. Tools and variables help to reduce total freight, vehicle traffic, measured by vehicle per km. So, it will reduce congestion, emission, accident and other environment impact. The plant site in France still has a chance to buy the product within a group. Normally, from Germany, according to distance matter and price level negotiation within a group (insider trading). There is price discrimination and priority for these business relationships. However, it is normal phenomenon in the group of company at anywhere.

4.2.2 Result

The concentration ratio for 4 largest is IFRALAN L12 and RODALUBE product. Indicated total CO2 in four largest product or total sales is not always smaller than CR8.

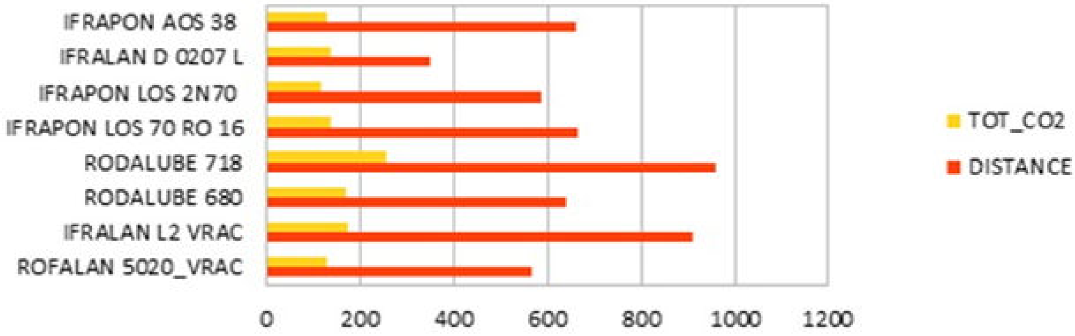
Figure 4.1: The Distance and Total CO2, CR4



It shows that almost total CO2 increased by specific distance with the exception of delivering ro- dalube 680 products. This case could be happened by several reasons; 1). The quality of vehicle, 2). the specific road type, 3). Eco-driving style, 4). Time windows. To maintain the CO2 level is need all cooperation of all stakeholders. The company is insufficient to handle CO2 problem, though as the main player and main contributor for CO2 level.

The purpose of finalization of each product is different; its depending on the client needed, however around 1305.6 Euros for each product. The distance is for each truck to reach the customer address within radius 534.76 km. The consumption for fuels truck is per km. To reach 100 km, the truck needs 165.93 with almost 222.37 gram CO2/km.

Figure 4.2: The Distance and Total CO2, CR8



The speed of truck quite safe 53 km/hours the average for the time truck is 10 hours to reach the client's address.

Table 4.4: The Calculation Concentration Ratio 8, CR8

No.	PRODUCT	DISTANCE	CO2
1	ROFALAN 5020 VRAC	565	127.49
2	IFRALAN L2 VRAC	909	172.3
3	RODALUBE 680	640	169.83
4	RODALUBE 718	958	254.22
5	IFRAPON LOS70RO 16	666	137.22
6	IFRAPON LOS2N70	587	115.89
7	IFRAPON D 0207 L	348	137.41
8	IFRAPON AOS 38	659	130.11
9	8 LARGEST	5332	1244.47
10	TOTAL	117646.7	48922.07
11	CR 8	4.53	2.54

The finding results from CR4 and CR8 shows that the number of CO2 in CR 8 percentage is smaller rather than CR 4. More product and added as concentration shows that produced of CO2 is smaller rather only CR4. But, for total sales and distance in percentage is higher rather in CR4.The product IFRAPON LOS 2N 70 that has high viscosity and as a marketable product from this company can be found in CR8. Total sales contribute to total sales and CO2.

4.2.3 Conclusion

The identification from the research work figured out that will be more efficient in oleo chemicals transportation using high tech of truck (high pump tech) rather than conventional truck, particularly for product with high viscosity products. By getting information for more close distance with plant origin (product processing and product delivery). All samples taken from the product crossed the continent and overseas which shows cost of production, delivery cost, and all operational cost are being carried out by management control systems. The complex management strategy faces on price competition by minimize internal managerial problem, Hovelaque et al. (2010).

The efficiency matter is the key for hyper competition. The energy efficiency is sunk cost that happening during operational or processing product. It's happened when delivering products to the customer is a critical point. Because, it could be the product was contained the hazardous product and viscosity product. The hazardous product and the viscosity product are needed more time for delivering arrangement. The special treatment of preparation, include here for loading and unloading process to all clients should be treated prudently and strictly.

All advantages from this case study: 1). Mostly, the information system of specific truck in France and other European Union refer to hyper competition, based on price offers. 2). The specific distance with specific delivering system product should be handling in transport planning. 3).by mapping the power of transportation system to promote oleo chemicals transport. 4). Identified the comparative product within industrial level and country level. 5). Minimize the fuel consumption by minimizing road distance, using specific truck, and tight schedule planning for transportation order. 6).

Delivering an advantage to transporter agents and oleo chemicals industries itself in various ways by minimizing fuel (energy) consumption through transportation planning and enterprise organization.

4.3 Airline Business Operations and Aircraft Industry

4.3.1 Introduction

How the aircraft industry resistance in global competition and survival from fluctuation of energy price, and also global supply chain spare part availabilities. This part informed the business development of aircraft industries toward intercontinental connection and prospect of domestic's market.

The point of this working paper is to improve energy efficiency, Barnhart and Laporte, (2007); Beer, (2000); BSR, (2012). Energy efficiency is leading issue from time to time.6 Normally, the future of this industry depends on high impact solution which applied to new design and aging fleets. In engineering field has been also trying to decrease the weight and fuel burn efficiency. Moreover, the management airplane has contribution for energy efficiency, for some ex- tension, White, (2013), Metaxiotis, (2010); McClellan, (2000), Kovacevic et al., (2013). These kinds of proposed gave the direction to solve the problem of energy efficiency in airline transport, Varma and Clayton, (2010). The industrial development on aviation industry has to measure its technical progress and efficiency method of aircraft engine. Time of ignition of engine while waiting for the passenger after landing. The price of kerosene is one of the volatile prices in this business.

4.3.2 The Consumption of Fuel-Kerosene

The links for those kinds of issues are reducing fuel use and environmental aspects. For instance, method energy efficiency and its extension for updating the aircraft's technology. Recently, the level of efficiency 80 percent which is more efficient than in the 1960s. The design was applied for such kind of turbofan engine, new type of all aircraft design and incremental improvement of abstract design to real operations. The fuel is the single biggest cost for airlines (more than labor cost).

In the mid of 1970s, the fuel conservation was set up to enhance flight management systems. This method allowed to decrease the speed of aircrafts engine, engine power based on all operational cost. Airline company has been trying to make up all procedures by a wide range of operational procedure, maintenance, and tight schedule plan procedures. All kinds of these procedures is to promote the optimal flying by using energy efficiency management. The possibility calculation for fuel conservation strategies (energy efficiency):

$$Cost\ Index\ ,CI = \ (Time\ cost\ /hr)/(Fuel\ cost\ cents\ /l) \tag{4.3}$$

Table 4.5: The Range of Allowable Cost Index for Given Boeing Airplane

Airplane	737-300	737-600	747-400	757	767	777
	737-400	737-700				
	737-500	737-800				
		737-900				
Cost Index Range	0-200	0-500	0-9999	0-999	0-999	0-9999
					0-9999	0-9999

Table 4.6: Comparing Result for Cost index values of Zero and Maximum

	CLIMB	CRUISE	DESCENT
Cost index	Minimum Fuel*	Maximum Range	Max L/D
Cost Index	VMO/MMO	VMO/MMO	VMO/MMO

Entering zero for the cost index results in maximum range airspeed, minimum trip fuel and entering the maximum value for cost index results in a minimum time speed schedule.

Table 4.7: Calculated Values for a Typical 757 Flight

	CLIMB	CRUISE	DESCENT	ALTITUDE RECMD
Cost Index 0	290/.778	.778	250	RECMD 310
Cost Index 9999	345/.847	.847	.819/334	RECMD 260
Cost Index 70	312/.794	.794	.80/313	RECMD 310

There is no sufficient information according to aircraft industries. However, there is possibility for us to work closer in the aircraft industries by involving our team on their global project. Therefore, in the near future we can explored the airline business data and industrial development of aircraft industries in detail.

Table 4.8: Cost Index Impact

	CLIMB	CRUISE	DESCENT
Cost index	Minimum Fuel*	Maximum Range	Max L/D
Cost Index	VMO/MMO	VMO/MMO	VMO/MMO

Table 4.9: Supply Chain Management in Boeing Business Program

	Responsibilities	Preferred Majors	Available Sites*
Procurement Agent	• Develop supply chain strategies • Negotiate & execute supplier contracts • Manage supplier performance & collaborative relationships • Assess supplier capability & capacity • Identify & mitigate supply chain risks	Supply Chain, Business, Industrial Engineering	All Sites
Procurement Analyst	• Develop, analyze & deploy supply chain metrics • Provide supplier contracting management & documentation support • Distribute & manage supplier & Boeing technical data	Supply Chain, Business, Industrial Engineering	Seattle Area, St. Louis, Charleston
Supply Chain Analyst	• Forecast, manage & optimize inventory • Order & schedule parts, products, services & data • Receive, store, ship & distribute inventory	Supply Chain, Business, Industrial Engineering	Seattle Area, St. Louis, Charleston
Supply Chain Logistics	• Manage the Boeing global transportation & logistics infrastructure • Maintain & manage collaborative relationships with transportation regulatory agencies, organizations & service providers	Supply Chain, Business, Industrial Engineering	Seattle Area, SoCal, St. Louis
Supplier Quality	• Conduct supplier process & product compliance assessments • Educate & coach suppliers & internal organizations on Quality system, regulatory compliance & company quality initiatives	Supply Chain, Industrial Engineering, Information Systems	Seattle Area

4.3.3 A Case of Indonesian Airline Business Development

The one of prospectus airline company in Indonesia is Lion Air, or so called PT Lion Mentari Airlines (officially). This company has been planning to order 234 aircraft from Airbus company which is located at Toulouse, France. The type of aircraft order is; 109 A320neo, 65 A321neo and 60 A320ceo, all is in one type of A320 (medium size). This order is to fulfill domestics market in Indonesia. By huge numbers of business order, the Lion Air becomes a really new customer for Airbus Company.

The point is how to support global supply chain, especially for global spare part supply chain. Due to the chain of global spare part of aircraft is a bit complicated between urgent needs and availability of spare parts for just in time service. Supply chain management is key successful for Boeing business operations. The breakdown from procurement agent, procurement analysis, supply chain analyst, supply chain logistics and supplier quality.

The specific type of A320 is in high fuel efficiency. The one of biggest business opportunity from this company is making all over tariffs became the cheapest one among the competitor's tariff as CEO Lion Air said. The one aircraft will accommodate around 180 passengers, then with a new cabin style A321 can accommodate 236 passengers. The type of A320 is the classic aircraft. The Neo A320 is more efficient in fuel consumption. The value of this type aircraft is more than US$ 100 million. By 2011, the order of aircrafts has been producing, particularly, for type Neo A320 will be deliver in 2016.

Job creation for European Union and especially for France shows that the demand of aircraft is in high demand and a very prospectus for Indonesian market. A low cost carrier is one of key success both in domestics and international airlines business competitiveness. The Lion Air was established since 2000, with enormous growth expansion in Asia, which more than 70 destination routes. The job creation data shows 24.000 jobs (Tempo, 2015). This is not only for creating the most excellent business aspect, but also economic aspect.

The Lion Air operated for the first time in 1999, the owner had the position at 33 ranked as the rich person in Indonesia, claimed with more than US$ 900 million within a group of Airline company. The Boeing company remarked an order for 234 aircraft for at least US$ 22.4 billion. The contract has been signed in 2011. The demand of airline passenger has been increasing year by year, the average growth is around 20%. Brégier said; the company will recruit 3.000 people from all over the world in 2013. The market price for each Aircraft is US$ 91.5 billion for A320. The first signing contract was US$ 20 billion.

Further business information, the state owned company so called Garuda Indonesia shows the efficiency of kerosene used. For this purpose, this airline company has been set up for more effectiveness in operations and replaces the air craft for the new one. All operations from the Garuda operations has consumed US$ 1.45 billion per year with one litter of avtur price US$ 1. The efficiency effort has been done well, reached 24 %. The budget 2012 is US$ 1.21 million than used only US$ 1.18.

However, Garuda will purchase for the new aircraft yearly because high demand of air transport. From the research center of CAPA (Centre for aviation), Garuda Indonesia group, Citylink and with Lion Air became a winner in case of number of airplane compare to Singapore Airline Group. The Garuda will operate 139 unit aircrafts, Lion 149 aircrafts.

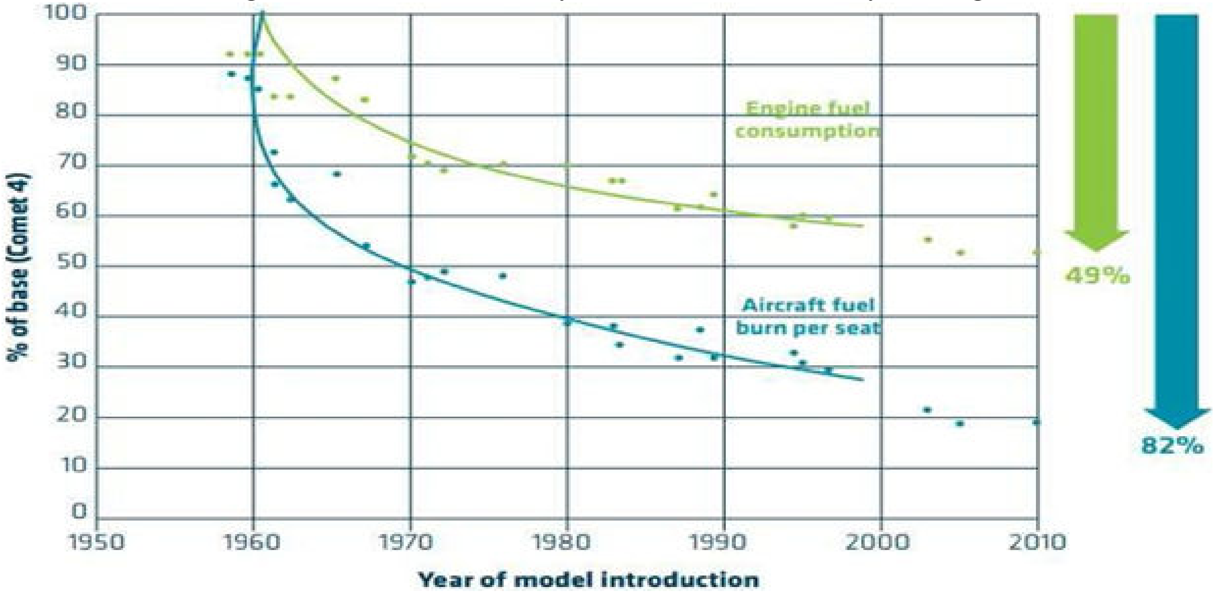
There are several Airline companies, so called, Air Asia, Merpati Nusantara, Sriwijaya Air, and Air Transport. In 2013, Garuda for full service class consumed jet A1 (avtur) 1.29 million Rupiah increased since 2011/2012 around 1.23 million Rupiah. In this full service class is noted that Singapore Airline (SIA) is the biggest competitor. The efficiency of avtur use is important to keep the CO2 emission, both in international level and domestics level. Its why the level of CO2 emission is important for environmental aspect. The biofuel is one of strategy to reduce CO2 emission. Aircraft A321 used the mixed fuel, i.e Avtur and 50 % bio-synthetic kerosene. The research of PRESAV (The potential for renewable energy sources in aviation) identified that there are several fuel can be adapted for aircraft: Bio-diesel, methanol, ethanol, hydrogen, and bio-methane. The best value to reduce the CO2 emission:

1. green airport
2. green flight
3. route efficiency

However, in Indonesian airline business used 1%-2% of bio-fuel and other used avtur. The main supplier of fuel for Airline business is PT PERTAMINA. The bio-fuel is not still enough for technology development, infrastructure development (holding system and queue system before landing, especially for busiest airport traffic).

It shows the fuel efficiency from the early age until in the end of 2010 (estimation).

Figure 4.3: Fuel Efficiency Gains Since the Early Jet Age



There was fuel efficiency 49 % for engine fuel consumption and aircraft fuel burn per seat 82 %. It was clear that year by year that both engine fuel consumption and aircraft fuel burn per seat were decreased. All cost of energy consumption to be continue for many reasons that beyond to business purpose. These kinds of necessaries factors are cost to transit, energy distribution, commodity prices, exchange rate level, and geopolitical factors.

4.3.4 Conclusion

From this article what can be learned is how to perform global supply chain by refer to regional development and inter-linked between companies and also the role of government. Without, any of governments involvement in global supply chain will be very difficult in international joint works, see Akhter (2003); Alexander (2005); Beer (2000).

Studying airlines industries gave information about the technology level, availabilities and performance in global supply chain aspects. Due to each aircraft manufacture has a client and the same time there are hyper competition for each step of aircraft construction and business operations. The airline industry or airline transport will be an excellent model how global supply chains work well at any chain of logistics level. Based on our designed to promote future efficient research work within three dimensions will deliver the best solution.

4.4 Energy Efficiency Measures for International Shipping

4.4.1 Introduction

Energy efficiency for minimizing CO2 emission is a matter for today's world. There are many barriers to enhance this research work. It has enabled to do kind of discussion to solve all barriers and data construction. Especially, in managerial level. We argued that the collaborative project will be enable for enhancing the quality as well. Especially, for energy efficiency in maritime logistics chains, see Acciaro and Wilmsmeier, (2015).

4.5 Real Time Data Observation in Singapore

Table 4.10: Vessel Arrivals,Singapore

Description	4/2/'16	6/2/'16	8/2/'16	10/2/'16	12/2/'16	14/2/'16	16/2/'16	18/2/'16
Passenger	215	193	220	213	235	197	239	209
Cargo	173	147	130	160	214	178	210	220
Tanker	237	264	229	236	246	217	252	236
Tug	145	120	57	135	120	114	136	153
pleasure	68	89	81	77	83	111	69	76
Fishing	10	13	9	9	8	18	3	2
Other	336	317	250	299	353	270	350	382

Source: http://www.marinetraffic.com/ais/details/ports/290/Singapore-port:Singapore,'16

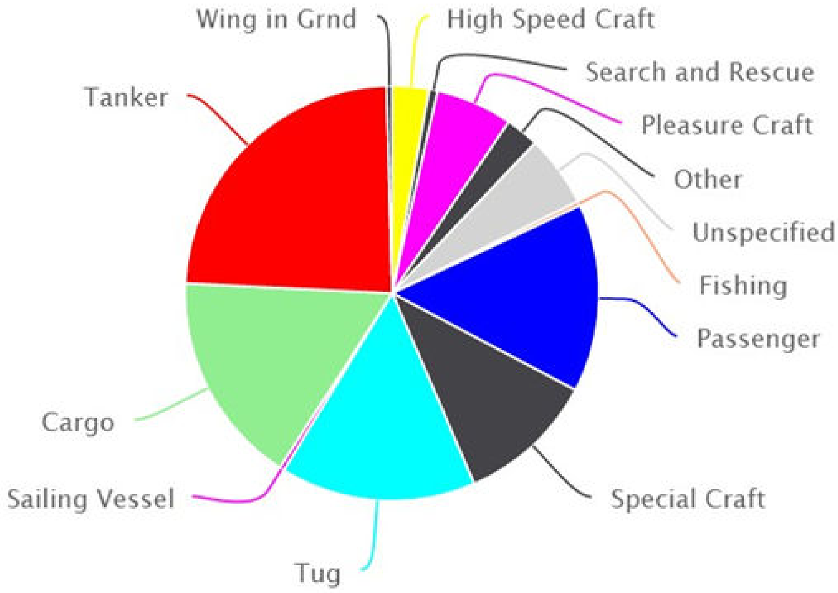
Overall, Singapore has high quality of port management, included data management. It also supporting by satellite in real time. The value added from Singapore's port is only in one authority area. This is a value of management to manage international shipping. In case of Indonesia, there are 29 official ports and need an extra effort to manage them.

4.6 Real Time Data Observation in Indonesia

Indonesia would like to have maritime cooperation with Singapore for improving port quality. Mainly, in efficiency ports management, and how to minimize energy efficiency in global shipping management. For example, dwelling time. Due to dwelling time taken for freight to load and unload at the port. In averaged seven to nine days in Indonesia, this a matter to create efficiency in port management system. We are aiming four to five days dwelling time, even less. Having better dwelling time, it means improving the logistic system, and reducing the cost for all port operations.

The numerous number is Tanker, followed by cargo, sailing vessel, tug, special craft, passenger ship etc. However, the port management shows the optimum capacity management. Particularly, for aiming energy efficiency in international shipping standard.

Figure 4.4: All Vessels Type, 30 Days



Source: Marine Traffic at Singapore, 2016

Singapore has one of the busiest ports in the world, with a ship leaving or arriving every two to three minutes. Indonesia is still upgrading ports as part of its vision to transform them into a maritime power. This is also to maximize all potentials of maritime source, commerce, and to connect many all islands (more than 17,000 islands, and sea ports are needed to improve sea links in the country). The target is to build 29seaports in the next five years. Its need around US$6 billion to develop all ports. The problem raised here is the infrastructure developments shows a lot of opportunities for foreign investors, but stake holders, also foreign companies are still looking for fixed factors when doing business in Indonesia. By 2015, the government providing US$400 billion, over five years, on building up overall infrastructure to stimulate economic growth.

The government authority said; the dwelling time problem is unsolved by Pelindo. The port management has been treated in monopoly system. Therefore, there is no competition for creating efficiency, particularly in energy efficiency in shipping management.

4.6.1 Difficulties

As mentioned above, all barriers to improve energy efficiency in shipping, between Singapore and Indonesia are really challenging due to typography of Indonesian ports. Contrary with Singapore located in one location.

This case study aimed for understanding an excellent energy management practices in shipping companies. Its explored all barriers to support energy efficiency in shipping through a case study. For example; a short sea shipping company in their process to apply energy management system.

An action research design was chosen to contribute better practice in the research community. For instance; project management capabilities, ship-shore communication, division of responsibilities, access to performance measurements, and competence in en-

Table 4.11: The Main Ports Administered by Pelindo

Port Corporation	Coverage (Provinces)	Ports Administered
Pelindo I	Aceh, North Sumatera, Riau	Belawan, Pekanbaru, Dumai, Tanjung Pinang, Lhokseumawe
Pelindo II	West Sumatera, Jambi, South Sumatera, Bengkulu, Lampung, Jakarta	Tanjung Priok, Panjang, Palembang, Teluk Bayur, Pontianak, Cirebon, Jambi, Bengkulu, Banten, Pangkal Balam, Tanjung Pandan
Pelindo III	Central Kalimantan, South Kalimantan, West Nusa Tenggara, East Nusa Tenggara	Tanjung Perak, Tanjung Emas, Banjarmasin, Benoa, Tenau/Kupang
Pelindo IV	Sulawesi (Central and North), Maluku, Irian Jaya.	Makassar, Balikpapan, Samarinda, Bitung, Ambon, Sorong, Biak, Jayapura

Source:Ray, 2009, adapted in OECD report, 2012.

ergy efficiency.

4.6.2 Methodology Challenges

From theoretical part, the energy efficiency in shipping is substantial. Coming from technical ways up to business opportunities. The goal was to understand what are good energy management practices, as well as what kind of barriers may hinder companies in their work. Especially, we wanted to under- stand the role of energy management system (EMS) standards, or best practices. Partly, because that they seem to have been a success factor in other industries, and partly because a particular kind of EMS standard the ship energy efficiency management plan (SEEMP). Moreover, there is a successful model in this case study, so called data envelopment analysis.

4.6.3 Data Envelopment Analysis

Cooper and Seiford, (2011), there is an increasing concern with measuring and comparing the efficiency of organizational units such as local authority departments, schools, hospitals, shops, bank branches and similar instances where there is a relatively homogeneous set of units. Data envelopment analysis (DEA)7 is a linear programming based technique for measuring the relative performance of organizational units where the presence of multiple inputs and outputs makes comparisons difficult.

Data envelopment analysis (DEA) is a nonparametric method in operations research and economics for the estimation of production frontiers. Empirically, to measure the productivity of efficiency in decision making units (DMUs). Although, DEA has a strong link to production theory in economics, the tool is also used for benchmarking in operations management, where a set of measures is selected to benchmark the performance of manufacturing and service operations. In the circumstance of benchmarking, the efficient DMUs, as defined by DEA, may not necessarily form a production frontier, but rather lead to a best-practice frontier. DEA is referred to as "balanced benchmarking" by Zhua (2007).

4.6.4 Real Time Analysis, Dwelling Time Analysis

Table 4.12: Observed Ports

No.	DMU	Country	City
1	Jakarta International Container Terminal (JICT)	Indonesia	Jakarta
2	International Container Terminal of Tanjung Perak	Indonesia	Surabaya
3	Terminal Peti Kemas Semarang	Indonesia	Semarang
4	Belawan International Container Terminal	Indonesia	Medan
5	Teluk Bayur Container Terminal	Indonesia	Padang
6	Makassar Container Terminal	Indonesia	Makasar
7	Batu Ampar	Indonesia	Batam
8	Singapore	Singapore	Singapore
9	Tanjung Pelepas	Malaysia	Johor
10	Laem Chabang	Thailand	Laem Chabang

Source:PT. Pelindo II, Indonesia, 2012

4.6.5 Energy Efficiency Operations

To understand the nature of ship operations, two issues are key and concern as follows; the commercial conditions for ship operations, and the organizational conditions for ship operations. A shipping company may choose to outsource crewing and technical management to third parties to focus on core commercial capabilities or to get benefit from economies of scale with third party managers. Cost reduction is a typical argument for outsourcing. Energy efficiency operation index (EEOI): the "EEOI" is an approach to assess the efficiency of a ship with respect to CO2 emissions.[3]

$$EEOI = \frac{(Environmental\ cost\ /Benefit\ to\ Society\ )}{(measured\ as\ grams\ CO2\ /tones\ x\ nauticalmile)} \tag{4.4}$$

EEOI = (Emitted CO2) / (Transport Work), i.e. the ratio of mass of CO2 (M) emitted per unit of transport work.

4.6.6 Interview Method Analysis

The goal of understanding what are good energy management practices in shipping companies through the study of the implementation of an energy management system (EMS)

[3]Source: Philip Tsichlis Naval Architect and Marine Engineer, 2011.

Table 4.13: Indonesian Port Data

DMU	Length (M)	Crane	Tug	Area (Ha)	Throughput (TEU)	Dwelling Time
(JICT)	2150	21	6	75	2,274,784	6.70
Tanjung Perak	1450	11	9	38	1,345,347	4.00
Semarang	495	5	4	21	427,468	7.00
Belawan	950	13	9	25	993,116	0.03
Teluk Bayur	1613	10	2	5	61,808	8.52
Makassar	850	5	3	0.8	513,482	2.33
Batu Ampar	1250	1	1	11	249,309	0.86
Singapore	16000	190	60	600	31,260,000	1.10
Malaysia	4300	138	6	120	7,700,000	4.00
Thailand	949	8	8	35	1,250,000	5.00

Source:JICT: Jakarta International Container Terminal, PT. Pelindo II, Indonesia, 2012

Table 4.14: Sample in Global Dwelling Time

Country	Dwelling Time (Days)
Singapore	1.5
Hongkong	2
France	3
Los Angeles, US	4
Australia	3
Port Klang, Malaysia	4
Thailand	5

Source:PT. Pelindo II, Indonesia, 2015

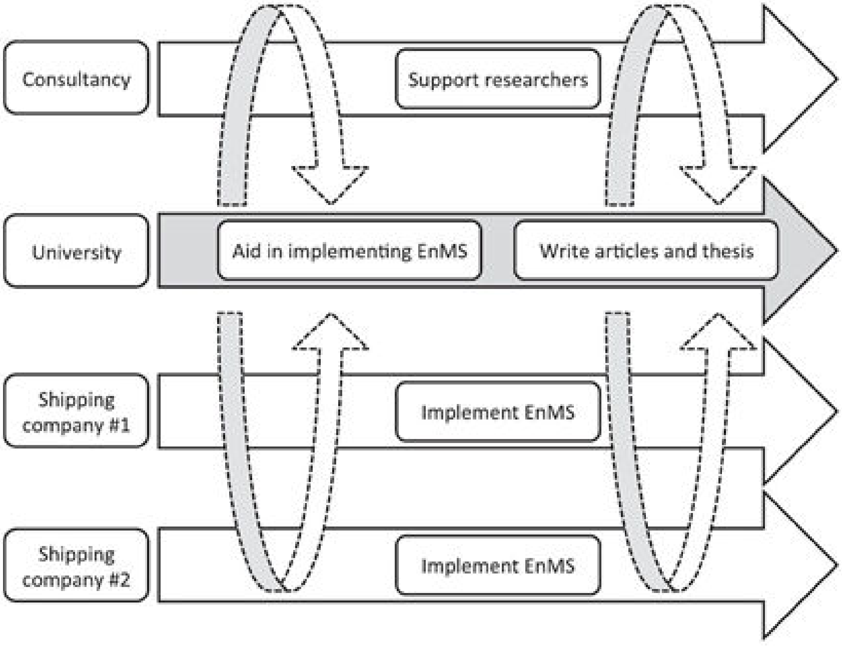
standard (ISO 50001) in such companies. Originally, it consists of for two shipping companies, and a consultant that have been worked as part of a team in each company to implement the international standard. The purpose of an EMS can be defined as organizations to establish the systems and processes necessary to improve energy performance, including energy efficiency, and consumption (ISO, 2011).

The company should make a target by international standard ISO 50001 upon which an organization can develop and implement an energy policy, and establish objectives, targets and action plans and also related to significant energy used (ISO, 2011). Briefly, the phases of formation of an energy policy, the energy planning and auditing, and implementation and operation are followed by constant checking.

This supported by an internal auditing system, processes for monitoring, measurement and analysis as well as for non-conformities, correction, corrective and preventive action. In interview analysis, there is energy consumption monitoring which can be a parameter for analyzing shipping efficiency.

Poulsen and Johnson, (2016), data from ECM can be used as a basis for vessel fuel-saving competitions. Typically, every quarter, the crew on-board the best-performing vessel of the receives a bonus to share for on-board well-fare activities. This is seen as a tool for raising awareness, though only used explicitly in two of the case companies.

Table 4.15: Collaborative Project to Implement EMS in Two Shipping Companies



Source:H. Johnson et al. / Journal of Cleaner Production 66 (2014) 317-327 Note: EMS= Energy Management System. SEEMP: Ship Energy Efficiency Management Plan.

4.6.7 Discussion and Result

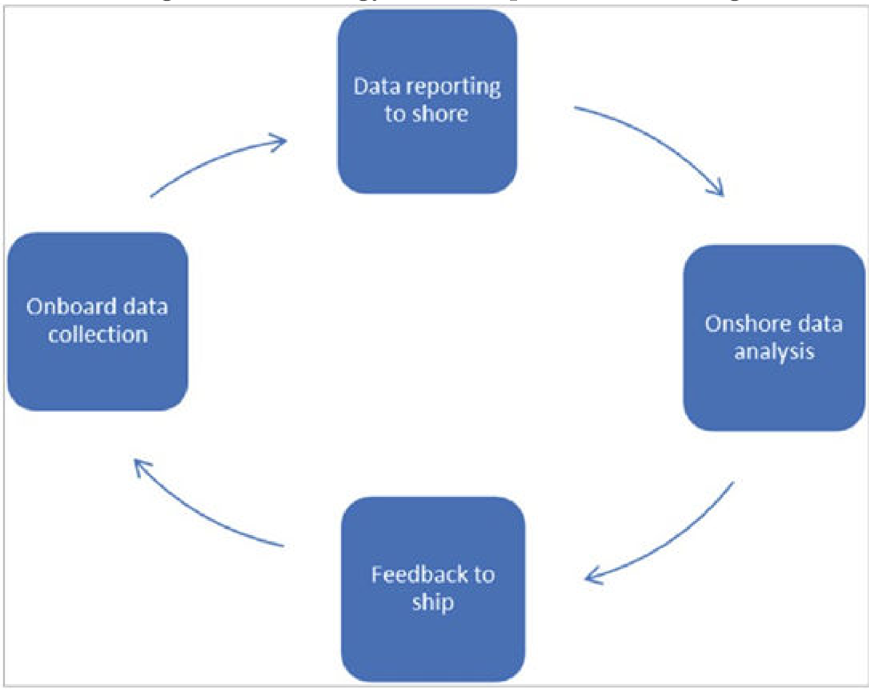
Exporter and importer which associated with ALFI (logistics association and forwarder Indonesia) clearly stated that Tanjung Priok port service must be well develop because there is a lack of energy efficiency measurement. Other problem, we have to make sure for entire ports that must be integrated well within 29 ports.

4.6.8 Conclusion

We have also adhered to work in problem formulation, problem-solving, reflection, and made sure that project participants from all parties have been able to discuss problems and solutions. There are five main patterns or barriers to work with energy efficiency have been discussed: low level of project management maturity, difficulties measuring energy performance, fragmented responsibilities, lack of communication, lack of knowledge, and resources. They were shown to have a match in the ISO 50001 standard.

Learning action research methodology as well as the practice of energy management and complement gathering of the kind of rich data would presumably also be of interest to organize the collaboration, see, Baan et al., (2015), Anas et al., (2013).

Figure 4.5: Energy Consumption Monitoring



4.7 Production

4.7.1 CSR - Production Efficiency in Risk Management within Manufacturing Industries

4.7.2 Production Efficiency in Manufacturing Industries

Market intervention by policy makers is to improve supply chain performance that can be considered. All comparisons can be made across related supply chains with similar features. Then, how we consider overall properties of a supply chain and whether within find structural and behavioral appearances associated with different types of supply chains: protectionist trade regimes are also more likely to favor large firms, both because these firms products compete more directly with imports, and because sectors with large, capital-intensive firms lobby the government more effectively, Thollander and Palm (2013).

Firm performance is based on economic efficiency, which is composed of two components; (1) Technical efficiency, defined as capacity to produce maximum possible output from a given set of inputs and technology. (2) Allocative efficiency, defined as the ability to equate marginal value product with marginal costs. Outsourcing is used to describe all the subcontracting relationships between firms, and the hiring of workers in non-traditional jobs.

For some extensions, Kihlen (2007) stated that following current issue is knowledge for geography matters. For example; economic interactions, it because of transport costs, time costs, fixed costs of entering new markets, and informational barriers also, then how to manage remote supply chains or production operations. As a note the agglomeration approach that we learned for profitable oriented, however the benefits coming from demand and supply chain linkages, from pools of labor market skills, or from technical spill overs.

London (2008) stated; supply chain explores the market fragmentation concept through the degree of firm integration along the supply chain in productive functions, and structural fragmentation in numerous firms in a highly competitive environment. The results, we might like to improve profitability, efficiency, productivity, and or innovation. The policies of governments towards supply chain management have been of a direct and indirect type and have focused upon improvement of performance for small to medium-sized enterprises (SMEs).

Supply chain management was evident at the manufacturing end of the chain, although in varying degrees. Kihlen (2007), shows that supplier development and co-ordination is evident, although supply chain management is less. All possibilities for global supply chain which those industries are profitable particularly as follows: food and beverages product, garment and textiles product, paper and paper products, other chemical products, non-metallic mineral product, basic metallic products and other, machinery except electrical, electrical machinery apparatus, transport equipment product, and other industrial products.

4.7.3 Introduction

The initiative to restructure manufacturing sectors are by making the priority for intermediate goods regulation, see, Aminata et al. (2002). The high impacts between backward and forward linkages are such as textiles, pulp-paper, food processing, rubber and wood-based products. Rationalizing trade policies and industrial regimes will create market more efficient and transparent, see Mouton and Marais (1996). By helping small and medium enterprises will generate employment and benefit consumers as well as to expand the distribution scheme. Foreign direct investment had a moderate impact on the development of supplier and supporting industries in Indonesia, since foreign firms located in Indonesia brought more than half of their input from abroad. By this action, it was cleared that the global supply chain has started. The government should continue all efforts to lower transaction cost, reduce unnecessary administrative and bureaucratic procedure to speed up the approval of investment. The important things are formulation and implementation of the effective global trade strategy for any products. The research question is how to identify the problem of openness and efficiency of production regarding output level and value added in manufacturing level.[4]

[4] Aminata J., Grandval S., Sbihi A., (2014), "The Impact of Organizational and Geographical Relocation of Firms Activity Trend on Openness and Production Efficiency in Indonesia's Manufactures", Journal Social Management, vol.12, n.1.

4.7.4 Methodology

4.7.5 Production Function

Following Cobb-Douglass production function, authors have tried to specify an industrial production function for Indonesian manufacturing sectors, by following these definitions, INDOUT =(CAP, OPENNESS, and TW) Definition: INDOUT: Manufacturing Output (CBS) CAP : Machinery and Building include Equipment (CBS) OPENESS: Total Import Manufacturing / Total Import Manufacturing + Total Output TW : Total worker by sector in Manufacturing Industries (CBS).

The purpose of using openness, as input variable is to get better understanding how much openness gave impact to the output. The openness factor is consisting of import variables. Due to, most of manufacturing industries are really depend on importing of the raw material or intermediate goods. Technological change in manufacturing industry is very important as a main factor to increase the output level.

4.7.6 Estimation for Selected Sector

1. INDOUT 313 (1975-1995) = f (CAP313 (1975-1995), OPENESS 313 (1975-1995), TW 313 (1975-1995))

2. INDOUT 321 (1975-1995) = f (CAP 321(1975-1995), OPENESS 321 (1975-1995), TW 321 (1975-1995))

3. INDOUT 341 (1975-1995) = f (CAP 341(1975-1995), OPENESS 341 (1975-1995), TW 341 (1975-1995))

4. INDOUT 352 (1975-1995) = f (CAP 352(1975-1995), OPENESS 352 (1975-1995), TW 352 (1975-1995))

5. INDOUT 369 (1975-1995) = f (CAP 369(1975-1995), OPENESS 369 (1975-1995), TW 369 (1975-1995))

6. INDOUT 381 (1975-1995) = f (CAP 381(1975-1995), OPENESS 381 (1975-1995), TW 381 (1975-1995))

7. INDOUT 382 (1975-1995) = f (CAP 382(1975-1995), OPENESS 382 (1975-1995), TW 382 (1975-1995))

8. INDOUT 383 (1975-1995) = f (CAP 383(1975-1995), OPENESS 383 (1975-1995), TW 383 (1975-1995))

9. INDOUT 384 (1975-1995) = f (CAP 384(1975-1995), OPENESS 384 (1975-1995), TW 384 (1975-1995))

10. INDOUT 390 (1975-1995) = f (CAP 390(1975-1995), OPENESS 390 (1975-1995), TW 390 (1975-1995))

4.7.7 Three Digits Manufacturing Industries

- 313: food and beverages product
- 321: garment and textiles product
- 341: paper and paper products
- 352: other chemical products
- 369: non-metallic mineral product
- 381: basic metallic products and other
- 382: machinery except electrical
- 383: electrical machinery apparatus
- 384: transport equipment product
- 390: other industrial products

4.7.8 Conclusion

As the estimation result shows that openness contributed for positive impact to the manufacturing output. The capital did not give impact to all manufacturing output. The labor intensive contributed for production efficiency for certain sectors (food and beverages product, garment and textiles product, non-metallic mineral product, basic metallic products and other, machinery except electrical, electrical machinery apparatus, transport equipment product, and other industrial products) than using capital intensive (however, the variable of capital contributed to other chemical product, basic metallic products and other, machinery except electrical, electrical machinery apparatus) particularly for Indonesia's manufactures between 1975-1995 period. In detail the description of estimation result for output and value added as follows:

- food and beverages product: labor was significant. This sector is more labor intensive.
- garment and textiles product: capital was not significant.Labor was significant. Openness was significant.
- paper and paper products: labor was significant in paper sector but the capital and openness did not contribute the output, significantly.
- other chemical product: the capital and openness contributed to the output, significantly.
- non-metallic mineral product the openness, and labor significantly contributed to the output but capital was not significant.

- basic metallic products and other: capital and labor contributed basic and metallic output, significantly.
- machinery except electrical: capital and labor were significant, but for openness was not significant.
- electrical machinery apparatus: capital and labor significantly contributed to the output but openness did not significantly contribute to the output.
- Transport equipment product: labor was significant but the openness was not significant.
- Other industrial products: labor and openness contributed to the output in other industrial sector, significantly.
- Robust procedure shows: Total paid and unpaid workers and average supervisory and professional workers contributed to value added within t-statistics, negatively. Total payment to production workers, Total payment to non-production workers, Total profit, and advertising and promotion contributed to value added within t-statistics, positively.

The estimation shows all sectors have been linked to global supply chain network for some extensions. Openness and production efficiency within industrial development framework without any strong global supply chain network will be faced on difficulties.

4.8 Production Process in A Case of Footwear

4.8.1 Introduction

This case study explored footwear industrial development. Business activities within time line on high competitiveness in global supply chain. All companies have been trying to apply specific management strategy. In order to maintain sustainability of footwear global business.

One of management strategy in their method is how to apply efficiency approach at any level of business activities, precisely the energy efficiency approach. The energy efficiency in footwear industries is an importance issue to enhance business development.

The actual business in domestic's level and multinational companies level is to find out the future business opportunity by using appropriate energy efficiency decision. Therefore, it will be significant to deliver technology level of machine, location, and energy type.

Based on this phenomenon, the company has kind of decision to relocate their companies, acquisition and merging (vertical and horizontal). The fashion style, consumer behavior, geographical location is key factors to support powerful supply chain. The meaning of energy efficiency gives influence for profit and competitiveness level to keep sustainable the footwear industrial development.

The footwear sector intends to increase the energy efficiency in many ways. It is not only for technology of machine but also how become less emission during processing the product. It means that the energy efficiency in the industrial activities closer zero emission level. One of the parameters to measure clean or not clean is to make identification by green factor. The phase of product processing until finishing product, also they should apply environmental indicators.

4.8.2 Energy Efficiency in Footwear Industry

The framework of this research work shows the link concept of energy efficiency in global supply chain with regard to the operations management. The operation management consists of efficiency production management, efficiency transportation management, and efficiency warehousing management.

Again in this case study, authors gave the dimension of energy efficiency that could be seen from three dimensions as mentioned in introduction. "Supply chain dimension (strategy level), especially in long term. Logistics dimension (tactical level) is in Medium term. Operations management dimensions (day to day term). The research work detailed on the supply chain from top to bottom contains: (I) efficiency production management, (II) efficiency transportation management and (III) efficiency warehousing management".

It shows, there top 10 footwear retailers in Europe as in 2011 in billion Euros. The first rank is Deichmann shows the turnover 4.1 as the highest one. Then, following by Vivarte, Eram and Footlocker. The lowest number of outlets is Leder and Schuh 355 outlets only. Shoezone reached 570 outlets but the turnover is smaller one, 0.3 billion Euros, only. We found that the main problem in footwear industries is:

1. low labor cost compared to European countries, mainly with China.
2. high level of globalized and trend fashion competition.
3. EU in the process of restructuration and relocation of the companies through the world within three decades.
4. the energy efficiency matter; level of unstable/high volatility energy prices, unstable demands, and corporate social responsibility, its means that corporate or company gives contribution to the environment, for example pollutant or emission. Therefore, the company should take care of environmental impact.

The energy efficiency in footwear industries explained the interaction started from processing up to final phase. One of the interesting forms that energy can store energy based on type of product materials.

The idea is divided by three categories; product list, main products, and enterprise business development. Referring to the energy consumption, however in reality each machine stands alone, and it is not consuming a lot of energy. But, when the job order is up to thousands tons. For sure, it will need energy management.

Table 4.16: Top Footwear Retailers in Europe - Turnover in Europe 2011 in Billion

Rank	Retailer	Turnover	Outlets
1	Deichmann	4.1	3200
2	Vivarte	3.0**	4500
3	Eram	1.8**	1755
4	Foot Locker	1.2e	2167
5	Garant	0.8	5360
6	Bata	n/a	5000
7	ANWR Schuhe	0.8	3100
8	Macintosh	0.7	873
9	Leder and Schuh	0.5	355
10	Shoezone	0.3	570

Note: **= 2010 and e=estimate2011 data are the latest available data for comparisons,
Source: Compiled from http://www.retail-index.com, retrieved 01/02/2914

Pressing machine, automatic riveting machines, and automatic drilling machines in certain condition need nonstop energy source to create massive products. The limit in footwear industries is fashion style. It proves that's not all manufactures or companies can provide well both in price offer and quality level.

In the categories of enterprise development, initial cost for investment is not low. But, energy efficiency for market orientation and R&D development are key roles to promote footwear industries to be sustainable one. The footwear industry tends to be slow growth in many aspects.

The strategy of supply chain method should perform well. For instance, how to fulfill the consumer demand, rapidly? In reality, comparing to the modern type of retail management which existing of extreme fragmentation and diversification of purchasing methods. The elasticity of the price that all this items relative to traditional retail. An increasing method of supply chain or distribution method especially in new location or store, and single brand outlet is really interesting for current competition.

Table 4.17: Real Fact and List of Current Footwear Technology Development

Product List	Main Products	Enterprise Development
Shoe Machine	Pressing Machine	Footwear Enterprise in several places shows shoe shoe machine does not share huge amounts of money for installation.
Folding Machine	Riveting Machines, Automatic Riveting Machines	Production capacity of domestic enterprises is under capacity
Splitting Machine	Automatic Drilling Machine	R and D
Insole Machine	Trimming Machine	Focusing in Energy Efficiency Market
	Shoe Polishing Machine, Cementing Machine	
	Covering Machine	
	Skiving Machine	
	Pounding Machine	

Source: http://www.eyelet-machine.com retrieved and update by Authors per 08/02/14

Footwear Industries

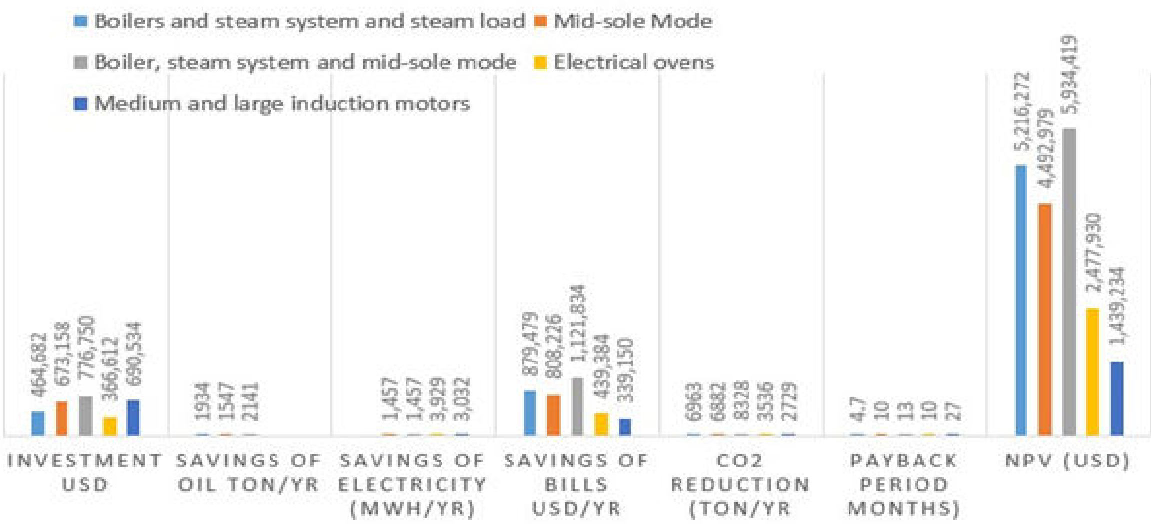
Green global supply chain management shows significant impact in industrial sectors and academic fields. The future direction, using organizational theories provide some opportunities to make an objective and clear special target. By making good understanding and the available field, to identify all opportunities for collaboration. According to mitigation, environmental quality level being considered for producing, distributing products in global markets act a central role. The exploration of current condition in global framework;

1. the cross linking of the machines network is one of the obstacles to promote certain enterprises move up better.
2. the complexity of component and how to fulfill the fashion trends.
3. the diversity of factory layout.
4. the internal management problem.

Xin, (2010) explained energy consumption and energy intensity reduction opportunities where quite different from one enterprise to other. It is necessary to understand how much energy is used at individual enterprise, where the most energy is consumed and what the best opportunities to invest in energy efficiency. Auditing energy efficiency was recently undertaken for the top 1000 largest Chinese enterprises.

Energy efficiency is as a corporate social responsibility (CSR) which company has responsibility for sustainable of environmental quality improvement; for further reference see Mannino et al., (2008), and Gokce and Gokce, (2013).

Figure 4.6: The Simulation of Cost-Effectiveness Results



Source: Ming Yang (2009): updated,Energy efficiency improving opportunities in a large Chinese shoe-making enterprise

The paper work that has been done previously showed that CO_2 reduction in ton per year is the suitable one by using boiler, steam and mid sole mode. The technology system by using medium and large induction motors showed the lowest one for CO_2 reduction.

However, boiler, steam system and mid sole mode was the highest one in investment $ US.

Table 4.18: EU 27 Structural Data in Million Euros

Number of Firms	2007	2008	2009	2010	2011	2012
Turnover	26100	24000	21700	21100	18900	17170
Production Value	30296	26515	21977	24000	19841	17498
Added Value at factor cost	28927	25351	20000	15832	11369	6905
Direct Employment	7631	6873	5589	4656	3635	2614
	368600	325700	291000	250833	212033	173233

Source: Euro stat-updated Apparent Consumption=Production + Import Export.

It shows EU 27 in structural data, from year to year the number of firms decreasing. However, all variables; turnover, production value, value added and direct employment showed that have decreased during duration of 6 years.

Table 4.19: Production, Consumption and External Trade

1000 Pairs	2008	2009	2010	2011	% Growth
Production	560231	470551	491006	505304	-10
Exports	172369	153292	168402	191500	11.1
Imports	2428402	2247836	2521994	2550505	5.0
Apparent Consumption	2816264	2565095	2844597	2864309	1.7

Source: Euro stat-updated Apparent Consumption=Production + Import Export

It shows production, consumption, and external trade in 1000 pairs with variables; production, exports, imports and apparent consumption. Regarding to percentage of growth 2008-2011 the export value was the highest one, 11.1 %. The amazing recorded in Cambodia's in percentage growth, and then followed by Indonesia, Switzerland, and then China. However, China holds the strong position during 2012.

Table 4.20: Top EU Supplier as Share of 2012 Imports in Million

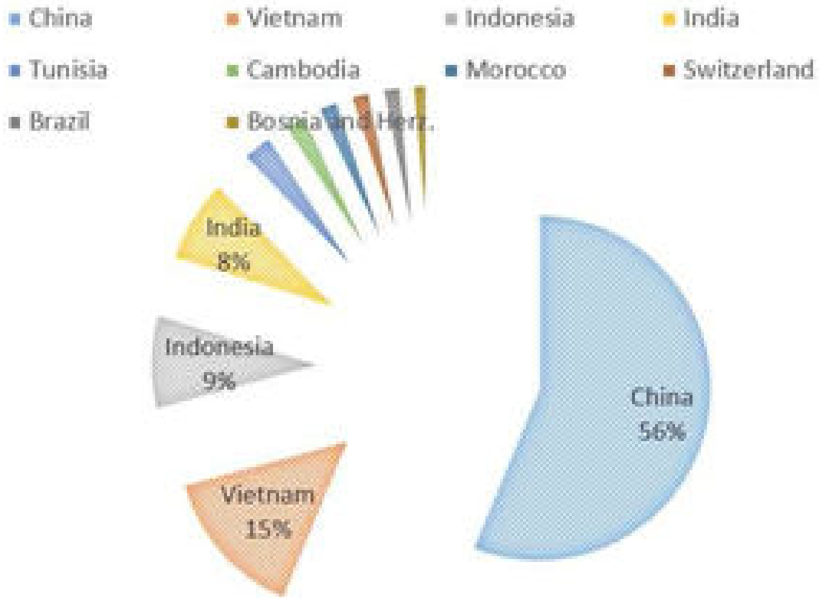
Countries	Share of 2012 Imports
China	51.2
Vietnam	13.2
Indonesia	8.2
India	7.3
Tunisia	2.7
Cambodia	2
Morocco	1.8
Switzerland	1.7
Brazil	1.6
Bosnia and Herz.	1.3

Source: Euro stat - Update by Authors

The China, Vietnam, Indonesia, and India are the most significance countries which act exporter or EU supplier as share 2012 import.

China, Vietnam, Indonesia and India are the main players for the business. Each of them can be reach hyper competition for future business development.

Figure 4.7: Top EU Supplier, Share of 2012 Imports



Source: Euro stat - Update by Authors

Table 4.21: Top EU Supplier as Percentage Growth 2008-2012 in Million

Countries	Share of 2012 Imports
China	32.5
Vietnam	-9.3
Indonesia	75
India	13.2
Tunisia	-9.7
Cambodia	167.1
Morocco	24.2
Switzerland	36.8
Brazil	-48.6
Bosnia and Herz.	22.2

Source: Euro stat - Update by Authors

4.8.3 Global Supply Chain in Footwear Industries

The number of imported shoes have been little difference between shoes brand name. However, the local product quality is still lower than import quality. But, it is not to mention Italy, German products, Korean products. The key findings are:

1. digital is the future development trend of the manufacturing sector, it convenient and faster.

2. improving features of equipment, etc.

3. the automation section is to save the labor costs. It will have automated equipment and many things.

Figure 4.8: Top 10 EU 27 Market in Million Euros

	2008	2009	2010	2011	2012	Share 2012 Import	% Growth 2011-2012	% Growth 2008-2012
Extra-Euro	5692	4756	5387	6478	7305	100	12.8	28.3
USA	1017	772	912	1077	1187	16.3	10.2	16.7
Russia	1012	671	753	927	1126	15.4	21.1	11.2
Switzerland	761	722	807	931	1063	14.6	11.2	39.2
Japan	296	275	295	354	414	5.7	16.8	39.5
Hongkong	188	171	235	335	398	5.5	19.1	111.8
Turkey	229	261	256	338	361	4.9	6.9	57.6
China	75	79	111	191	251	3.5	33.1	210.6
Norway	212	180	202	230	218	3.4	7.7	16.9
Ukraine	195	124	135	165	175	2.4	4.1	-10.2
Canada	152	119	146	178	174	2.4	-2.1	17.9

Source: Euro stat - Update by Authors

4.8.4 Basic Formula in Efficiency

The Formula of General Efficiency

Energy efficiency equal output divided by input. To formulate this idea can be explained as follows:

$$Efficiency = \frac{Output\ )}{Input} \tag{4.5}$$

4.8.5 Efficiency Calculation

The measurement of relative efficiency where there are multiple possibly of inputs and outputs. The construction of a hypothetical efficient unit, as a weighted average of efficient units, to act as a comparator for an inefficient unit. A common measure for relative efficiency:

$$EEOI = \frac{(WeightedSumOutput\ )}{(WeightedSumInputs\ )} \tag{4.6}$$

On mathematical modeling of industrial energy management exposed the systems theory in thermal and chemical engineering, see Sieniutycz and Jezowski (2009). They proceed in a systematic way; a total system is often divided into subsystems. In an industrial plant the technological subsystem (consisting of technological processes) and the energy subsystem (energy management) are distinguished. The production of the energy branches is intended to cover the needs of the technological branches and, partially, also the plants own consumption.

Thus, the energy management of an industrial plant is a system defined as a set of energy equipment and engines, as well as the inner relations between them and the external relation between energy management and the environment. The aim of production, conversion, transmission, and distribution of energy carriers consumed in industrial plants.

Table 4.22: Energy Savings and Emission Reductions

	Boiler 1	Boiler 2	Boiler 3	% Total Used
Boiler production capacity (ton of steam/unit/hr)	4	10	4	66.67
Number of boilers in operation	4	2	3	44.44
Hourly fuel oil consumption rate (ton/unit/hr)	0.25	0.5	0.25	80.65
Number of hours of operation per day (hrs/day)	24	24	24	100.00
Number of days of operation in a year (days/yr)	302	302	302	100.00
Load factor (%)	20	42.7	15	85.47
Annual consumption of heavy oil (ton/yr)	1449.6	3094.9	815.4	27.04
Hourly production capacity (ton of steam/hr)	3.2	8.5	1.8	22.86
Daily production of steam (ton of steam/day)	76.8	205	43.2	23.63
Annual production of steams (ton/yr)	23194	61898	13046	23.63
Daily lost seam & water at the open outlet (ton/day)	76.8	41	43.2	47.70
Annual lost steam & hot water (ton/yr)	23193.6	12379.6	13046.4	47.70
Temperature of steam at the outlet of the boiler (1C)	194	194	194	100.00
Temperature of steam & hot water at the condenser (1C)	98	98	98	100.00
Total share of energy savings by closing the steam system (%)	41.5	26	41.5	130.91
Savings of heavy oil per year (ton/yr)	601.1	803.6	338.1	34.49
Savings of diesel per year (ton/yr)	0	191.6	0	0.00
Total savings of oil and diesel (ton/yr)	601.1	995.2	338.1	31.08
CO2 emission reduction (ton/yr)	2163.8	3582.6	1217.1	31.07

Source: Source: adapted from Ming Yang, 2009

Table 4.23: Cost Effectiveness Analysis

Description	Boiler room 1	Boiler room 2	Boiler room 3	% Total Used
Average price of heavy oil in 2006 constant price (USD/ton)	417	417	417	100.00
Cost of high pressure steam pump (USD/unit)	5263.2	5263.2	5263.2	100.00
Number of units needed (units)	4	8	4	25.00
Cost of total steam pumps (USD)	21052.6	42105.3	21052.6	25.00
Cost of higher pressure steam transmission pipe (USD/m)	20	20	20	100.00
Length of the steam system and boilers (m)	100	600	100	12.50
Capital cost for high pressure pipes (USD)	2000	12000	2000	12.50
Total equipment investment costs (USD)	23052.6	311342.1	23052.6	6.45
Equipment installation costs	6915.8	93402.6	6915.8	6.45
Grand total of investment and installation fees (USD)	29968	404744.7	29968.4	6.45
Saved value of salt (USD/yr)	762	2033	429	23.64
Saved value of water (USD/yr)	3525	1882	1983	47.70
Saved value of fuels (USD/yr)	250639	477241	140985	28.85
Total saving values (USD/yr)	254927	481156	143396	28.99
Payback period (Months)	1.4	10.1	2.5	29.79
Life time of the new technology (yrs)	20	20	20	100.00

Source: adapted from Ming Yang, 2009

This model is a development of the input-output analysis that applied to energy management of industrial plants. The productive branch of an industrial plant is a technological and energy process producing a given major product, as well as optional by-products. If there is more than one source of energy carrier produced as the major product, the production must be divided into its basic part and peak part (e.g. the steam extraction nozzle of the turbine and the steam from the pressure-reducing valve).

4.8.6 Conclusion

There are small numbers of researchers who are working in energy matter particularly in footwear industry. However, energy availability will be key factor when discussing industrial location (the location of companies) that energy is under construction or still in difficulty for price and resource feasibility and availability. For example, most of companies are always looking for industrial location to get the best industrial location based on global market demand. Especially for the European market, most suppliers are coming from non

EU 27. The market is dealing with a very recent trend style. It gives impact to keep the enterprise giving quickly feedback to the market. Moreover, the labor cost gives uncertain condition for footwear sustainability, mainly the enterprise based in the region with unstable energy prices.

The future solution for energy matter is to construct relative less expensive energy price for promoting footwear industries. Internal organization within footwear industries should maintain, carefully. To avoid the worst of labor wage problem in certain position or level at company. Energy efficiency that shows an amount of saving, total emission reduction and cost effectiveness will take important role in global supply chain that stimulates trade structure and international trade flows.

4.9 Energy Application Planning Model

4.9.1 Introduction

The long-range energy alternatives planning system (LEAP) is a scenario-based energy-environment modeling tool. LEAP as a database, it provides a comprehensive system for maintaining energy information; where the decision makers are allowed to switch from policy idea to policy analysis as a policy analysis tool. Its scenarios are based on comprehensive accounting of how energy is consumed, converted and produced in a given region or economy under a range of alternative assumptions on population, economic development, technology, price and so on.

LEAP allows for analysis as rich in technological specification and end-use detail as the user chooses. In this research, Indonesian is a case study. However, LEAP has wide variety of projects, programs, technologies and other energy initiative strategies that addressed to environmental and energy problems.

Efficiency and intensity are seemingly to be understand as comparing energy consumption and energy product. It means that knowing the pattern of output and the level of consumption. There are two meaning of efficiency in engineering context and economic context. Engineering efficiency is the amount of useful work output that a process or a piece of equipment performs with a unit of energy input.

Economic efficiency highlights the cost performance of equipment and processes. A machine or a process is more economically efficient than another if it is less costly or yields greater benefits. For example, 40,000 Btu/barrel distillation columns is more efficient than the 60,000 Btu/barrel columns only if it processes the oil at a lower cost.

Energy intensity focuses on the energy use of entire industries or countries. It is expressed in units of energy per unit of physical or monetary output. It encompasses the effects of both engineering efficiency and industrial structure It encompasses the effects of both engineering efficiency and industrial structure.

Industrial structure refers to the mix of plants and facilities in the industry or country, and manifests itself in the mix of raw materials, intermediate products, and finished goods that are produced. A country can lower its energy intensity by installing more energy efficient equipment and processes and/or shifting its industrial base away from heavy, processing industries toward light, fabricating ones. Processing raw materials, such as steel and petrochemicals production, generally requires much more energy per unit of output than does fabricating finished goods, such as computer and automobile manufacture. There were supporting services toward electricity providing, as like: consultancy, construction, test and examination, operations and maintenance, research and development, education and training. Each types of business must be operated by the different business factors, to achieve fair competition for sake of market efficiency.

However; the business priority must be given to BUMN on the operation of the transmission and distribution of electricity. In the future, the actors in electricity market will be given chance to role as electricity providers; those are central or local government, business corporation, and private sector. See in appendix A.8.1.; "leading issues in energy management, a case of Indonesia".

Currently, by the regulation shows that the effort of electricity provider could be divide into: 1. generator of the electricity 2. transmission the electricity 3. distribution the electricity 4. trading the electricity 5. stocks the electricity 6. operating system.

The regulation no. 22/2005 oil and natural gas (UU Migas) would be the solution toward the oil and the free market. Management for oil and natural gas was restructured both at the primary sectors and in the nature sectors. On the primary sectors the authority for exploration and exploitation was taken over by the stated own Entreprise (PT. Pertamina).

Management for exploration and exploitation were hold by the control body in accordance with legislative recommendation whereas same private sectors, co-operative, BUMD and BUMN were allowed to exploited, due to PERTAMINA as part of BUMN was given an even treatment as like the others by these regulations. Where upon the primary activity on oil and natural gas will be implemented on the platform of fairness and transparency. In the future electricity sector toward the trend to market of electricity. However, electricity business become multi buyer and multi seller.

The government also has duty and authority to establish the aims of the development of electricity, which is the grand plan of national electricity (RUKN). To accommodate local aspiration, RUKN should consider the grand plan of local electricity (RUKD). To support the development of electricity in remote and rural areas, and to subsidize the poor, it is necessary to form social fund for electricity development (DPKS). DPKS will be one of cost components in electricity price structure.

The amount of natural resources is limited compared with the increase of human need that causes the scarce of energy. The need of energy fulfillment has created such efforts to provide renewable energy sources. The existence of renewable energy sources has not been explored optimally because of the availability of fund and technology. During the period of 1980s and 1990s, the renewable and un-renewable based economic development has been debated all over the world. The insistence of sustainable energy development needs comprehensive policy instrument. The oil crisis in 1970s, 1980s and millennium era is one of considerable phenomenon that shows the energy management is still inadequate, especially in developing countries where rich natural resources is often mismanagement.

The energy resources management has structured to overcome unlimited human needs. The planning and estimation of energy consume will be useful for energy development that will greatly affect other sectors. That energy estimation, especially production and consumption directly contribute for energy development. Instead of good energy development, it is also necessary to design development plan for environment recovery. It is important to participate in energy sector.

Instead of development planning, it is important to develop energy sector. To handle the environment problems as the impact of energy processes and energy consumption. These are importance matters to support the future of sustainable human life. The purpose of this research is to know the amount of the future energy demand (next 30 years).

This research is also aimed to know the impact of environment impact (electricity generator) and the consumption of energy. As the fine oil imported country, Indonesia depended on the world raw oil price. The energy management cover the role of department of energy and mineral resources. The trend of global market already pushes the regulation in energy market, especially electrical sector.

In the commodity of fuel energy and electricity management, government role through the state own enterprise (BUMN). There were supporting services toward electricity providing, as like: consultancy, construction, test and examination, operations and maintenance, research and development, education and training. Each types of business must be operated by the different business factors, to achieve fair competition for sake of market efficiency however; the business priority must be given to BUMN on the operation of the transmission and distribution of electricity. In the future, the actors in electricity market will be given chance to role as electricity providers; those are central or local government, corporation, see Gu et al. (2013).

4.9.2 The Estimation of Energy Demand

The demand program available in LEAP can be applied to the project. This program is a kind of disaggregation analysis instrument that covers the need of energy based on the previous year's data of energy up to the recent time. By using data time series, it can project or estimate the rate of energy consumption totally or sectoral, such as household, industry, transportation, agriculture, and other sectors. The demand data was formed in to four hierarchical grades:

1. the meaning of sectors is the various economy sectors in examples: households sector, transportation sector, industry sector, trading sector, public services sector, etc.

2. the meaning of sub-sectors for existing sectors were divided in to the sub-sectors in examples: industrial sector was classified in to textile industry, steel, oil, papers

agriculture, etc. Even so in households could be classified in to several of rate of income groups, habitant's area (where they were live), etc.

3. the meaning of end use energy is in every sub-sectors that is classified into the end user of energy. In examples: the consumption of energy in rural habitants used for cooking, lighting, appliance, etc. The end use of energy in industrial sub-sector in examples: the use of gasoline, fuel for diesel engine, Kerosene, heating (boilers) etc. Since the end use of energy in agriculture sub-sector, in example: irrigation, plantation, etc.

4. the meaning of device every end user of energy were classified into tools device: in examples: in the household's stoves were separated than into: Kerosene stove, LPG stove, charcoal, store cool, bio-gas, electric etc. Also, for example for lighting device, bulb, flour scent, and kerosene gas lamp.

Projection method or analysis method determine in to what activities are or the prospective calculation result of the future energy intensity. The assumptions could be based on the growth target of various sources or analysis, from macroeconomic projection and from other sources. The use able methods are:

1. the meaning of "interpolation"; the method is used for the future projection of each sector, based on each activity grade, However, the early year's data is needed as the way to look up the future projection.

2. the meaning of growth rate; by entering the annually growth rate and shown in to percent. The future activity grade would be increased from the year first that the research worker used by. These growth rate are various multi polar and its result could be exponentially fluctuated.

3. the meaning of drivers and elasticity; the method is used to project the activity rate, or the intensity as the function of one or more driver variable by using or without using elasticity.

4.9.3 Demand Model

1. final analysis of energy sector: e = a x I e = energy demand a = rate of effectiveness i = intensity of final energy (energy consumed per unit of activity) Example: energy demand of the fertilizer industry that could be projected in to the rate of effectiveness in the fertilizer process per one ton, it will be change in the future.

2. analysis of energy being operated e = a x (u/n) u = is the intensity of energy being operated n = efficiency

Example: The exchange of energy demand of one building or office being happened from time to time:

1. the amount of reconstructed building being grew in to numerous (+u)

2. the amount of air conditioned being installed by the rich peoples continuously grow (+u) or public service facilities being updated (+u) or preference exchange the use of Kerosene in to electric energy or gas (+n) Demand Model.

3. stock analysis: c = s x d s = Stock d = device intensity (energy use per device) Example: The implication of efficiency rate to energy stock in standardization. Transformation program This program is used to calculate the amount of energy supply and conversion process to find out the demand of primary energy.

This program is used to calculate the amount of energy supply and its conversion process and to know the primary energy demand:

1. the rate of module; in this rate are shown the various sectors of energy or the types of electricity generator, fuel energy processing and products of primary fuel energy the calculation in this phase is based on the calculation result of the LEAP demand as the program before. This module is used to find out the needs of domestic fuel energy demands, or export targets of fuel energy.

2. the rate of process; in this rate of process, the technology of one energy generator or combination of fuel energy generator is explained, in examples: electricity generator, fuel energy refinery.

The four types of modules are:

1. this module is applied for limited analysis of process, as the small part of the energy route entirely. In this part only three types of data process area needed, as follows: feed stocks as the input, output or product of the conversion process, and the efficiency rate of those conversion process.

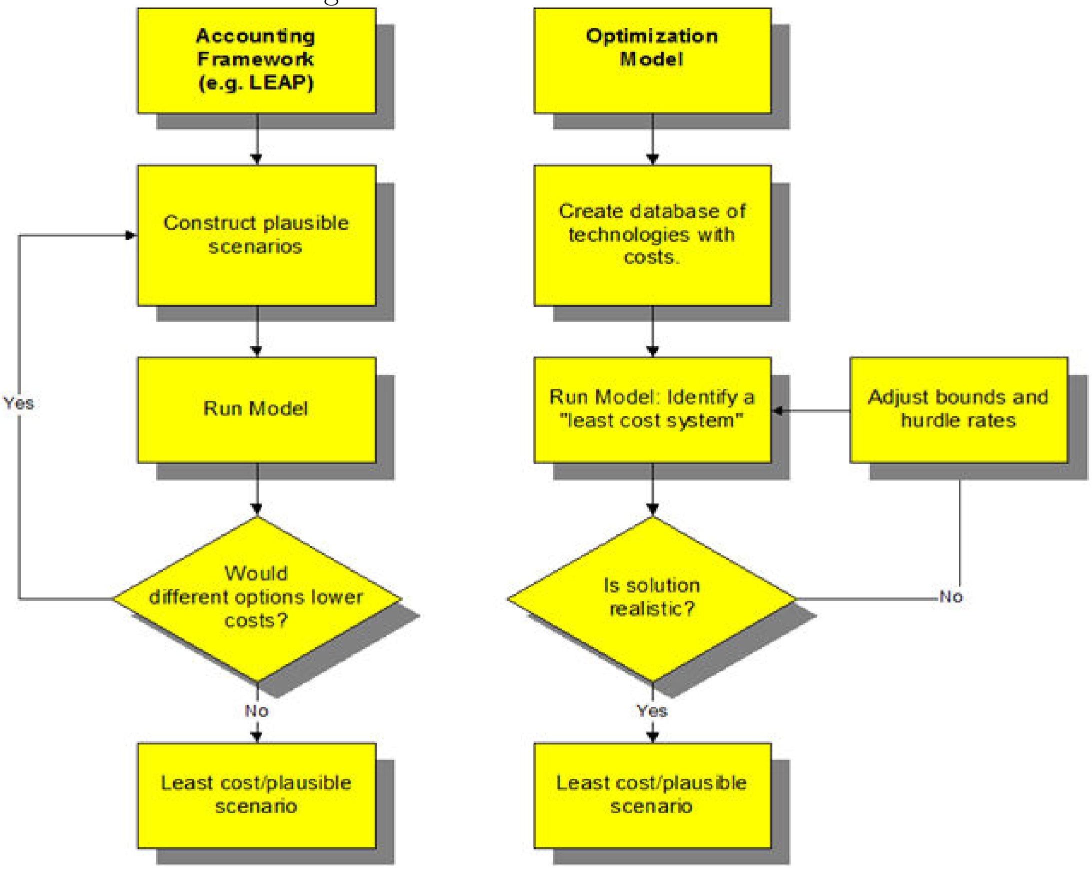
2. transmission and distribution, it is applied to explain the lost energy during transmission and energy distribution was operated. In each process is shown the percentage of the lost energy (example: lost = 5%, it is mean the secondary energy output was 95% efficient).

3. this module is applied for details and complex of various energy conversion processes. The use or various type of fuel in this process is aimed to product the various types of refinery and capacity included.

Accounting Frameworks:

- accounting frameworks (1): physical description of energy system, costs and environmental im- pacts optional. Rather than simulating decisions of energy consumers and producers, modeler explicitly accounts for outcomes of decisions. So instead of calculating market share based on prices and other variables, accounting frameworks

Figure 4.9: LEAP Calculation Flows



Source: LEAP Module

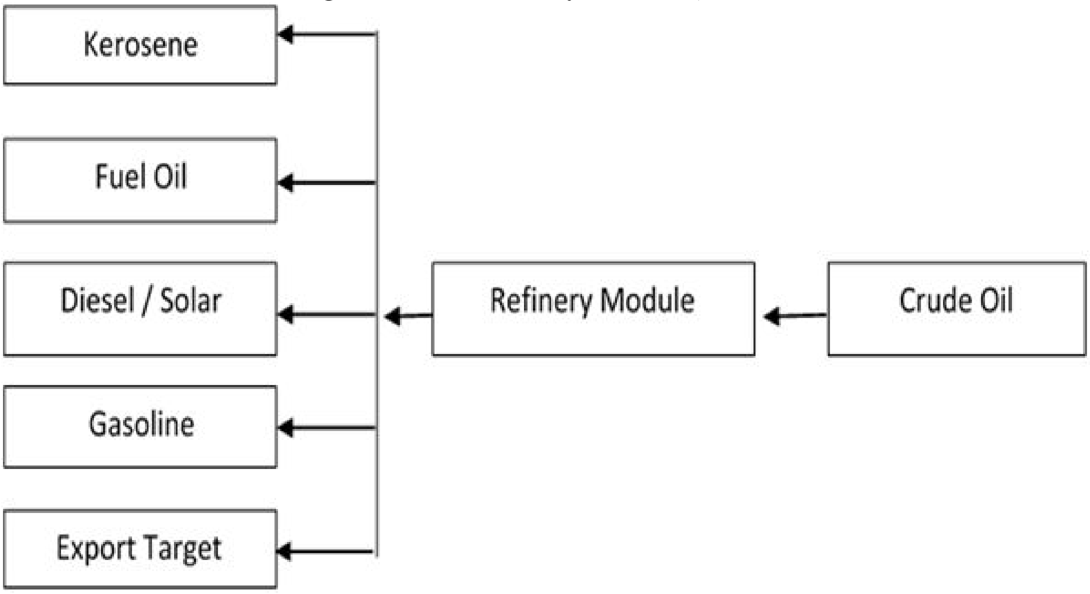
simply examine the implications of a scenario that achieves a certain market share. Explores the resource, environment and social cost implications of alternative future what if energy scenarios. Example: what will be the costs, emissions reductions and fuel savings if we invest in more energy efficiency and renewable vs. investing in new power plants?

- accounting frameworks (2) pros: simple, transparent and flexible; lower data requirements does not assume perfect competition. Capable of examining issues that go beyond technology choice or are hard to cost. Especially useful in capacity building applications. Cons: does not automatically identify least-cost systems: less suitable where systems are complex and a least cost solution is needed. It does not automatically yield price-consistent solutions (e.g. demand forecast may be inconsistent with projected supply configuration).

This electric module is specially used for electric reactors. Those electric reactors are arranged based on loading system capability, so that they will be able to fulfill the demand every year by managing certain peak-load system. The picture 5.3.2 is a module for electric reactors with various input (feed stock) as reactor power, which is then processed into electric output to measure the demand per year and peak-load system.

Calculation of the environment impact. In every year from the base year to the finished year of research, on the demand device and process of transformation in related with the EDB trough the sources categories, each EDB sources could be taken some various from

Figure 4.10: Refinery Module, LEAP



Source: LEAP Module

of the environment impact. The environment impact was based on the quantity of energy consumed for energy years. Whereas, environment impact that emitted by the by the transformations process was based on the quantity of the input and output of energy year. Form the several demands and its transformations, was converse form the giga-joules to the physic unit (i.e. ton). The point of the convention is to get the real data as similar with the data was kept in the EDB. After the conversion in to the physic unit form, then as similar with the real data in the three programs that are the demand program transformation program and EDB than the amount of environment impact could be calculated.

This calculation is divided into two parts; those are:

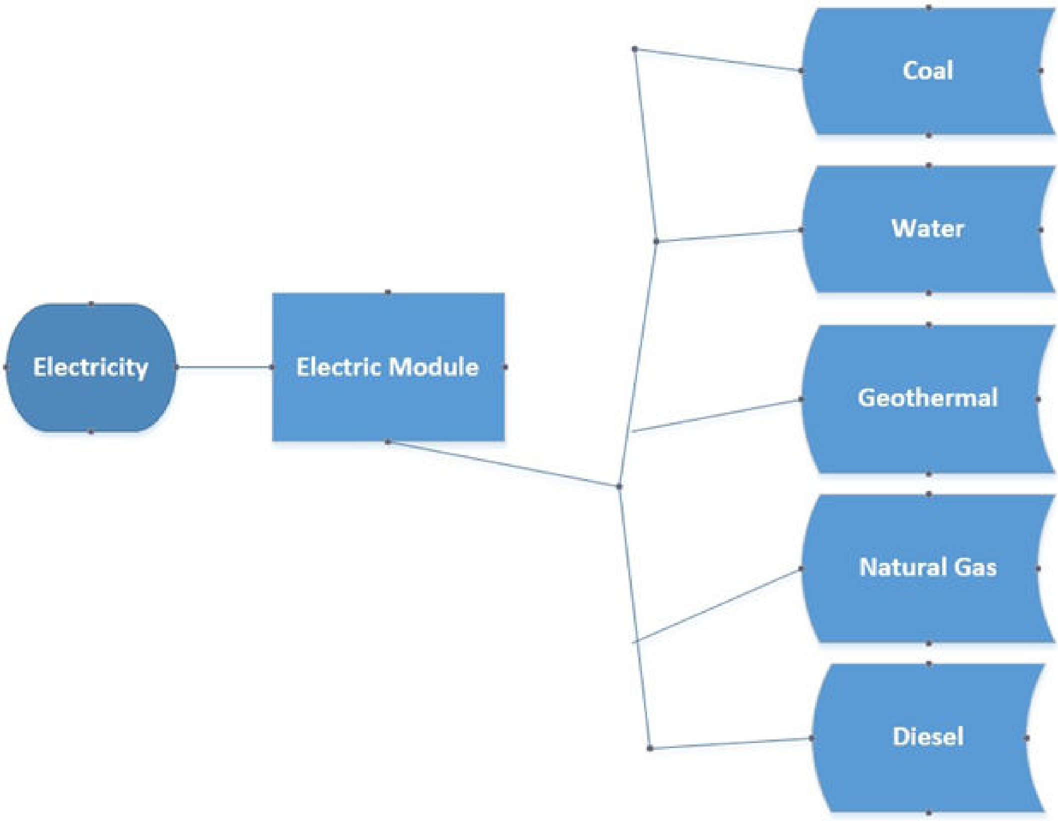
1. loading = physical ¡ coefficient. loading = the amount of emission in each year i.e.: CO2, in kg physical = physical quantity of fuel energy i.e. coals in ton. coefficient = EDB coefficient

2. adjusted loading = loading ¡ composition area composition EDB adjusted, loading: the adjustment of data entry to show the fuel composition used in certain area. Composition area: the percentage of emission content of every energy used in certain area. Composition EDB: the percentage of emission content of every energy in EDB.

3. the type of final energy (energy supply) being used at this time are; fuel energy, natural energy, gas energy, LPG, goal, coals bricket, electric, woods, charcoal.

In the future, it hoped types of renewable energy could be developed, in example: ethanol as become the transportation energy and so other alternatives energy to be the power of electric generators. In this time the could be supplied by the domestic energy industry. Temporarily import of energy was relatively in small scale, it is only done when

Figure 4.11: Electric Reactor Module



Source: LEAP Module

the domestic production of energy is being disturbed. However, in the parts of domestic oil refinery keep used the imported of crude oil (oil stock).

It shows the flows of energy supply in the scheme form it is coming from the primary form into the final energy that ready to consumed. This scheme is called reference energy system (RES) - in the quite right of the column is the various forms of primary energy: wind, natural gas, oil, coal, woods and water power. The directly consumed of these form to be the final energy are: natural gas, coal and woods. In the middle of the column is transformation of energy. Electric was come from the transformation process of geo-thermal, water power, natural gas, coals, and fuel energy; fuel energy were coming from the transformation of oil mining; LPG comes from the transformation of oil mining and gas, etc. Energy that comes from the transformation process is called secondary energy that directly could be used to fulfill the final energy demand. The quite left of column is the energy demand on the that figure, the demands its mean domestic energy demand and export energy demand than in that figure shown the flows of LNG to the demand box for export of LNG. The energy industries that produce the primary energy are crude oil, gas and coals; whereas the secondary energy producers, LPG refinery, LNG refinery, industry of coal bricket, charcoal manufacture and ethanol manufacture. In order to fulfill the raising amount of energy demand it is needed the capacity extension from energy industries. Data analysis in this part is contains of several parts:

data analysis of demand program: in this part, it would be shown some information the demand projections of the industrial sector and households sector toward energy, including electricity energy.

data analysis of transformation program: the data processing of this part will give information the amount of electricity reactor output (in joules), the amount of losing energy during transmit- ting and distributing process. The activities of energy consumption are divided into household sector and industry sector. Model assumption the assumption models used are:

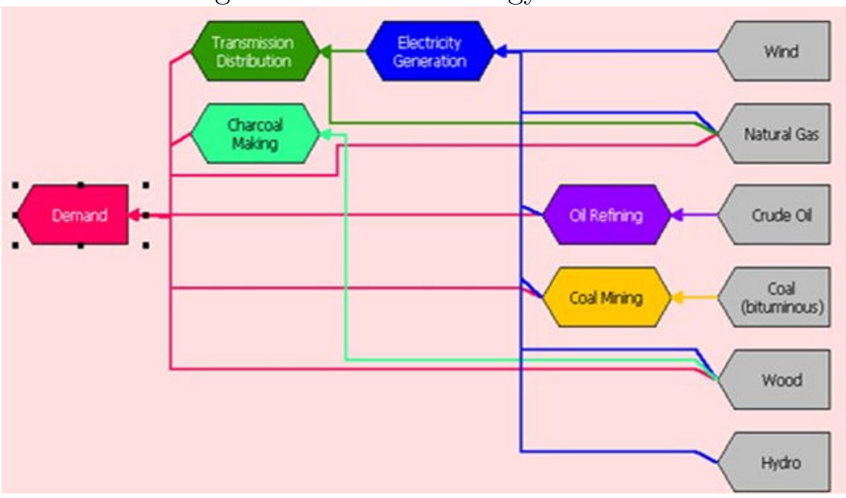
- The growth in year 2002 2030, the GDP is projected to grow moderately 2.254 % per year. This GDP growth is a trigger for the growth of other sectors energy consumption instead of household sector.
- The energy consumption in household sector instead of electricity is the average consumption of total population, while for the electricity the calculation is only considered for they who get electricity access. The electrification ratio assumption per population group averagely in the year 2000 is 52.019%. The growth of energy consumption is as followed: electricity 7.794 %, oil 2,51 %, natural gas 2,54 %, coal 1,08 %, and LPG 6,29 %. The growth rate of energy demand per year up to 2030 for:
- Electricity; 4,305%
- Oil; 2,7887 %
- Coal; 8,44 %
- LPG; 2,37%

Demand program on analysis energy demand was implicated by the variables of macro economy and micro economy. The variable of macro economy that implicate the energy demand is the price of energy, theoretically the price of energy must be relates toward the energy stock level and market scarcity both. But, in the reality, the price of energy was hanged on the government policy frequently. Regulation of subsidy policy to the energy demand implicate toward this type of energy demand pattern. Even so regulation of subsidy policy to the oil energy was implicating deeper toward the domestic energy demand entirely.

4.9.4 Conclusion

The source of energy in Indonesia, for example: oil, gas, coals, geo thermal, and so the raw material of nuclear, it is also the energy sources comes from the surface. In example; biomass, water power, wind power, tides power and solar power. Few of these energy could be directly consumed to fulfill the needs of final energy, but the other parts must be exchanged in to the different form of energy through the transformation process, to achieve the final energy that is ready to consume.

Figure 4.12: Final Energy Demand



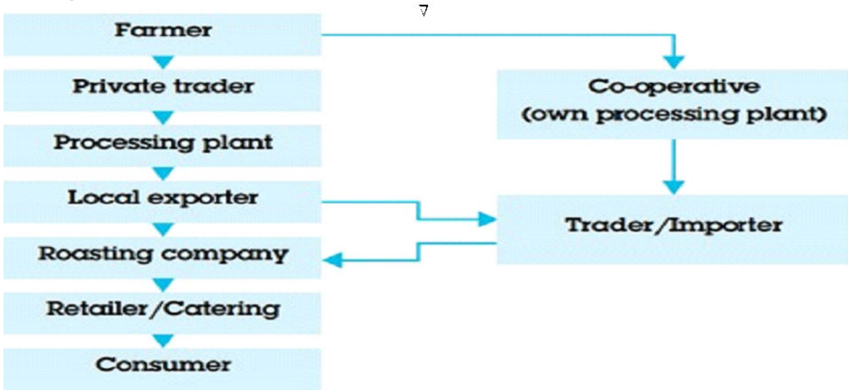
Source: LEAP Module

4.10 Energy Efficiency Measures for Coffee Production

The qualified production system is required for supporting global supply chain system. The lag of management system in logistics and supply chain quality will give impact on sustainability of business itself, both in short run and long run term. Indonesia has a big challenge for coffee industries, especially for European market. All kind of management skill is needed to handle the business by cooperation from all stake holders. The aim of this paper is to trace the gap and lag of business opportunity, particularly in global business through global supply chain. The combination of marketing intelligence and supply chain approach are tools to support this business. Moreover, to get initial stage of this business, the framework of construction supply chain in economics and management science will perform in this paper. Finally, this paper will deliver such kind of description and analysis, mainly the product system of Indonesia's coffee. In addition to know more the production and distribution of coffee in European market, clearly. The management gap on the role of government, supply chain management and logistics or reverse logistics, also in case studies of innovative business practice as follows:

- the lag of management system in logistics and supply chain quality
- a big challenge for coffee industries, especially for European market
- to trace the gap and lag of business opportunity, particularly in global business through global supply chain, moreover to get initial stage of this business, the framework of construction sup- ply chain in economics and management science will perform in this paper.
- description and analysis, mainly the product system of Indonesia's coffee. In addition to know more the production and distribution of coffee in European market.

Figure 4.13: The Paths of Coffee Producer to EU Market [7]



Source: Fair trade Organization, 2012

4.10.1 Market Information

United Kingdom and France are best example in fair trade with certification or labeling, generally. The organic coffee from Germany is key role in EU market without doubt. Market for sustainable coffee has been achieving by Germany, Denmark, Dutch, Finland, Austria, Luxembourg, and Sweden.

The smaller market for sustainable coffee product is South Asia and East Europe. However, sustainable coffee product is more available in Spain, and Italia. The fair trade and organic coffee time to time is become well known in small shops, especially in down town.

More than 72 % of Frances population drink coffee, the market size shows that Frances market has more various commodities in Europe. The Arabica coffee is the more popular in France. The share of Robusta coffee is 32%. Frances import for green coffee 254.000 tons in 2009 and was increasing year by year.

Table 4.24: Percentage of Distribution for Green Decafeine by Frances Import

Description	2007	2008	2009	2010	2011
Arabica	51.5	52.7	49.8	49.6	48.8
Colombian Milds	7.2	8.6	6.8	7.1	6.8
Other Mild	14.8	15.5	14.9	15.1	15.1
Brazilian Naturals	29.5	28.7	28.2	27.5	26.8
Robustas	30.2	28.2	28.0	26.5	25.4
Others	18.3	19.0	22.3	23.8	25.8

Source: Source: International Trade 2007.

shows that Arabica, Colombian Milds, Brazilian, Natural Robustas, and etc has decreased, the exceptional is type of mild is still open to make more open market share.

Export and import regulation: all export and import for EU market is strictly and high regulated. By taking Indonesia's part for this research work can be finding easily, particularly procedure and its requirements. Addressing to International Coffee Agreement (ICA-1983) and its changed for international agreement, quota, price control, and market intervention. By type of coffee product, Indonesia is exporter for 85 % of Robusta, and 15% Arabica. The climate change and differences of climate for certain continent are key factor for increasing demand of coffee. During winter is a good example for increasing of coffee demand.

The market prospect for coffee product in France: the more interesting is the competition, for re- export coffee in France. This happened in France, due to France market is a good market for big importer for both green coffee and roasted coffee. To the exporter is important to taking care of tracing coffee product. How the original coffee product has been produced in origin country? All products must be verified and certified to assure the product quality by labeling. All exporters faced on difficulties to entry in European market, due to the local regulations and European commission members. The impact of certification scheme will be different country to country. For example; organic coffee from Germany will be important, relatively.

4.10.2 The Competition of Green Coffee

The supply chain in re-export mechanism from EU is increase time to time. On average 19 % per year and the market share from companies from rest the world is noted 6.1 %, only. The impact of comparative scheme from different certification is varieties. Coffee organic from Germany is really important. But, in UK and France Fair trade scheme is more important.

The market for sustainable coffee in UK, Denmark, Netherlands, Finland, Austria, Luxembourg, Sweden, and Germany is quite high. The market shares for sustainable coffee in south Asia, and east Europe is smaller. However, sustainable coffee could be found easily in Spain and Italy. Indonesia has a good competitor in this product, mainly for Robusta coffee. Namely: Vietnam, Cote d'ivoire and Cameron. The retail price for EU 2007 with price 5.71 Euros (ICO, 2008), year by year the price is increasing. Indonesia's coffee product has been decreased in the case of 2011 target, 633.990 tons only from production target 689.920 tons. Meanwhile, Germany is the main coffee market for coffee organic. Its so called Rainforest Alliance. EU has been imported coffee organic 50 %. This trend will be increase year by year by support of Nespresso coffee brand.

The governments regulation based on No.27/M/-DAG/PER/7/2008, for coffee export. In 2009/2010, Robusta's export 85% and Arabica 15 %, 350 tons that is equal to US$ 705.5 million.

It is natural when the demands of world coffee increase yearly; the supply from Indonesian coffee companies could not provide the product sufficiently. Frances import policy: the import is regulated by EU standard and all agriculture products are in double supervision in order to get sanitary and phytosanitary certification.

4.10.3 The Basic Idea of Supply Chain Approach

How to maintain the coffee product in sustainable global supply chain? There is a high competition from green coffee from EU members to be export to France. The market of EU is promising market development.

The basic identification of international coffee product is from Vietnam, Cote d'ivoire, and Cameroon. Supply chain framework in these cases described international coffee product is need global supply chain complexity approach. There are a lot of barriers for exporting coffee product:

1. the caffeine volume should not be exceeding 0.3 % from weight, net.
2. it should be noted well that without containing caffeine by specific label.
3. if there is additional ingredient should be marked on coffee product, officially.
4. if there is additional liquid on the coffee product less than 25 % from weight-net. In global supply chain perspective shows that the one of the successful business method in not make a deal, only. The action before enhance the business is a make construction for supply chain coffee product.

How the supply chain business product can be sustainable one? especially for European market. Therefore, it is important to know what kind of coffee production system in country origin. Further- more, the global supply chain system should follow certification, social security insurance system, packaging, labeling, and etc. Somehow, the labeling scheme is one of the non-tariff barriers.

The formal relationship should be maintaining, especially inter association coffee producer. For example: the business relationship between importer and exporter. International trade, France seems to be stronger by making rebounded effect when their international trade become intensively with Asian countries. In business of coffee product can be summarized as follows:

1. the statistics ICO (International coffee organization) shows the coffee consumption in France, 72 % has been consuming coffee product, daily.
2. more than 90% of them have coffee machine in their home. This condition pushed the consumption of coffee product become highest one. The culture of drink coffee is one of their embedded cultures, also. The consumption of coffee product in France is 333 thousand tonnes in 2009; it has been increased 8.0% from 2008.
3. from time to time, France becomes the third biggest in EU for coffee product market. The coffee consumption is 14 % in entire of EU (ICO, 2010). Per capita consumption as noted in 2008 was 5.5 KG (ECF, 2008).
4. The Fairtrade in coffee product has been increasing while the economic performance in a country grows up as well. This perspective will take account that the farmer should have a better welfare and quality of life, also.
5. the good sample as follow; in general, the consumption of coffee 100 % is Arabica coffee, 36% is pure coffee, then mixed coffee containing Arabica coffee and Robusta coffee 17 % is in single service packages (SSP).

6. the rest is 17 % as ethnic sector coffee or so called coffee espresso 10 and then mild Arabica 6 % or is in a common sense so called green coffee which is low level of caffeine.

4.10.4 Positioning

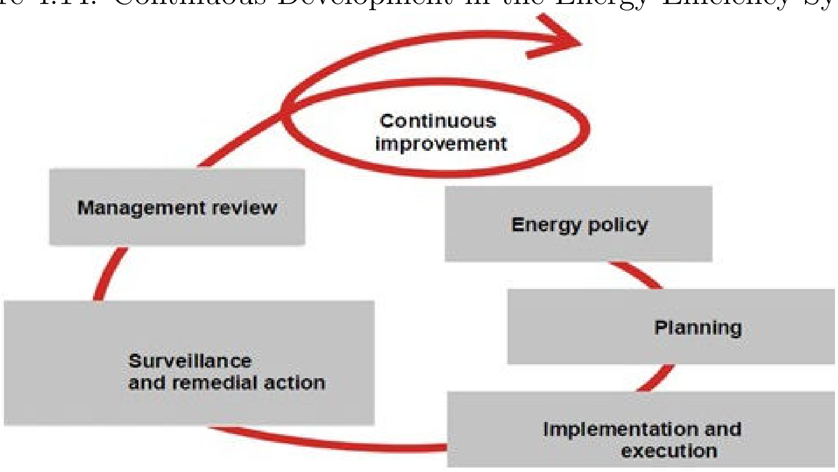
Indonesia has a chance to take over the Vietnam position as coffee exporter, particularly on Robusta coffee product. These are following strategic could be done, comprehensively: market share in EU market should be maintained and become greater periodically. How to reach this strategic; it is by increasing the quality of product, and or certified coffee organic. The certified coffee product is one of the best methods to find the barriers of international coffee trade.

The potential EU market: while focusing on sustainable coffee product, the effort is also how to go direct market penetration, efficiently. By increasing product quality and sustainable of business are best key points in this business challenge. Based on current issues there are a lot thing to do to make more efficiency in business development.

Promoting the environmental issues has linked to business coffee product. The linked has been proposed in the concept of fair trade, organic rain forest alliance and UTZ certified. The certified of fair trade in the main strategic for coffee product. By this certification on fair trade, the consumer will be guaranteed that the international coffee product price is competitive one. This policy is one of the method how government protect the farmer and or producer coffee product. By exclusivity, part of coffee product in the reality is produced by small farmer or enterprises.

Almost 54 % of fair trade coffee product certified at EU is closed to 91 thousand tons of volume in coffee product trade. The coffee product sold has increased 24 %, started from 2005. The fair trade put on his product by labeled coffee organic. By referring the law enforcement of EU, 1994/4/EC for coffee extraction, the coffee product can be distributing in EU market by putting labeling system which is contain the composition and coffee extract.

Figure 4.14: Continuous Development in the Energy Efficiency System



Source: LEAP Module

The coffee extract: the extraction from roasted coffee by adding the certain of water volume. The acid nitrate and hydraulics process is excluding in this process. For further information, these are not kind of definition of coffee extract; the coffee instant, and or other coffee extraction method that similar to coffee instant.

4.10.5 Methodology

Calculation of the Energy Efficiency:

For the calculation of the energy efficiency index (EE) of a domestic coffee machine, the Annual Energy consumption of a domestic coffee machine is compared to its Standard Annual Energy Consumption (a) The Energy Efficiency (EE) is calculated as follows and rounded to one decimal place:

$$EE = \frac{(SAE\ )}{(AE\ )} \tag{4.7}$$

Where,
SAE= calculated standard annual energy consumption of the domestic coffee machine, in kWh/year with SAEC is 110 kWh/a for drip filter coffee machines, 137 kWh for portioned filter coffee machines and 110 kWh/a for espresso machines;
AE = calculated annual energy consumption of the domestic coffee machine, in KWh/year and rounded to one decimal place.

Trend setter: The last updated is Jamaica for trend setter in business coffee product. Jamaica could entry easily to the European market by getting rainforest alliance certified. The one of best product from them is the blue mountain coffee which is one of their best products. See, Mannino et al. (2008), Gokce and Gokce, (2013).

4.10.6 Conclusion

However, it is still hard to measure energy efficiency in global supply chain of coffee production. Because, the process of coffee production in developing countries or exporter countries are different one. For example, we need a huge of water for coffee processing and exported them in raw materials. so that, to make sense the energy efficiency which used a huge of electricity for coffee processing were happen in large enterprise or developed country as well. Furthermore, to follow up those kind of strategic method:
the first is by avoiding the excessive insecticide on coffee plantation and coffee price at local price and international price. It's a must how to make a balancing the international price and local price competitiveness.
Second, business collaboration rather than collaboration to make more openness in France or EU market. More specific, there are two markets segmentation which consist of users and supplier in this business opportunity a). house hold consumer, market segmentation become more various one, b). small medium coffee shop: super market, coffee shop, small shop which is focus on selling coffee product.

4.11 Nuclear Power Plant in Global Supply Chain

Since the first construction phase through entire of finishing nuclear power plant is need global supply chain both local and international level. Industrial supporting system will survey to get feasible impact of nuclear power plants construction. During nuclear power plants construction will absorb 4000 peoples both in international and domestic people. The first construction cost will take 10 % from total cost of nuclear power plants construction.

The positive impact is local people will get the job from road construction and nuclear power plants pre-construction. Operational system of nuclear power plants construction should well have connected to regional economy. Avoiding the negative impact from plants construction. Moreover, it can promote local economy.

Discussing industry profile shows that all component analysis and nuclear power plant construction based on local industrial linked with construction plant needs. From tracing studies have found 63 industrial profile that can promote the project. However, it will be first stage for local industry to be more efficient and high level of productivity to support sustainability of nuclear power plants construction. The domestic cost in economic sector on input-output table framework BOP, Balance of plant components price has been determined in input output analysis and identify the necessities for power plants construction.

Identification for local industries which can lead for produce plants equipment with high quality. The good and all services can be trace form I-O tables. From I-O table can be identified the price and goods based on economic sector activities. The same methodology can be used for each power plants construction based on KSNP type to know how much it will take cost for each year plants construction. Mapping all cost can be done on I-O tables. Monte Carlo simulation on global electric management trading; the present situation is due to the French government deciding in 1974, just after the first oil shock, to expand rapidly the country's nuclear power capacity, using Westinghouse technology.

4.11.1 Introduction

In order to overcome the electricity crisis that exist in Indonesia. The head of the national nuclear energy agency (BATAN), propose to the government to develop nuclear energy. Building nuclear power plants will be able to overcome these problems with the selling price is cheaper and stable. The pacific islands region as one of the ideal locations of nuclear power plants, in addition to the northern region of the island of Java.

"The results of the poll last November, 72 percent of Indonesia supports. In the pacific islands, 57 percent of the population has been supportive". It calls nuclear power plant technology (NPP) is now entering the third generation is much safer. In the latest technology, the NPP will automatically stop operating in the event of an earthquake. This technology is not owned nuclear power plant in Fukushima, which leaked during the tsunami in 2011. "Fukushima was using the technology in the 1960s".

How ready we build and manage human resources? A preparatory program of development of nuclear power plants is actually quite a long time, so more than 30 years. But until this last challenge, the community, public acceptance of nuclear power. Perhaps the perception of some people, the nuclear scary, like the case of a recent accident in Fukushima (2011), Chernobyl (1986), and the atomic bomb. We can understand it. The tendency of poll results last? Post-traumatic in Fukushima, only 40 percent who favor nuclear power plants.

This is a very good capital for the new government to harness nuclear power plants in order to overcome the energy crisis. There is no single country that people 100 percent supportive of nuclear, but many countries are rational. For example: America is a country where Greenpeace was born but also operate 100 nuclear power plants. The growth in nuclear energy: supply chain challenges, "Despite the Fukushima nuclear accident and the withdrawal from the market by countries such as Germany, nuclear energy is experiencing a global resurgence as countries aim to diversify their energy mix and reduce their carbon emissions", John Wood, 2014. However, still make a hope for energy alternative development for nuclear supply chain in developing countries such as Indonesia.

The research work can be drawn as follows; the location of project planning is in north of central java island. The power plants construction is needed due to the massive energy demand. The nuclear power plant will contribute to national demand 4 %. The estimation for 2015 confirmed that the national demand for electricity 100 Gigawatt. However, in this decade is available 34 Gigawatt, only. All need in this research work is management skill; particularly on energy management logistics and supply chain management inter islands.

This study is to measure the impact of nuclear power plant and its significance to global supply chain that will occur to this site plant site. The economic activity will increase if the site plants construction well executed. The study can be explored for prep-construction and phase of construction. By certain condition this study estimates the impact of site plants construction in specific scale of regional economic development. The necessary of theoretical background and literature review will contribute in this research. The nuclear site plants construction or installation as the main object. Moreover, to understand well the mechanism of nuclear plant site.

Nuclear power plant need enormous of uranium stock. Fortunately, a huge amount of uranium exists in Kalimantan Indonesia. The local administrative is waiting for central government to build up nuclear power plants. Enormous amount of uranium closed to 900 tons, precisely at Melawi regency, west Kalimantan. The current of Indonesia's uranium reserve of at least 53,000 tons which might be used enough for basic material to build nuclear power plants. Its included 29,000 tons in Bangka Belitung. Approximately 1,000 MW, Nuclear power plants needs 200 tons' uranium per year. By reaching 29,000 tons the plants can be operated for 145 years.

For Papua needs some research field, stated by the national nuclear energy agency

(BATAN-Indonesia). However, Economic development is the process of the local government and community to manage all resources to create economic growth and local economic activities. The endogenous development, institutional developments are important to support local government activities.

Table 4.25: Nuclear Power Plants World-Wide-1

No.	Country	Number	Electric.Net	Number	Elec.Net
1	Argentina	2	935	2	717
2	Armenia	1	375	-	-
3	Belarus	-	-	1	1,109
4	Belgium	7	5,927	-	-
5	Brazil	2	1,884	1	-
6	Bulgaria	2	1,906	-	27,756
7	Canada	19	13,5	-	-
8	China	21	16,89	28	1,6
9	6 Reactor in Taiwan	6	3,804	-	1,6
10	Czech Republic	4	2,752	1	-
11	Finland	58	63,13	1	-
12	Germany	4	5,308	-	-
13	Hungary	21	915	6	1,325
14	India	1	42,388	-	6,37
15	Iran	48	20,71	2	-
16	Japan	23	42,388	5	-
17	Korea, Republic	2	20,71	-	630
18	Mexico	1	1,33	-	-
19	Netherlands	1	482	2	8,382
20	Pakistan	3	690	-	880
21	Romania	2	1,3	10	-
22	Russian Federation	33	23,643	2	-
23	Slovakian Republic	4	1,815	-	-
24	Slovenia	1	688	-	-
25	South Africa	2	1,86	-	-
26	Spain	7	7,121	-	-
27	Sweden	10	9,474	-	-
28	Switzerland	5	3,308	-	-
29	Ukraine	15	13,107	2	1,9
30	UAE	-	-	2	2,69
31	UK	16	9,231	-	-
32	USA	104	101,465	5	5,633
	Total	435	372,022	72	68,344

Source: Nuclear Power Plants World-Wide-3

Hungary, Japan, and Romania were trying to provide nuclear plant site with enough sufficiency of energy sources, particularly on nuclear site. Regarding current issues of nuclear energy Japan and Germany shows to decrease the number of nuclear power plant site. The issue was environmental impact and concerned for earthquake problems.

After getting green light from US Government, the Iranian government in massive activities to shows their capacity in energy source (nuclear energy), especially for reconstruct their economic situation. USA is the giant for providing energy source in nuclear system. It is correlated with historical and scientific development program. However, France is in advance for nuclear scientific development.

Table 4.26: World Nuclear Power Reactors and Uranium Requirements-1

Country	Nuc. Elec.Gen.		Reac.Op.		Reac.Und.Cons.		Reac. Planned	
	billion kWh	% e	No.	MWe Net	No.	MWe gross	No.	MWe gross
Argentina	5.3	4.0	3	1627	1	27	0	0
Armenia	2.3	30.7	1	376	0	0	1	1060
Bangladesh	0	0	0	0	0	0	2	2400
Belarus	0	0	0	0	2	2400	0	0
Belgium	32.1	47.5	7	5943	0	0	0	0
Brazil	14.5	2.9	2	1901	1	1405	0	0
Bulgaria	15.0	31.8	2	1906	0	0	1	950
Canada	98.6	16.8	19	13553	0	0	2	1500
Chile	0	0	0	0	0	0	0	0
China	123.8	2.4	26	23144	23	25163	45	52200
Czech	28.6	35.8	6	3766	0	0	2	2400
Egypt	0	0	0	0	0	0	2	2400
Finland	22.6	34.6	4	2741	1	1700	1	1200
France	418.0	76.9	58	63130	1	1720	1	1720
Germany	91.8	15.8	9	12003	0	0	0	0
Hungary	14.8	53.6	4	1889	0	0	2	2400
India	33.2	3.5	21	5302	6	4300	22	21300
Indonesia	0	0	0	0	0	0	0	30
Iran	3.7	1.5	1	915	0	0	2	2000
Israel	0	0	0	0	0	0	0	0
Italy	0	0	0	0	0	0	0	0
Japan	0	0	43	40480	3	3036	9	12947
Jordan	0	0	0	0	0	0	2	2000
Kazakhstan	0	0	0	0	0	0	2	600
Korea DPR North	0	0	0	0	0	0	0	0
Korea RO South	149.2	30.4	24	21657	4	5600	8	11600

Source: World Nuclear Association, 2014

Table 4.27: World Nuclear Power Reactors and Uranium Requirements-2

Country	Nuc. Elec.Gen.		Reac.Op.		Reac.Und.Cons.		Reac. Planned	
	billion kWh	% e	No.	MWe Net	No.	MWe gross	No.	MWe gross
Lithuania	0	0	0	0	0	0	1	1350
Malaysia	0	0	0	0	0	0	0	0
Mexico	9.3	5.6	2	1600	0	0	0	0
Netherlands	3.9	5.6	2	1600	0	0	0	0
Pakistan	4.6	4.3	3	725	2	680	0	0
Poland	0	0	0	0	0	0	0	6
Romania	10.8	18.5	2	1310	0	0	2	1440
Rusia	169.1	18.6	34	25264	9	7968	31	32780
Saudia Arabia	0	0	0	0	0	0	0	0
Slovakia	14.4	56.8	4	1816	2	942	0	0
Slovenia	6.1	37.2	1	696	0	0	0	0
South Africa	14.8	6.2	2	1830	0	0	0	0
Spain	54.9	20.4	7	7002	0	0	0	0
Sweden	62.3	41.5	10	9487	0	0	0	0
Switzerland	26.5	37.9	5	3333	0	0	0	0
Thailand	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	4
Ukraine	83.1	49.4	15	13168	0	0	2	1900
UAE	0	0	0	0	3	4200	1	4200
UK	57.9	17.2	16	10038	0	0	4	6680
USA	798.6	19.5	99	98756	5	6018	5	6063
Vietnam	0	0	0	0	0	0	4	4800

Source: World Nuclear Association, 2014

As of 21 April 2015, it has included only for those future reactors envisaged in specific plans and proposals and expected to be operating by 2030. Then, making a plan for sort-run developments and the prospective long-run to role nuclear power in national energy policies.

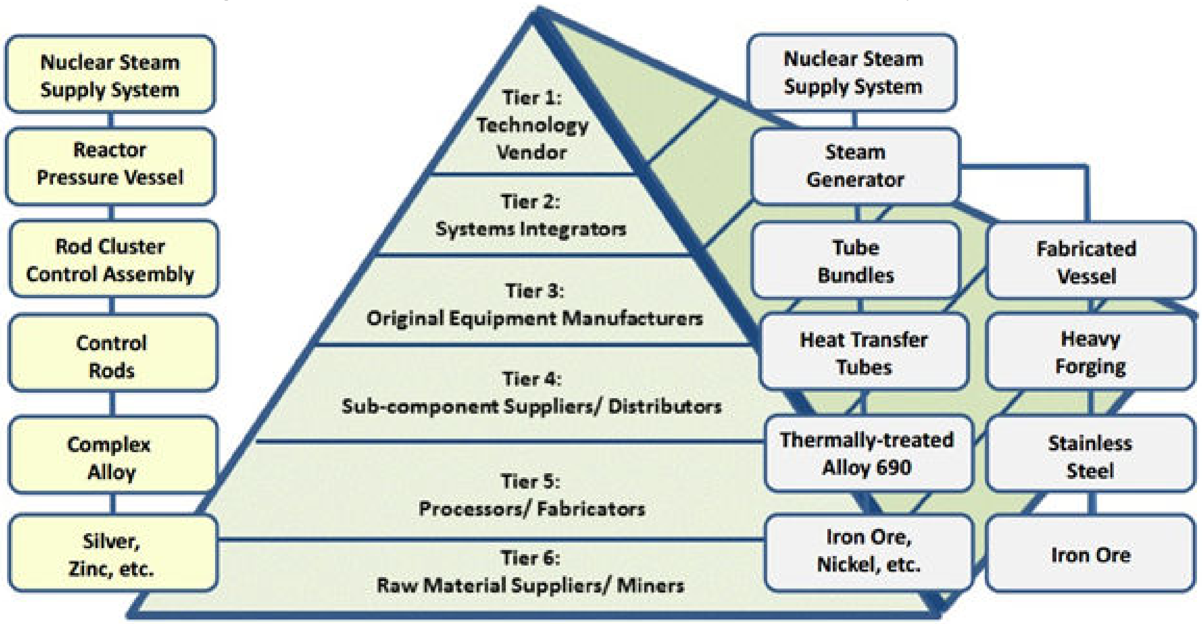
Figure 4.15: Maintenance Supply Chain Model

Information Flow			**Customer**
Decision Flow			
OEM (1...m)⇐⇒		**Main Contractor**	←−**Orders**
	Transaction	**Organizational Management**	
Material Supplier (1...n)⇐⇒			
		Functional Activities	
Sub-Contractor (1...k)⇐⇒	**Material and Service Flow**		←−**Products/Services**
reverse logistics			
Logistics			

Supply chain management is well-known concept in logistics. Cooper and Ellram (1993) SCM is:an integrative philosophy to manage the total flow of a distribution channel from the supplier to the ultimate user. Mentzer et al. (2001) define a supply chain as: A set of three or more entities directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer. Conkling (2011) stated that the integration of business processes from end user through original suppliers that provides products, services and information that add value for customers. There is an emphasis on flows of products, services and information between firms, which have to be organized and managed as if they belong to one entity.

According to the energy scarcity, energy efficiency, energy supply chain inters countries, islands, and cities. The US administration deregulates for nuclear business development:remove protectionist access to the global supply chain, promote commercial nuclear industries in foreign markets, supplementary compensation for nuclear damage, and restriction for extended scheme of loan guarantees.

Figure 4.16: Macro Scheme of Global Nuclear Supply Chain



Source:World Nuclear Association, Greg Kaser, 2014

Ensuring that the economics of nuclear power are competitive with other generating sources First, economic challenges, and Second, developing reliable international supply chains:

a). capability challenges.

b). quality challenges.

c). challenges are inter-related.

Focusing on Capability Challenges Develop the supply base: - to create joint understanding; on safety culture, on quality management,

- knowledge transfer,
- building the capability of the workforce.

4.11.2 Input Output Estimation Model

To study interconnection or link between production sectors in economy, the best model or methodology is input-output model, Leontief (1986). The first input-output model developed by Wassily Leontief from Harvard University in 1930s.

The input output model is one of the powerful models to see the interaction between economic sectors. The economic structure can be found easily in input output model. The economy structure consists of a country, region, and metropolitan and inter region. The input output analysis is the tools to know the general equilibrium. The economic condition is reliable in this condition. Therefore, it is not theoretical approach only.

Remuneration of the production factor is called the value added. The factors of production in the economy are not all used up in the production sectors. There are also the factors of production are used as final demand. In addition of intermediate inputs purchased from other sectors in the economy, and the primary input in the form of the factors of production, the production process of certain sectors can also buy inputs from abroad, in the form of imports.

Figure 4.17: Transaction of Input Output Table

			Intermediate demand		Final demand				Total Output
			Production sector						
			1	2	C	I	G	E	X
Intermediate Input	Production sector	1	Z11	Z12	C1	I1	G1	E1	X1
		2	Z21	Z22	C2	I2	G2	E2	X2
Value added		L	L1	L2	LC	LI	LG	LE	L
		N	N1	N2	NC	NI	NG	NE	N
Import		M	M1	M2	MC	MI	MG	ME	M
Total Input		X	X1	X2	C	I	G	E	X

Source:World Nuclear Association, Greg Kaser, 2014

It has referred as the input-output transactions table. It is assumed in the economy there are only two production sectors (sector 1 and sector 2); There are four components of final demand, household consumption (C), investment firms (I), government spending (G), and foreign exports (E); two factors of production, namely labor wage remuneration (L) and capital (N). In addition, the production sectors and end users can also buy goods from abroad in the form of imports (M). Sims et al. (2007), noted that the IEA (2006b) data on known reserves and estimated resources. The latter category may include some quantities shown as resources as in Figure

1. the capacity of energy carriers is shown by the width of the lines.

2. energy conversion steps may take place in the end-use sectors, such as the conversion of natural gas into heat and/or electricity on site at the individual consumer level.

3. buildings include residential, commercial, public service and agricultural.

4. organic waste is included with biomass.

5. the resource efficiency ratio by which fast-neutron technology increases the power-generation capability per ton of natural uranium varies greatly from the OECD assessment of 30:1 (OECD, 2006b). In this diagram the ratio used is up to 240:1 (OECD,2006c).

6. comparisons can be made with SRES B2 scenario projections for 2030, energy supply, Source: IEA, 2006b.

The output produced by sector, sector i is distributed to the two users. First, users who use the output for further production process, and second, users who use the output for final use. The first user is the production sector. Second, user is the end user. For the first user, the output of sector i are the raw materials or intermediate inputs (intermediate inputs), while for the second user, the output sector i is final demand. In the context of intermediate inputs, movements of goods between sectors, from sector i to sector j. From sector i to sector i itself, or the so-called displacement intra sector. In other words, the displacement of sector i to sector j, where i = j. Say that the value of the money flow of goods from sector i to sector j given notation zi j , the total output of sector i given the notation Xi and the total final demand sector i is given the notation Yi . Thus can be written that:

$$X_i = Z_{i1} + Z_{i2} + \ldots + Z_{in} + Y_i \tag{4.8}$$

that there are n sectors in the economy. Thus, there will be n equations for the whole economy, namely:

$$\begin{aligned} X_i &= Z_{i1} + Z_{i2} + \ldots + Z_{1n} + Y_i \\ X_2 &= Z_{21} + Z_{22} + \ldots + Z_{2n} + Y_2 \\ X_3 &= Z_{n1} + Z_{n2} + \ldots + Z_{nm} + Y_n \end{aligned} \tag{4.9}$$

For each column, note that can be written a column vector containing:

$$\begin{bmatrix} Z_{11} \\ Z_{12} \\ Z_{13} \\ . \\ . \\ . \\ . \\ Z_{n1} \end{bmatrix} \tag{4.10}$$

Referred as the input-output transactions table. It is assumed in the economy there are only two production sectors (sector 1 and sector 2); There are four components of final demand, household consumption (C), investment firms (I), government spending (G), and foreign exports (E); two factors of production, namely labor wage remuneration (L) and capital (N). In addition, the production sectors and end users can also buy goods from abroad in the form of imports (M).
Matrix with elements in the upper-left group called Environmental the input matrix. So it can be made between the input matrix, Z, which read:

$$Z = \begin{bmatrix} Z_{11} & Z_{12} \\ Z_{21} & Z_{22} \end{bmatrix} \tag{4.11}$$

So it can be made a primary input matrix, W, which read:

$$B = \begin{bmatrix} L_{11} & L_{12} \\ N_{21} & N_{22} \end{bmatrix} \tag{4.12}$$

While the matrix with elements in the upper-right group called the matrix of final demand. The contents of this matrix are the final demand for each sector in the economy. In the discussion, the matrix is usually used as a column vector, which each element is the total final demand of each sector in the economy. The final demand matrix form is:

$$Y = \begin{bmatrix} C_1 & I_1 & G_1 & E_1 \\ C_2 & I_2 & G_2 & E_2 \end{bmatrix} = Z = \begin{bmatrix} Y_1 \\ Y_1 \end{bmatrix} \tag{4.13}$$

By knowing zij and Xij, can be calculated a technology coefficient, ai j , as follows:

$$A_{ij} = \frac{Z_{ij}}{X_j} \tag{4.14}$$

which is often called the input-output coefficients, or direct input coefficients. These coefficients can be interpreted as the number of input sector i required to produce one unit of output of sector j. If there are n sectors in the economy, there will be as many as the n x n coefficient ai j . All coefficients can be expressed in a matrix, A, in the form of:

$$A = \begin{bmatrix} a_{11} & a_{12} & \ldots & a_{1n} \\ a_{21} & a_{22} & \ldots & . \\ . & . & . & . \\ . & . & . & . \\ . & . & . & . \\ a_{n1} & a_{n2} & \ldots & a_{mn} \\ \end{bmatrix} \tag{4.15}$$

A matrix is often called the technology matrix. A matrix of each column shows the composition of inputs in the production process of the sector i, which reflects the technology used by the production sectors. Algebraic manipulation of condition yields:

$$Z_{ij} = a_{ij}X_j \tag{4.16}$$

This equation confirms again that all the coefficients ai j other not reflect the relationship between the output and the input of sector j i sector. In the analysis of the input-output relationship means the amount of the fixed nature of this relationship has not changed despite improvements in the economy. After getting the technology coefficients ai j , then the system of equations can be written as follows:

$$\begin{array}{llllll} X_1 = & a_{11}X_1+ & a_{12}X_2+ & \ldots & a_{1n}X_n+ & Y_1 \\ X_2 = & a_{11}X_1+ & a_{12}X_2+ & \ldots & a_{2n}X_n+ & Y_2 \\ . = & & & & & \\ . = & & & & & \\ . = & & & & & \\ X_n = & a_{n1}X_1+ & a_{n2}X_2+ & \ldots & a_{nn}X_n+ & Y_2 \end{array} \tag{4.17}$$

By shifting all elements to the left, except Yi , obtained form:

$$\begin{array}{lllllll} X_1 & - & a_{11}X_1 & - & a_{12}X_2 & - & \ldots - a_{1n}X_n - Y_1 \\ X_2 & - & a_{21}X_1 & - & a_{12}X_2 & - & \ldots - a_{2n}X_n - Y_2 \\ . & & & & & & \\ . & & & & & & \\ . & & & & & & \\ X_n & - & a_{n1}X_1 & - & a_{n2}X_2 & + & \ldots - a_{nn}X_n - Y_2 \end{array} \tag{4.18}$$

Xi can be simplified into:

$$\begin{aligned} (1-a11)X1 - a12X2 - ...a1nXn &= Y1 \\ -a21X1 - (1-a22)X2 - ... - a2nXn &= Y2 \\ . \qquad\qquad & \quad . \\ . \qquad\qquad & \quad . \\ . \qquad\qquad & \quad . \\ -a_{n1}X_1 - a_{n2}X_2 - .....(1-a_{nn})X_n &= Y2 \end{aligned} \tag{4.19}$$

Where I, is the identity matrix of size n x n matrix A is as defined in advance, while X and Y is the column vector of the form:

$$(I-A)X = Y \tag{4.20}$$

$$X = \begin{bmatrix} X_1 \\ X_2 \\ . \\ . \\ . \\ X_n \end{bmatrix} \leftrightarrow and \leftrightarrow X = \begin{bmatrix} X_1 \\ X_2 \\ . \\ . \\ . \\ X_n \end{bmatrix} \tag{4.21}$$

If there is a change in final demand, then there will be changes in the pattern of national income. It can be written that:

$$X = (I-A)^{-1}Y \tag{4.22}$$

4.11.3 Estimation Analysis

The input output table in particular year (ex: 1 year), on the basis of the previous year IO table (ie. year 0) is to produce a table of I-O technology matrix is based on the technology matrix 0 I-O years, used RAS method. This method does not require a detailed survey to get the technology matrix, so it is appropriate to use I-O tables to predict the future by combining RAS method with projection models developed previously. To explain the use of the method in obtaining the future of I-O RAS Table, a survey conducted in this method is replaced by the projection, which is done partially to obtain information from the three vectors. First, the column vector which is the sum of each row of the matrix Z in the usual 1 denoted by U (1). Second, the line vector is the sum of each column of the matrix Z in the usual 1 denoted by V (1). Third, of course, is the matrix X (number of output) in the first year, which is denoted by X (1). In principle, the method seeks to obtain a matrix RAS technology in period 1, which is denoted by A (1). There are two

methods that can be used to predict the technology matrix A (1) on the assumption that stable matrix technology or not all the time. If stable , then A (0) = A (1), whereas if the technology matrix is not stable , then A (0) A (1) . The following describes the procedure with the RAS method using three economic sectors of production, assuming that A is unstable. This economy has data transactions between economic actors for years 0 to note also that the technology matrix:
- input output model.
- input output system.
- construction of input output table.
- related concept of input output account.

4.11.4 Theoretical Background of Input Output

Recently, economic development decisions require information the impacts of economic growth or decline and the relative benefits and costs. What will be the impact of a manufacturing plant closure or what resources does the community have to offer to potential industries seeking a plant location ? The fundamental underlying relationship of input-output analysis is that the amount of a product (good or service) produced by a given sector in the economy is determined by the amount of that product that is purchased by all the users of the product, has not changed, see Leontief (1986), Samuelson (2004), and for more recent article see Timmer et al. (2015). A specific input output modeling for enterprise, see Lin and Polenske (1998). In this paper said: input-output modeling of production processes for business management.

However, today input-output analysis has become important to all the highly industrialized countries in economic planning and decision making because of this flow of goods and services that it traces through and between different industries. Input-output tables are capable of simulating almost any conceivable economic impact. Economists using input-output analysis today generally adopt an eclectic approach. They classify the goods in the tables into three classes which broadly match the three fields of trade theory:

1. "heckscher-ohlin's goods", which have generally known and relatively stable technologies, with comparative advantage resting largely on factor endowments. Comparative advantage may shift around among countries in response to changes in factor prices and factor availabilities, so that the so-called "foot-loose".

2. technological goods for which the production process is sophisticated and subject to frequent change, with the most recent technology probably specific to certain countries, and with proximity to high income markets an important factor. Computers and pharmaceutical products are examples of such goods.

3. "ricardo's goods", where can be found that comparative advantage depends largely on production conditions. These usually include extraction industries (agriculture, mining as mentioned previously) and industries which carry out the processing of

raw materials. Comparative advantage here may located within developing countries.

4. the ensuing relationships of goods between industries reflect the state of technology of a particular region. Technology then is an essential feature of the input-output analysis. By determining what can be produced, and quantity of each intermediate product which must be used up in the production process, given the quantities of available resources and the state of technology.

5. growth in a particular industry may be induced by growth in others and input-output methods allow the effects of such inter linkages to be unraveled and the components of growth to be identified consistently.

6. one of the interests in the field of input-output economics concerned with the fact that it is very concrete in its use of empirical data and also very compact. All changes in the endogenous sectors of an input-output table are results of changes in the exogenous sectors. In the static model, one deals solely with the production or "current account side" of an economy which provides a sound example of the compactness of the model. However, investment or capital account activities are not included. These are then generally included in final demand rather than in the part of the input-output matrix representing flows between individual industries. This then becomes a serious limitation of the static model because the changes in the structure of an industry's capital stock, and the changes in its pattern of capital equipment sourcing, are one of the most important manifestations of technological change and may have a direct impact on its output growth. Economies are dynamic so it may be argued that dynamic input- output models should be used because after all, input-output tables give the stance at a particular point in time, which will be outdated extremely quickly. The types of matrices shown may then be used to attain goals such as increasing employment within a region, or to compare output figures of one economy to another.

Input-output tables have three advantages that make them particularly well suited to analyzing structural change:

1. the data are usually comprehensive and consistent. By their nature, input-output tables en- compass all the formal market place activity that occurs in an economy, including the service sector which is frequently poorly represented. For some countries, over a hundred different data sources are used to ensure the completeness and internal consistency of the data, making it probably the single most comprehensive and complete source for economic data for most coun- tries. Consequently, input-output tables frequently play a fundamental role in the construction of the national accounts. This role means that the data are thoroughly has been checked for their accuracy, and that the tables are intrinsically linked with many of the traditional indicators of economic performance such as production and GNP.

2. the nature of input-output analysis makes it possible to analyses the economy as an interconnected system of industries that directly and indirectly affect one another, tracing structural changes back through industrial interconnections. This is especially important as production processes become increasingly complex, requiring the interaction of many different businesses at the various stages of a product's processing. Input-output techniques trace these linkages from the raw material stage to the sale of the product as a final, finished good. This allows the decomposition analysis to account for the fact that a decline in domestic demand for autos not only affects the auto industry, but also its suppliers like the steel industry and the steel suppliers like the coal industry and so on. In analyzing an economy's reaction to changes in the economic environment, the ability to capture the indirect effects of a change is a unique strength of input-output analysis.

3. the design of input-output tables allows a decomposition of structural change which identifies the sources of change as well as the direction and magnitude of change. Most importantly, an input-output based analysis of structural change allows the introduction of a variable which describes changes in producer's recipes - that is, the way in which industries are linked to one another, in input-output language, called the "technology" of the economy. It enables changes in output to be linked with underlying changes in factors such as exports, imports, domestic final demand as well as technology. This permits a consistent estimation of the relative importance of these factors in generating output and employment growth. In a general sense, the input- output technique allows insight into how macroeconomic phenomena such as shifts in trade or

changes in domestic demand correspond to micro economic changes as industries respond to changing economic conditions.

Although the field is widely practiced today, problems such as those Leontief encountered, still exist. The limitations of the input-output approach, according to the OECD document, structural change and industrial performance:

1. the basic input-output analysis assumes constant returns to scale. The input-output model assumes that the same relative mix of inputs will be used by an industry to create output regardless of quantity.

2. assuming that each industry is to produce only one type of product. For example, the automobile industry produces only cars. The distribution and sale of this product is fixed.

3. on each product within the industry is assumed to be the same. Also, there is no substitution between inputs. The output of each sector is produced with a unique set of inputs.

4. technical coefficients are assumed to be fixed: that is, the amount of each input necessary to produce one unit of each output is constant. The amount of input

purchased by a sector is determined solely on the level of output. No consideration is made to price effects, changing technology or economies of scale.

5. assuming that there are no constraints on resources. Supply is infinite and perfectly elastic.

6. assuming that all local resources are efficiently employed. There is no underemployment of resources.

7. timeliness of input-output data. There is a long time lag between the collection of data and the availability of the input-output tables.

8. the sporadic nature of input-output tables means that continuous time series are impossible to construct without estimating input-output tables for the years between benchmarks. In effect, input-output tables provide a snapshot of the complete economy and all of its industrial inter- connections at one time, see more; Magnus and Neudecker (2007), Keith (2004), Hal (1996). Furthermore, for global approach in input output database, we can work on world input output database (WIOD) in detailed see; McKinnon and Ge (2004), Kalenojaa et al. (2011),Dietzen- bachera et al. (2013b,c,a).

4.11.5 The Basic Elements

- Classifies economy into productive sectors, let say n sector.
- by considering both uses as intermediate and final product.
- consider availability of product with time dimension.

4.11.6 The Balance equation

• availability of a product = utilization of the product • opening stock + current production + import = intermediate use + consumption + FCF + export + closing stock

• or: • intermediate use + consumption + FCF + export - import + change in stock (closing - opening)= current production denote

Denote

Xij : output of ith product used input in jth industry Xi : output of the ith product Ci : consumption of the ith product Fi : fixed capital formation of the ith product Ei : export of the ith product Mi : import of the ith product Si : change in stock of the ith product

****** Technical considerations for efficient operational management for example: safety margins, design margins, operational margins, security considerations, unit availability considerations, operating experience, materials assessment, maintenance and refueling considerations. However, systems and topics for review included: NSSS, BOP, electrical systems, civil, security and fire protection, operational consideration, and maintenance and refueling considerations. The concept of decision sciences in this section will take an important role. By applying management science on specific decision analysis will be an appropriate one. Management and development in millennium era will be much delivering complex problem and taking complex system. In the modern era, the choice of technology used been used and provided by "scientist", government, enterprises and other institution, enormously. The decision science for application analysis is a strong tools to help how make a choice of alternative energy sources. Therefore, I applied AHP analysis which is a part of decision tools for better decision and simulation analysis for extended problem solving. Schaefer (1988), energy analysis as a basis for rational use of energy an absolutely essential requirement in any plans and measures to rationalize the use of energy is an analysis of the energy situation. An analysis of this kind, if it is to provide a suitable basis, must have the support of actual measurements, regardless of whether they are for individual installations, machines or entire plants. Fairly, large areas (regions or entire countries) are statistically recorded in energy balance sheets or data base (real time, cross section and times series data). Vine et al. (2003), explained which electricity sector reforms affect energy efficiency and load management incentives among various market actors through multiple pathways. These included: 1. changes in the role of energy efficiency/load management in meeting public interest goals and objectives and/or the addition of new goals to a country or states list of priorities for the electricity sector. 2. electricity sector reforms that affect barriers to energy efficiency eliminating barriers, creating barrier and/or changing the relative importance of barriers; and structural changes that affect the funding, implementing organization, roles of key players, basis for evaluation or general focus, and direction of mechanisms.

Global energy flows (EJ in 2004); from primary energy through carriers to end-uses and losses. Re- lated carbon dioxide emissions from coal, gas and oil combustion are also shown, as well as resources (vertical bars to the left). Energy carriers such as heat, electricity and solid, liquid and gaseous fuels deliver useful energy services. The conversion of primary energy-to-energy carriers and eventually to energy services creates losses, which, together with distribution losses, represent inefficiencies and cost of delivery.

****** Plant efficiency and fuel switching reductions in CO2 emissions can be gained by improving the efficiency of existing power generation plants by employing more advanced technologies using the same amount of fuel. For example, 27% reduction in emissions (gCO2/kWh) is possible by replacing 35% efficient coal-fired steam turbine with 48% efficient plant using advanced steam, pulverized-coal technology.

Replacing a natural gas single-cycle turbine with combined cycle (CCGT) of similar output capacity would help reduce CO2 emissions per unit of output by around 36%. Switching from coal to gas increases the efficiency of the power plant because of higher operating temperatures, and when used together with the more efficient combined-cycle results in even higher inefficiencies (IEA, 2006a). Emission savings (gCO2-eq/kWh) were calculated before and after each substitution option (based on IPCC 1996 emission factors).

The baseline scenario (IEA, 2004a) assumed a 5% CO2 reduction from fossil-fuel mix changes (coal to gas, oil to gas etc.) and further 7% reduction in the Alternative Policy scenario from fuel switching in end uses. By 2030, natural gas CCGT plants displacing coal, new advanced steam coal plants displacing less-efficient designs, and the introduction of new coal IGCC plants to replace traditional steam plants could provide a potential between 0.5 and 1.4 GtCO2 depending on the timing and sequence of economics and policy measures (IEA, 2006a).

IEA analysis also showed that up to 50 GW of stationary gas-fired fuel cells could be operating by 2030, growing to around 3% of all power generation capacity by 2050 and giving 0.5 Gt CO2 emissions reduction (IEA, 2006j). This potential is uncertain, however, as it relies on appropriate fuel-cell development.

Figure 4.18: Policy Measures Given General Policy Objectives and Options to Reduce GHG Emission from the Energy-Supply Sector

Policy options / Policy objectives			Policy processes		
	Economic instruments	Regulatory instruments	Voluntary agreements	Dissemination of information and strategic planning	Technological RD&D and deployment
Energy efficiency	• Higher energy taxes • Lower energy subsidies • Power plant GHG taxes • Fiscal incentives • Tradable emissions permits	• Power plant minimum efficient standards • Best available technologies prescriptions	• Voluntary commitments to improve power plant efficiency	• Information and education campaigns.	• Cleaner power generation from fossil fuels
Energy source switching	• GHG taxes • Tradable emissions permits • Fiscal incentives	• Power plant fuel portfolio standards	• Voluntary commitments to fuel portfolio changes	• Information and education campaigns.	• Increased power generation from renewable, nuclear, and hydrogen as an energy carrier
Renewable energy	• Capital grants • Feed-in tariffs • Quota obligation and permit trading • GHG taxes • radable emissions permits	• Targets • Supportive transmission tariffs and transmission access	• Voluntary agreements to install renewable energy capacity	• Information and education campaigns • Green electricity validation	• Increased power generation from renewable energy sources
Carbon capture and storage	• GHG taxes • Tradable emissions permits	• Emissions restrictions for major point source emitters	• Voluntary agreements to develop and deploy CCS	• Information campaigns	• Chemical and biological sequestration • Sequestration in underground geological formations

Source: Energy Supply in Climate Change: Mitigation, 2007.

Emission-reduction policies for energy supply subsidies, incentives and market mechanisms presently used to promote fossil fuels, nuclear power and renewable may need some redirection to achieve more rapid decarbonisation of the energy supply.

Subsidies and other incentives The effects of various policies and subsidies that support fossil-fuel use have been reviewed (IEA, 2001; OECD, 2002b; Saunders and Schneider, 2000). Government subsidies in the global energy sector are in the order of 250-300 billion US$/yr, of which around 2- 3% supports renewable energy (de Moor, 2001; UNDP 2004a).

An OECD study showed that global CO2 emissions could be reduced by more than 6% and real income increased by 0.1% by 2010 if support mechanisms on fossil fuels used by industry and the power-generation sector were removed (OECD, 2002b). However, subsidies are difficult to remove and reforms would need to be conducted in a gradual and programmed fashion to soften any financial hardship. For both environmental and energy-security reasons, many industrialized countries have introduced, and later increased, grant support schemes for producing electricity, heat and transport fuels based on nuclear or renewable energy resources and on installing more energy efficient power-generation plant. For example, the US has recently introduced federal loan guarantees that could cover up to 80% of the project costs, production tax credits worth 6 billion US$, and 2 billion US$ of risk coverage for investments in new nuclear plants (Energy Policy Act, 2005).

To comply with the 2003 renewable energy directive, all European countries have installed feed- in tariffs on permit schemes for renewable electricity (EEA, 2004; EU, 2003). Several developing countries including China, Brazil, India and a number of others have adopted similar policies.

Time constrains for delivering the product and efficiency during loading and unloading product is an important issue in oleo-chemical industries. For instance, one plant produces more than hundreds tons per day which will have impact on energy consumption. Moreover, it will influence on the level of stock, logistics and supply-chain operations, Sbihi and Eglese (2007). This is crucial for sustainability of multinational companies, because if there is mistake in calculation, stock planning will take costly for all business operations.

Connecting to energy matter, there is a question; why energy efficiency is important for all aspect? by improving the energy efficiency, its efficient consumption will be leading to a better security, a quality improvement of the concerned industry. Also, by increasing the energy security (supply, accessibility, etc.), competitiveness and profitability will increase and contribute to reducing the overall impact global warming. The oleo chemicals industries must choose a good transport service to handle efficiency energy matter and extended existing problems, see Commission, 2013. The main problem is to provide a best choice of transport service which is a challenge one in the range of simple business up to complex business activities.

They have to assure that the product will arrive safely to all clients around the world. With regards to the environmental impact, all companies which is included the transport service must be careful with concern the environmental. The report of Ademe. (2012), showed that between 2000 and 2007 from road transport statistics, there was energy efficiency improvement. It could be happened by management transportation and eco-driving when the car use on the road. Precisely, the efficiency of vehicles (measuring by the ratio ton/km) is efficient, year by year. The management transport shows by the increasing of the ratio ton-km/vehicle.

According to the legislation, the oleo chemicals industries are one of the most dangerous output products. How to produce, to maintain the product, to process, and to deliver all products is connected well in global supply chain system. It is not only in the industrial supply chain system but follow the conduct of regional law and national law for some circumstances.

The storing and transporting the oil in oleo chemicals industries are really heavy treatment by the company and their global supply chain network, to make a guarantee of best quality product, see Liu et al. (2010), 1987. The reduction of company's cost is derived from transport cost lower when delivering the product; energy consumption within in industries which is appears in product processing. The absences of regular transport though the special haulier services availability giving the performance of the companies in some extend. It's quite often the location of the oleo chemicals plant in remote areas, in order to keep the environment clean and reduce the emission factors.

In normal condition, the direct impact of plant location in remote areas is lowering the production cost, increased the producer price, and there is a probability increasing the investment level. Discussing efficiency energy is continuous role in global business sustainable showed, see Karlheinz (2000). The specific research in transportation palm oil is very limited. Though, there are previous significant researches in the previous time. See, Aminata et al. (2013), delivered the research finding; the relationship between vehicle routing, scheduling, and green logistics. The proposed CO2 calculation here is used CO2 efficiency by using an intensity calculation, in order to get energy efficiency.

Moreover, for airline industries within global supply chain at glance will covered how measure the sustainability of this industry. Focusing on global supply chain that would be interesting and important one, in this matter. We can describe that will be minimum awareness to be successful:

1. the level of responsiveness and efficiency factor for whole business schemes.
2. the measurement of efficiency supply chain and energy used or kerosene used is efficient enough due to the fluctuation of kerosene price (energy price).
3. supporting IT system for business sustainability.
4. demand side and supply side from company to provide an excellent service and regular maintenance.
5. supply chain management should be strong one, to promote non value added activities.

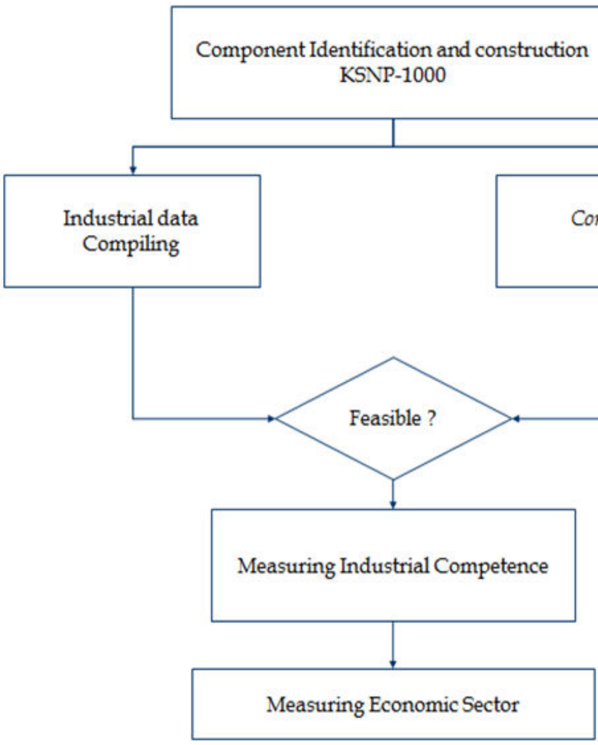
Killeen et al., (2010) and Choi et al. (2008) explained, "the other controversial chemical parameter is hydrogen concentration, applied to mitigate water analysis. For a long time, a value of 25-35 ml/kg (within a range of 25-50) has been used. The US's electric power research institute (EPRI) is considering increasing the hydrogen concentration towards 50 ml/kg and possibly beyond, depending on the results of the ongoing qualification work on the risk of decreasing the time to crack initiation.

The intention is to minimize crack growth rates. However, Japanese utilities are evaluating the action of decreasing hydrogen concentration to delay crack initiation. The preferred strategy for PWR is to adjust chemistry in a series of small, controlled steps towards the optimum values. The guiding principle is to avoid large changes at once and to monitor progress as the desired option is approached.

Another important concern in PWR is the mitigation of CIPS (crud induced power shift) also named AOA (axial offset anomaly) of neutron flux. The international atomic energy agency program, FUWAC will provide relevant data on the phenomenon, "taking into account high burn-up operation, mixed cores and plant aging". Like in PWR plants, BWR coolant chemistry is intended to meet the sometimes conflicting requirements of mitigating inter-granular SCC (IGSCC), controlling radiation field and avoiding fuel performance issues. Reduction in feed water iron ingress and maintaining feed water zinc has mitigated fuel crud concerns, Nordmann et al. (2010), Coriou et al. (1959), and Dobrovolska et al. (2006).

4.11.7 The Flowchart Component

Figure 4.19: The Flowchart Component Cost Identification and Construction Cost



Source: Energy Supply in Climate Change: Mitigation, 2007.

4.11.8 Indonesia's Nuclear Power Plants Location

The component analysis of nuclear power plant on KSNP type; the reactor, all special building purpose for radioactive and nuclear safety. There is non-nuclear island; building, turbine, building system for electricity installation, computer network and control system, electricity transmission, diesel platform, etc. Type of KNSP:

1. nuclear steam supply system (NSSS),
2. turbine and generator (T/G),

3. fuel,
4. balance of plant(BOP) only, which permitted by KSNP CO., Ltd (KHNP), particularly for output product from stakeholder. There are in small number that will produce in local industries NSSS and T/G.
BOP, balance of plant for nuclear power plants: 1. architecture,
2. building construction,
3. electric and electronic,
4. environmental aspects,
5. control and instrumentals,
6. mechanic,
7. nuclear,
8. pipe.

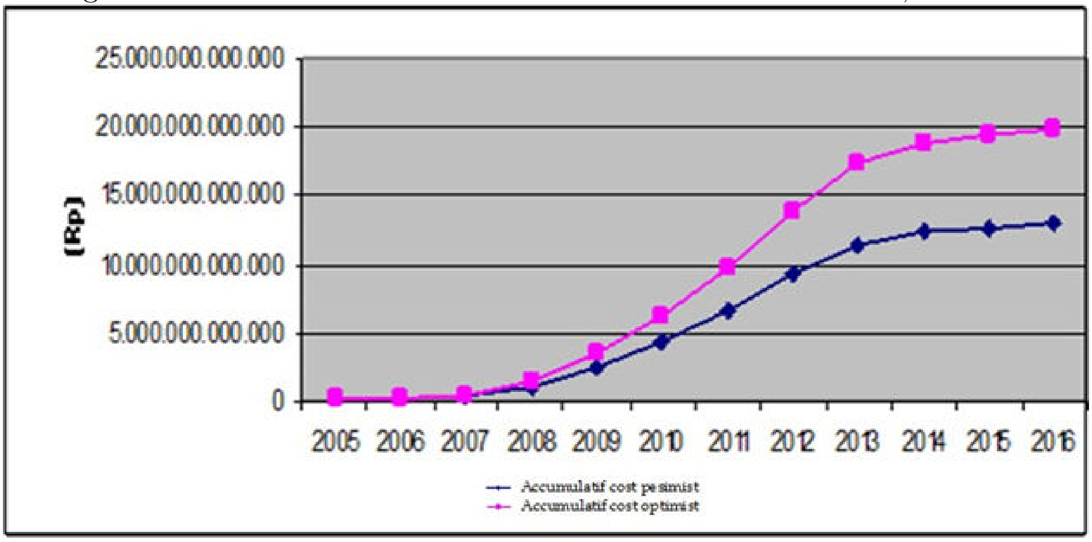
4.11.9 Nuclear Power Plants Construction Phase

Since the first construction phase through entire of finishing nuclear power plant is need global supply chain both local and international level. Industrial supporting system will survey to get feasible impact of nuclear power plants construction. During nuclear power plants construction will absorb 4000 peoples both in international and domestic people. The first construction cost will take 10 % from total cost of nuclear power plants construction. The positive impact is local people will get the job from road construction and nuclear power plants prep-construction. Operational system of nuclear power plants construction should well have connected to regional economy. Avoiding the negative impact from plants construction. Moreover, it can promote local economy. BOP, Balance of plant components price has been determined in input output analysis and identify the necessities for power plants construction. Identification for local industries which can lead for produce plants equipment with high quality. The good and all services can be trace form I-O tables. From I-O table can be identified the price and goods based on economic sector activities. The same methodology can be use for each power plants construction based on KSNP type to know how much it will take cost for each year plants construction. Mapping all cost can be done on I-O tables.

4.11.10 The Input Demand for Construction

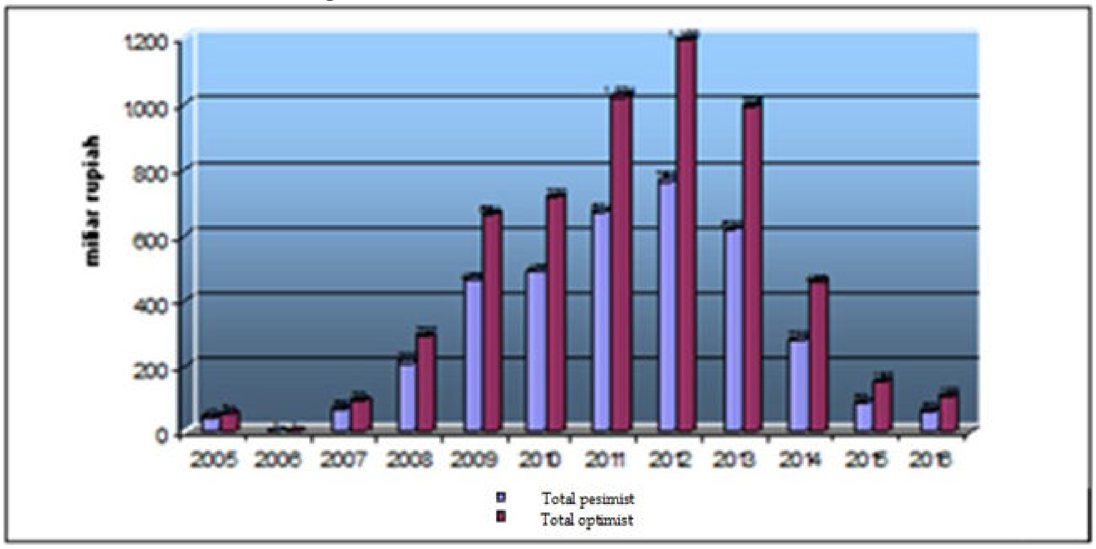
Component analysis and break down cost have been identified for demand and domestic output within linked industries. All prices and all values of product using 2004 data to predict all construction phase between 2005- 20016, inflation rate has been implied in this studies. The inflation rate is the policy target from the government. The inflation rate is 7 % (Rp 10.000/US \$ 1). The pessimistic scenario inflation rate 4 % with exchange rate Rp 9.000/US \$ 1). The estimation value based on final demand in the end of project: Where V2000 was the final demand for final year of 2000 and from CCBS, and "t" is year.

Figure 4.20: Accumulation Cost on Nuclear Power Plant Cost, S Curve.



Source: GMU Data Base

Figure 4.21: Income Effect 2005-2016



Source: GMU Data Base

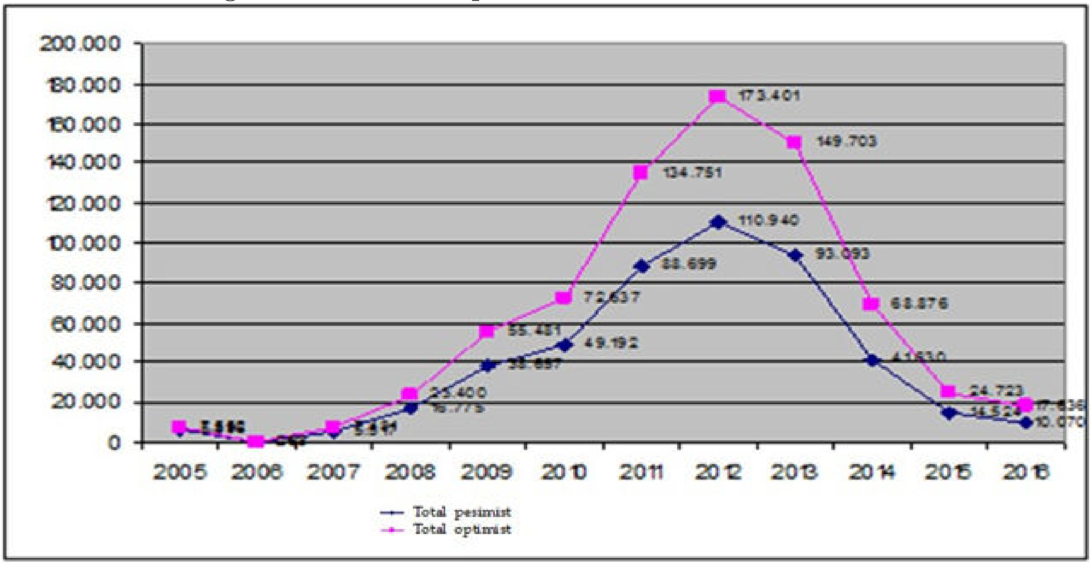
The increasing of economic sector activity will increase household production factors. Its shown that household income dispersion happened during preparation and construction execution, 2005- 2016, ceteris paribus.

By the assumption of employment growth 1.57 % per year, it can be calculated the additional job creation on existing nuclear power plants. It caused direct and indirect impact within nuclear power plants construction.

All scenarios are based on assumption, ceteris paribus. The labor growth 1.57% per year calculated as additional labor force due to nuclear power plant construction. The job creation simulation was 475.197 people will get job place. In certain sector (39) the lowest is 23 people and maximum 179.109 people.

If using the pessimist scenario (inflation rate 4 %, exchange rate Rp 9.000/US $1), total labor force impacts during construction 2005-2016 475.197. Then, with optimistic scenario, (inflation rate 7%, exchange rate Rp. 10,000/US $1), will give impact to labor

Figure 4.22: The Impact for Labor Force 2005-2016



force 735.909 people.

This includes oil producing countries seeking to reduce their oil and gas reliance. Saudi Arabia's projected energy demand, for example, means they would be a net importer of oil by 2032. In January 2014, the world nuclear association reported 71 nuclear reactors under construction, 172 on order or planned, and a further 312 proposed reactors. This is in addition to ongoing projects to extend the life or increase capacity of existing nuclear power plants.

This growth in demand presents considerable capacity and capability challenges for the nuclear supply chain, not only for the design and construction of the plants, but also their ongoing operation and maintenance. This also applies to consultancy services where there are limited resources with nuclear experience. Construction and operation of nuclear power plants is highly regulated and con- trolled. Requirements vary from country to country, but some fundamental principles are the same.

UK site license holders are responsible for nuclear and radiological safety and security, including contractors work. This has significant implications for the procurement of the construction and operation services, to ensure compliance with the site license conditions. This growth in demand presents considerable capacity and capability challenges for the nuclear supply chain.

The site license holder is directly responsible for managing its suppliers, and this should be cascaded down to the supply chain. Contractors engaged on works requiring nuclear and radiological safety and security must be aware of the license conditions and the licenses obligations. The licensee must ensure that all contractors are suitably experienced and qualified.

In UK nuclear power stations have been constructed since the early 1990s, demonstrating the necessary new build experience may be a challenge for many UK companies. However there are organizations with experience in nuclear decommissioning and nuclear generation who will be able to demonstrate nuclear capability. Whether the supply chain has the capacity to handle nuclear new build as well as the existing nuclear generation and decommissioning is a different question. The supply chain for the construction and operation of nuclear power plants is complex. However, there are large parts of the nuclear power plant that are no different to any other power station. In simple way the supply chain can be categorized as nuclear related and non-nuclear related.

Construction Type: All type of it's elements: nuclear island (NI), conventional island (CI), and balance of plant facilities which supporting infrastructure ("construction logistics center or construction worker's accommodation").

The number of nuclear technology vendors in the global market is limited. All have well established supply chains to support the manufacture and construction of the nuclear island. The key factor will be their current order books and whether their supply chains have the capacity to meet delivery time lines, particularly the heavy forgings required for the nuclear steam supply system (NSSS). Increasing capacity in existing suppliers or certifying new suppliers can be costly and time consuming.

It's quite often that all countries embarking on nuclear power at first time face on additional challenges in obtaining the necessary agreements to enable nuclear suppliers to export their technologies. For the non-nuclear elements of the nuclear power plant, market capacity may not be an issue. However major equipment such as turbines, generators and switch gear are likely to be long-lead items and again may be impacted by manufacturing capacity. There are several elements to the nuclear fuel supply cycle:

Fuel Cycle: Mining enrichment milling manufacture reprocessing fuel for the current generation of nuclear reactors is uranium, which is abundantly available but needs to be enriched prior to manufacture of the fuel rods. The demand for new nuclear reactors will need additional capacity in existing fuel enrichment, manufacturing, and reprocessing facilities. New facilities are expensive and controlled through international treaties.The demand for new nuclear reactors will need additional capacity in existing fuel enrichment, manufacturing, and reprocessing facilities.

Operations and Maintenance:

The supply chain for operation and maintenance of the nuclear power plant varies depending on how much the operating company for applying: HSSSEQ (health and safety, security, health physics, environmental, quality assurance) O+M labour Spares/equipment Hired in plant Support services (training, engineering, project, finance, legal, facilities management, transport).

Countries with existing nuclear power stations have a well-established supply chain and as existing stations reach the end of their operational life, there should be capacity to cope with new stations coming on line. Countries with no existing nuclear power stations face a major challenge in establishing a supply chain. One solution is to outsource the entire operation and maintenance to an experienced nuclear operator, but challenges remain in establishing a local supply chain to support the operator.

Solution: In example in UK government has published in 2012, nuclear supply chain action plan which sets out the plan for identifying skills and increasing capacity through training and funding. Emerging nuclear generating countries are seeking to establish capability and capacity in country to support their nuclear ambitions but face tough challenges in attracting the knowledge, capability and investment needed in the absence of in-country capability. Long term strategies are needed to create a supply chain capable of providing the necessary capacity and capability to support the nuclear program.

4.11.11 The Cost of Decommissioning Nuclear Power Station

It was certain that if demand for electricity rise time to time. If so, it should keep the generation capacity to keep up with demand. The problem is exacerbated by the fact that much of the country's current power supply, especially its aging nuclear power plants, is reaching the end of its design life and will shortly be closed down. In fact, by 2023, for example in Great Britain even in France, or other developed countries currently operating nuclear plants will have ceased operation, with the remaining reactor until 2035. By attention of this phenomenon, the government paid a lot attention for generating energy source, especially for nuclear energy.

4.11.12 Conclusion

The economic projection under activity of the nuclear power construction in peninsula of Muria, central Java around 0.01 % in the first initial project and then in the final preparation of construction phase around 0.03 % in 2009. During construction 2010-2016 the economics of central Java has been increasing from 0.53 % at 2010, 0.54 % at 2011. For local economy, Jepara's resident during construction phase economic growth around 0.75 % predicted happened in 2005 and 2.46% in 2009. The economic growth for central Java predicted 3.13 % in 2010 and 3.18 % in 2010. The analysis of component and cost-break down structure shows the ability of domestic's company to supply part of components in nuclear power plants construction at Peninsula of Muria. The construction cost 25 % coming from domestic input. The pattern of construction planning is follows S-curve. Its means, a small amount of cost at the first phase, then increasing in the second phase, finally decreasing at final construction. The positive impact: 1). The national output will increase Rp 22.398 Billion, 2). Increasing revenue from the owner of production factors Rp 3.759 Billion, 3). Job creation: 735.909 people. In pessimist scenario shows that nuclear power plants will gave impact on national output Rp. 22,398 Billion, the increasing income of the owner of production factor around Rp. 3,759, and absorb labor force 475,197 people.

The optimist scenario will give higher impact to national output Rp. 34,447, then the increasing income of the owner of production factor Rp 5.761 Billion, absorb labor force 735.909 people. The most significant to attract labor force is construction sector, trade cement industry, transportation, mining, mineral industry, bamboo, wood, rattan, metal and other metal product[5]. This decision was taken in the context of France for having

[5]Aminata J., Grandval S., Sbihi A., (2014), Nuclear Warehouse: Emphasize on Energy Efficiency

substantial heavy engineering expertise but few indigenous energy resources. Nuclear energy, with the fuel cost being a relatively small part of the overall cost, made good sense in minimizing imports and achieving greater energy security.

4.12 Warehousing

4.12.1 CSR - Risk Management on Warehouse Management

4.12.2 Special Section on Warehouse Management

In this special section, we explored how the new perspective of global supply chain energy efficiency on warehouse gave us a leading issue on certain point of views. The energy efficiency in global supply chain emphasized on warehousing for creating sample case study is the most difficult one. Therefore, I presented only one sample case study.

Its so difficult, because I must return back to the definition of warehousing supply chain in order to create global supply chain level. The description of warehouse in classical way is a building, or a part of one, in which wholesalers keep large stocks of merchandise, which they display and sell to retailers. Also, warehouse can be describe as a building, or a part of one, for the storage of goods, merchandise. These kinds of definition is classical one to understand how traditional warehouse operated in business activities, see more Manzini (2012), Manzini (2012), Mannino et al. (2008), Marchi et al. (2013)

4.13 Electric Warehouse Intelligence

This happened due to the French government decided in 1974, just after the first oil shock, to expand rapidly the country's nuclear power capacity, using Westinghouse Technology. This decision was taken in the context of France having substantial heavy engineering expertise but few indigenous energy resources. Nuclear energy, with the fuel cost being a relatively small part of the overall cost, in order to minimized imports and achieving greater energy security. As a result of the 1974 decision, France now claims a substantial level of energy independence and almost the lowest cost electricity in Europe.

It also has an extremely low level of CO2 emissions per capita from electricity generation, since over 90% of its electricity is nuclear or hydro. In mid-2010 a regular energy review of France by the International Energy Agency urged the coun- try increasingly to take a strategy role as provider of low-cost, low-carbon base-load power for the whole of Europe rather than to concentrate on the energy independence which had driven policy since 1973. The low cost of French nuclear power generation is indicated by the national energy regulator (CRE) setting the price at which EDFs electricity is sold to competing distributors. In 2014, the rate is 42/MWh, but CRE proposed an increase to 44 in 2015, 46 in 2016 and 48 in 2017 to allow EDF to recover costs of plant upgrades, which it puts

Strategy in Global Supply Chain. Journal of International Logistics, Volume 12, n.2—August 2014, pp.61-80.

at 55 billion to extend all 58 reactor lifetimes by ten years. In November 2014 the government froze the price at 42 to mid-2015. The re-sale price has represented a long-term floor price for EDFs power, and is nominally based on the cost of production. The industrial group Uniden said that the proposed 2015 wholesale price of 44/MWh would be 14 higher than Germanys. French retail prices, without major effects from feed-in tariffs for wind and solar, remain very low. In 2013 French prices for medium-size industrial were 90% of EU-27 average, and those for medium-size households (at less than 8 c/kWh, "currency unit / kWh") were less than half of EU-27 average, Carrera (2010). RTE's France reported which all challenges for French's electrical network, RTE (2013):

1. how to account for the growth of peak electricity consumption related to new electricity end-uses?
2. how to maximize the use value of the electricity system for the collectivity?
3. how to take into account the energy transition options as launched in France by 2050, in view of meeting decarbonisation legislation of the pan European electricity system?
4. how to increase the flexibility of the electricity system at acceptable cost?
5. how to be more socially responsible (which requires: identifying, measuring, quantifying and minimizing environmental impacts of the transmission network)?
6. how to integrate a wider and wider span of scientific and technological evolution to serve the global performance of the company?

4.13.1 Current Issues and Technology Development

The green issues and CSR issues have been taking important parts in global business development. For instance, is the current issue of the security electricity supplies chains during winter session 2015-2018. The next challenge is how do we encourage SMEs industries for giving more proper contribution by developing smart-phone and tablets that significance to societies demand (CSRs policies ex; nuclear, solar, winds, wave). The android system in smart-phone and tablets could be one of possibilities to market captive and also to get response from CRSs implementation.

The objective is to full fill the global electricity supply chain that will reach the remote areas, by using RTE business model. For instance, around 40 % the mobile spare parts is produce by local enterprise. This issues faced on international competition. The global competition required each company to develop their own path to survive from global competition. The efficiency éCO2, CSR and competence level will take attention of company's policies as an important role model, Muller (2007) and Manzini (2011). Single operation plant model like France is the best example how to produce and develop commercial exchange in electricity supply chain.

The commercial exchange figured in period of March, particularly in Spain has been went down but start from April has been increased. For period June and August are certain period of Spain which indicated under zero level.

The lag of data for this data base before fixed one is in two years. The real time data available for time line data and update every 30 minutes.

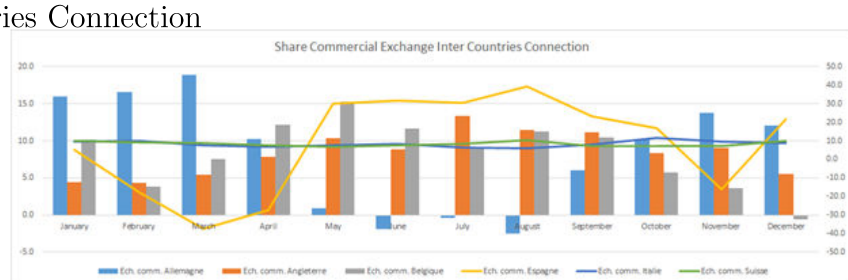
Table 4.28: France's Warehouse Energy Nuclear for Commercial Exchange

	Germany	Britain	Belgium	Spain	Italy	Switzerland
January	16.0	4.4	10.1	5.4	9.8	9.9
February	16.6	4.3	3.8	-17.9	10.1	9.1
March	18.9	5.4	7.6	-37.3	7.6	8.9
April	10.3	7.8	12.2	-27.2	6.6	7.8
May	0.9	10.3	15.3	30.0	7.6	6.7
June	-1.9	8.9	11.6	31.8	8.4	7.5
July	-0.4	13.4	8.9	30.5	6.3	8.5
August	-2.5	11.5	11.2	39.5	5.9	10.3
September	6.0	11.1	10.4	23.3	7.9	7.0
October	10.2	8.4	5.8	16.7	11.7	7.1
November	13.7	9.0	3.6	-16.2	9.5	7.0
December	12.1	5.5	-0.6	21.5	8.8	10.1

Source: RTE, Calculated by Authors, 2013.

It shows that in January and February most of commercial exchange is in positive exchange, but commercial exchange with Spain the number showing negative signed. It means that Spain has unprofitable exchange supply chain or commercial exchange with France. The same condition has been shown in other period of time, also. However, in winter season, particularly for November and December 2013, only Belgium and Spain which is in negative signed.

Figure 4.23: The Share Level of Commercial Exchange to Total Energy Production within Inter Countries Connection

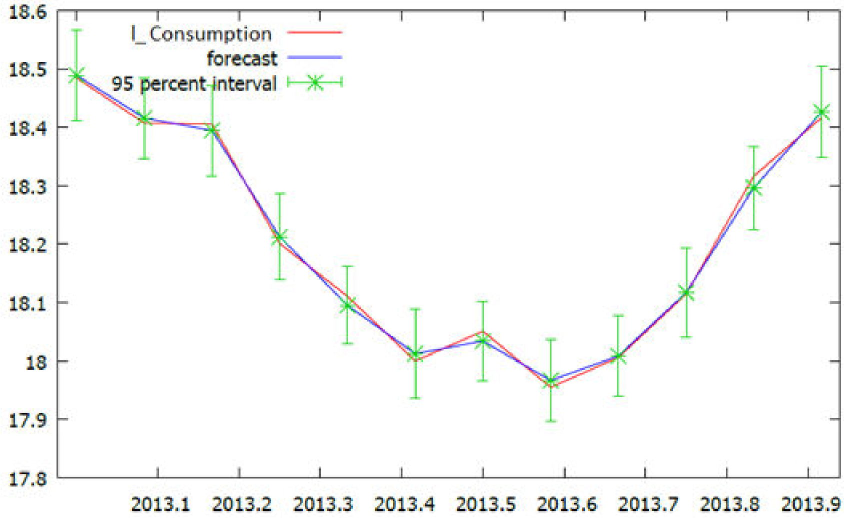


Source: RTE, calculated by Authors

The commercial exchange with Spain has been fluctuated, sharply. Especially, during February to mid of November. The positive commercial exchange can be seen on commercial exchange with Germany, England, Belgium. With Swiss, shown that the data was almost shown stagnant figured.

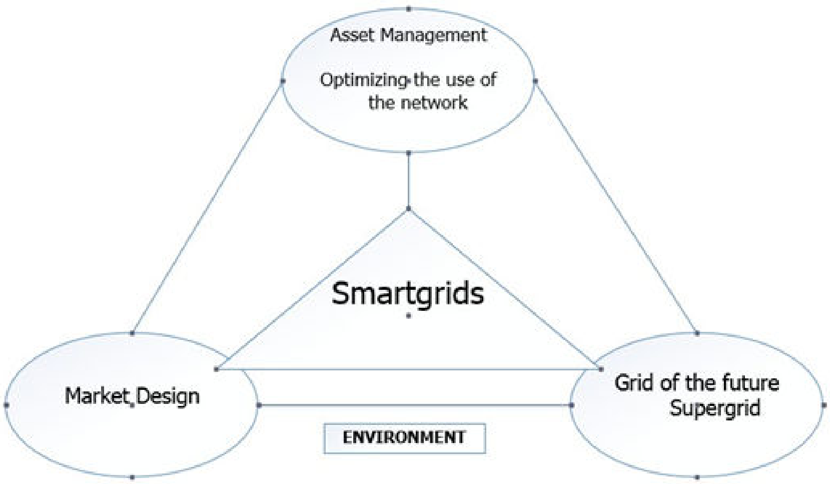
The commercial exchange figured in period of March, particularly in Spain has been went down but start from April has been increased. For period June and August are certain period of Spain which indicated under zero level.

Figure 4.24: Forecast for Total Energy Consumption Level



The lag of data for this data base before fixed one is in two years. The real time data available for time line data and update every 30 minutes.

Figure 4.25: Strategic Programs and Objectives



Source: RTE - Update, 2013

4.13.2 Methods

CO2 Emissions per kWh of electricity generated in France which provide by RTE as an indicator of the carbon footprint of electricity generation, expressed in grams of CO2 per kWh generated. The "real-time" indicators are based on telemetry and estimation method. The optimization approach is to minimize the éCO2 mix level within warehouse, delivering time and up to customer's house.

We applied productions efficiency and customers' efficiency for it. Open up international strategy for global business on electricity sector, Save Project (2012). How to encourage the RTE-European model which is feasible for global electricity business model?

How it works in a monte Carlo simulation, a random value is selected for each of the tasks, based on the range of estimates. The model is calculated based on this random value. The result of the model is recorded, and the process is repeated. A typical Monte Carlo simulation calculates the model hundreds or thousands of times, each time using different randomly and selected values. When the simulation is completed, we will have a large number of results from the model, each based on random input values.

These results are used to describe the likelihood, or probability, of reaching various results in the model. For estimating ranges of values in some cases, it's possible to estimate a range of values. In a construction project, it will take to complete a particular job; based on some expert knowledge.

The same could be done for project costs. In a financial market, there is distribution of possible values through the mean and standard deviation of returns. By using a range of possible values, instead of a single guess, by creating a more realistic picture of what might happen in the future. When a model is based on ranges of estimates, the output of the model will also be a range.

4.13.3 Result

These results are used to describe the likelihood, or probability, of reaching various results in the model. For estimating ranges of values in some cases, it's possible to estimate a range of values. By using a range of possible values, instead of a single guess, can create a more realistic picture of what might happen in the future. If the same model were based on ranges of estimates for each of the three parts of the project, the result would be a range of times it might take to complete the project. When each part has a minimum and maximum estimate, we can use those values to estimate the total minimum and maximum time for the project. Monte Carlo simulation can describe a range of values as a result, beginning to understand the risk and uncertainty in the model. The key feature of a monte Carlo simulation is by creating the ranges of estimation, how likely the resulting outcomes.

Table 4.29: Random Value with Iteration, from the raw data

	Minimum Cost	Maximum Cost	Random Value	Cont. to 231 iterations
January	101591.53	117732.24	111399.15	.
February	88070.64	102063.17	95688.93	.
March	88250.55	102271.67	96426.40	.
April	75438.82	87424.42	83075.77	.
may	74632.21	86489.66	77076.14	.
June	68515.90	79401.60	74529.18	.
July	73508.24	85187.12	76135.57	.
August	71624.43	83004.01	80978.05	.
September	71270.01	82593.28	77742.92	.
October	74413.52	86236.22	82109.61	.
November	82942.56	96120.36	86487.36	.
December	96839.17	112224.84	102603.30	.

Calculated by Authors

For each month shows that a lot of differences for commercial exchanges values. Almost the random minimum cost shown in June. It was cleared that in June is the starting month before summer session. Started, October until January the data shown seemingly increasing. The maximum cost and random value increasing and decreasing based on regular activities (the consumption level, monthly).

The highest score for Germany is in March, Britain in July, Belgium in May, Spain was the highest one among commercial exchanges countries. Italy is in October for the highest score. and the period of August is the maximum commercial exchanges with Switzerland. Creating and promoting multi agents and efficient delivery service by reducing éCO2 mix problems level. Looking for alternative solution based on the best decision criteria. The expectation result is for better understanding all possibilities for global business expansion based on RTE business model, instead of France-European countries. Furthermore, developing and opening the international project feasibility and wider global network. To develop a holistic approach for progressive scheduling of the construction for global business electricity sector model that will apply as world electricity integration model 2020-2050.

4.13.4 Conclusion

Increasing and developing productivity level by giving full respect of CO2 mix problems level, mainly for global business electricity sector to wider future marketing level of business opportunities, also. In addition, as one of CSRs company policy to give transparency data for CO2 emission, see Pilavachi (1993).

4.14 A New Perspective of Energy Consumption

An important remarkable scientific writing can be found on how we can construct a simulation of warehouse based on a computer model and testing it by executing computer-based experiments with different combination, in detailed see Ficko et al. (2012).

Bitcoin is virtual currency that has a lot of advantages than ordinary money. The transaction cost is a very low one and anonym. Utilizing bitcoin gave us a lot opportunity for economy, mining process, and also development of E-commerce. Although, Bitcoin faced on volatility and anonym, see Agora (2013). The trend setter for information technology in 2014 was Bitcoin. Bitcoin is only one of virtual currency. Virtual currency produces by mining processing by using computer. It used for tradable and service on real life or online. This virtual currency accepted by vendors in US dollar.

Bitcoin created and constructed by cryptography algorithm which s called also as crypto currency. other samples are “Ripple, Litecoin, Peercoin, NXT and Dogecoin”. It was anonym scientist so called “Satoshi Nakamoto” in 2009 using peer to peer so no need special authority or specific banking system. Transaction event done well by computer network. The natural design of crypto currency is open source and freely open. The straight point from this work is computer network that need energy consumption. Because there is no identity, anonym, no borders and authority who control the transaction cost will be very

low one. The complexity of Bitcoin pushes up for regulation update and customer protection. However, the way is a really supply chain revolution and a new perspective on global supply chain. The main regulator is central bank will have faced on many challenging issues if crypto currency become bigger which give impact their own currency in deterioration condition. The strong infrastructure and high quality of computation. Otherwise, the central bank focus how to eliminate the risk because the volume of Bitcoin and other cryptocurrency overwhelming in society. So that their own currency will not effective for the economy.

All prices and inflation will not have covered by the central bank. The dependence of high technology is really high. It depends on high tech and high infrastructure. The weakness of infrastructure will give impact on independency of Bitcoin. The business activity of Bitcoin challenges has declared as follows: • bitcoin mining. • exchange of Bitcoin in real transaction. • barter transaction for Bitcoin investor (IRS, 2004).

4.14.1 Introduction

This phenomenon shows the challenging topic, how a new perspective of supply chain connecting with the global network of supply chain. It is not only glocalisation and warehouse in ordinary classical of type warehouse. But, it would be more mining of Cryptocurrency which so called bitcoin mining approach. Where, all mining methods applied on these activities. The point is to get approval scientific approach by using management scheme for sustainability, responsibility, and ability to develop efficiency energy in mining process by modest infrastructure.

It is difficult for mining in a single block alone. But, by increasing hash rate speed of the network become expensive one, unless by making significant investment in hardware system. A hash function takes a long path ways and procedures in specific mining. However, we can calculate for mining Bitcoin by using simple hash rate formula, as equation in 3.23, "solo and pool mining".

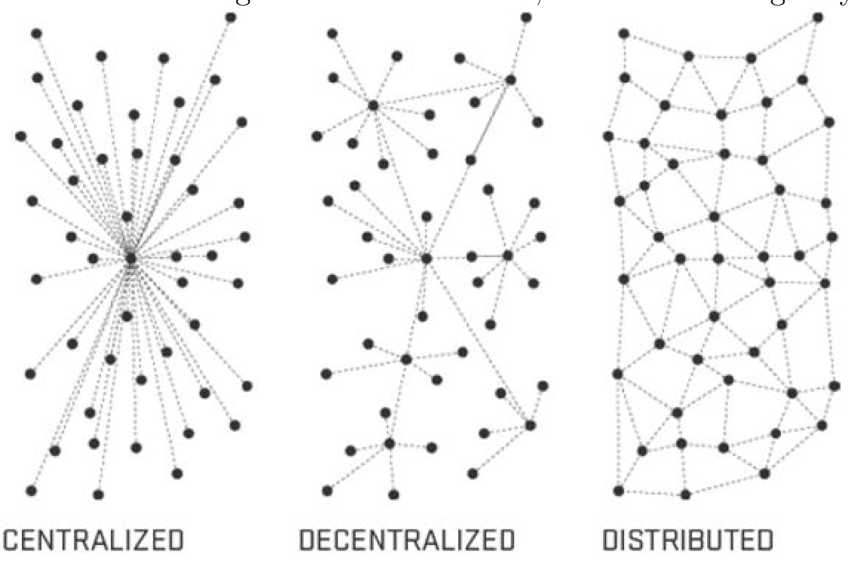
Hash functions are deterministic, that is, the same input will always produce the same output, see Selgin (2014); Ron and Shamir (2014); Bouallagui (2010). "But they are designed to be unpredictable, in the sense that if you want to find an input that hashes to a specified output, the best possible way is to try many effort, many random inputs until one of them works", Bouallagui (2010). To mine Bitcoin, miners must find an input that includes a list of all of the most recent transactions that need to be verified, and whose hash is smaller than some specified value. (This value is adjusted periodically to change the difficulty.)

$$Simple\ Hash\ rate\ Formula\ = \frac{(OwnHashRate\ )}{(NetworkHashRate\ )} \tag{4.23}$$

Farell (2015), the crypto currency market has evolved erratically and at unprecedented speed over the course of its short lifespan. Since the release of the pioneer anarchic crypto currency, Bitcoin, to the public in January 2009, more than 550 crypto currencies have been developed, the majority with only a modicum of success. Research on this industry is still scarce.

The majority of it is singularly focused on Bitcoin rather than a more diverse spread of crypto currencies and is steadily being outpaced by fluid industry developments, including new coins, technological progression, and increasing government regulation of the markets. Through the fluidity of the industry does, admittedly, present a challenge to research, also through evaluation of the crypto currency industry. This paper seeks to provide a concise yet comprehensive analysis of the crypto currency industry with particular analysis of Bitcoin, Bouallagui (2010), the first decentralized crypto currency. Particular attention will be given to examine theoretical economic differences between existing coins, Dwyer (2014), Selgin (2014), Ron and Shamir (2014). The real think from imagination of bitcoin being a unit of inventory which called as a digital wallet ("as bitcoin address"). As well as being an inventory for keeping location, storing, center of distribution by using truck transport. The block chain application can use as the balance and transfer of inventory across a distributed supply chain network, Gonzalez, 2015. The good point is how to measure the energy used during mining operations. Research question followed by 1). how does energy efficiency supported by infrastructure facilities of bitcoin mining? 2). how we can get the profit from bitcoin transaction? and 3). what is learned lesson from crypto currency?

Figure 4.26: The Emergence of Permissioned, Distributed Ledger Systems



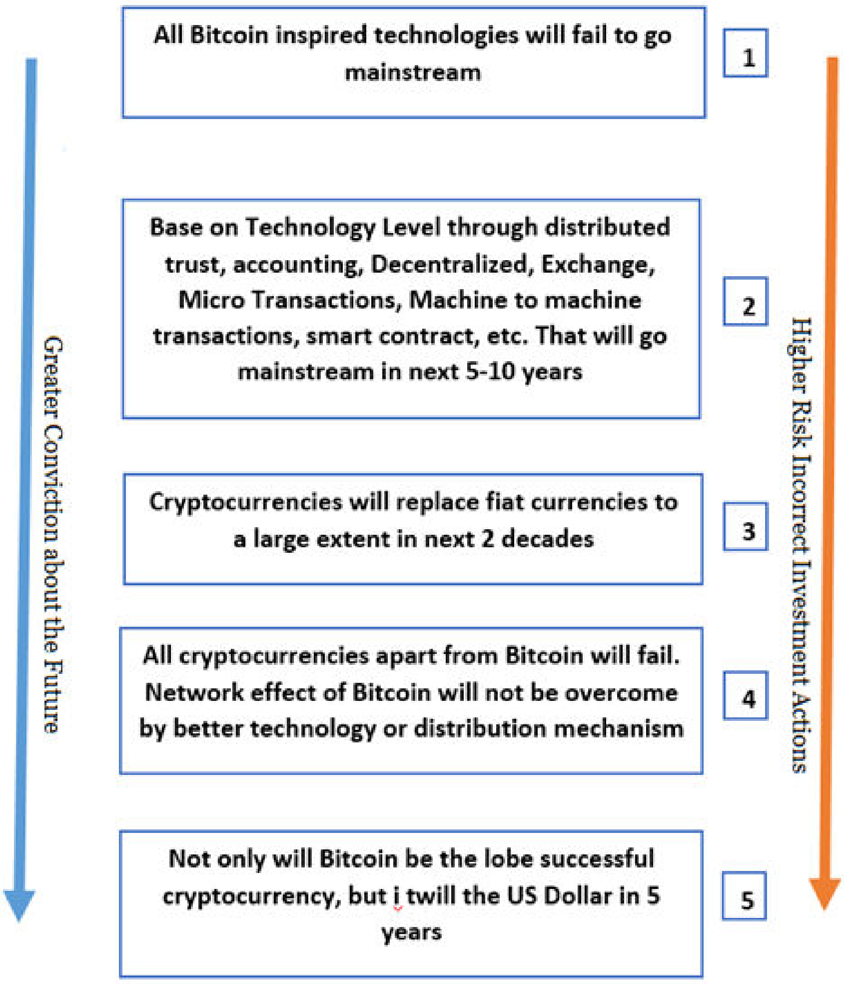
Source: Swanson (2015)

The consensus of mechanism is the process in which majority within network validators goes into agreement on the state of ledger. This is the rule and a set of procedure that allowed us for maintaining between the facts and multiple participating nodes. It the true one that the longest chain need proof of work which considered to be proper and valid ledger. There were many consensus mechanisms that have been explored in past three decades. All ideas and innovations from distributed database required tolerance, (Leslie

Lamport) and distributed economic consensus methods. Its needs formalization, analysis, and valid implementation. The secure transactions within a crypto currency system is a must regulation that have to provide by the system itself and can be corrected by the system if there is a failure detected. a crypto currency system assumes that transactions are transmitted in a peer-to-peer fashion. Traditionally one way to undermine a peer-to-peer network is by creating large amounts of pseudonymous identities in order to gain a disproportional amount of influenced. Bitcoin was purposefully designed to make it expensive to attack the network in this manner. It establishes an ordering for transactions through a "proof-of- work" process.

An on-chain transaction is one which users settle transactions on the public block chain. The block chain as there were no external intermediaries or custodians available. Over the past several years, transactions that occur off of the block chain, on the edges, have become increasingly popular as it allows for faster clearing. Furthermore, exchanges and many other services now exist to provide off-chain services and are managed by their own internal accounting records (e.g. exchanges perform buy/sell operations off the chain via their own private database).

Figure 4.27: Tokenize Everything



Source: Roy (2014)

4.14.2 Methodology

Level 1 is the phase of all Bitcoin inspired technologies that will fail to be mainstream. Level 2 is the step token agnosticism. Level 3 is the level for Cryptocurrency maximization. Level 4 is the step that Bitcoin reached maximalism. Then, at the end level 5 is Hyper bitcoinisation. Essentially, Roy (2014) said that we can "absorb everything".

The figured visualizes the conviction towards "a crypto currency based tokenized economy". Every business, institution and organization has different business needs. In order to determine whether or not integrating a new network is beneficial, so that the total costs of ownership must be declared without failed.

Roy (2014), there are newly distributed consensus systems have been proposed and a few have been built out into proofs-of-concept with the backing of venture capital. For avoiding the very high risk. Tokens are being built without the intention of making these coins available for purchase to retail customers. Because the developers are not necessarily to create another currency or commodity. Therefore, the future challenge is to develop a right auditing agencies. Although, peer to peer concept and actions have been approved well done.

Over all the definition of energy efficiency is efficiency energy=output/input. In mining process there is a need to calculate "profit and loss". The formula shows how to calculate the income of Bitcoin mining:

$$IBM = \frac{(OHashratee\ )}{(NHashrate\ )} X \frac{(RoundReward + TXRewards\ )}{(600s\ )} X \frac{(Income(BTC)\ )}{(s\ )} \tag{4.24}$$

IBM= the income of Bitcoin mining

The OHashrate is the users own hash rate, Nhashrate is the entire Bitcoins network hash rate. Almost calculation of Nhashrate normaly changes every two weeks, Ala-Peijari (2014). The final objective is to calculate the users portion of the "hash calculation" where the user adds to the entire network system. Basically, the level of likelihood of the user receiving the reward. The network reward illustrated as "Round-reward" is the lottery reward that the network rewards one miner or pool on average every 10 minutes i.e 600 seconds, Ala-Peijari (2014). The winning miner also receives transaction rewards marked as TXRewards in the total transaction reward is dependent on the number of transactions, and to what extent the users making the transactions paid the transaction reward. For assessing actual profit is necessary take into account the electricity and hardware costs as shown:

$$EH - Cost = \frac{(Profit\ )}{(s\ )} = \frac{(Income\ )}{(s\ )} - \frac{(ecost\ )}{(s\ )} - \frac{(Hcost\ )}{(s\ )} \tag{4.25}$$

EH-Cost= electricity and hardware costs

In reality it is very difficult to estimate value for bitcoin, but also the electricity price, transaction rewards, equipment, and also maintenance costs. Electricity cost per second is shown in equation as "ecost/s". The more difficult one to calculate is device cost per second shown as "Hcosts/s". Finally, at this section, to access the actual profit, it is necessary to see electricity and hardware costs, see more in Davarpanah and Kaufman (2015), Lewis (2014), Terra (2014), O'Dwyer and Malone (2014). It shows that all computers used for mining testing to know how much electricity level consumed during operations, Ala-Peijari (2014).

4.14.3 Data Construction

The interesting point and valuable point here is to discuss the supply chain in the context of global chain perspective. The Bitcoin mining will not work and stop the operation when they faced of network difficulty. They couldn't work properly without well-constructed network system. It was so called, the new perspective of global supply chain system.

4.14.4 Result

The old type of CPU and simple infrastructure will gave impact on mining performance. However, latest type of computer and high-tech of computer infrastructure will create efficient mining. But the the modest infrastructure will give impact in energy efficiency issues. The interesting point here was the open source software system more efficient rather than under- windows system. It could be that open source system there is no much sophisticated software and the simpler softwares shows less consumed energy. This way created strong reason that we should work on open source system for future crypto currency challenges.

4.14.5 Advantages

The perspective of a new way of supply chain in Bitcoin mining is a very challenging for scientist even for managerial level. Due to many Bank analysts were trying to analyst what's going on for the way of crypto currency. Because, without a good awareness of banking sector even All government stake holder. The advancement of crypto currency cannot be stop by any financial authority. It was just like when the first financial operation by credit card delivered since 1938s and became most well-known by 80s or 90s in many countries. By double decades or triple decades all possibilities of crypto currency will be a think possible one on the real business transaction.

4.14.6 Conclusion

It was cleared enough that Bitcoin mining system was efficient rather than ordinary the world banking system (energy consumption for building, computer system, ...etc). So

Table 4.30: Mining Bitcoin-The Devices Tested

Class	Name	Mining unit(s)	OS	Miner	Notes
CPU	Pandaboard	ARM (2-cores)	Ubuntu 12.1	Cpuminer 2.3	No mouse or key- board
CPU	Raspberry PI	ARM (1-core)	Wheezy 16.12.2012	Cpuminer 2.3	No mouse or key- board
CPU	Intel i7 920	X86 (4- cores)	Ubuntu 12.1	Cpuminer 2.3	
CPU	Intel Atom D510	X86(2- cores)	Linux Mint 14	Cpuminer 2.3	
GPU	E-350 Linux CPU	X86 (2- cores)	XUbuntu 13.04	Poclbm 20120920	
GPU	E-350 Linux GPU+CPU	X86+GPU	XUbuntu 13.04	Poclbm 20120920	
GPU	E-350 Linux GPU	GPU	XUbuntu 13.04	Poclbm 20120920	
GPU	E-350 win GPU	GPU	Windows 7	Poclbm 20120920l	
GPU	E-350 win HD 7950 GPU	HD 7950 DCII TOP	Windows 7	Poclbm20120920	
GPU	E-350 win HD 7950 GPU + CPU	HD 7950 DCII TOP with CPU	Windows 7	Poclbm 20120920	
GPU	Desktop qx9650 HD7950 GPU	HD 7950 DCII TOP	Windows 7	Poclbm 20120920	
GPU	N53JQ laptop geforce 425M GPU	Geforce 425M	Windows 7	Poclbm 20120920	
GPU	Mac mini GPU	geforce 325M	OSX	Bitminter 1.4.3	
GPU	Mac mini GPU	geforce 325M with CPU	OSX	Bitminter 1.4.3	
ASIC	ASIC Litle single	ASIC	Windows 7	Bfgminer 3.1.1	Dedicated miner

Source: Ala-Peijari (2014)

that, the government or private banking can save their expenditure. The partnership system with all stake holders and other institutions become efficient. There is no fear to accept financial innovation. The need is how to regulate banking system and pursue the latest high-tech financial innovation system.

Table 4.31: Real Time of Block chain 1

Height	Age	Transactions	Total Sent	Relayed By	Size(kB)
396201	4 minutes	22	1.758.24 BTC	BTCC Pool	52.61
396200	4 minutes	1892	21.09108 BTC	Telco 214	731.65
396199	21 minutes	1885	39.071.04 BTC	KnCMiner	908.47
396198	28 minutes	2400	35.378.01 BTC	AntPool	912.41
396197	33 minutes	2809	139.241.69 BTC	AntPool	912.55
396196	59 minutes	1094	15.957.78 BTC	F2Pool	976.43

Source: https://blockchain.info/ at 2/1/2016 10:59:54 PM

Table 4.32: Real Time of Block chain 2

Latest Transactions		
...	< 1 minute	-
...	< 1 minute	-
...	< 1 minute	-
9fba41e94916d71e92085adcb...	< 1 minute	0.0459661 BTC
f056fb452a43341cc0f932ad1...	< 1 minute	0.0299 BTC
76d1ddea83f73547057a2d18...	< 1 minute	0.05531764 BTC
2922056bb8957e09c9d383926...	< 1 minute	0.00127408 BTC
c85431dbaecb72007a3c20140...	< 1 minute	0.2146073 BTC
068d6b2abe22ac94c210e2628	< 1 minute	97.977534 BTC
0ae16ccd6aa5520e82137f369	< 1 minute	10.37746694 BTC

Source: https://blockchain.info/ at 2/1/2016 11:00:54 PM

Chapter 5

The Impact of Institutional Organization

Industrial energy use accounts for roughly one-third of global energy demand. While there is significant potential to decrease energy consumption in this sector, opportunities to improve energy efficiency are still under-exploited. Although energy efficiency measures have frequently been demonstrated to contribute to the competitiveness of companies and to raise their productivity, energy efficiency actions and improvements are still not typically or widely viewed as a strategic investment in future profitability. A number of barriers to industrial energy efficiency exist including limited access to technical know-how and to capital, risk aversion and transaction costs. Source; 0ECD/IEA, 9 rue de la Fédération, 75739 Paris Cedex 15, France

5.1 The Role of Institutional on Supply Chain Organization

The success of the energy management Programme is clearly correlated with the provision of appropriate resources and supporting mechanisms, including assistance, capacity building and training, and provision of tools and guidance during the implementation stage. Initially, drivers including incentives play an important role in stimulating industry to engage in energy management. In particular, small- and medium-sized enterprises may require additional support and resources. As the Programme matures, Programme managers can explore options to phase out support or transfer the responsibility for the Programme to the private sector. Depending on the design of the Programme, the implementation phase may also require training of auditors and ensuring an effective verification and certification of energy management systems, source; 0ECD/IEA, 9 rue de la Fédération, 75739 Paris Cedex 15, France

5.1.1 Institutional Organization at Local and Global Level

A range of approaches have been developed to support Programme implementation. Mentoring and technical expertise are provided through Agreements Support Managers. The Support Managers conduct site visits, provide energy management advice, respond to queries, and can also assist with data collection and administration of funding. Special Investigations, which are a cornerstone of the EAP, take a step beyond routine assessments. SEAI continually develops processes, methodologies, or sector-specific approaches and projects to ensure continued effectiveness in uncovering new energy efficiency opportunities. Successful actions and approaches are then analyzed, standardized and disseminated to the wider network, namely the LIEN. The Special Investigations thus not only identify opportunities in specific businesses but also contribute to wider knowledge creation and promote the replication of proven practices and successes (O'Sullivan, 2011a; SEAI, 2010). In some cases, funding support for special investigations is provided (SEAI, 2009).

5.1.2 Conclusion

Voluntary agreements between governments and companies can provide the extra incentive that makes enterprises start to realise energy efficiency potentials. Experiences show that the three programmed have been effective at addressing numerous barriers to improved industrial energy efficiency.

5.2 Conclusion

The programmes have different formats and support systems but have attained similar results. The programmes have all succeeded because the local energy agencies have set up supporting policy measures, i.e. a combination of measures such as tax relief, assistance to join the programmes, grants, effective reporting systems and networking activities. One of the key identified success factors is the creation of a culture with real interest from top management, sufficient time allocated to work with the EnMSs, help from external consultants, networking and the promotion of concrete results on a national level. The three cases clearly show that the structured approach embedded in EnMSs enables enterprises to successively work toward deeper energy service and process changes.

Part II

General Conclusion

It is really important to notify that risk management and various issues in corporate social responsibility is big deal for the future of enterprise development. The thesis explained well about the impact of risk management, CSR and energy efficiency in supply chain. This idea is based on the concept of energy efficiency that give pressured in global energy supply chain. The writer advised that energy efficiency can be addressed by organization management, at the same time risk level and CSR. To show the evidence energy efficiency can be derived by three dimension (Production, transportation, warehousing) which answered for risk management, and CSR that covered supply chain. The aims of the research work are to support energy supply chain more efficient in many ways. In the first chapter shows: a) general risk management, more specific supply chain management, b) the concept of CSR in organizations, C) The concept of energy efficiency that related to strategic management. How to see the dimension of production, transportation, and warehousing that can be seen from the scheme of energy efficiency. The mechanism of energy efficiency is to promote: how to reduce pollution impact, and for extent is how to follow the law. Discussing about energy efficiency that linked to responsibility level of certain companies. Thus, risk level has to manage in the context of hyper competitive era. Institutional organization can be formulating to handle problems may arise in hyper competition. Also, the hyper competition as the one of trigger to attract related issues mainly in the global supply chain. Then, how to make connection between hyper competition and its impact on environmental issues. The firms, enterprises, and companies have been trying to develop; constructing and developing between industrial development with respect to the role of government. So that the CSR concept and its application will be very powerful things to create energy efficiency. From the theoretical framework is very important to note here up to managerial level that 1). Practically, the firms, enterprises, and or companies tend to pay the tax rather than creating energy efficiency which reflected to environmental impact. 2). In the spectrum of energy efficiency, the risk management an CSR particularly in energy efficiency, must take an attention on the scope of institutional development. Because, if there is no understanding about institutional development will be very difficult for creating energy efficiency development in the global context. The main points from this thesis is a lot of evidence from case to case. Based on all parameters, analysis will be very interesting if denoted to improve the development strategy. In chapter 4 shows the abundant of research activities which are real evident in academic research activities. Despite this fact, all findings seem to emerge: 1) first, the problem of pollution levels in transport that can be managed at the right level 2) Second, it is difficult to have a global approach to energy efficiency in production. sector because of the diversity of enterprise and each sector of activity seems to follow a strategy in accordance with energy efficiency. The research work shows how to make assumptions and calculate the energy efficiency in diverse sectors such as logistics; ex. in the oil industry, airlines, shipping, manufacturing production industries, sectoral and competitive industries. Studying the maritime transport sector shows that the thesis highlights some limitations for dissemination an analysis in terms of energy efficiency. The study of the footwear industry raises tensions, such as company locations along value chain, between access to energy and access to low labor costs. Also for example the study of the coffee industry reveals how difficult it is to assess energy efficiency in this sector because it is highly fragmented in different subsystems (coffee, green, organic coffee, etc. . .) with very different production modes, storage and transportation. Thesis shows that there is a potentially to reduce the energy impact along the logistics chain. It should be possible to propose a generic modeling to understand the construction, and evaluation of energy efficiency. Also by establishing political and institutional development, the possibility is to reduce the impact of energy consumption within the global logistics chain. Finally, the general conclusion offers the managerial implications. In particular, suggestions are made regarding the energy efficiency in global logistics chain. This concept is approached in multidimensional ways, the economic, environmental, social and political, and geopolitical dimensions. The goal is to propose and develop the models to optimize energy consumption with efficient supply chain management, specifically, under the constraints of minimizing the environmental impact. The proxy chosen is to measure the CO2 emission level. However, the level of CO2 compliance with CSR positioning and risk management that influenced the quality of environment. The doctoral thesis highlights the theoretical and managerial contributions that can be found in case studies. The initial question of the thesis work involves the promotion of energy efficiency management from the perspective of global logistics chain.

Regression analysis is a statistical technique for modeling and analysing multiple variables by exploring the relationship between one dependent and one or more independent variables. This approach can be used to quantify the factors that influence energy use and can be particularly useful in conjunction with other methods to establish causality.

Audits are is an inspections, surveys and analysis of energy flows. They can be instrumental in identifying energy efficiency opportunities but may fully capture systems improvement potentials. Energy audits can range from cursory to in-depth and comprehensive. A walk-through energy audit is typically a quick and relatively inexpensive approach that provides a qualitative examination of facilities to identify basic opportunities for savings as well as areas that need further examination. A detailed energy audit, which requires more time and expertise, may cover equipment or processes for which energy-savings opportunities were identified during a walk-through audit or where a benchmarking process has identified savings potentials. Detailed audits can be carried out at various levels, e.g. at the equipment, system, or process level. Energy performance benchmarking is the comparative analysis of energy use per unit of physical production. This analysis involves the calculation of energy intensity by different fuel types or activities, and comparison with intensities achieved in the sector via reference to appropriate benchmarking guides. Similarly, energy best practices benchmarking involves comparing processes, operations and systems to sectoral best-in-class operations.

The conclusion shows that all findings have significant results. Precisely, the management strategy should be the key concept for long period to promote three dimension in transportation, production, and warehouse. It has to refer on the concept of management in energy efficiency.

Utilizing straight forward point analyzed for all cases studies shown that the point of global supply chain must be established by strong chain for each business activities. Furthermore, energy efficiency also push us for greening management strategy. Back to all dimensions in this works: I delivered some conclusion that with current issues of greening effort which matched to Mathers (2015):

- by setting up the performance goals for improving the quality of environment via management approach.

- by tracking logistics emission should as a reference for a standard practice. Also, improving the the tracking performance by various indicators and methodology.

- by seeking and building the external factor so called a leadership practice.

Discussing in energy issues, particularly on energy efficiency which creating efficiency output level must be coherence and high linkages from backward and forward linkages. Especially for global market and global product should be traced. Focusing on energy used for each business activities is useful one. Therefore, all products assured by using energy intensity and global supply chain properly.

By optimizing energy source in proper way, it would be give minor impact on environmental. This is the main idea for increasing industrial intensity with small environmental impact. So that, using CSR's matrix will contribute the knowledge capacity to the global business and global community.

However, from the management side shows that the management strategy is a role play for promoting energy efficiency in scale and geographical areas. By establishing and constructing a strong logistics and well-connected global supply chain will enhance global supply chain performance.

Mathematical approach and statistical approaches shown technicals on energy efficiency calculation. The innovation of this research is the discussion through corporate social responsibility and energy efficiency. It seemed that enterprises or small, medium even large size of company for future competition, as D'aveni (1995). It should be able to handle energy efficiency. Moreover, energy efficiency as one of tool to know company is efficient or not. Finally, the energy efficiency in global supply chain shows that efficiency energy in global level could be perform by any type of product, mainly on energy matter. By focusing on how to transport them, the way of production system, and how to build warehouse system to keep source of energy become more efficient to serve inter-links of chain and end users.

In general, the three dimension of this research shows that transportation field, production field, ware- house field need all stake to holder to evaluate for each step of energy use and any part of business activities to measure energy intensity. Mapping inter countries relationship to promote global energy link, (acceleration of energy global supply chain) analyzing the impact of "energy trilemma" which included energy security, energy equity: environmental sustainability on the new era of global supply chain. See, also; Bocca and Hanna (2014). The energy sustainability index ranks countries which likely be able to provide sustainable energy policies through the three dimensions of the energy trilemma:

- energy security: the effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of participating energy companies to meet current and future demand.

- energy equity: the accessibility and affordability of energy supply across the population.

- environmental sustainability: the achievement of supply and demand-side energy deficiencies and the development of energy supply from renewable and other low-carbon sources.

It shows that the point of global supply chain must be established as a strong chain for each industrial phase or business activities phase. To create efficiency output must be coherence and high linkages from backward and forward linkages. Especially, for global market and global product should be traced,easily by focusing on energy used or energy resources that use for each business activities. By optimizing energy source in proper way, it would be give minor impact on environmental aspect. Koppl (2010), rational expectations models create model closure by stipulating that the representative agent acts as if it had access to the theorist's model. Such rationality does not seem to view the difference between the model and the world as potentially problematic. Computational complexity refers to the difficulty or impossibility of making a calculation or deciding a well-posed mathematical question. Axtell (2005), reports that Walrasian auctioneer faces a computational problem that is hard in a precise mathematical sense: there are no polynomial time algorithms for the general case with nonlinear utility functions (p. 196)., Moreover, Axtell (2005), explains, polynomial time algorithms. Finally, by applying complex system methodology and one of them so called CSR's matrix simulation shows; Each of stakeholder will contribute their knowledge capacity to the global business competitiveness. The lesson learned from this dissertation: To fulfill a critical gap in the current state of art in research work. Statistical analysis to calculate the éCO2 mix by using data base on real time. Formulating and creating the new global supply chain by source of energy alternative.

5.3 Institutional Organization on Supply Chain Management

Difficulties

Based on Flyvbjerg (2006), there are five misunderstandings or oversimplifications for the nature of such research:

- general theoretical (context-independent) knowledge is more valuable than concrete, practical (context-dependent) knowledge.
- the case study is most useful for generating hypotheses; that is, in the first stage of a total research process, while other methods are more suitable for hypotheses testing and theory building.
- the case study contains a bias toward verification, that is, a tendency to confirm the researchers preconceived notions.

base on similarity findings on this research work as follows;

- transportation cases in global supply chain is applicable task to build up simulation, based on many options; technological level, type of product, and management trading system.
- production cases in global supply chain is applicable task to build up simulation, based on many options; technological level, type of product, and management policies.
- warehouse cases in global supply chain is not easy task to build up global simulation, However, we can create a new global supply chain based on many options; technological level, type of product, and innovation of management.

5.4 Contribution for Management Science

5.4.1 Value Added

The research work can be distinguished as follows (Contribution for Management Science):

- input output matrix model as a model to create A New Global Supply Chain Perspective.
- all methods applied is useful to develop energy efficiency in global supply chain.
- Monte Carlo simulation is a bridge for the new era of global supply chain methodology, particularly in real time simulation for all business products (ex; electricity transmission).

- optimizing the production system by robust estimation.
- building the new approach for industrial development: ex; the nuclear power plant to open up the real global supply chain management. Ex; by local power of resource management and all availabilities in global product supply chain availabilities.
- the next research work possibilities: the new mechanism how to put energy efficiency labeling for each manufactured product. Its means; Each product should have energy efficiency labeling product (the product has been manufactured by energy efficiency management system within enterprise)

Leach et al. (2000); be able to reach some agreement on the range of issues to build up their understanding of the nature of science. The methodological issue of how we exploring the nature of science. The science might reasonably be regarded as an essential component of an understanding of science. By an assumption that the human has knowledge and understanding to the nature of science.

5.4.2 All Highlight of Research Findings

To response all problems by using management science approach;

1. to pursuit the high performance; a global downstream program aimed at implementing targeted, sustainable improvements in supply chain optimization processes, technology, information and organizational abilities.
2. achieving higher value from enterprise wide data by managing data quality and creating robust analytical capabilities.
3. how to implement the global supply chain optimization program via solid performance through prior collaborations.
4. the capability of company in supply chain efficiency, supply chain visibility and integrated data warehousing as well as collaborative reports, to deliver value and innovation across business areas.
5. emphasizing on innovation, extensive industry experience and insight, data management, business intelligence knowledge, robust implementation methodology and organizational capabilities.

All research worked done can be distinguished as follows:
1. input output approach in global supply chain,
2. AHP,
3. Monte Carlo simulation,
4. all methods for example using software packaged installed (LEAP),
5. method of calculation $CO2$,
6. global supply chain in real time calculation and real simulation,

7. the new era of supply chain in real time simulation,

8. optimizing the production system by robust estimation,

9. industrial development: nuclear plant to open up the real of global supply chain. By local power of resource management and all availabilities of global product availabilities.

5.4.3 The Global Theoretical Contribution

All Mapping to Scientific Contribution from Research Works:

1. to fulfill a critical gap in the current state of the art in research and business,

2. the contribution of the dissertation on CO2 mix is how to calculate the CO2 mix by using statistical analysis to analysis the data in real time,

3. ECO2 clouds of ecological concerns; energy efficiency or CO2 footprint,

4. formulating and creating the new global supply chain by source of energy alternative.

Connecting the Three Dimension of Global Supply Chain by Research Case Studies

- nuclear power plant development,
- international trading on electric transmission,
- energy production by energy alternative (LEAP approach),
- energy labeling for all manufactured products,
- labeling for distance level from origin to end users.

5.5 Research Work Achievement

- input output matrix model as a model to create a new global supply chain perspective.
- analytical hierarchy process is useful to develop energy efficiency in global supply chain via managerial decision.
- Monte Carlo simulation is a tool for the new era of global supply chain methodology, particularly in real time simulation (ex;electricity transmission).
- optimizing the production system by robust estimation.
- building the new approach for industrial development: ex; the nuclear power plant to open up the real global supply chain management. Ex; by local power of resource management and all availabilities in global product supply chain availabilities.

- the next research work possibilities: the new mechanism how to put energy efficiency labeling for each manufactured product. Its means; each product should have energy efficiency labeling product (the product has been manufactured by energy efficiency management system within enterprise).

5.5.1 Transportation Optimization

Based on hypothesis that improving industrial development will give impact on environmental impact on pollution level (CO2). By developing supply chain strategy faced on complexity problems and challenges for enhancing business development at global level. What does "global" actually means?. There are many descriptions on this terminology.

However, the concept of globalization is a shift from the simply refer to the concept of a product related to the whole supply chain coordination. To get better understanding into these descriptions, should be back to the sociological roots of globalization theory. A lot of the sociological aspects of global business can be traced back to Perlmutter (1969) stated that the evolution of the multinational corporation.

The geocentric is a worldwide approach in both headquarters and subsidiaries. The firms subsidiaries are neither satellites nor independent city states, but part of a whole whose focus is on worldwide objectives as well as local objectives. The point here is each part contributing to make a unique contribution also by unique competence.

Geo centrism is expressed by function, product, and geography. Dickens, (1998) distinguished between the internationalization, which is a (quantitative) geographic extension of existing economic activities, and globalization, which is a functional integration (qualitative) of economic activities. Providing where the transport from their country origin to the country which consuming on it, constitutes at international level.

They utilized six categories (management teams, strategy, operations and products, technology and R&D, financing and marketing), each of which consists of multiple dimensions. Also, Bartlett and Ghoshal (1989) defined multiple dimensions to identify a firms position on the multinational to complex global chain. Kanter and Dretlet (1998) attempted to define what global really means. Their approach is to identify six aspects:

- global is synonymous with international.
- global strategy means doing the same thing everywhere.
- globalizing means "becoming stateless, with no ties" to home country.
- globalizing requires "abandoning images and values" of home country.
- globalizing involves acquisitions without integration.
- a firm must engage in sales or operations in a foreign country to be considered global.

The cost of transportation will be recovered by the total value of sales. The viscosity and non-viscosity products are important parts in this business. One is to distinguish which transportation type is the best suitable. Mainly, for the high level of viscosity of a product, the delivery is scheduled in the morning rather than in the afternoon. All reasons is to avoid the traffic congestion and to meet the legislation of delivering procedure. Just in time method was applied in these industries by maximum effort. All is based on client demand, precisely. The main problem is to take into account when loading and unloading products. If the loading and unloading last more than 30 minutes in each activities, then the companies will be take in charge more for transportation cost based on the agreement and the logistics contract. Of course there is free time for two hours for loading and unloading products by using tank car tank.

5.5.2 Production Optimization

Briefly summarizing from the production optimization approach: I concluded based on all research work achievement. I used production function and Simulation. However, there are a lot of methodological approaches for this topic. On production optimization topics is easier to distinguish the energy consumption on the site.

The interesting question is can we measure the existence of energy efficiency when the product has been finalized or as a final product. The answers is not so simple one. We must calculate fuel consumption when delivering the product to consumer. Therefore, there will be much interesting one when the research output can be identified from the first manufacturing process, middle process, up to final process the in hand of customer.

As stated in the part of introduction and conclusion this dissertation, the input output analysis is the appropriate model to describe local/regional and global supply chain energy efficiency. Moreover, the measurement of input output impact or aggregation will be notified in exact number. Both based on the real data and aggregation method. More reference see more Chapman (2006).

5.5.3 Warehouse Optimization

Briefly summarizing from the warehouse optimization approach: I concluded that input output analysis and Monte Carlo theory have been explored as useful methods. Because, various methodologies will be possible to enrich the scientific work. The point is we can create the initial global supply chain energy efficiency on nuclear power plant construction.

5.5.4 Theoretical Contribution for Scientific Development

- the supporting system in energy efficiency choice.
- energy efficiency; effectiveness of energy used in various purposes. Moreover, connecting to global supply chain requires a lot of criteria. There is no doubt that energy is the main role for supporting business activities.

- the scarcity of energy source as one of obstacles to develop global supply chain business (emerging economies and market).
- high skill of management science knowledge; how to manage and to decide which energy efficiency method and energy employed for appropriate business activities.

5.5.5 Strengthen to Theoretical Aspects

Theoretical approaches used in this dissertation:

1. input output model analysis.
2. Monte Carlo theory.
3. production function.
4. robust estimation.
5. scheduling theory.

Theoretical Challenges: in Energy Efficiency in Global Supply Chain

1. Bayesian approach.
2. Markov chain model.
3. combinations of Markov chain Monte Carlo and applied Bayesian statistics.
4. scheduling theory versus Bayesian probability approach.

Future Theoretical Possibilities: in Energy Efficiency in Global Supply Chain

1. modeling combination system.
2. applied labeled Markov processes (ALMP) on logistics sustainability.
3. efficiency computing algorithm system.

5.6 The Impact of Institutional Organization

Industrial energy use accounts for roughly one-third of global energy demand. While there is significant potential to decrease energy consumption in this sector, opportunities to improve energy efficiency are still under-exploited. Although energy efficiency measures have frequently been demonstrated to contribute to the competitiveness of companies and to raise their productivity, energy efficiency actions and improvements are still not typically or widely viewed as a strategic investment in future profitability. A number of barriers to industrial energy efficiency exist including limited access to technical know-how and to capital, risk aversion and transaction costs. Source; 0ECD/IEA, 9 rue de la Fédération, 75739 Paris Cedex 15, France

5.6.1 The Role of Institutional on Supply Chain Organization

The success of the energy management Programme is clearly correlated with the provision of appropriate resources and supporting mechanisms, including assistance, capacity building and training, and provision of tools and guidance during the implementation stage. Initially, drivers including incentives play an important role in stimulating industry to engage in energy management. In particular, small- and medium-sized enterprises may require additional support and resources. As the Programme matures, Programme managers can explore options to phase out support or transfer the responsibility for the Programme to the private sector. Depending on the design of the Programme, the implementation phase may also require training of auditors and ensuring an effective verification and certification of energy management systems, source; 0ECD/IEA, 9 rue de la Fédération, 75739 Paris Cedex 15, France

5.6.2 Institutional Organization at Local and Global Level

A range of approaches have been developed to support Programme implementation. Mentoring and technical expertise are provided through Agreements Support Managers. The Support Managers conduct site visits, provide energy management advice, respond to queries, and can also assist with data collection and administration of funding. Special Investigations, which are a cornerstone of the EAP, take a step beyond routine assessments. SEAI continually develops processes, methodologies, or sector-specific approaches and projects to ensure continued effectiveness in uncovering new energy efficiency opportunities. Successful actions and approaches are then analyzed, standardized and disseminated to the wider network, namely the LIEN. The Special Investigations thus not only identify opportunities in specific businesses but also contribute to wider knowledge creation and promote the replication of proven practices and successes (O'Sullivan, 2011a; SEAI, 2010). In some cases, funding support for special investigations is provided (SEAI, 2009).

5.6.3 Conclusion

Voluntary agreements between governments and companies can provide the extra incentive that makes enterprises start to realise energy efficiency potentials. Experiences show that the three programmed have been effective at addressing numerous barriers to improved industrial energy efficiency.

5.7 Managerial Contribution

The nuclear power plant global supply chain, the plant is established by local supply chain (low to medium technology) to global supply chain (high technology and high quality product required). In fact, the construction of nuclear power plant is not only discussed product supply chain but also how to supply high skilled person for the final phase of nuclear plant construction. For the first decade will absorbed a lot of worker for road construction and other infrastructure equipment to support nuclear plant construction. Because, the nuclear power plant construction needs a decade to be ready for utilization and final utilization for producing electricity output. Therefore, the global partnership between MNCs and local companies must be constructed.

Technical approaches and managerial applied, the most powerful research work shown here, by utilizing optimization (matrix approach), statistical approaches and the art of management science how to manage relationship between all existing stake holders. All dimensions in transportation, production and warehouse optimization need skilled full of management approaches.

The relationship and or any form of competition need high attention of all stake holders to get an optimal output. The real time demand driven supply chain management, especially by information technology, see correlated, see Paris et al. (2015).

The information architecture spanned technology, software applications, data, processes and metrics. It was designed to provide a window into the supply chain by meeting two objectives: enabling the integration of data from various parts of the business and providing supply chain visibility metrics. To ensure the true competition, a pan-European market required that electricity can be exchanged across-borders. Fortunately, the current market rules ensure that the electricity can be transported on the highest grid level at the same price independent of the distance. This principle best supports the development of a competitive electricity market.

Supply security Europe's energy dependency is high and is likely increase time to time. EU owned oil and gas reserves are steadily decreasing, and the continents overall energy demand continues to grow. Currently, 50% of all European energy supply comes from outside Europe. Politically, Europe is becoming vulnerable to foreign energy suppliers, thus undermining its economic independence. Making matters worse, a significant amount of Europe's money will be transferred annually to countries outside Europe, reducing Europe's trade balance. By reducing energy consumption and electricity demand.

Europe can support its goals of reducing its energy dependency. Improving energy efficiency will play a fundamental role in this process, while also helping the European electricity market to become even more competitive.

5.8 Conclusion

The programmes have different formats and support systems but have attained similar results. The programmes have all succeeded because the local energy agencies have set up supporting policy measures, i.e. a combination of measures such as tax relief, assistance to join the programmes, grants, effective reporting systems and networking activities. One of the key identified success factors is the creation of a culture with real interest from top management, sufficient time allocated to work with the EnMSs, help from external consultants, networking and the promotion of concrete results on a national level. The three cases clearly show that the structured approach embedded in EnMSs enables enterprises to successively work toward deeper energy service and process changes.

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Part III

Appendix

Table 5.1: Energy Savings and Emission Reductions

Description	Boiler room 1	Boiler room 2	Boiler room 3	% Total Used
Boiler production capacity (ton of steam/unit/hr)	4	10	4	66.67
Number of boilers in operation	4	2	3	44.44
Hourly fuel oil consumption rate (ton/unit/hr)	0.25	0.5	0.25	80.65
Number of hours of operation per day (hrs/day)	24	24	24	100.00
Number of days of operation in a year (days/yr)	302	302	302	100.00
Load factor (%)	20	42.7	15	85.47
Annual consumption of heavy oil (ton/yr)	1449.6	3094.9	815.4	27.04
Hourly production capacity (ton of steam/hr)	3.2	8.5	1.8	22.86
Daily production of steam (ton of steam/day)	76.8	205	43.2	23.63
Annual production of steams (ton/yr)	23194	61898	13046	23.63
Daily lost seam & water at the open outlet (ton/day)	76.8	41	43.2	47.70
Annual lost steam & hot water (ton/yr)	23193.6	12379.6	13046.4	47.70
Temperature of steam at the outlet of the boiler (1C)	194	194	194	100.00
Temperature of steam & hot water at the condenser (1C)	98	98	98	100.00
Total share of energy savings by closing the steam system (%)	41.5	26	41.5	130.91
Savings of heavy oil per year (ton/yr)	601.1	803.6	338.1	34.49
Savings of diesel per year (ton/yr)	0	191.6	0	0.00
Total savings of oil and diesel (ton/yr)	601.1	995.2	338.1	31.08
CO2 emission reduction (ton/yr)	2163.8	3582.6	1217.1	31.07

Source: Aminata J., Grandval S., Sbihi A., (2014),"Energy Efficiency in Production Process: A Case of Footwear Trade Development", The Business & Management Review, vol.4, n.4, p.104-113

Table 5.2: Cost Effectiveness Analysis

Description	Boiler room 1	Boiler room 2	Boiler room 3	% Total Used
Average price of heavy oil in 2006 constant price (USD/ton)	417	417	417	100.00
Cost of high pressure steam pump (USD/unit)	5263.2	5263.2	5263.2	100.00
Number of units needed (units)	4	8	4	25.00
Cost of total steam pumps (USD)	21052.6	42105.3	21052.6	25.00
Cost of higher pressure steam transmission pipe (USD/m)	20	20	20	100.00
Length of the steam system and boilers (m)	100	600	100	12.50
Capital cost for high pressure pipes (USD)	2000	12000	2000	12.50
Total equipment investment costs (USD)	23052.6	311342.1	23052.6	6.45
Equipment installation costs	6915.8	93402.6	6915.8	6.45
Grand total of investment and installation fees (USD)	29968	404744.7	29968.4	6.45
Saved value of salt (USD/yr)	762	2033	429	23.64
Saved value of water (USD/yr)	3525	1882	1983	47.70
Saved value of fuels (USD/yr)	250639	477241	140985	28.85
Total saving values (USD/yr)	254927	481156	143396	28.99
Payback period (Months)	1.4	10.1	2.5	29.79
Life time of the new technology (yrs)	20	20	20	100.00

Source: Aminata J., Grandval S., Sbihi A., (2014),"Energy Efficiency in Production Process: A Case of Footwear Trade Development", The Business & Management Review, vol.4, n.4, p.104-113

Energy Savings and Cost Effective Analysis

Sample Program in SAS Software

SAS-DATA-NEW

1. if sic-3d= 31100 or sic-3d= 31200 or sic-3d= 31300 or sic-3d= 31400 or sic-3d= 32100

2. or sic-3d= 32200 or sic-3d= 32300 or sic-3d= 32400 or sic-3d= 33100 or sic-3d= 33200

3. or sic-3d= 34100 or sic-3d= 34200 or sic-3d= 35100 or sic-3d= 35200 or sic-3d= 35300

4. or sic-3d= 35400 or sic-3d= 35500 or sic-3d= 35600 or sic-3d= 36100 or sic-3d= 36200

5. or sic-3d= 36300 or sic-3d= 36400 or sic-3d= 36900 or sic-3d= 37100 or sic-3d= 37200

6. or sic-3d= 38100 or sic-3d= 38200 or sic-3d= 38300 or sic-3d= 38400 or sic-3d= 38500

7. or sic-3d= 39000 ;

keep sic-3d year ltlnou ltl zpdvcu zndvcu yt1vcu iadvcu vtlvcu ; run;

procedure-sort ; by sic-3d
proc summary data=is7595.dbf
class sic-3d ; var ltlnou ltl zpdvcu zndvcu yt1vcu iadvcu vtlvcu ; output out=id7595 sum=t-ltln t-ltl t-zpd t-znd t-yt1 t-iad t-vtl
proc-print

drive1;
a = 0.5; do iter=1 to 10000; do time = 0 to 500;
y = 1 - exp(-a*time) + 0.1 *rannor(123); output; end; end; run; data drive2;
a = 0.5; yp = 1.0 + 0.01 *rannor(123); do iter=1 to 100; do time = 0 to 500;
y = 1 - exp(-a)*(1 - yp); yp = y + 0.01 *rannor(123);
output; end; end; run; title1 'Monte Carlo Simulation of ODE';

procedure model data=drive1 noprint;
parm a 0.5; dert.y = a - a * y; fit y / outest=est; by iter; run; proc univariate data=est noprint;
var a; output out=monte mean=mean p5=p5 p95=p95; run; proc print data=monte; run;
Source: the program created by authors based on statistics database (central bureau of statistics, Jakarta).

Related Source and Information

Hyper Competition

Rosenau (1997), the limitation of complexity theory is to build up the alternative solution. Why it does matter?, Because, the theory can make an answer to give a solution for a complex system in world complex system. How can theory exactly adapt and give problem-solving? How to determine initial condition that will lead outcomes? All these things can be solved through computer simulations, with minimizing the deviation level, for example to measure the business model as below:

Hyper Competition via Transparency

Based on BSR and Maersk Line's report, 2010; the notion of hyper transparency takes the idea of transparency and extends it exponentially. It reflects the way of consumers, customers, local communities, investors, regulators, and other key stakeholders increasingly expect full visibility into how business operates, how it performs, and the impact of business on people, profit, and the planet as a whole. Developments in information communication technologies are pushing and enabling this trend as they provide us with the means required to receive and to process information (ex. smartphone that can be used as airplane boarding passes). Moreover, see Rosenau (1997); about complexity, global politics, and national security, also see more New (2010), " At each stage of the chain, a new rule will apply: The only acceptable products are those with a clear, comprehensive provenance".

Examples of hyper-transparency:

1. corporate reporting on financial and non-financial performance.

2. consumer expectations for transparency which allows consumers to access information about the sustainability performance of a particular product.

3. allows consumers and citizens on debate corporate green-washing.

4. both carbon-labeling schemes (voluntary and regulatory), and sustainability consortia, which drive product transparency. ex:Liu et al. (2010), p.108: according to energy efficiency performance and utilization of renewable energies.

5. the point that can be figured out from collaboration is transparency to show how the work itself has been executed in efficiency method.

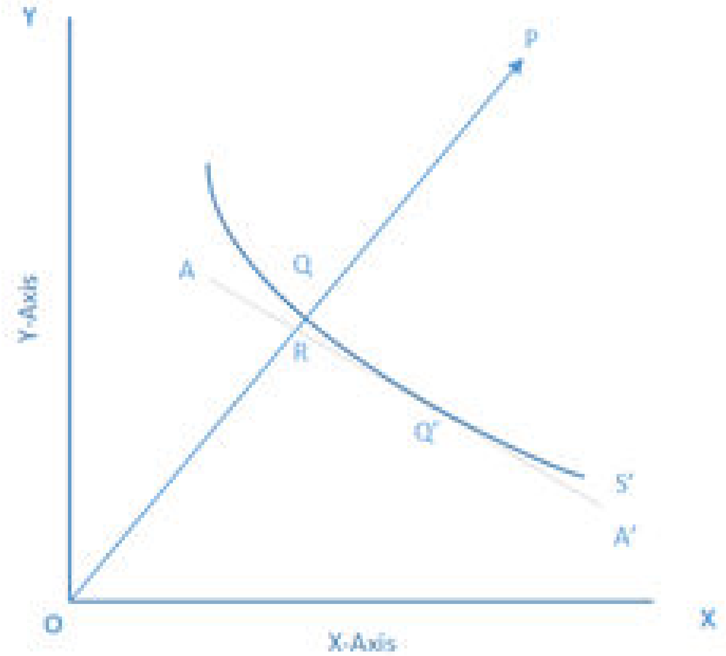
Energy Efficiency: Theory and Extension

Basically, energy efficiency can be calculated as well as output variable divided by input variable. This formula is the fundamental before creating complex calculation. The aim of this research work is what we can learned from managerial aspect which refer to energy efficiency problem. There are many variations how to find and to create energy efficiency. The point is not only technology level, but also handling the organizational aspect. particularly within three dimensions of transportation, production and warehousing. For some extension there are weighted score for each variable:

$$Energy\ Efficiency = \frac{(Output\ )}{(Input\ )} \tag{5.1}$$

$$Energy\ Efficiency = \frac{(Weighted\ Sum\ Output\ )}{(Weighted\ Sum\ Input\ )} \tag{5.2}$$

Figure 5.1: The Production Function, Isoquant



Source: Samuelson, Microeconomics, 1998

An isoquant is the set of points at which the same quantity of output is produced while changing the quantities of two or more inputs. An isoquant shows all those combinations of factors which produce same level of output. An isoquant is also known as equal product curve or iso-product curve. The isoquant shows ability to substitute between the two different inputs at will in order to produce the same level of output. An isoquant map can also indicate decreasing or increasing returns to scale based on increasing or decreasing distances between the isoquant pairs of fixed output increment, as output increases, Salvatore (1989), Chiang (1984), Varian (1992).

Mostashari (2011), collaborative modeling and decision-making for complex energy systems, p.25; "evaluative complexity is due to the existence of stakeholders in a complex system, and is an indication of the different normative beliefs that influence views on the system. Thus, even in the absence of the two former types of complexity, and even if be able to model the outputs and to perform the system, it would still be difficult to reach an agreement on what good system performance signifies. This type of complexity is one of the primary motivators for engaging stakeholders in systems modeling and policy design.

The AHP Process

1. to identify an unstructured situation into its component parts,

2. to arrange the parts or variables into a hierarchic order,

3. assign numerical values to subjective judgments for each variable,

4. to determine which variables have the highest priority.

The Mathematics of AHP: Normalization behind the scene, 1

$$\begin{bmatrix} C11 & C12 & C13 \\ C12 & C22 & C23 \\ C31 & C32 & C33 \end{bmatrix} \tag{5.3}$$

$$C_{ij} = \sum_{i=1}^{n} C_{ij} \tag{5.4}$$

$$X_{ij} = \frac{C_{ij}}{\sum_{i=1}^{n} C_{ij}} \begin{bmatrix} X_{11} & X_{12} & X_{13} \\ X_{21} & X_{22} & X_{23} \\ X_{31} & X_{32} & X_{33} \end{bmatrix} \tag{5.5}$$

$$W_{ij} \frac{\sum_{j=1}^{n} X_{ij}}{n} \tag{5.6}$$

(5.7)

$$\begin{bmatrix} C11 & C12 & C13 \\ C12 & C22 & C23 \\ C31 & C32 & C33 \end{bmatrix} * \begin{bmatrix} W11 \\ W21 \\ W31 \end{bmatrix} = \begin{bmatrix} Cv_{11} \\ Cv_{21} \\ Cv_{31} \end{bmatrix} \tag{5.8}$$

$$\begin{array}{l} Cv_{11} = \frac{1}{W_{11}} \left[\; C_{11}W_{11} + \quad C_{12}W_{21} + \quad C_{13}W_{31} \; \right] \\ Cv_{21} = \frac{1}{W_{11}} \left[\; C_{11}W_{11} + \quad C_{12}W_{21} + \quad C_{13}W_{31} \; \right] \\ Cv_{31} = \frac{1}{W_{11}} \left[\; C_{11}W_{11} + \quad C_{12}W_{21} + \quad C_{13}W_{31} \; \right] \end{array} \tag{5.9}$$

$$\Longrightarrow \partial = \sum_{i=1}^{n} Cv_{ij} \Longrightarrow \text{CI}=\frac{\partial - n}{n-1} \Longrightarrow \text{Cr}=\frac{CI}{RI}\,(This\,is\,for\,Cr < 0.10)) \tag{5.10}$$

Table 5.3: The Matrix Simulation-1

CTQ - SCORE	Efficiency	Effectiveness	Enterprise	Society	Government
Efficiency	1	5	6	7	9
Effectiveness	0.2	1	5	6	7
Enterprise	0.16	0.2	1	8	9
Society	0.14	0.16	0.13	1	5
Government	0.11	0.14	0.11	0.2	1
Col. Total	1.62	6.50	12.24	22.2	31

Note; its taken and reformulated from the basic concept of matrix supply chain on business-economic, and social performance, CTQ Score= critical to control quality score), Analytical Hierarchy Process Matrix to Analyze Intervention Case Index (ICI), Per Case, Monthly Based on Policy Simulation

Energy Efficiency

Popper et al. (2009), in energy future near-term decisions from theme is based on the energy efficiency of the global supply chain in terms of production, transportation and storage of products, and Joshi and Kumar (2012) stated energy efficient thermal management of data centers. The objective is optimizing energy throughout the supply chain for

Table 5.4: The Matrix Simulation-2

CTQ - SCORE	Normalized Score Efficiency Policy	Normalized Score Effectiveness Policy	Normalized Score Enterprise Policy	Normalized Score Society Policy	Normalized Score Government Policy	Cumulative Normalized Score or row Sum Policy	Normalized Percentage or Percent Ratio Scale of Priority Policy
Efficiency Policy	0.62	0.77	0.49	0.32	0.29	2.48	49.62
Effectiveness Policy	0.12	0.15	0.41	0.27	0.23	1.18	23.63
Enterprise Policy	0.10	0.03	0.08	0.36	0.29	0.87	17.32
Society Policy	0.09	0.03	0.01	0.05	0.16	0.33	6.61
Government Policy	0.07	0.02	0.01	0.01	0.03	0.14	2.82
Col. Total Policy	1	1	1	1	1	1	1

Table 5.5: The Matrix Simulation-3

Score to be Allocated			
Description	Normal	AHP Score	Average AHP Score
Poor	1	1 to 2	1.5
Average	2	3 to 4	3.5
Good	3	5 to 6	5.5
Very Good	4	7 to 8	7.5
Excellent	5	9 to 10	9

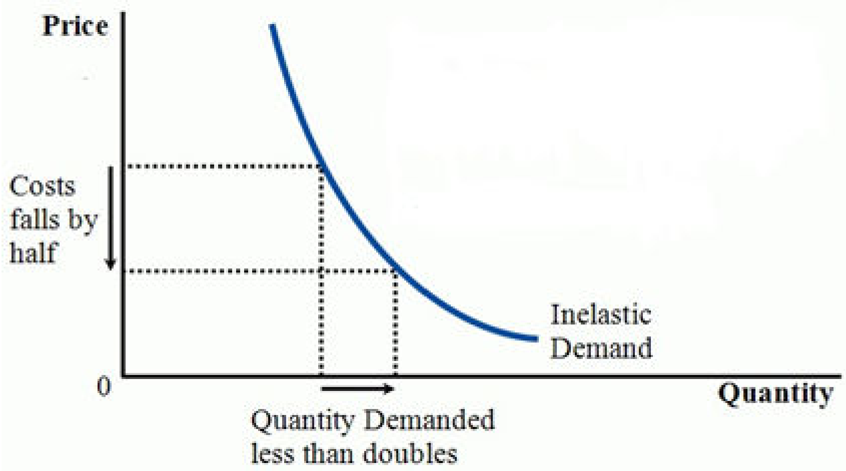
a minus impact on the environment.

Aswathanarayana and Divi (2009) on energy portfolios, Serletis (2007), Molak (1997), about fundamentals of risk analysis and risk management, Vose (1997); referring the fundamentals of risk analysis and risk management using monte carlo risk analysis modeling cleared that "the analysis should not be thought of as the only technique for evaluating risk and uncertainty". The point is the decision maker should use "monte carlo risk analysis as one of several complementary inputs to the decision process analysis.

The Jevons paradox is to observe that an increase in the efficiency with which a resource (i.e. fuel) is used causes a decrease in the price of that resource when measured in terms of what it can achieve (i.e. work). A decrease in the price of a good or service will increase the quantity demanded (see supply and demand, demand curve). Thus with a lower price for work, more work will be "purchased" (indirectly, by buying more fuel). The resulting increase in the demand for fuel is known as the rebound effect. The Jevons paradox occurs when the rebound effect is greater than 100%, exceeding the original efficiency gains.

The Jevons paradox was first described by the English economist William Stanley Jevons in his book, 1865; The coal question. Jevons observed that "England's consumption of coal soared after James Watt introduced his coal-fired steam engine", which greatly improved the efficiency of Thomas in the earlier design. Watt's innovations made coal a more cost-effective which leading to the increased use of the steam engine in a wide

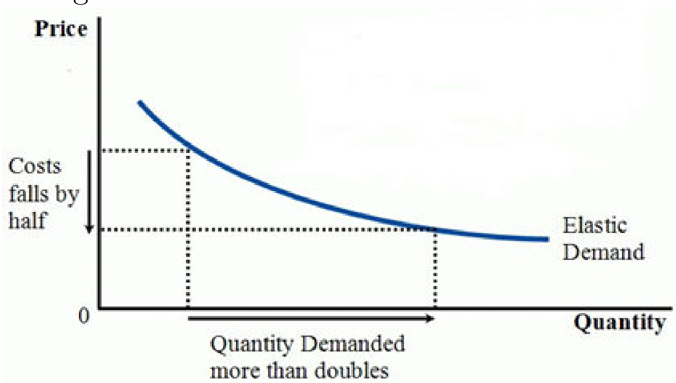
Figure 5.2: Elastic Demand for Work Full



Demand for Work: A doubling of fuel efficiency more than doubles work demanded, increasing the amount of fuel used. Jevons paradox occurs, see Polimeni et al. (2008).

range of industries. Jevons argued that improve- ments in fuel efficiency tend to increase, rather than decrease. For fuel use that there is a confusion of ideas to suppose that the economical use of fuel is equivalent to diminished consumption. Jevons argued that this view was incorrect, as further increases in efficiency would tend to increase the use of coal. Hence, improving technology would tend to increase, rather than reduce it at the rate at which England's coal deposits were being depleted.

Figure 5.3: Inelastic Demand for Work Full



demand for work: A doubling of fuel efficiency does not double work demanded, the amount of fuel used decreases. Jevons paradox does not occur. see Polimeni et al. (2008).

In the 1980s, economists Daniel Khazzoom and Leonard Brookes revisited the Jevons paradox in the case of a society's energy use. Brookes, argued that attempts to reduce energy consumption by increasing energy efficiency would simply raise demand for energy in the economy as a whole. Khazzoom focused on the narrower point that the potential for rebound was ignored in mandatory performance standards for domestic appliances being set by the California Energy Commission.

In 1992, the economist Harry Saunders dubbed the hypothesis that improvements in energy efficiency work to increase, rather than decrease. Saunders showed that the Khazzoom-Brookes postulate was consistent with neo-classical growth theory ("the mainstream economic theory of capital accumulation, technological progress and long-run economic growth") based on many assumptions.

Further Information on Literature Review

Energy efficiency can be defined as the ratio of useful outputs to energy inputs for a system. The system in question may be an individual energy conversion device (i.e. a boiler), a building, an industrial process, a firm, a sector or an entire economy. In all cases, the measure of energy efficiency will depend upon how useful is defined and how inputs and outputs are measured (Patterson, 1996). The options include:
• thermodynamic measures: where the outputs are defined in terms of either heat content or the capacity to perform useful work;
• physical measures: where the outputs are defined in physical terms, such as vehicle kilometers or tonnes of steel; or
• measures: where the outputs (and sometimes also the inputs) are defined in economic terms, such as value-added or GDP.

When outputs are measured in thermodynamic or physical terms, the term energy efficiency tends to be used, but when outputs are measured in economic terms it is more common to use the term energy productivity. The inverse of both measures is termed energy intensity. The choice of measures for inputs and outputs, the appropriate system boundaries and the time frame under consideration can vary widely from one study to another. However, physical and economic measures of energy efficiency tend to be influenced by a greater range of variables than thermodynamic measures, as do measures appropriate to wider system boundaries. Hence, the indicator that is furthest from a thermodynamic measure of energy efficiency is the ratio of GDP to total primary energy consumption within a national economy. According to economists are primarily interested in energy efficiency improvements that are consistent with the best use of all economic resources. These are conventionally divided into two categories: those that are associated with improvements in overall, or "total factor productivity" (in economics so called; technical change), and those that are not (in case of the existent of "substitution"). Further- more, its assumed by changes of energy price to other inputs. However, empirically between these two categories can be challenging, not least because changes in relative prices also induce technical change, see Samuelson (2004).

Attempting to operate all of the energy efficiency indicators. These include the role of value judgments in the construction of energy efficiency indicators, the energy quality problem, the boundary problem, the joint production problem and the question of isolating the underlying technical energy efficiency trend from the aggregate indicator.

Capehart et al. (2007) & Meyers and Laskowski (2001), Guide to Energy Management, p.10; in- troduction to energy management; the phrase energy management means different things to different people. Also, it can be determine that energy management is; "the efficient and effective use of energy to maximize profits (minimize costs) and enhance competitive positions". This rather broad definition covers many operations from services to product and equipment design through product shipment. Waste minimization and disposal also presents many energy management opportunities. A whole systems viewpoint to energy management is required to ensure that many important activities will be examined and optimized. Presently, industries are adopting total quality management (TQM) strategy for improving their operations. Total quality management approach should include an energy management component to reduce energy costs. The primary objective of energy manage- ment is to maximize profits or minimize costs. To distinguish sub objectives of energy management programs:

1. improving energy efficiency and reducing energy use (cost minimization),
2. decreasing greenhouse gas emissions and improve air quality,
3. improving better communications on energy matters,
4. sustainable energy management,
5. effective monitoring, reporting, and management strategies,
6. energy investments through research and development,
7. energy management program from all employees,
8. eliminate any interruption in energy supplies.

Mining and projects supply chain team combines the experience, expertise and long-standing relationships of our mining, energy, infrastructure, oil and gas, and industrial clients. This vertical offers a complete end-to-end solution using innovative methods. Combining services such as chartering, project freight forwarding, and specialized cargo shipping together with world-class project management to remove complexity from energy, mining and projects supply chains. The project freight at anywhere in the world for example; by land, sea and air, using trucks, rail, cranes, ships, barges, and planes. Providing high-quality, configured logistics solutions for projects of any size. For examples areas:

- oil and gas,
- refineries, pipelines LNG plants on and off-shore drilling upstream developments,
- power stations;gas, steam, thermal, hydro, coal sub-stations, power distribution, transmission lines engines and turbines,
- "green field" mining developments,
- airports, bridges harbors, rail road networks, and pipelines industrial,
- industrial factories for the toughest supply chain challenges,

- the energy, mining, and projects group to eliminate supply chain complexities and maximize competitive advantage.

Troccoli (2008), Management of Weather and Climate Risk in the Energy Industry, p.53-54; to esti- mate consumption must be provide at least two things: 1. temperature and modeling; temperature is parameter offering the highest correlation during winter or summer. The appearance shows in air conditioning system in houses and buildings. Modeling of the consumption that based on cloud cover. 2. production optimization; depending on the production techniques used, energy specialists have different needs in terms of meteorological data and may be required to forecast their production. Hydro-electricity: the history and data relating to rainfall are useful when decisions have to be taken about whether or not to use hydro power dams to produce electricity.

Type of specific requirements:

- wind electricity: at the early stage of a project to set up a wind farm, energy specialists to determine the geographic areas offering the best wind potential to produce electricity.
- photo voltaic electricity: as with wind energy, specialists may need to use weather forecasting services to target the most advantageous locations for installation.
- temperature: the efficiency (and even use) of many production means (e.g. nuclear power plants and co-generation plants) varies according to temperature.

Other requirements:

Transmission optimization; transmission facilities are located outdoor they are subject to weather conditions. These conditions have to be taken into account in order to ensure better management and prevent loss:

- depending on the temperature, the transmission capacity of high voltage lines may be lowered.
- extreme events (such as strong winds, icing, etc.) must be forecast as early as possible so that maintenance teams are ready to act. It should be noted that transmission specialists who are aware there is a risk of icing (based on temperature, humidity, etc.) can adopt transmission methods to reduce this risk.

Infrastructure plan; energy specialists generally need to plan ahead for the infrastructures needed in the coming decades, if not the next century. This is why their planning has to take into account future lifestyles, industrial resources and climate conditions. With the current change in climate, forecasting climatic conditions is of prime importance, at least in terms of the parameters with the highest energy correlation.

- n-article : the code of product which produced by ES France as result of successful marketing department to all customers for European Union. Head office (virtual office) of marketing section is located in Paris, France.

Table 5.6: Oleo Transport-1

Product	N_Art.	Quantity	Price_Unit	Tot_Sales	road_ A	road_ B	road_ C
IFRALAN L12	15020028	5	1950	9750	143	143	143
IFRALAN L12	15020034	5	1950	9750	316	339	307
ROFALAN 7020	15020034	0.36	3383	1217.88	689	689	737
IFRAPON LOS 70 RO 16	15020034	23	1347	30981	666	666	666
IFRAPON LOS 70 RO 16	15030030	23	1347	30981	666	666	666
IFRAPON LOS 70 RO 16	15030030	23	1347	30981	666	666	666
IFRAPON LOS 70 RO 16	15030030	23	1347	30981	272	272	272
IFRAPON LOS 2N70	15030001	24	1206	28944	272	272	272
IFRAPON LOS 2N28 K	15030008	20	555	11100	331	382	339
IFRAPON LOS 2N28 K	15010012	2.85	2290	6526.5	111	111	111
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
SUPERFOAM	15030025	16.8	885	14868	1287	1262	.
RODALUBE 580	15010007	5.4	2538	13705.2	640	757	787
IFRALAN L12	15020028	6	1910	11460	418	459	437
RODALUBE 680	15010011	18	2093	37674	640	757	787
RODALUBE 680	15010011	18	2093	37674	640	757	787
IFRALAN D 0207 L	15020034	12	2170	26040	348	369	389
IFRALAN L12	15020028	10	1960	19600	1086	1140	1150
RODALUBE 680	15010011	18	2093	37674	640	757	787
IFRALAN L12	15020028	5	2030	10150	1086	1140	1150
IFRAPON LOS 2N28 K	15030008	23	480	11040	324	375	311
IFRAPON LOS 2 N 28 K	15030009	2	750	1500	544	510	546
IFRAPON LOS 2N70	15030026	14.52	1540	22360.8	109	115	114
IFRAPON LOS 2 N 28 K	15030009	2	750	1500	544	510	546
RODALUBE 680	15010011	18	2093	37674	640	757	787
IFRAPON LOS 2 N 70	15030001	24	1150	27600	50.7	55.6	76.6
Caflon 2L70	15030026	1.76	1406	2474.56	782	841	.
IFRAPON LOS 2N28 pH 11	15030004	25	530	13250	290	331	325
IFRAPON LOS 2N28 pH 11	15030004	25	530	13250	290	331	325
IFRALAN L12	15020028	5	1910	9550	418	459	437
IFRALAN L12	15020028	5	2030	10150	1086	1140	1150
IFRAPON LOS 2 N 70	15030001	23	1125	25875	203	272	.
RODALUBE 580	15010007	5.4	2538	13705.2	640	757	787
IFRAPON LOS 2N70	15030001	24.5	1030	25235	1445	1468	.
IFRAPON LOS 2N70	15030001	24.5	1030	25235	1445	1468	.
RODALUBE 580	15010007	1.8	2100	3780	1445	1468	.
ROFACER GPT	15010006	5.7	1990	11343	890	948	.
ROFACER GPT	15010006	5.7	1990	11343	890	948	.
RODALUBE 680	15010011	10	2272	22720	958	1017	1079
Rodalube 718	15010009	18	1895	34110	958	1017	1079

Table 5.7: Oleo Transport-2

RODALUBE 680	15010011	18	2093	37674	640	757	787
IFRAPON LOS 2N28 pH11	15030007	12	615	7380	240	317	280
IFRAPON AOS 38 P	15030028	5	990	4950	291	259	310
IFRAPON AOS 38 P	15030028	5	990	4950	291	259	310
IFRAPON LOS 2N28 pH 11	15030004	24	510	12240	389	371	485
RODALUBE 680	15010012	2.85	2250	6412.5	389	371	485
RODALUBE 680	15010012	3.8	2273	8637.4	789	848	-
RODALUBE 680	15010012	3.8	2273	8637.4	789	848	-
IFRAPON AOS 38 P	15030027	24	610	14640	596	670	632
IFRALAN L7	15020012	4.5	1855	8347.5	389	371	485
IFRALAN L12	15020028	5	2030	10150	1086	1140	1150
IFRALAN L12	15020028	5	1910	9550	418	459	437
IFRALAN L12	15020028	5	1910	9550	418	459	437
IFRAPON LOS 2N70	15030001	24	1110	26640	587	585	586
IFRALAN L12	15020028	5	1910	9550	418	459	437
IFRAPON LOS 2 N 70	15030001	23	1125	25875	436	445	473
IFRAPON LOS 2N70	15030026	0.22	1400	308	436	445	473
IFRAPON LOS 2N70	15030001	24	1122	26928	1333	1366	1409
IFRAPON LOS 2N70	15030001	24	1206	28944	587	585	586
IFRALAN D 8 10	15020045	10080	2170,00	21873,60	568	650	603
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
IFRAPON LOS 2 N 70	15030001	23000	1125,00	25875,00	203	272	
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2 N 70	15030001	23000	1125,00	25875,00	436	445	473
IFRALAN L12	15020028	5000	1910,00	9550,00	418	459	437
IFRALAN L12	15020029	2850	2250,00	6412,50	112	112	112
IFRALAN L12	15020030	2850	2250,00	6412,50	112	112	112
IFRALAN L12	15020028	5000	2030,00	10150,00	1086	1140	1150
Rodalube 718	15010009	18000	1895,00	34110,00	559	610	602
IFRAPON LOS 70 RO 16	15030030	23000	1321,00	30383,00	666	666	666
IFRAPON LOS 2N28 pH 11	15030004	20000	535,00	10700,00	414	434	440
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	-
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
RODALUBE 680	15010012	4750	2255,00	10711,25	112	112	112
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586

Table 5.8: Oleo Transport-3

IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N28 pH 11	15030004	20000	530,00	10600,00	505	514	542
IFRAPON AOS 38 P	15030028	10000	800,00	8000,00	302	403	310
IFRAPON AOS 38 P	15030028	10000	800,00	8000,00	302	403	310
IFRAPON LOS 2 N 70	15030001	23000	1090,00	25070,00	302	403	310
IFRAPON LOS 2 N 70	15030001	23000	1090,00	25070,00	302	403	310
IFRAPON LOS 2 N 70	15030001	23000	1090,00	25070,00	303	354	290
IFRAPON LOS 2 N 70	15030001	23000	1090,00	25070,00	303	354	290
IFRAPON LOS 2 N 70	15030001	23000	1090,00	25070,00	303	354	290
IFRAPON LOS 2 N 70	15030001	23000	1090,00	25070,00	303	354	290
IFRAPON LOS 2 N 70	15030001	23000	1090,00	25070,00	303	354	290
IFRAPON LOS 2 N 70	15030001	23000	1090,00	25070,00	303	354	290
IFRAPON LOS 2 N 70	15030001	23	1125,00	25875,00	203	272	.
ROFACER GPT	15010006	5700	1990,00	11343,00	890	948	.
IFRAPON LOS 2N28 K	15030008	23000	534,00	12282,00	890	948	.
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	510	615	.
IFRALAN L12	15020028	5000	1910,00	9550,00	418	459	437
RODALUBE 580	15010007	2700	2350,00	6345,00	418	459	437
IFRAPON AOS 38 P	15030027	24000	600,00	14400,00	41	269	.
IFRAPON AOS 38 P	15030027	24000	600,00	14400,00	41	269	.
IFRAPON AOS 38 P	15030028	5000	990,00	4950,00	291	259	310
IFRAPON LOS 2N70	15030001	24000	1030,00	24720,00	291	259	310
IFRAPON LOS 2N70	15030001	24000	1030,00	24720,00	291	259	310
IFRAPON LOS 2N70	15030001	24000	1030,00	24720,00	1781	1739	1770
IFRAPON AOS 38 P	15030027	24000	600,00	14400,00	241	269	.
IFRAPON LOS 2N70	15030001	24500	1030,00	25235,00	1447	1470	.
IFRALAN L12	15020028	5000	1950,00	9750,00	143	143	143
IFRALAN L12	15020028	5000	1950,00	9750,00	143	143	143
IFRALAN L12	15020028	5000	1950,00	9750,00	143	143	143
IFRAPON LOS 26 RO 16	15030035	24000	645,00	15480,00	260	270	310
IFRAPON LOS 2 N 70	15030001	23000	1130,00	25990,00	184	181	.
IFRAPON LOS 2 N 70	15030001	23000	1130,00	25990,00	184	181	.
IFRAPON LOS 2 N 70	15030001	23000	1125,00	25875,00	203	272	.
IFRAPON LOS 26 RO 16	15030035	24000	645,00	15480,00	260	270	310
IFRAPON LOS 26 RO 16	15030035	24000	645,00	15480,00	260	270	310
IFRAPON LOS 26 RO 16	15030035	24000	645,00	15480,00	260	270	310
IFRAPON LOS 26 RO 16	15030035	24000	645,00	15480,00	260	270	310
IFRAPON LOS 26 RO 16	15030035	22000	645,00	14190,00	260	270	310
RODALUBE 680	15010012	4750	2255,00	10711,25	112	.	.
IFRALAN L12	15020028	5000	1910,00	9550,00	260	270	310
IFRALAN L12	15020028	5000	2030,00	10150,00	1086	1140	1150
IFRAPON LOS 2N28 pH11	15030006	12000	660,00	7920,00	241	269	.
RODALUBE 680	15010013	3600	2350,00	8460,00	262	258	312
IFRAPON LOS 26 RO 16	15030004	24000	510,00	12240,00	262	258	312
IFRAPON LS NF pH 11	15030016	24000	525,00	12600,00	389	371	485
RODALUBE 680	15010013	3600	2350,00	8460,00	262	258	312

Table 5.9: Oleo Transport-4

IFRAPON LOS 2N70	15030001	24500	1030,00	25235,00	262	258	312
IFRAPON LOS 26 RO 16	15030001	23000	1130,00	25990,00	262	258	312
IFRAPON LOS 2N70	15030001	23000	1130,00	25990,00	1229	1262	1305
IFRALAN L12	15020028	5000	1910,00	9550,00	262	258	312
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 2N70	15030001	24000	1110,00	26640,00	587	585	586
IFRAPON LOS 70 RO 16	15030030	23000	1321,00	30383,00	666	666	666
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	.
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	.
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	.
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	.
SUPERFOAM Surfactant	15030025	16800	885,00	14868,00	5415	5405	
IFRALAN L1150 - CPB	15020007	6000	1310,00	7860,00	259	261	309
IFRAPON LOS 2N28 pH 11	15030004	25000	510,00	12750,00	290	331	325
IFRALAN D 8	15020045	10080	2170,00	21873,60	568	650	603
RODALUBE 680	15010011	10000	2160,00	21600,00	309	359	295
IFRAPON LOS 2N28 pH11	15030005	210	820,00	172,20	578	665	712
ROFALAN 7050	15020023	3600	2600,00	9360,00	524	575	589
IFRAPON LOS 26 RO 16	15030035	20000	645,00	12900,00	259	261	309
IFRAPON LOS 26 RO 16	15030035	20000	645,00	12900,00	259	261	309
IFRAPON LOS 26 RO 16	15030035	20000	645,00	12900,00	259	261	309
IFRAPON LOS 26 RO 16	15030035	20000	645,00	12900,00	259	261	309
IFRAPON LOS 26 RO 16	15030035	19000	645,00	12255,00	259	261	309
IFRAPON AOS 38 P	15030028	10000	810,00	8100,00	140	157	.
IFRAPON AOS 37 pH	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH 12	15030041	24000	645,00	13296,00	259	261	309
IFRAPON AOS 37 pH 12	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH 12	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH 12	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH 12	15030041	24000	554,00	13296,00	330	320	371
CAFLON_2L70	15030026	1760	1406,00	2474,56	782	841	.
IFRAPON AOS 38 P	15030028	5000	990,00	4950,00	291	259	310
IFRALAN L1150 - CPB	15020007	6000	1310,00	7860,00	517	526	554
ROFACER GPT	15010006	5700	1990,00	11343,00	890	948	
IFRAPON LOS 2N70	15030001	23000	1130,00	25990,00	1229	1262	1305
IFRAPON AOS 38	15030013	24000	670,00	16080,00	659	738	776
IFRAPON AOS 38	15030013	24000	670,00	16080,00	659	738	776
IFRAPON AOS 38	15030013	24000	670,00	16080,00	659	738	776
IFRAPON LOS 2N28 K	15030008	20000	490,00	9800,00	596	671	632
IFRAPON LOS 2N28 B	15030032	210	820,00	172,20	578	665	712
IFRAPON LOS 70 RO 16	15030001	23000	1125,00	25875,00	203	272	.
IFRAPON LOS 70 RO 16	15030030	23000	1321,00	30383,00	666	666	666
IFRAPON LOS 2 N 70	15030001	23000	1130,00	25990,00	184	181	.
IFRAPON LOS 2N28 pH11	15030006	12000	660,00	7920,00	259	261	309
IFRALAN L12	15020028	5000	1850,00	9250,00	418	459	437
IFRALAN L12	15020028	5000	1850,00	9250,00	418	459	437
IFRALAN L12	15020028	5000	1850,00	9250,00	418	459	437

Table 5.10: Oleo Transport-5

CAFLON 2 L 28 B	15030035	1000	800,00	800,00	578	665	712
IFRALAN L12	15020028	5000	1975,00	9875,00	1086	1140	1150
RODALUBE 580	15010007	5400	2270,00	12258,00	259	261	309
IFRAPON LS NF pH 11	15030016	23000	517,00	11891,00	436	445	473
ROFACER GPT	15010006	5700	1990,00	11343,00	890	948	.
IFRAPON AOS 37 pH	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH	15030041	24000	554,00	13296,00	330	320	371
IFRAPON AOS 37 pH	15030041	24000	554,00	13296,00	330	320	371
RODALUBE 680	15010011	18000	2093,00	37674,00	640	757	787
IFRAPON AOS 37 pH 12	15030041	24000	554,00	13296,00	330	320	371
IFRAPON LOS 2N70	15030001	25000	1122,00	28050,00	1333	1366	1409
IFRAPON LOS 2N70	15030001	25000	1122,00	28050,00	1333	1366	1409
IFRAPON LOS 2N70	15030001	25000	1122,00	28050,00	1333	1366	1409
CAFLON AOS 21	15030042	23	460	10580	259	261	309
IFRAPON LOS 2 N 70	15030001	23000	1130,00	25990,00	179	186	196
IFRAPON LOS 2 N 70	15030001	23000	1130,00	25990,00	179	186	196
Trimethylolpropantricaprylat	15010014	370	2500,00	925,00	637	659	
SUPERFOAM - fût fer 210 kg net	15030025	16800	885,00	14868,00	5415	5405	
SUPERFOAM - fût fer 210 kg net	15030025	16800	885,00	14868,00	5415	5405	
SUPERFOAM - fût fer 210 kg net	15030025	16800	885,00	14868,00	5415	5405	
SUPERFOAM - fût fer 210 kg net	15030025	16800	885,00	14868,00	5415	5405	
SUPERFOAM - fût fer 210 kg net	15030025	16800	885,00	14868,00	5415	5405	
SUPERFOAM - fût fer 210 kg net	15030025	16800	885,00	14868,00	5415	5405	
SUPERFOAM - fût fer 210 kg net	15030025	16800	885,00	14868,00	5415	5405	
SUPERFOAM - fût fer 210 kg net	15030025	16800	885,00	14868,00	5415	5405	
SUPERFOAM - fût fer 210 kg net	15030025	16800	885,00	14868,00	5415	5405	
RODALUBE 618	15010015	5040	2860,00	14414,40	1042	1034	1033
IFRAPON LS NF pH 11	15030016	23000	517,00	11891,00	436	445	473
IFRAPON LS NF pH 11	15030016	23000	517,00	11891,00	436	445	473
IFRAPON LS NF pH 11	15030016	23000	517,00	11891,00	436	445	473
IFRALAN L12	15020028	6000	1890,00	11340,00	259	261	309
IFRALAN L12	15020028	5000	1890,00	9450,00	143	143	143
RODALUBE 618	15010015	5040	2350,00	11844,00	1042	1034	1033
IFRALAN L2 VRAC	15020004	25000	1720,00	43000,00	259	261	309
IFRALAN L2 VRAC	15020004	25000	1720,00	43000,00	259	261	309
IFRALAN L2 VRAC	15020004	25000	1720,00	43000,00	909	975	952
IFRALAN L2 VRAC	15020004	25000	1720,00	43000,00	909	975	952
IFRALAN L2 VRAC	15020004	25000	1720,00	43000,00	909	975	952
ROFACER GPT	15010006	1990,00	1990,00	11343,00	890	948	.
IFRAPON LOS 2 N 70	15030001	23000	1130,00	25990,00	184	181	.
IFRAPON LOS 2 N 70	15030001	23000	1130,00	25990,00	184	181	.
IFRAPON LOS 2 N 70	15030001	23000	1130,00	25990,00	184	181	.
IFRAPON LOS 2 N 70	15030001	23000	1130,00	25990,00	184	181	.
IFRALAN L12	15020028	10000	1850,00	18500,00	418	459	437
IFRAPON AOS 38 P	15030028	5000	990,00	4950,00	291	259	310
ROFALAN 5020 - Vrac	15020014	21000	2605,00	54705,00	565	574	602

Table 5.11: Oleo Transport-6

IFRAPON LOS 70 RO 16	15030030	18000	1382,00	1382,00	792	767	.
Rodalube 718	15010009	18000	1895,00	34110,00	559	610	602

Table 5.12: Oleo Transport-7

Speed_A	Speed_B	Speed_C	Time_truck_A	Time_truck_B	Time_truck_C	Normal_time_CAR_A
51.44	51.44	51.44	2.78	2.78	2.78	1.39
61.96	53.64	45.55	5.1	6.32	6.74	2.55
48.18	48.18	50.76	14.3	14.3	14.52	7.15
50.68	50.68	50.68	13.14	13.14	13.14	6.57
50.68	50.68	50.68	13.14	13.14	13.14	6.57
50.68	50.68	50.68	13.14	13.14	13.14	6.57
44.16	44.16	44.16	6.16	6.16	6.16	3.08
44.16	44.16	44.16	6.16	6.16	6.16	3.08
51.08	55.52	47.21	6.48	6.88	7.18	3.24
50.00	50.00	50.00	2.22	2.22	2.22	1.11
49.46	41.24	.	26.02	30.6	.	13.01
49.46	41.24	.	26.02	30.6	.	13.01
49.46	41.24	.	26.02	30.6	.	13.01
49.46	41.24	.	26.02	30.6	.	13.01
49.46	41.24	.	26.02	30.6	.	13.01
49.46	41.24	.	26.02	30.6	.	13.01
49.46	41.24	.	26.02	30.6	.	13.01
49.46	41.24	.	26.02	30.6	.	13.01
49.46	41.24	.	26.02	30.6	.	13.01
49.46	41.24	.	26.02	30.6	.	13.01
58.18	57.70	55.11	11	13.12	14.28	5.5
51.23	54.64	51.05	8.16	8.4	8.56	4.08
58.18	57.70	55.11	11	13.12	14.28	5.5
58.18	57.70	55.11	11	13.12	14.28	5.5
55.59	55.24	54.33	6.26	6.68	7.16	3.13
56.74	55.83	52.13	19.14	20.42	22.06	9.57
58.18	57.70	55.11	11	13.12	14.28	5.5
56.74	55.83	52.13	19.14	20.42	22.06	9.57
51.59	56.14	46.14	6.28	6.68	6.74	3.14
59.91	49.80	48.92	9.08	10.24	11.16	4.54
44.67	45.28	43.51	2.44	2.54	2.62	1.22
49.10	49.80	48.92	11.08	10.24	11.16	5.54
58.18	57.70	55.11	11	13.12	14.28	5.5
46.94	50.55	69.64	1.08	1.1	1.1	0.54
54.92	56.07	.	14.24	15	0	7.12
47.85	48.11	46.56	6.06	6.88	6.98	3.03
47.85	48.11	46.56	6.06	6.88	6.98	3.03
51.23	54.64	51.05	8.16	8.4	8.56	4.08
56.74	55.83	52.13	19.14	20.42	22.06	9.57
50.00	44.16	.	4.06	6.16	.	2.03
58.18	57.70	55.11	11	13.12	14.28	5.5
55.32	54.61	.	26.12	26.88	0	13.06
55.32	59.00	.	26.12	24.88	0	13.06
55.32	59.00	.	26.12	24.88	0	13.06
54.80	55.76	.	16.24	17	0	8.12
54.80	55.76	.	16.24	17	0	8.12
56.42	54.85	56.91	16.98	18.54	18.96	8.49
56.42	54.85	56.91	16.98	18.54	18.96	8.49

Table 5.13: Oleo Transport-8

58.18	57.70	55.11	11	13.12	14.28	5.5
54.05	61.43	46.51	4.44	5.16	6.02	2.22
57.51	41.24	48.90	5.06	6.28	6.34	2.53
57.51	41.24	48.90	5.06	6.28	6.34	2.53
48.38	44.92	54.86	8.04	8.26	8.84	4.02
48.38	44.92	54.86	8.04	8.26	8.84	4.02
54.94	56.01	.	14.36	15.14	.	7.18
54.94	56.01	.	14.36	15.14	0	7.18
57.75	60.58	51.38	10.32	11.06	12.3	5.16
48.38	44.92	54.86	8.04	8.26	8.84	4.02
56.74	55.83	52.13	19.14	20.42	22.06	9.57
51.23	54.64	51.05	8.16	8.4	8.56	4.08
51.23	54.64	51.05	8.16	8.4	8.56	4.08
55.48	55.08	54.87	10.58	10.62	10.68	5.29
51.23	54.64	51.05	8.16	8.4	8.56	4.08
52.28	52.98	55.00	8.34	8.4	8.6	4.17
52.28	53.36	55.00	8.34	8.34	8.6	4.17
58.41	59.34	58.22	22.82	23.02	24.2	11.41
55.48	55.08	54.87	10.58	10.62	10.68	5.29
56.80	60.07	53.94	10	10.82	11.18	5
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
50.00	44.16	.	4.06	6.16	0	2.03
55.48	55.08	54.87	10.58	10.62	10.68	5.29
55.48	55.08	54.87	10.58	10.62	10.68	5.29
55.48	55.08	54.87	10.58	10.62	10.68	5.29
55.48	55.08	54.87	10.58	10.62	10.68	5.29
52.28	52.98	55.00	8.34	8.4	8.6	4.17
51.23	54.64	51.05	8.16	8.4	8.56	4.08
50.45	.	.	2.22	.	.	1.11
50.45	.	.	2.22	.	.	1.11
56.74	55.83	52.13	19.14	20.42	22.06	9.57
54.38	57.01	55.64	10.28	10.7	10.82	5.14
51.00	.	.	13.06	.	.	6.53
50.49	51.30	51.64	8.2	8.46	8.52	4.1
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
55.48	55.08	54.87	10.58	10.62	10.68	5.29
55.48	55.08	54.87	10.58	10.62	10.68	5.29
50.45	.	.	2.22	.	.	1.11
55.48	55.08	54.87	10.58	10.62	10.68	5.29

Table 5.14: Oleo Transport-9

55.48	55.08	54.87	10.58	10.62	10.68	5.29
55.48	55.08	54.87	10.58	10.62	10.68	5.29
64.51	52.80	.	9.1	11.08	.	4.55
64.51	52.80	.	9.1	11.08	.	4.55
55.99	56.61	53.66	9.02	9.08	10.1	4.51
59.45	57.24	43.42	5.08	7.04	7.14	2.54
59.45	57.24	43.42	5.08	7.04	7.14	2.54
59.45	57.24	43.42	5.08	7.04	7.14	2.54
59.45	57.24	43.42	5.08	7.04	7.14	2.54
49.67	54.46	44.07	6.1	6.5	6.58	3.05
49.67	54.46	44.07	6.1	6.5	6.58	3.05
49.67	54.46	44.07	6.1	6.5	6.58	3.05
49.67	54.46	44.07	6.1	6.5	6.58	3.05
49.67	54.46	44.07	6.1	6.5	6.58	3.05
49.67	54.46	44.07	6.1	6.5	6.58	3.05
50.00	44.16	.	4.06	6.16	.	2.03
54.80	55.76	.	16.24	17	.	8.12
54.80	55.76	.	16.24	17	.	8.12
56.04	55.51	.	9.1	11.08	.	4.55
51.23	54.64	51.05	8.16	8.4	8.56	4.08
51.23	54.64	51.05	8.16	8.4	8.56	4.08
9.19	56.51	.	4.46	4.76	0	2.23
9.19	56.51	.	4.46	4.76	0	2.23
57.51	41.24	48.90	5.06	6.28	6.34	2.53
57.51	41.24	48.90	5.06	6.28	6.34	2.53
57.51	41.24	48.90	5.06	6.28	6.34	2.53
57.56	55.95	56.95	30.94	31.08	31.08	15.47
54.04	56.51	.	4.46	4.76	.	2.23
55.31	54.65	.	26.16	26.9	.	13.08
56.30	53.76	.	2.54	2.66	.	1.27
56.30	53.76	.	2.54	2.66	.	1.27
56.30	53.76	.	2.54	2.66	.	1.27
52.63	53.15	50.49	4.94	5.08	6.14	2.47
45.10	43.51	.	4.08	4.16	.	2.04
45.10	43.51	.	4.08	4.16	.	2.04
50.00	44.16	.	4.06	6.16	.	2.03
52.63	53.15	50.49	4.94	5.08	6.14	2.47
52.63	53.15	50.49	4.94	5.08	6.14	2.47
52.63	53.15	50.49	4.94	5.08	6.14	2.47
52.63	53.15	50.49	4.94	5.08	6.14	2.47
52.63	53.15	50.49	4.94	5.08	6.14	2.47
50.45	.	.	2.22	.	.	1.11
52.63	53.15	50.49	4.94	5.08	6.14	2.47
56.74	55.83	52.13	19.14	20.42	22.06	9.57
54.04	56.51	.	4.46	4.76	0	2.23
52.61	51.19	50.49	4.98	5.04	6.18	2.49
52.61	51.19	50.49	4.98	5.04	6.18	2.49
48.38	44.92	54.86	8.04	8.26	8.84	4.02
52.61	51.19	50.49	4.98	5.04	6.18	2.49

Table 5.15: Oleo Transport-10

52.61	51.19	50.49	4.98	5.04	6.18	2.49
52.61	51.19	50.49	4.98	5.04	6.18	2.49
58.19	57.05	58.00	21.12	22.12	22.5	10.56
52.61	51.19	50.49	4.98	5.04	6.18	2.49
55.48	55.08	54.87	10.58	10.62	10.68	5.29
55.48	55.08	54.87	10.58	10.62	10.68	5.29
55.48	55.08	54.87	10.58	10.62	10.68	5.29
51.00	.	.	13.06	.	.	6.53
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
53.07	50.78	50.66	4.88	5.14	6.1	2.44
47.85	48.11	36.19	6.06	6.88	8.98	3.03
56.80	60.07	53.94	10	10.82	11.18	5
51.33	55.92	45.38	6.02	6.42	6.5	3.01
54.84	53.98	55.63	10.54	12.32	12.8	5.27
52.09	54.97	56.31	10.06	10.46	10.46	5.03
53.07	50.78	50.66	4.88	5.14	6.1	2.44
53.07	50.78	50.66	4.88	5.14	6.1	2.44
53.07	50.78	50.66	4.88	5.14	6.1	2.44
53.07	50.78	50.66	4.88	5.14	6.1	2.44
53.07	50.78	50.66	4.88	5.14	6.1	2.44
51.09	52.33	.	2.74	3	.	1.37
51.56	49.54	54.08	6.4	6.46	6.86	3.2
51.56	49.54	54.08	6.4	6.46	6.86	3.2
53.07	50.78	50.66	4.88	5.14	6.1	2.44
51.56	49.54	54.08	6.4	6.46	6.86	3.2
51.56	49.54	54.08	6.4	6.46	6.86	3.2
51.56	49.54	54.08	6.4	6.46	6.86	3.2
51.56	49.54	54.08	6.4	6.46	6.86	3.2
54.92	56.07	.	14.24	15	.	7.12
57.51	41.24	48.90	5.06	6.28	6.34	2.53
56.44	52.50	54.21	9.16	10.02	10.22	4.58
54.80	55.76	.	16.24	17	.	8.12
58.19	57.05	58.00	21.12	22.12	22.5	10.56
54.64	57.12	54.72	12.06	12.92	14.18	6.03
54.64	57.12	54.72	12.06	12.92	14.18	6.03
54.64	57.12	54.72	12.06	12.92	14.18	6.03
57.64	60.56	51.38	10.34	11.08	12.3	5.17
54.84	53.98	55.63	10.54	12.32	12.8	5.27
50.00	44.16	.	4.06	6.16	.	2.03
51.00	.	.	13.06	.	.	6.53
45.10	43.51	.	4.08	4.16	.	2.04
53.07	50.78	50.66	4.88	5.14	6.1	2.44
51.23	54.64	51.05	8.16	8.4	8.56	4.08
51.23	54.64	51.05	8.16	8.4	8.56	4.08
51.23	54.64	51.05	8.16	8.4	8.56	4.08

Table 5.16: Oleo Transport-11

54.84	53.98	55.63	10.54	12.32	12.8	5.27
56.74	55.83	52.13	19.14	20.42	22.06	9.57
53.07	50.78	50.66	4.88	5.14	6.1	2.44
52.28	52.98	55.00	8.34	8.4	8.6	4.17
54.80	55.76	.	16.24	17	.	8.12
51.56	49.54	54.08	6.4	6.46	6.86	3.2
51.56	49.54	54.08	6.4	6.46	6.86	3.2
51.56	49.54	54.08	6.4	6.46	6.86	3.2
51.56	49.54	54.08	6.4	6.46	6.86	3.2
51.56	49.54	54.08	6.4	6.46	6.86	3.2
51.56	49.54	54.08	6.4	6.46	6.86	3.2
58.18	57.70	55.11	11	13.12	14.28	5.5
51.56	49.54	54.08	6.4	6.46	6.86	3.2
58.41	59.34	58.22	22.82	23.02	24.2	11.41
58.41	59.34	58.22	22.82	23.02	24.2	11.41
58.41	59.34	58.22	22.82	23.02	24.2	11.41
53.07	50.78	50.66	4.88	5.14	6.1	2.44
43.03	44.71	46.01	4.16	4.16	4.26	2.08
43.03	44.71	46.01	4.16	4.16	4.26	2.08
52.82	52.89	.	12.06	12.46	.	6.03
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
56.02	55.59	54.20	18.6	18.6	19.06	9.3
52.28	52.98	55.00	8.34	8.4	8.6	4.17
52.28	52.98	55.00	8.34	8.4	8.6	4.17
52.28	52.98	55.00	8.34	8.4	8.6	4.17
53.07	50.78	50.66	4.88	5.14	6.1	2.44
56.30	53.76	.	2.54	2.66	.	1.27
56.02	55.59	54.20	18.6	18.6	19.06	9.3
53.07	50.78	50.66	4.88	5.14	6.1	2.44
53.07	50.78	50.66	4.88	5.14	6.1	2.44
55.97	57.76	52.14	16.24	16.88	18.26	8.12
55.97	57.76	52.14	16.24	16.88	18.26	8.12
55.97	57.76	52.14	16.24	16.88	18.26	8.12
54.80	55.76	.	16.24	17	.	8.12
45.10	43.51	.	4.08	4.16	.	2.04
45.10	43.51	.	4.08	4.16	.	2.04
45.10	43.51	.	4.08	4.16	.	2.04
45.10	43.51	.	4.08	4.16	.	2.04
51.23	54.64	51.05	8.16	8.4	8.56	4.08
57.51	41.24	48.90	5.06	6.28	6.34	2.53
53.61	54.15	55.64	10.54	10.6	10.82	5.27

Table 5.17: Oleo Transport-12

49.19	37.09	.	16.1	20.68	.	8.05
54.38	57.01	55.64	10.28	10.7	10.82	5.14

Table 5.18: Oleo Transport-13

Normal_time_CAR_B	Normal_time_CAR_C
1.39	1.39
3.16	3.37
7.15	7.26
6.57	6.57
6.57	6.57
6.57	6.57
3.08	3.08
3.08	3.08
3.44	3.59
1.11	1.11
15.3	.
15.3	.
15.3	.
15.3	.
15.3	.
15.3	.
15.3	.
15.3	.
15.3	.
15.3	.
6.56	7.14
4.2	4.28
6.56	7.14
6.56	7.14
3.34	3.58
10.21	11.03
6.56	7.14
10.21	11.03
3.34	3.37
5.12	5.58
1.27	1.31
5.12	5.58
6.56	7.14
0.55	0.55
7.5	
3.44	3.49
3.44	3.49
4.2	4.28
10.21	11.03
3.08	.
6.56	7.14
13.44	
12.44	
12.44	
8.5	
8.5	
9.27	9.48
9.27	9.48

Table 5.19: Oleo Transport-14

6.56	7.14
2.58	3.01
3.14	3.17
3.14	3.17
4.13	4.42
4.13	4.42
7.57	.
7.57	
5.53	6.15
4.13	4.42
10.21	11.03
4.2	4.28
4.2	4.28
5.31	5.34
4.2	4.28
4.2	4.3
4.17	4.3
11.51	12.1
5.31	5.34
5.41	5.59
.	.
.	.
.	.
.	.
.	.
.	.
3.08	.
5.31	5.34
5.31	5.34
5.31	5.34
5.31	5.34
4.2	4.3
4.2	4.28
.	.
.	.
10.21	11.03
5.35	5.41
.	.
4.23	4.26
.	.
.	.
.	.
.	.
.	.
.	.
5.31	5.34
5.31	5.34
.	.
5.31	5.34

Table 5.20: Oleo Transport-15

5.31	5.34
5.31	5.34
5.54	.
5.54	.
4.54	5.05
3.52	3.57
3.52	3.57
3.52	3.57
3.52	3.57
3.25	3.29
3.25	3.29
3.25	3.29
3.25	3.29
3.25	3.29
3.25	3.29
3.08	.
8.5	.
8.5	.
5.54	.
4.2	4.28
4.2	4.28
2.38	
2.38	
3.14	3.17
3.14	3.17
3.14	3.17
15.54	15.54
2.38	.
13.45	.
1.33	.
1.33	.
1.33	.
2.54	3.07
2.08	.
2.08	.
3.08	.
2.54	3.07
2.54	3.07
2.54	3.07
2.54	3.07
2.54	3.07
.	.
2.54	3.07
10.21	11.03
2.38	
2.52	3.09
2.52	3.09
4.13	4.42
2.52	3.09

Table 5.21: Oleo Transport-16

2.52	3.09
2.52	3.09
11.06	11.25
2.52	3.09
5.31	5.34
5.31	5.34
5.31	5.34
.	.
.	.
.	.
.	.
.	.
.	.
2.57	3.05
3.44	4.49
5.41	5.59
3.21	3.25
6.16	6.4
5.23	5.23
2.57	3.05
2.57	3.05
2.57	3.05
2.57	3.05
2.57	3.05
1.5	.
3.23	3.43
3.23	3.43
2.57	3.05
3.23	3.43
3.23	3.43
3.23	3.43
3.23	3.43
7.5	.
3.14	3.17
5.01	5.11
8.5	.
11.06	11.25
6.46	7.09
6.46	7.09
6.46	7.09
5.54	6.15
6.16	6.4
3.08	.
.	.
2.08	.
2.57	3.05
4.2	4.28
4.2	4.28
4.2	4.28

Table 5.22: Oleo Transport-17

6.16	6.4
10.21	11.03
2.57	3.05
4.2	4.3
8.5	.
3.23	3.43
3.23	3.43
3.23	3.43
3.23	3.43
3.23	3.43
3.23	3.43
6.56	7.14
3.23	3.43
11.51	12.1
11.51	12.1
11.51	12.1
2.57	3.05
2.08	2.13
2.08	2.13
6.23	.
.	.
.	.
.	.
.	.
.	.
.	.
.	.
.	.
.	.
9.3	9.53
4.2	4.3
4.2	4.3
4.2	4.3
2.57	3.05
1.33	.
9.3	9.53
2.57	3.05
2.57	3.05
8.44	9.13
8.44	9.13
8.44	9.13
8.5	.
2.08	.
2.08	.
2.08	.
2.08	.
4.2	4.28
3.14	3.17
5.3	5.41

Table 5.23: Oleo Transport-18

10.34	
5.35	5.41

Table 5.24: Annex-1: The Part of Sample Data Base: The Oleo Chemical Transportation in France/E-U.

product	n_article	tonnes	kg	price_unit	tot_sales	road_a	road_b	road_c
3	15020034	23	23000	1347	30981	666	666	666
3	15030030	23	23000	1347	30981	666	666	666
3	15030030	23	23000	1347	30981	666	666	666
3	15030030	23	23000	1347	30981	272	272	272
4	15030001	24	24000	1206	28944	272	272	272
5	15030008	20	20000	555	11100	331	382	339
6	15030025	16.8	16800	885	14868	1287	1262	.
6	15030025	16.8	16800	885	14868	1287	1262	.
6	15030025	16.8	16800	885	14868	1287	1262	.
6	15030025	16.8	16800	885	14868	1287	1262	.
6	15030025	16.8	16800	885	14868	1287	1262	.
6	15030025	16.8	16800	885	14868	1287	1262	.
6	15030025	16.8	16800	885	14868	1287	1262	.
6	15030025	16.8	16800	885	14868	1287	1262	.
6	15030025	16.8	16800	885	14868	1287	1262	.
6	15030025	16.8	16800	885	14868	1287	1262	.
8	15010011	18	18000	2093	37674	640	757	787
8	15010011	18	18000	2093	37674	640	757	787
9	15020034	12	12000	2170	26040	348	369	389
1	15020028	10	10000	1960	19600	1086	1140	1150
8	15010011	18	18000	2093	37674	640	757	787
5	15030008	23	23000	480	11040	324	375	311
4	15030026	14.52	14520	1540	22360.8	109	115	114
8	15010011	18	18000	2093	37674	640	757	787
4	15030001	24	24000	1150	27600	50.7	55.6	76.6
11	15030004	25	25000	530	13250	290	331	325
11	15030004	25	25000	530	13250	290	331	325
4	15030001	23	23000	1125	25875	203	272	.
4	15030001	24.5	24500	1030	25235	1445	1468	.
4	15030001	24.5	24500	1030	25235	1445	1468	.
8	15010011	10	10000	2272	22720	958	1017	1079
13	15010009	18	18000	1895	34110	958	1017	1079
8	15010011	18	18000	2093	37674	640	757	787
11	15030007	12	12000	615	7380	240	317	280
11	15030004	24	24000	510	12240	389	371	485
14	15030027	24	24000	610	14640	596	670	632
4	15030001	24	24000	1110	26640	587	585	586
4	15030001	23	23000	1125	25875	436	445	473
4	15030001	24	24000	1122	26928	1333	1366	1409
4	15030001	24	24000	1206	28944	587	585	586
16	15020045	10080	10080	217000	2187360	568	650	603
4	15030001	23000	23000	112500	2587500	203	272	.
4	15030001	24000	24000	111000	2664000	587	585	586
4	15030001	24000	24000	111000	2664000	587	585	586

Source : ES France data base, it was compiled, formulated, and organized from the original of International business transaction, 2011.

- tonnes : total volume for each vehicle based on customer order.
- kg : total volume in kilograms
- unit price : unit price per ton.
- tot-sales : total value of sales volume in Euro currency.
- Route/Road ”A” : the precise calculation of distance; from the origin of plant to warehouse of customer via vehicle through remote sensing application by google earth tech., authors named it ”road a” in kilometer, one way direction.
- Route/Road ”B”: the precise calculation of distance; from the origin of plant to warehouse of customer via vehicle through remote sensing application by google earth tech., authors named it ”road b” in kilometer, one way direction.
- Route/Road ”C”: the precise calculation of distance; from the origin of plant to warehouse of customer via vehicle through remote sensing application by google earth tech., authors named it ”road c” in kilometer, one way direction.

Note:

- all variables based on company data base and except for all road types are estimated values (remote sensing application by google earth tech).
- all software based on Linux and for extension of calculation by Gnumeric system.
- the general conclusion from annex 1: the value added here is the simulation of road a, b, and c therefore the decision for transport planning is key parameter for successful business.

- product: the type of product which produced by ES France as result of successful marketing department to all customers for European Union. The head office (virtual office) of marketing section is located in Paris, France.
- tot-sales: total sales in Euro currency. Km_Road_A: Total volume for each vehicle based on customer order.
- liter-A: total distance reached by all vehicles which took the road A, all simulations based on real planning of business vehicle route. liter/km: total fuel consumption per km by vehicle when delivering the product order.
- tot-CO2: the total of CO2 as result of vehicle which deliver product to client.
- speed: the average speed of truck on the road A.
- time-truck: the average of time truck from the warehouse’s origin plant to reach client’s ware- house (in total hours per trip, one way).

Table 5.25: Annex-2: The Part of Sample Data Base: The Oleo Chemical Transportation in France/E-U.

Product	tot_sales	km_road_A	litre_A	liter/km	T_liter	tot_CO2	speed	time_truck
ROFALAN 5020 - Vrac	54705	565	484.75	1.17	658.54	127.49	53.61	10.54
IFRALAN L2 VRAC	43000	259	186.66	1.39	359.38	49.09	53.07	4.88
IFRALAN L2 VRAC	43000	259	186.66	1.39	359.38	49.09	53.07	4.88
IFRALAN L2 VRAC	43000	909	655.10	1.39	1261.30	172.30	55.97	16.24
IFRALAN L2 VRAC	43000	909	655.10	1.39	1261.30	172.30	55.97	16.24
IFRALAN L2 VRAC	43000	909	655.10	1.39	1261.30	172.30	55.97	16.24
RODALUBE 680	37674	640	640.61	1	639.39	169.83	58.18	11.00
RODALUBE 680	37674	640	640.61	1	639.39	169.83	58.18	11.00
RODALUBE 680	37674	640	640.61	1	639.39	169.83	58.18	11.00
RODALUBE 680	37674	640	640.61	1	639.39	169.83	58.18	11.00
RODALUBE 680	37674	640	640.61	1	639.39	169.83	58.18	11.00
RODALUBE 680	37674	640	640.61	1	639.39	169.83	58.18	11.00
Rodalube 718	34110	958	958.91	1	957.09	254.22	56.42	16.98
Rodalube 718	34110	559	559.53	1	558.47	148.34	54.38	10.28
Rodalube 718	34110	559	559.53	1	558.47	148.34	54.38	10.28
IFRAPON LOS 70 RO 16	30981	666	521.71	1.28	850.19	137.22	50.68	13.14
IFRAPON LOS 70 RO 16	30981	666	521.71	1.28	850.19	137.22	50.68	13.14
IFRAPON LOS 70 RO 16	30981	666	521.71	1.28	850.19	137.22	50.68	13.14
IFRAPON LOS 70 RO 16	30981	272	213.07	1.28	347.23	56.04	44.16	6.16
IFRAPON LOS 70 RO 16	30383	666	521.71	1.28	850.19	137.22	51.00	13.06
IFRAPON LOS 70 RO 16	30383	666	521.71	1.28	850.19	137.22	51.00	13.06
IFRAPON LOS 70 RO 16	30383	666	521.71	1.28	850.19	137.22	51.00	13.06
IFRAPON LOS 2N70	28944	272	204.19	1.33	362.32	53.70	44.16	6.16
IFRAPON LOS 2N70	28944	587	440.67	1.33	781.92	115.89	55.48	10.58
IFRAPON LOS 2N70	28050	1333	960.67	1.39	1849.63	252.66	58.41	22.82
IFRAPON LOS 2N70	28050	1333	960.67	1.39	1849.63	252.66	58.41	22.82
IFRAPON LOS 2N70	28050	1333	960.67	1.39	1849.63	252.66	58.41	22.82
IFRAPON LOS 2 N 70	27600	50.7	38.06	1.33	67.54	10.01	46.94	1.08

Source : ES France data base, it was compiled, formulated, and organized from the original of International business transaction, 2011.

Note: this research work covered and based on 221 within international business transactions (daily basis and at least four months in field investigation). All variables are estimated values, except for total sales. IFRAPON LOS 2N70: the high viscosity product. All software based on Linux platform and for extension of calculation by Gnumeric system. However, currently the Gnumeric can be installed on windows platform. The general conclusion from annex 2:

- The value added here is road A has been chosen, based on the real road and all possibilities for energy (fuel) consumption, therefore the decision from transport planning (transport agent manager) is key parameter for successful business as counterpart business in oleo chemical industries.
- The speed of vehicle based on eco-driving style which gives a big impact for fuel consumption. The ability of marketing section to bit the price competition in market price became an important part of business sustainability particularly on oleo chemicals market. France's transport should take a reposition as business counterpart for warehouse's oleo chemicals plants. Further- more, it should be stronger on procurement price competition which offered by oleo chemicals companies.

This research work has been established by collaboration E&S Chimie, Ecogreen Group, France and DHW, Ecogreen Group, Germany via monitoring by international central office at Singapore.

Energy Efficiency Measures for International Shipping

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The ordinary least square method was applied. Normally, if there is an existing an auto correlation, Cochran orcutt method will apply for it, see Gujarati (1999). Figures in parentheses shows t-value.

1. Food and Beverages Products: SITC Code: 313 LOG(Y) = 6.611+ 0.016*LOG (K) +1.396*LOG (TW) + 0.002*LOG (M) (0.34) (9.82) (0.25) R-squared: 0.97
2. Garment and Textiles Products: SITC Code: 321 LOG(Y) = -12.340+0.074*LOG(K) + 2.252*LOG(TW) + 0.165*LOG(M) (0.72) (6.51) (3.89) R-squared: 0.98
3. Paper and Paper Products: SITC Code: 341 LOG(Y) = 6.808 - 0.048*LOG (K) + 1.117*LOG (TW) - 0.15*LOG (M) (-0.84) (2.66) (-0.41) R-squared: 0.98
4. Other Chemical Products: SITC Code: 352 LOG(Y) = -4.286 + 0.100*LOG (K) + 1.762*LOG (TW) - 0.011*LOG (M) (1.62) (12.79) (-0.95) R-squared: 0.98
5. Non-Metallic Mineral Products: SITC Code: 369 LOG(Y) = 1.7639 + 0.195*LOG (K) + 1.093*LOG (TW) + 0.201*LOG (M) (0.71) (1.76) (1.48) R-squared: 0.94

6. Basic Metallic Products and Other: SITC Code: 381 LOG(Y) = 5.909 + 0.150*LOG(K) + 0.861*LOG(TW) - 0.027*LOG(M) (4.06) (5.67) (-0.43) R-squared: 0.98

7. Machinery except Electrical Products: SITC Code: 382 LOG(Y) = -4.782 - 0.015*LOG (K) + 2.060*LOG (TW) - 0.016*LOG(M) (-0.17) (10.23) (-1.34) R-squared: 0.98

8. Electrical Machinery Apparatus: SITC Code: 383 LOG(Y) = 2.938 + 0.184*LOG (K) + 1.102*LOG (TW) - 0.010*LOG(M) (2.90) (7.21) (-0.16) R-squared: 0.98

9. Transport Equipment Products: SITC Code: 384 LOG(Y) = -2.698 + 0.047*LOG (K) + 1.744*LOG (TW) +0.063*LOG(M) (0.56) (7.54) (0.81) R-squared: 0.97

10. Other Industrial Products: SITC Code: 390 LOG(Y) = 2.798 + 0.056*LOG (K) +1.041*LOG (TW) + 0.077*LOG(M) (0.99) (8.92) (6.25) R-squared: 0.98

Why we applied robust procedure? Because, in order to know well the value added level or output level as a function of total paid and unpaid workers, average supervisory and professional workers, total payment to production workers, total payment to non-production workers, total profit, and ad- vertising and promotion. Moreover, to get best description of manufacturing value added during 20 years. The most common general method of robust regression is M-estimation, see SAS (2002). The M in M-estimation stands for “maximum likelihood type”. Least squares alternatives, in 1973, Huber introduced M-estimation for regression (see, robust statistics for additional details of M-estimation). The M in M-estimation stands for “maximum likelihood type”. The method is robust to outliers in the response variable, but turned out not to be resistant to outliers in the explanatory variables (leverage points). In fact, when there are outliers in the explanatory variables, the method has no advantage over least squares.

In the 1980s, several alternatives to M-estimation were proposed as attempts to overcome the lack of resistance. See the book by Rousseeuw and Leroy for a very practical review. The most common general method of robust regression is M-estimation, introduced by Huber, 1964.

In The SAS procedure, here we used robust regression (procedure in robust regression model in SAS software) and the model construction on it; all variables called; value added, total paid and unpaid workers, average supervisory and professional workers, total payment to production workers, total payment to non-production workers, total profit, and advertising and promotion.

All List of data used and definition:
- VTLVCU: Value added,
- LTLNOU: Total paid and unpaid workers,
- LTL: Average supervisory and professional workers,
- ZPDVCU: Total payment to production workers,
- ZNDVCU: Total payment to non-production workers,
- YT1VCU: Total profit,

- IADVCU: Advertising and promotion

Estimation result for value added:

Variable of VTLVCU =

17392.5 -321.8LTLNOU+0.7 LTL+1.5 ZPDVCU+2.7ZNDVCU+0.9YT1VCU+4.2IADVCU

(-324.07) (-2.59) (1.40) (2.66) (0.92) (4.1769)

Table 5.26: Vessel Arrivals, Belawan Port

Description	4/2/'16	6/2/'16	8/2/'16	10/2/'16	12/2/'16	14/2/'16	16/2/'16	17/2/'16
Passenger	7	0	0	0	0	1	0	0
Cargo	19	3	3	4	2	1	3	4
Tanker	9	8	1	2	0	1	1	2
Tug	3	1	0	1	0	0	0	0
pleasure craft	6	0	0	0	0	0	0	0
Fishing	1	0	0	0	0	0	0	0
Other	12	0	0	0	1	0	0	0

Table 5.27: vessel arrivals, Pekanbaru Port

Description	12/2/'16	13/2/'16	14/2/'16
Passenger	0	0	0
Cargo	1	0	0
Tanker	1	0	1
Tug	0	0	0
pleasure craft	0	0	0
Fishing	0	0	0
Other	0	1	0

Table 5.28: Vessel Arrivals, Dumai Port, Sumatra

Description	5/2/'16	6/2/'16	7/2/'16	10/2/'16	11/2/'16	12/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	1	1	0	1	0	0	0	0	0	0
Cargo	0	2	2	1	0	2	0	4	0	1
Tanker	0	1	1	0	3	2	6	4	1	0
Tug	0	0	0	0	0	0	0	1	0	0
pleasure craft	0	0	0	0	0	0	0	1	0	0
Fishing	0	0	0	0	0	0	0	5	0	0
Other	0	0	0	0	2	0	0	3	0	0

Source: Marine Traffic, Indonesia, 2016.

Table 5.29: Vessel Arrivals, Tanjung Pinang Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16
Passenger	1	2	0	1
Cargo	0	0	0	0
Tanker	0	0	0	0
Tug	0	0	0	0
pleasure craft	0	0	0	0
Fishing	0	0	0	0
Other	0	0	2	0

Table 5.30: Vessel Arrivals, Lhokseumawe Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16
Passenger	0	0	0	0
Cargo	0	0	0	0
Tanker	0	0	0	0
Tug	0	0	0	0
pleasure craft	0	0	0	0
Fishing	0	0	0	0
Other	0	0	0	0

Table 5.31: Vessel Arrivals, Tanjung Priok Port

Description	4/2/'16	6/2/'16	8/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	16/2/'16	17/2/'16
Passenger	22	16	16	14	26	15	10	8	9	33
Cargo	58	50	64	45	47	53	49	38	30	44
Tanker	5	4	5	6	5	8	3	7	4	9
Tug	38	36	37	34	42	33	29	20	17	45
pleasure craft	26	21	25	22	18	22	21	15	5	21
Fishing	35	28	35	28	21	28	28	21	7	21
Other	106	105	85	91	88	84	80	62	41	110

Table 5.32: Vessel Arrivals, Panjang Port

Description	3/2/'16	4/2/'16	5/2/'16	6/2/'16	8/2/'16	10/2/'16	12/2/'16	13/2/'16	14/2/'16	1/2/'16
Passenger	0	1	0	0	0	0	1	0	0	0
Cargo	3	4	2	2	2	3	0	3	2	1
Tanker	1	1	0	0	0	0	0	2	2	3
Tug	0	0	0	0	0	0	0	3	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	1	0	0	0	1	0	0

Table 5.33: Vessel Arrivals, Palembang Port

Description	5/2/'16	6/2/'16	7/2/'16	10/2/'16	11/2/'16	12/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	0	0	0	0	5	0	0	0	0	0
Cargo	3	3	3	2	12	8	1	5	0	1
Tanker	5	2	0	2	7	1	6	3	3	2
Tug	4	2	0	1	3	1	3	3	2	1
pleasure craft	0	0	0	0	3	0	0	0	0	0
Fishing	0	0	0	0	1	0	0	0	0	0
Other	1	0	4	0	12	0	2	0	0	2

Table 5.34: Vessel Arrivals, Teluk Bayur Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16
Passenger	0	0	0	2	0	0	0	2	0
Cargo	1	2	2	1	0	2	0	2	2
Tanker	1	0	0	0	1	0	1	0	2
Tug	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0

Table 5.35: Vessel Arrivals, Pontianak Port

Description	4/2/'16	6/2/'16	7/2/'16	8/2/'16	11/2/'16	12/2/'16	13/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	6	0	0	3	0	0	3	1	0	5
Cargo	14	2	2	3	2	2	2	3	2	13
Tanker	7	3	0	1	0	2	4	0	2	6
Tug	5	0	0	0	0	0	1	0	0	3
pleasure craft	3	0	0	0	0	0	0	0	0	3
Fishing	1	0	0	0	0	1	0	0	0	1
Other	11	1	3	2	1	4	3	2	1	11

Table 5.36: Vessel Arrivals, Cirebon Portt

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16
Passenger	0	0	0	0	0	0	0	0	0
Cargo	0	0	0	0	1	1	0	0	0
Tanker	1	0	0	0	0	0	0	1	0
Tug	0	0	0	0	0	1	1	0	0
pleasure craft	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0
Other	0	2	1	1	0	0	0	0	1

Table 5.37: Vessel Arrivals, Jambi Port

Description	5/2/'16	6/2/'16	7/2/'16	10/2/'16	11/2/'16	12/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	0	0	0	0	0	0	0	0	0	0
Cargo	0	0	0	0	0	0	0	0	0	0
Tanker	0	0	0	0	0	0	0	0	0	0
Tug	0	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table 5.38: Vessel Arrivals, Bengkulu Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16
Passenger	4	2	6	4	3	2	2	4	7	2
Cargo	14	7	15	14	7	7	7	15	21	7
Tanker	2	0	0	1	0	0	1	0	0	0
Tug	10	5	10	10	5	5	5	10	15	6
pleasure craft	10	5	10	10	5	5	5	10	15	5
Fishing	14	7	14	14	7	7	7	15	21	7
Other	30	15	30	30	15	15	15	30	45	15

Table 5.39: Vessel Arrivals, Banten Port

Description	5/2/'16	6/2/'16	7/2/'16	10/2/'16	11/2/'16	12/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	0	0	0	0	0	0	0	0	0	0
Cargo	0	0	0	0	0	0	0	0	0	0
Tanker	0	0	0	0	0	0	0	0	0	0
Tug	0	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table 5.40: Vessel Arrivals, Pangkal Balam Port

Description	4/2/'16	5/2/'16	6/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16
Passenger	1	1	1	2	1	2	0	1	0	1
Cargo	0	0	1	0	0	0	0	0	0	0
Tanker	0	1	0	0	0	2	1	0	1	0
Tug	0	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table 5.41: Vessel Arrivals, Tanjung Pandan Port

Description	5/2/'16	6/2/'16	7/2/'16	10/2/'16	11/2/'16	12/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	0	0	0	0	0	0	0	0	0	0
Cargo	0	0	0	0	0	0	0	0	0	0
Tanker	0	0	0	0	0	0	0	0	0	0
Tug	0	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table 5.42: Vessel Arrivals, Tanjung Perak Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	3	3	3	5	2	3	4	4	4	5	1	3	10	4
Cargo	6	16	11	11	9	8	13	11	11	9	20	21	22	15
Tanker	0	2	1	0	1	2	3	0	2	1	2	2	7	0
Tug	1	1	3	6	0	1	1	2	1	2	2	3	6	3
pleasure craft	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Fishing	0	1	3	6	0	0	1	2	1	3	2	2	4	3
Other	4	3	7	0	2	4	6	5	5	3	3	3	13	7

Table 5.43: Vessel Arrivals, Tanjung Emas Port

Description	5/2/'16	6/2/'16	7/2/'16	10/2/'16	11/2/'16	12/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	0	0	0	0	0	0	0	0	0	0
Cargo	0	0	0	0	0	0	0	0	0	0
Tanker	0	0	0	0	0	0	0	0	0	0
Tug	0	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table 5.44: Vessel Arrivals, Banjarmasin Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	0	6	2	1	2	0	2	2	2	0	3	1	1	2
Cargo	5	6	3	4	3	2	2	2	7	3	3	2	5	0
Tanker	0	8	4	3	1	8	9	9	0	2	6	8	1	1
Tug	6	8	7	8	10	2	7	11	11	9	8	11	5	10
pleasure craft	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Other	4	11	6	5	3	3	2	2	6	3	5	8	2	3

Table 5.45: Vessel Arrivals,Benoa Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	3	2	2	2	5	3	2	3	2	2	3	3	4	3
Cargo	0	1	0	0	0	0	0	0	1	0	0	0	0	0
Tanker	1	1	0	1	0	1	1	1	0	0	1	0	1	0
Tug	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	1	1	0	0	0	1	0	1	1	0	0
Fishing	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Other	0	0	0	0	1	1	0	0	0	0	0	0	1	1

Table 5.46: Vessel Arrivals, Tenau Kupang Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	2	3	1	2	1	3	1	4	5	3	2	0	0	5
Cargo	0	3	0	1	0	0	0	1	0	0	0	2	2	0
Tanker	0	2	0	2	0	1	0	0	1	0	0	0	0	0
Tug	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	1	1	2	0	2	0	0	1

Table 5.47: Vessel Arrivals, Makassar Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	1	2	2	1	3	2	2	1	2	1	3	1	2	3
Cargo	2	4	1	1	1	6	3	1	2	1	3	5	6	9
Tanker	2	0	1	1	1	0	1	1	2	1	1	0	2	1
Tug	0	0	0	0	1	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	1	1	0	2	0	0	1	1	2	0	1	0	2	5

Table 5.48: Vessel Arrivals, Balikpapan Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	15/2/'16	16/2/'16
Passenger	0	1	0	0	0	0	0	0	0	0	0	1	0
Cargo	0	0	0	0	0	1	1	0	0	0	1	0	1
Tanker	1	1	3	0	2	3	1	0	3	6	3	3	2
Tug	0	0	0	1	0	0	0	2	1	0	3	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	1	0	2	2	2	3	3	2	1	0	0

Table 5.49: Vessel Arrivals, Samarinda Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16
Passenger	0	1	0	10	0	0	2	0	0	0
Cargo	1	0	0	0	0	1	0	1	3	2
Tanker	0	0	0	0	1	1	0	0	0	0
Tug	0	0	1	0	3	1	0	1	1	0
pleasure craft	0	1	1	0	4	1	1	1	4	4
Fishing	0	0	0	0	0	0	0	0	0	0
Other	1	0	1	1	1	2	0	0	0	1

Table 5.50: Vessel Arrivals, Bitung Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	0	1	0	1	1	0	0	1	0	0	1	0	29	6
Cargo	1	2	4	0	1	3	1	1	0	0	4	0	2	0
Tanker	2	2	3	1	2	3	4	0	1	0	1	2	4	0
Tug	0	0	0	0	0	0	0	0	0	0	0	0	14	2
pleasure craft	0	0	0	0	1	0	0	0	0	0	0	0	7	1
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	1	0	2	0	1	1	2	3	0	1	2	1	49	10

Table 5.51: Vessel Arrivals, Ambon Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	15/2/'16
Passenger	1	3	2	1	10	1	0	2	0	0	2	4
Cargo	0	1	0	1	12	0	2	1	0	4	14	23
Tanker	0	0	0	0	14	1	1	0	0	0	0	10
Tug	0	0	0	0	10	0	0	0	0	0	0	6
pleasure craft	0	0	0	0	6	0	0	0	0	0	0	3
Fishing	0	0	0	0	4	0	0	0	0	0	0	2
Other	0	0	0	0	35	1	3	1	2	11	2	18

Table 5.52: Vessel Arrivals, Sorong Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16	12/2/'16	13/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	2	0	2	5	3	2	3	4	2	2	3	3	3	5
Cargo	1	1	0	0	1	0	0	0	0	1	0	0	0	1
Tanker	0	1	1	1	0	0	0	0	2	0	1	1	0	0
Tug	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	1	0	0	0	0	1	0	0	0	0	0	1
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	1	5	2	2	0	2	2	1	2	1	0	4	2	5

Table 5.53: Vessel Arrivals, Biak Port

Description	5/2/'16	6/2/'16	7/2/'16	10/2/'16	11/2/'16	12/2/'16	14/2/'16	15/2/'16	16/2/'16	17/2/'16
Passenger	0	0	0	0	0	0	0	0	0	0
Cargo	0	0	0	0	0	0	0	0	0	0
Tanker	0	0	0	0	0	0	0	0	0	0
Tug	0	0	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table 5.54: Vessel Arrivals, Jayapura Port

Description	4/2/'16	5/2/'16	6/2/'16	7/2/'16	8/2/'16	9/2/'16	10/2/'16	11/2/'16
Passenger	1	0	0	2	1	0	0	1
Cargo	1	2	1	1	0	0	0	0
Tanker	0	0	0	1	1	0	0	0
Tug	0	0	0	0	0	0	0	0
pleasure craft	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	1	1	0