

Project Report

**Supply Chains Evaluation
In
BEIL Infrastructure Ltd**

ProjectQ.in



Name: ***

Enrolment No. – ?????*?????**

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*****Student Name*****

Chapter 1: Objective

The objectives of the study are as the following:

- To reducing working capital in the company
- To maximize overall value generated
- To look for sources of revenue and cost

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Chapter 2: Scope

The work of this project starts with defining the purpose supply chain. The purpose of the pre-study was to learn more about what the logistics department does and how internal customers obtain materials and services.

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Chapter 3: Executive Summary

Cost-cutting has been a persistent burden on businesses. These changes have largely been caused by pressures from more demanding customers than ever before, as well as increased obligations at all levels. Other factors, such as the evolution of the Internet, have also influenced these shifts. However, it must be remembered that these variables have also posed serious dangers to market share losses and, as a result, to the value and profitability of enterprises' shareholders.

This approach is affecting not only all sorts of company sectors, but also all levels within a single business sector. All levels refer to the manufacture of raw materials through to the delivery of the finished product to the final customer. As a result, all businesses affected by these shifts must recognize that they are more than just component suppliers or end-product manufacturers. Instead, all parties participating in a single product must recognize that they are part of a product or supply chain, which often involves a huge number of organizations.

Reduced cycle times, shorter lead times, and a drive to reduce stocks aren't new ideas. For a long time, the same desires have existed. The difference is that the businesses have begun to integrate into supply chains. It's worth noting that parties who are cooperating now may have been rivals not long ago. This new way of thinking is forcing competitors to collaborate across their own business lines. Something like that would have been unimaginable just ten years ago. While rivalry took place between competitor enterprises in the 1990s, it now takes place on a far larger scale.

Nowadays, companies have entered into a new era of supply chain competition, meaning that the focus is shifting from the individual company's competitive advantage towards the entire supply chain's competitive advantage.

The underlying philosophy behind today's SCM concept is the planning and coordinating of the product flow from source to end user as an integrated system, rather than managing the flow as a series of independent activities.

As a result, it is becoming increasingly vital for all firms to assess the supply chains in which they are involved. Following the evaluation process, various supply chains should be compared to determine which is more profitable for a business. Some businesses are also considering where they should put their money. Because these funds are typically invested in a variety of supply chains, it's necessary to compare investment options. Furthermore, it may not be so easy for the company to withdraw its financial resources from new-built supply chains, so each company should be able to know in the beginning what to expect from a particular project.

Chapter 4: Literature review

Most businesses exist to expand and flourish in the marketplace and to generate profits for all stakeholders. Each business is a part of a longer or shorter supply chain. Because the twentieth century was the age of globalisation and cross-cultural exchange, the majority of these supply chains are transnational. During the creation of these supply networks, each company had to determine what type of supply chain it wanted to be a part of and which supply chain would bring them the most profit. As a result, decision-makers have had to choose between several options for investing cash and money. In this paper, decision-makers are defined as all individuals or groups of individuals who make decisions on the creation of various supply chain options, i.e. deciding between various investment options. This decision was influenced by the evaluation and comparison of several options. As a result, the process of assessing and comparing transnational supply networks is inextricably linked to investment decisions.

The decision-making process is the most crucial aspect of investing. During this stage, an investor decides whether or not to invest his money (or the money he invests on behalf of his clients) in a certain project. A project like this should be treated like any other supply chain. A decision-maker would opt for the option that yields the highest profit margins, regardless of the sort of product produced. However, it is important to note that the ethical issue influences this decision, as a decision-maker would select an option that is consistent with his values and conscience. An investor, without a doubt, looks after his or her money and seeks to recoup as much profit as possible. These requirements of an investor are obvious, as human psychology

and logical conduct imply that the decision to have less or more is already made in a person's mind– the person picks the best position.

The writers of this project have opted to leave out the behaviour of an illogical person for the purposes of this study. As a result, this study focuses on the actions of a reasonable individual. However, it must be remembered that only the decision-maker knows which reasons he employed to arrive at his decision. Decisions are not always made solely on the basis of economic and quantitative considerations. Personal ties have been extremely important in some countries, such as China and Japan, for centuries. A good example is the Chinese concept of guanxi (good relationships). The writers of this dissertation regard such decisions to be partially logical. These decisions are rational on one hand since the parties involved expect mutual gains from the relationship, but they are not based on purely economic factors such as profits, costs, revenues, and sales on the other. These, on the other hand, are qualitative elements.

Managers and decision-makers have demanded to know which project would generate the most revenues and which supply chain will be the most efficient. As a result, economists, accountants, and marketers have developed a wide range of ideas and methods for assessing global supply chains.

The international business point of view, as one of the most important factors while evaluating a certain project, takes into consideration profits and costs of the venture. An enterprise may use a number of tools for valuing a production line. Some of the most known and popular are so called “dynamic methods”, such as the Net Present

Value (NPV) analysis, the Internal Rate of Return (IRR) analysis and the so called "static methods", such as the payback period and the Average Rate of Return. Another group of the tools is connected to financial analysis and includes such methods as the DuPont model. Sometimes, another accounting way of approaching a valuation is used: the Cost-Volume-Profit (CVP) analysis. All of these methods are used to select among several alternative chains.

It cannot be forgotten in this context that sometimes rational decisions of a single person are irrational in the holistic approach. As an example one can state the game theory and the prisoner's dilemma, where lack of information makes the rational decision of a prisoner not rational from the point of view of an outsider, who has full information. As another example one can give the holding company in which one subsidiary makes "paper losses" (through e.g. the system of transfer prices) on purpose – so the whole company gains. Just to name a couple of advantages for the whole company, one can give such examples: reduction of tax liabilities, reduction of exposure for exchange risks, way of escaping from unfavorable countries'. That also makes multinational supply chains unique in the sense that sometimes parts of a supply chain may on purpose be more expensive than the other investment possibilities.

Furthermore, we have to state that the time value of money is very important in the investment process. Sometimes, high inflation rates may deteriorate the expected profits coming from supply chains. The methods like NPV (Net Present Value) or IRR (Internal Rate of Return) take it into consideration.

Another issue that has to be mentioned in the investment process are the political and economic risks associated with future cash flows. However, by improving the chosen methods of supply chain evaluation by probability and measurement of expected value of these cash flows, that problem might be overcome. Another way of approaching that problem is using increased discount rates for measurement of present value of these cash flows.

Differences between a supply chain and a value chain

A supply chain is defined as "a network of autonomous or semi-autonomous business entities collectively responsible for procurement, manufacturing, and distribution activities associated with one or more families of related products" along the value chain from the raw material supplier to the "point of use," such as retail stores or end-customers, or in other words "a network of autonomous or semi-autonomous business entities collectively responsible for procurement, manufacturing, and distribution activities associated with one or more families of related products."

The breadth of a value chain is much greater. It encompasses not just all supply chain procedures, but also all value-creating activities such as marketing, customer support, and package disposal. In other words, it's "a high-level model of how firms take raw materials as input, add value to them through multiple processes, and sell finished goods to customers."

Briefly, supply chains are parts of value chains, extended with non-logistics related activities which create value for the product.

The Cost-Volume-Profit analysis

The Cost-Volume-Profit (CVP) analysis is one of the most essential accounting methods for analysing supply chains. A corporation can use this notion to figure out at what level of production (and sales) of a specific product a venture will be profitable. This study also allows a corporation to determine which supply chains generate more profit or less loss at a given level of production (and sales). This analysis has been regarded by many authors as one of the most significant in analysing supply networks.

To explain and implement this accounting concept, one must first distinguish between the many types of costs that an organisation must incur. The costs are distributed in a variety of ways in managerial accounting. In the CVP analysis, however, the separation of fixed and variable costs appears to be the most important factor. Fixed costs are costs that do not change during the manufacturing process, regardless of the volume of production (Figure 1).

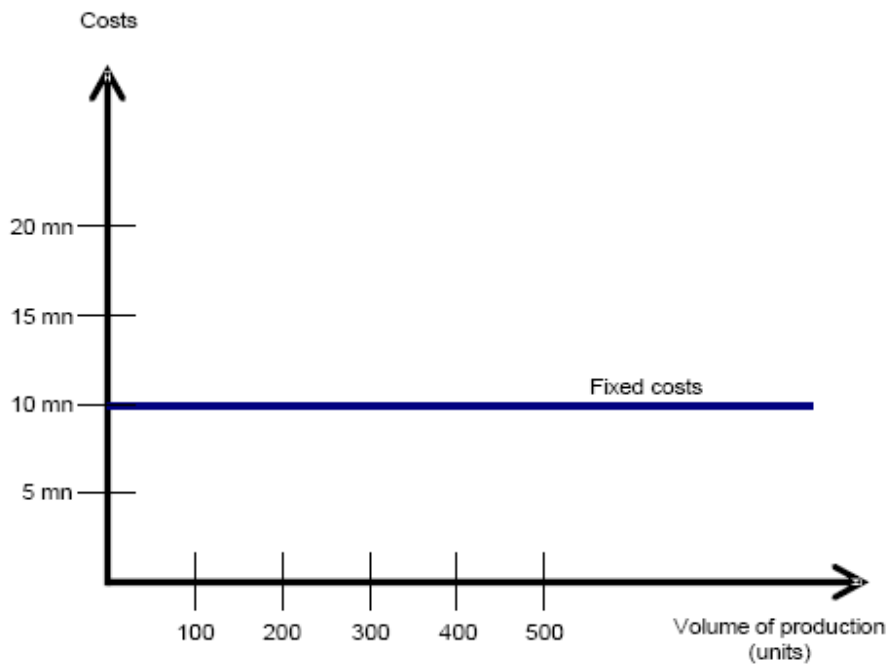


Figure 1: Fixed Cost

These are for example such costs as amortization of the machines used for the production or remuneration of managers. Variable costs – on the other hand are costs, which depend on the volume of the production. These are such costs as direct materials costs, direct labor costs and other direct costs of the product (Figure 2).

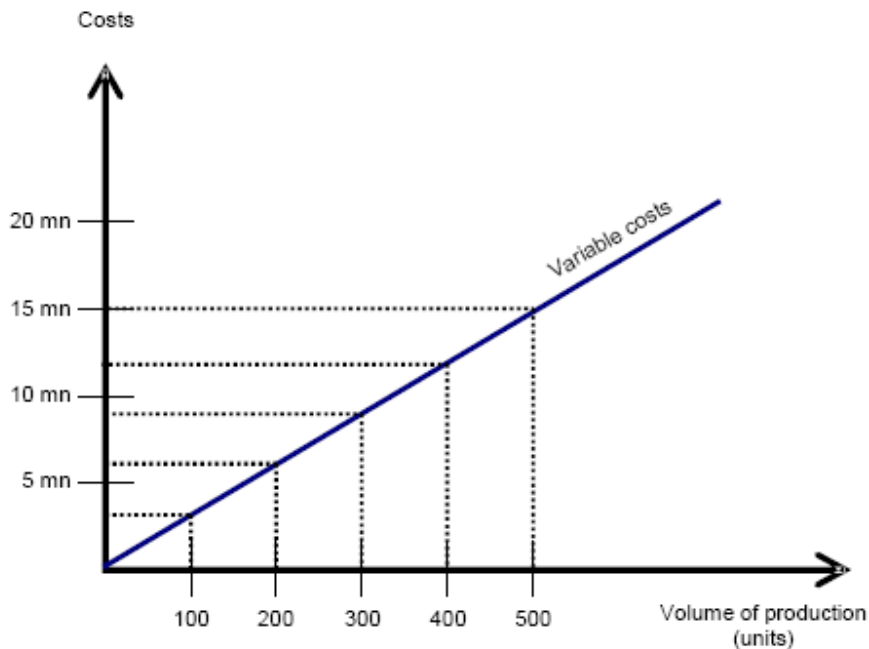


Figure 2: Proportional variable costs

These costs increase when an enterprise produces more units of a product and decrease while an enterprise is producing fewer units.

However, it should be remembered that in fact, a production line's fixed costs should be viewed as semi-fixed costs. This indicates that the costs are set, but only up to a specific amount of output. This appears to be self-evident. If a machine is built to create 10,000 units throughout the course of its life (which could be a year), it means that the expenses of purchasing and installing the machine are the same regardless of how many units the machine produces (this one year). The only difference, which occurs, is that, the costs of the purchase and installation of the machine are divided into a different number of units. Thus the part of fixed costs which is applied to the products varies according to the number of units produced. It results in various amounts of costs, which are applied to one unit of a product. As a result the more units are produced, the cheaper every single unit is (Figure 3).

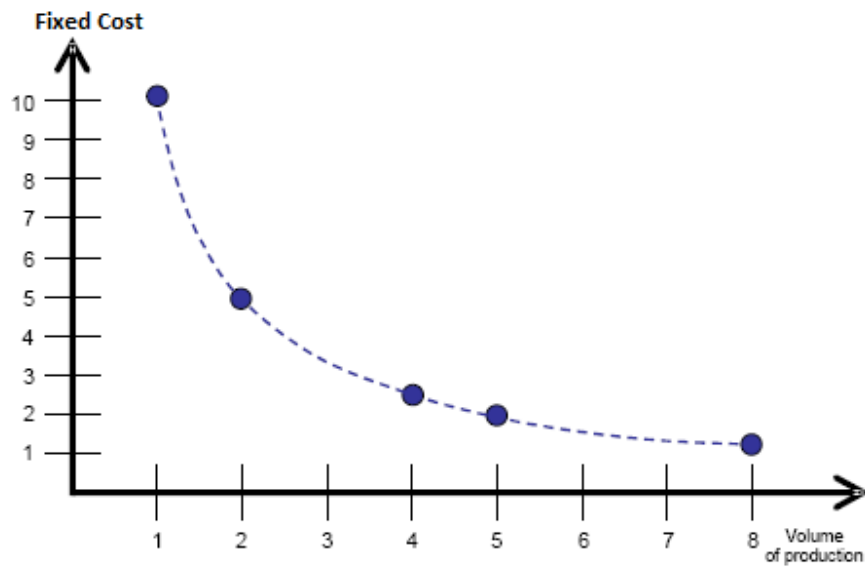


Figure 3: Dependence between the amounts of fixed costs applied to each unit of a product and the volume of production

However, if an enterprise has decided to produce two times more products than the machinery park is able to create, then the additional devices must be bought. These additional machines are extra fixed costs (Figure 4).

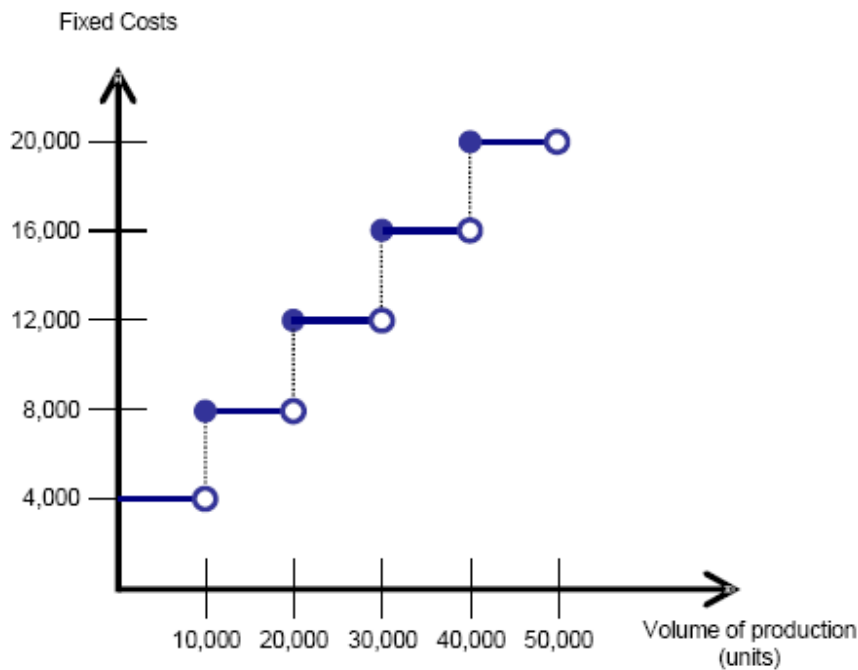


Figure 4: Dependence between fixed costs and production volume

Furthermore, if a corporation considers variable costs, it should keep in mind that these costs do not always increase equally, or by the same amount of money. Variable costs may rise or fall over time, depending on the product and manufacturing process (Figure 5). When the following unit of a product requires a higher quantity of variable costs, progressive growth occurs, whereas degressive growth occurs when the next unit of a product requires fewer variable costs.

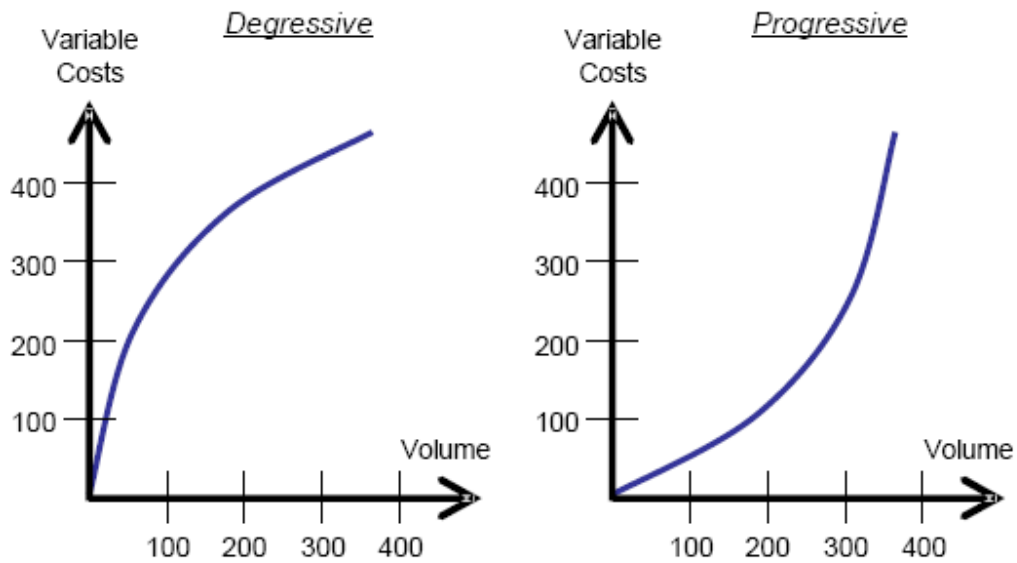


Figure 5: Degressive and progressive variable costs

All costs a company has to take into consideration, while deciding on which supply chain to choose, can be written by means of a simple linear equation

$$C(V) = C_F + C_V$$

$$C(V) = C_F + c_V * V$$

where:

$C(V)$ = all total costs which a company has to bear during certain production level

C_F = total fixed costs

C_V = total variable costs

c_V = variable costs of production of 1 unit of a product.

V = volume of production

All costs of a production line are represented in the Figure 6

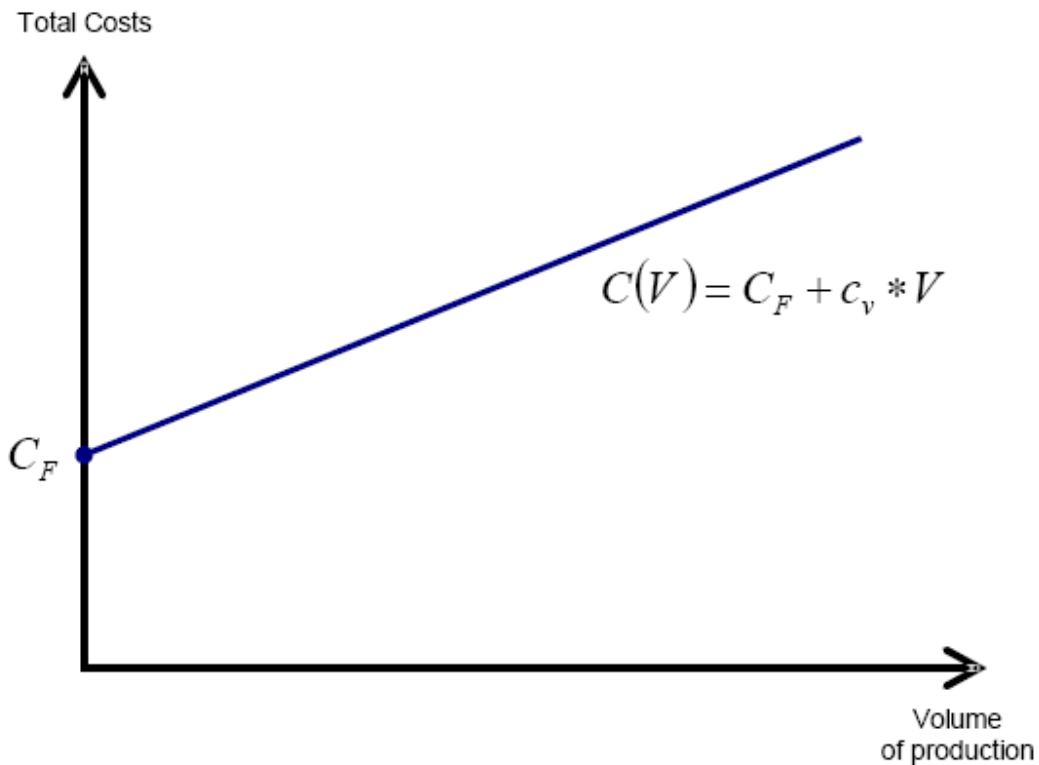


Figure 6: Total Cost

An enterprise earns a profit when income from the sales of products exceeds the costs of production, which is represented in Figure 7. The point at which the project's revenues equal the costs of the project is called Break Even Point and is calculated according to the following equation:

$$BEP = \frac{C_F}{(p - c_v)}$$

where:

BEP = Break Even Point

p = price of a product

c_v = variable costs of production of 1 unit of a product.

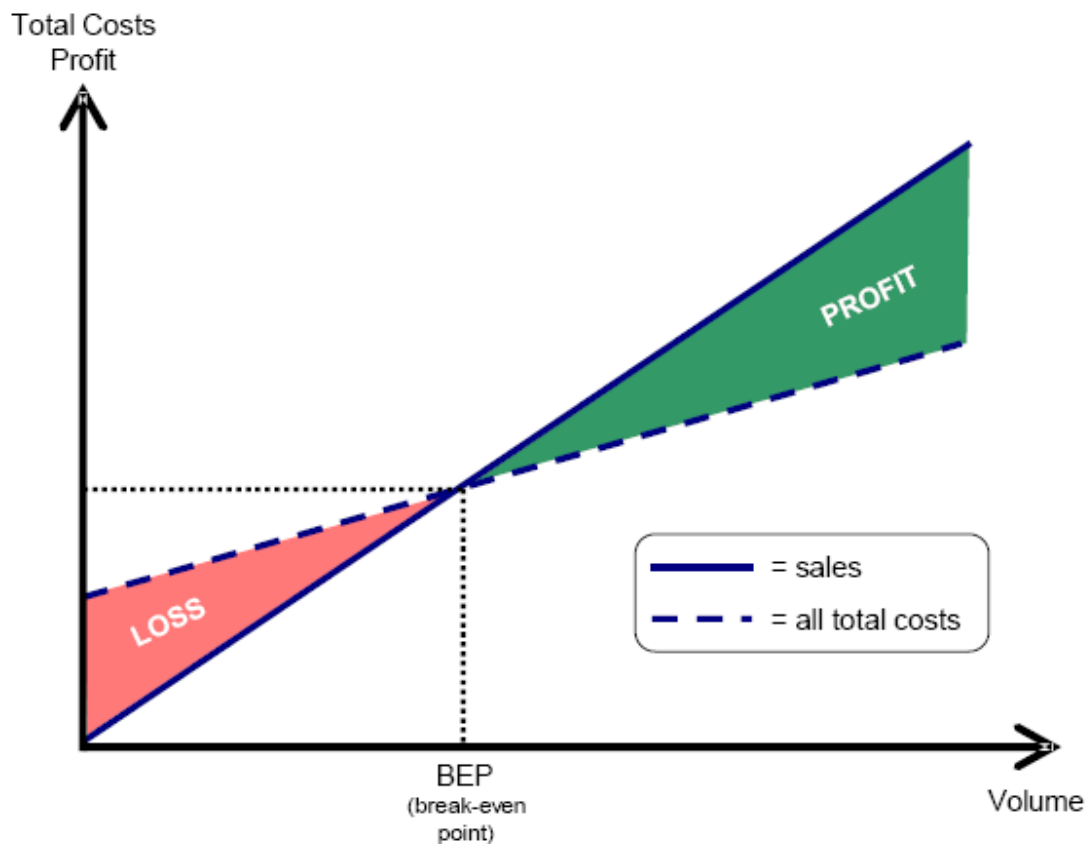


Figure 7: Costs and revenues of a production line

If an organisation decides to go with one of the two supply chains, it should analyse all of the total expenses associated with each one. In addition, the size of the output must be taken into account. Furthermore, not only is the degree of production significant, but so is the market's capacity, because the items must be sold in order to make a profit. Different levels of fixed and variable production costs suggest that one supply chain will be more profitable than the other only until a particular point in the manufacturing process. Figure 8 clearly demonstrates this.

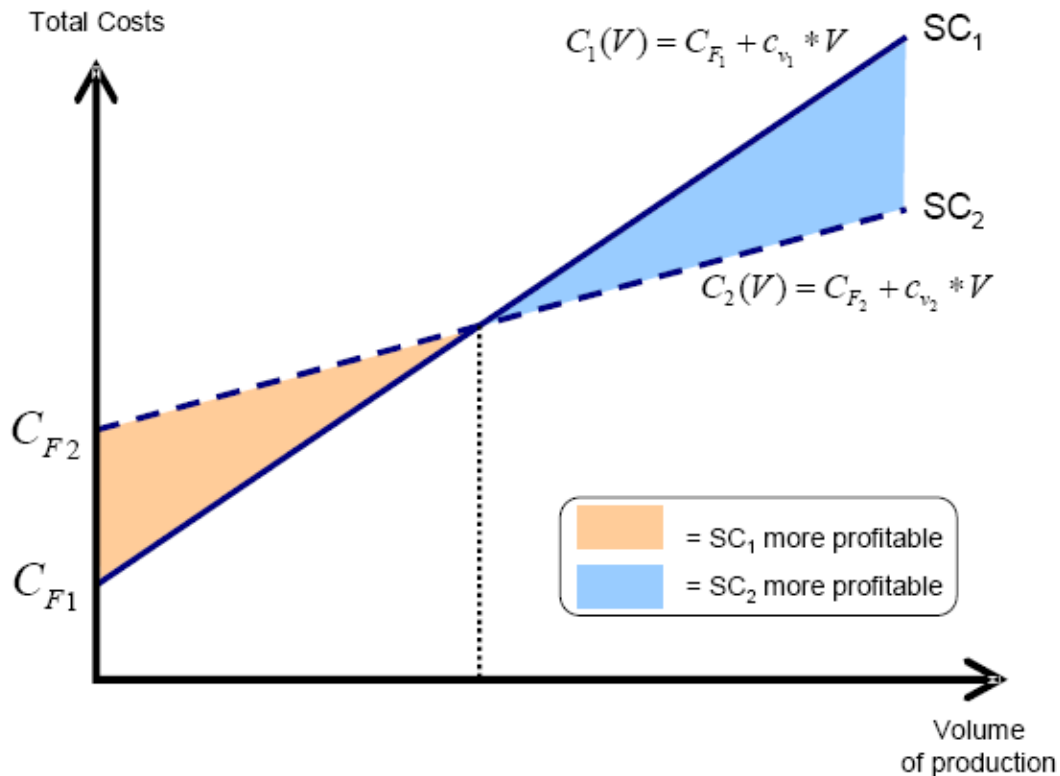


Figure 8: Costs of two possible supply chains

One of the disadvantages of this method, which is worth mentioning, is the difficulty in applying the CVP analysis in multi-product operations (e. g. restaurant operations).

According to the authors of this dissertation, in business life, companies usually undertake one of the three possible strategies, while considering a choice between fixed and variable costs. These strategies are displayed in Figure 9.

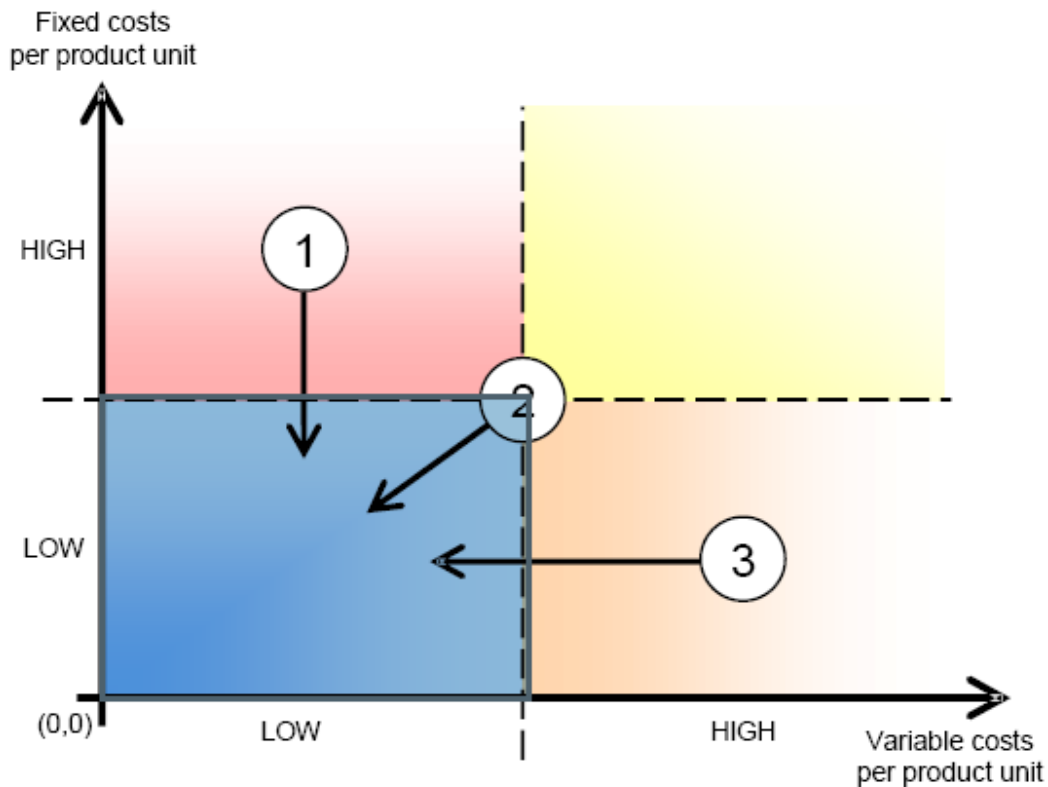


Figure 9: Strategies for fixed and variable costs

Companies usually undertake one of the three possible strategies, while considering a choice between variable and fixed costs per product unit.

Variable costs per unit of a product are represented on the horizontal axis. These expenses are measured in monetary units. The fixed costs per unit of a product are represented by the vertical axis, which is likewise measured in currency units. This graph could be used to compare fixed and variable cost strategies adopted by different firms. These businesses must be in the same industry (for example, bookstores), and the things they sell must be similar. Furthermore, the comparison must be done for a single product (e.g. books).

A corporation that employs the first technique reduces variable costs such as production, supply, and material acquisition. Simultaneously, the corporation builds up a huge stock of products (higher fixed costs per unit), because purchasing large quantities of a product usually decreases the price (minimised variable costs).

The third technique allows a corporation to reduce fixed costs per product unit (e.g. by minimising the stock). At the same time, it maintains a high level of variable costs per product unit (e.g. by buying small quantities exactly at the time when the product is needed).

The second strategy is a mixture of the first and the third strategy.

As an example, consider a bookstore: Amazon.com sells books as part of its product offering. To reduce fixed costs, the corporation retained no equity in 1997. As a result, fixed costs such as warehouse acquisition, stock insurance, warehouse insurance, and warehouse worker salaries were greatly reduced. When Amazon.com received an order from a client, it placed an order with a wholesaler for this exact book. The price paid to the wholesaler was significantly more than the price paid to the publisher by Amazon.com. Publishers, on the other hand, sell books in larger volumes, thus Amazon.com would have to maintain books on hand at the warehouse.

An conventional bookstore is the antithesis of Amazon.com. The proprietor of a typical bookstore tries to buy books in bulk from publishers in order to keep the price of a single book as low as possible (minimising of variable costs per unit). The owner, on the other hand,

must maintain a large stock of books and pay for the warehouse, insurance, and other expenses (increased fixed costs per product unit).

In our opinion, every company should focus on moving its strategy closer into point (0,0), so it would result in minimising the total costs per product unit (and not only variable or fixed costs per product unit).

The new notion takes into account a product's quality. "The quantitative breakeven point at a certain level of quantity, the qualitative breakeven point at a given scale of operations, and a two-dimensional quantitative – qualitative breakeven point," Iwasiewicz identifies three concepts. It is believed that the profitability of a company's operations (and consequently the profitability of a supply chain) can only be ensured if two variables are met: a sufficient number of sales and a suitable level of quality. The qualitative breakeven point is therefore, the lowest possible level of quality at which the company is not suffering loss. The qualitative breakeven point is calculated by the equation:

$$p = \frac{(m - ck - cs)}{(m + cd)}$$

where:

p = product defectiveness rate

m = unit coverage margin = price - variable cost per unit

ck = unit cost related to maintaining the present quality of manufacture

cs = fixed unit cost

cd = defectiveness loss unit

The concept of a qualitative breakeven threshold can likewise be applied to supply chain evaluation. In most cases, you must choose between quality and price, and a lower price is frequently associated with lower quality, and vice versa. However, we would like to point out that market competition has been fierce in recent years, and the quality of a product can no longer be substituted for the low price of that goods. As a result, managers should focus not only on quantitative Break Even Points, but also on qualitative ones, because only a low price paired with excellent product quality can lead to market success.

Static methods

The payback time and the Average Rate of Return are further instruments available to managers (unjustified rate of return). The payback period is the amount of time it takes to recoup the initial investment cost. The ideal investment, according to this theory, is one that returns the initial cost in the shortest amount of time. This strategy considers cash flows that are not affected by inflation or interest rates. Another drawback of using this strategy is that it ignores cash flows after the payback, which could be critical to the project's success.

The average rate of return (ARR) method considers average profits from each year of the project as the most important factor in evaluating multinational supply chains. The best project is the one with the highest ARR ratio.

$$ARR = \frac{\text{Average Annual Profit Before Interest and Taxation}}{\text{Initial Capital Investment}}$$

The nominal, rather than the real, worth of money is used in this method. Furthermore, there are many various definitions of profits, which can make interpreting this ratio challenging. These methodologies, in our opinion, can only be used to a limited extent when examining supply chains. The payback time strategy would only be useful in the early stages of a business. Managers can weigh the costs of a supply chain (such as transportation, direct materials, insurance, and storage) against the revenues it generates. However, as previously stated, this method has a number of drawbacks and should not be utilised as a means of evaluating supply chains. The ARR technique is neither complete nor adequate for assessing supply chains. If there were two different supply chains in two different companies and one end product, it might be useful. Then this ratio would show which of these supply chains generates the greatest profit for the company.

Dynamic methods

Managerial accounting provides decision-makers also with other – more complicated – methods of evaluating different investment ventures such as multinational supply chains. In these methods, the time value of money is taken into consideration. One of these methods is the Net Present Value (NPV) method, which is very similar to Capital Budgeting. The other one is the Internal Rate of Return (IRR) method, also known as the yield method.

The NPV analysis enables managers to discover whether the initial cost of an investment (such as building a new production line, searching for a supplier or building a new supply chain) and costs incurred during the life time of a project (such as some expensive licenses, utilization

of dangerous materials, necessary spare parts) are lower than the positive cash flows created by this project during its life-time.

$$NPV = PV - C$$

Where:

NPV = Net Present Value of a certain project (supply chain)

PV = Present Value of future cash flows calculated according to the presumption that the discount rate's level is equal to "r"

C = initial cost of an investment

DuPont model

Another popular approach of measuring the performance of a supply chain is represented by a so-called method of pyramid analysis. The essence of these methods is the complex evaluation of the financial situation of an enterprise through the system of a ratios' pyramid. It must be stated that there is a tight "reasons and effects" relationship between the ratios. For the needs of this project, we have decided to look deeper at the Return on the Investment ratio (ROI), which is a part of the DuPont model:

$$ROI = \frac{Income}{Investment}$$

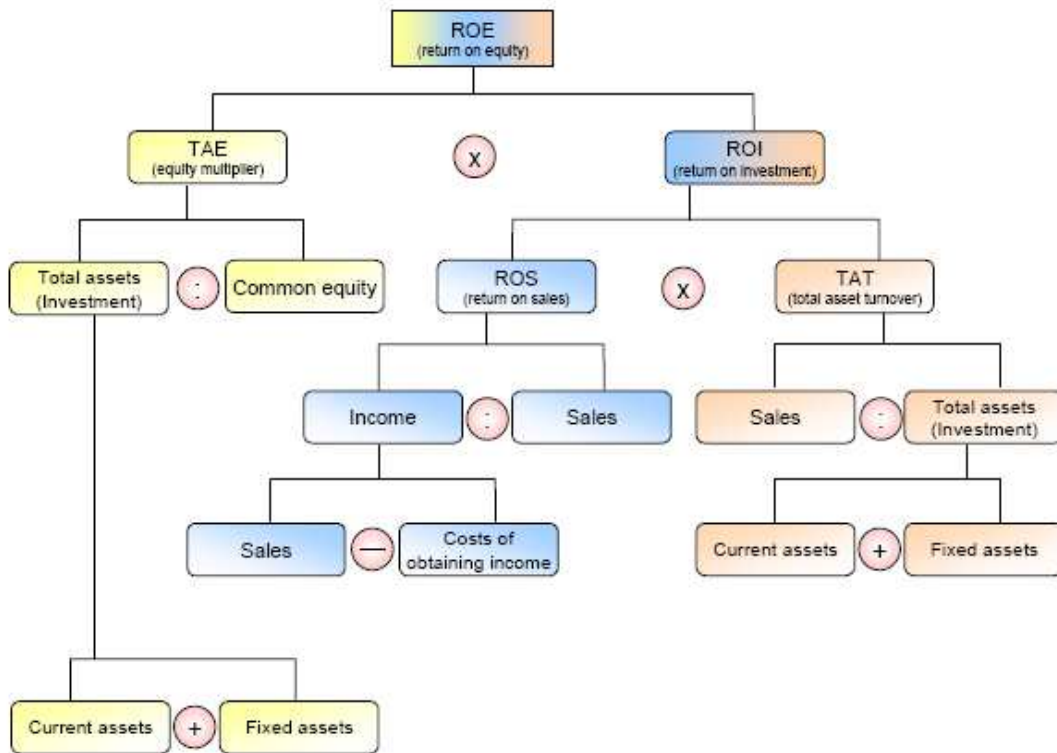


Figure 10: DuPont Model

In the DuPont model, usually the term Total Asset Turnover is used instead of Investment (Capital) Turnover.

The Supply Chain Operations Reference (SCOR) model

According to our definition, the SCOR model is a framework. However, we've treated it as a method that we may apply to our own evaluation model. It's usually used as a benchmarking tool, but in this dissertation, it'll be used to compare two supply chains.

Description of the SCOR model

Comparing a Supply Chain's performance to that of other divisions within the same firm is one way to assess its performance. This isn't always a good idea, though, because comparisons with the "outside"

can reveal better ideas and encourage the adoption of those approaches.

When it comes to enhancing supply chain operations, the SCOR model is a valuable tool for businesses. It provides a framework for manufacturers, suppliers, distributors, and retailers to assess the efficacy of their supply chain activities as well as target and quantify specific process operations.

It's built as a process reference model, which means it combines the ideas of business process reengineering, benchmarking, and process measurement into a single cross-functional framework. It also aids organisations in capturing the current state ("as-is") of a process with the goal of achieving the intended target state ("to-be"). It also enables businesses to evaluate operational performance and set internal goals based on "best-in-class" achievements from similar businesses. It defines the typical management procedures as well as the relationships between them.

Standard metrics are designed to monitor process performance and management strategies that achieve best-in-class results. Finally, it demonstrates the management methods and software solutions that lead to "best in class" results.

SCOR's 4 levels

The main part of the SCOR model is a "pyramid of four levels" that represents the path, which a company takes on the road to improve its supply chain(s).

SCOR Level 1

Strategic decisions are made on this level regarding a company's operation in the following areas

- Delivery performance,
- Order fulfillment performance,
- Fill rate (Make-to-stock),
- Order fulfillment lead time,
- Perfect order fulfillment,
- Supply-chain response time,
- Production flexibility,
- Total supply-chain management cost,
- Value-added productivity,
- Warranty cost or returns processing cost,
- Cash-to-cash cycle time,
- Inventory days of supply,
- Asset turns.

Because a company can't focus on all of them, it must choose which ones to prioritise in order to increase supply-chain efficiency. Because these are the four core processes, this defines the Plan, Source, Make, and Deliver process types.

- "**Plan**" is the process in which a company should assess supply resources, aggregate and prioritize demand requirements, plan inventory, distribution requirements, production, material and rough-cut capacity of all products and all channels. Decision related to long term capacity and resource planning, product phase-in / phase-out are undertaken in this phase.

- "**Source**" manages sourcing infrastructure. Various activities like vendor certification and feedback, sourcing quality monitoring or vendor contracts are conducted.
- "**Make**" is concerned with production, execution and managing the production's infrastructure.
- "**Deliver**" consists of order management, warehouse management and transportation management.

SCOR Level 2

Level 2 defines 26 core process categories, which can be present in a supply chain. Using these processes, organisations can configure their ideal or actual operations.

SCOR Level 3

Level 3 provides the information required for a successful planning and setting of goals for supply-chain improvements. It also defines a company's ability to compete successfully in its chosen markets and consists of:

- Process element definitions
- Process element information inputs and outputs
- Process performance metrics
- Best practices where applicable
- System capabilities required to support best practices
- Systems/tools

SCOR Level 4

Level 4 focuses on putting specific supply-chain improvements into action. These improvements are not defined within an industry standard model as the implementation can be unique to each company since every company has its own needs, routines and rules.

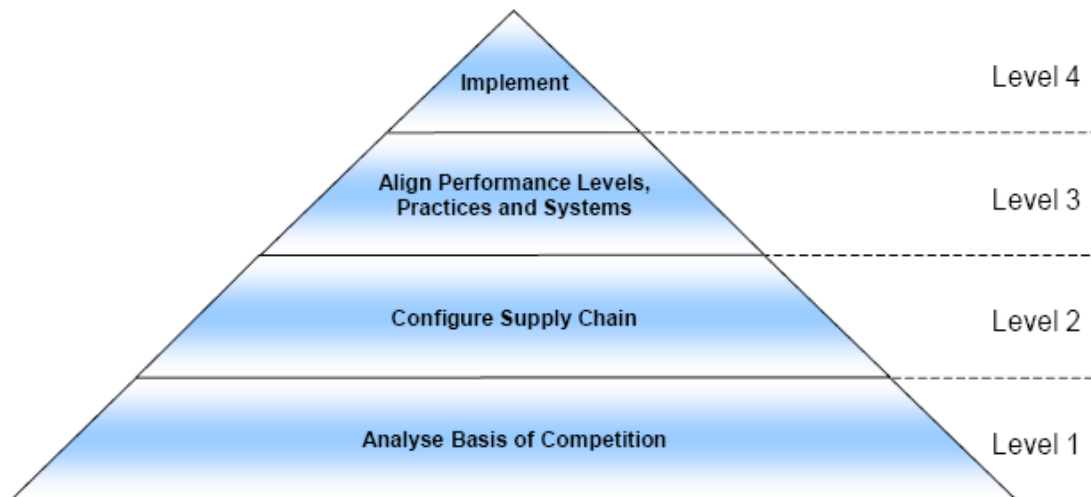


Figure 11: The 4 Level of SCORE

The SCOR model is used to measure and benchmark performance. As the adage goes, "if you can't measure it, you can't manage it." To analyse Supply Chains, measures must be made; the SCOR model takes this adage into account and includes performance attributes for each process in the model where appropriate. There are five performance metrics on which process analysis rely; these are:

- Supply Chain reliability,
- Supply Chain responsiveness,
- Supply Chain flexibility,
- Supply Chain costs and
- Supply Chain asset management.

Asset and cost attributes are mainly faced by internal actors whereas reliability, responsiveness and flexibility affect the customer's satisfaction.

Boundaries of the SCOR model

- The SCOR model includes the following factors:
- All interactions towards suppliers and customers,
- all physical material transactions (from the supplier's supplier via the own production itself up to the customer's customer),
- All market interactions (from the understanding of the market to fulfilling each order) and returns.

The approach excludes the functional units of processes, focusing on the consequences of activities rather than the person or organisational element carrying out the activity. It also makes no attempt to cover every company process or activity. Sales administration, technology development, product and process design and development procedures, and some after-sales technical support operations are all left out of the model.

Given that SCOR is used to benchmark supply networks, it is clear that data from other companies is used, hence it cannot be used only by a company to analyse its supply chain (s). However, because the data generated can be used to detect problems in a company's supply chain and thus be utilised to make changes to improve performance, SCOR will be employed as an evaluation method in this dissertation (as stated above).

Chapter 5: Methodology

The research philosophy is a method of thinking about the development of knowledge. The three most important categories appear to be positivism, realism, and interpretivism. Interpretivism appears to be the main philosophy for this project for a variety of reasons. General laws are inappropriate in this field of study since it is too complex and distinct. In addition, in order to produce a functional model, it must be adapted to specific requirements.

Research approaches

We've decided between two research methods: deductive and inductive procedures. Starting with a theory, derive a hypothesis, then test it with an empirical investigation is the deductive approach. The inductive technique is more versatile since it allows for the examination of more variables, factors, and their relationships. It is possible to develop ideas using this method. Furthermore, the inductive technique necessitates qualitative rather than quantitative data, allowing a much smaller sample of people to be used to construct a hypothesis.

Because the purpose of this work is to develop a model, it is necessary to have some current ideas that may be utilised to describe key factors. It is for this reason that international literature has been researched.

Finally, the research strategy for this study will be a hybrid inductive-deductive method, with a focus on the more flexible inductive part. The reason for this is that when developing a generic model for evaluating international supply chains, not only existing theories but also empirical studies on corporations are taken into account.

Research strategy

A research strategy is a broad approach for addressing the research topics. Different tactics can be used in general: Experiment, survey, case study, grounded theory, ethnography, or action research are all examples of research methods. A mixed strategy will be useful for this dissertation: First, a case study, which is "a research strategy that involves an empirical investigation of a particular contemporary phenomenon in its real-life context using multiple sources of evidence," and then a survey, which allows "the collection of a large amount of data... in a highly economical way" and gives researchers a high degree of independence during the data collection process.

Time horizons

Studies can be conducted on two different time horizons: longitudinal for long-term studies and cross-sectional for time-limited papers, commonly known as "snapshots." Because of the dissertation's short time frame, only a cross-sectional study was conducted, and no change in a specific time period was considered.

Data collection methods

The primary and secondary data collecting processes are the two basic methods for gathering information. Primary data is information that researchers have gathered, revised, analysed, and translated into meaningful information. Secondary data is information that has already been processed, converted, and transformed into a form that researchers can use. The authors of this dissertation decided that primary data would be more relevant for the purposes of this dissertation since bias from other researchers could alter how we perceive reality. Therefore, we have hoped that the measures, which have been obtained by us during the data collection process, would be reliable.

Secondary data

A distinction should be made between case studies and surveys. The process of gathering data from the companies in this dissertation is first done as case studies, because a case study, according to Robson's definition, is "a strategy for doing research, which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence." We've been looking into supply chain evaluation methodologies as a phenomenon.

We ran a survey after our case studies. A survey is connected with a logical method and researcher independence, which has allowed us to create our own questionnaires and receive answers to questions that were both fascinating and relevant to our research. The information gathered through the surveys was then examined and used in the construction of a supply chain evaluation model.

Survey

After assessing the interviews, there was still a paucity of information, necessitating the creation of a survey to gather further data, particularly on how large corporations evaluate their supply chains. We chose a representative sample of businesses from various industries in order to have a more comprehensive understanding of the situation.

Chapter 6: Data Collection and Analysis

We chose to look at 300 companies in order to collect data. It is a sampling as well as the population. When surveying the entire population is impractical, the decision to test a sample was taken because a subgroup should be evaluated rather than all probable cases.

After some deliberation, I opted to take the simplest route. We looked up the web URLs of the companies on the internet. Data was obtained using the questionnaire listed in the appendix. The purpose for choosing this method of contacting organisations was to avoid influencing the respondent, which meant that the questionnaire had to be completed by the respondent. We also wanted to incorporate the benefits of both the online and postal options, such as quick response times.

The total active response rate is calculated as:

$$\text{total response rate} = \frac{\text{total number of responses}}{\text{total number in sample} - (\text{ineligible} + \text{unreachable})}$$

In total for this project:

$$\frac{37}{300 - (106)} = 19,07 \%$$

This number is a rather normal response rate for this type of survey, so we assume that the data is useful for our analysis.

Some of our emails were likely mistakenly identified as spam messages and simply discarded as a result of this response rate, thanks to so-called spam filters. Of course, other organisations simply declined to respond, possibly due to the time of year, when many critical answers take up all of a company's time. When a responsible person for responding our queries could not be found within the organisation, those messages that got through to companies that essentially wished to answer might have been deleted in the information department. Researchers can't always avoid being screened by spam filters, and they can't always sway a company's decision to reply. We could have mentioned the appropriate department (logistics, control, etc.) to whom the email receiver may have sent the message.

Data Analysis

This section will give a short overview of the answers of the returned questionnaires.

Question	Answers
Type of product	11 simple, 21 complicated, 3 other
Internationality of supply chain	10x international, 2x Nigerian, 23x Nigerian and international
Evaluation (yes/no)	21 yes, 14 no
Method of evaluation	A big variety of answers made the analysis of this question rather inaccurate:

	SCOR was used in 2 companies, NPV: 5, DuPont: 2, CVP: 5, Payback: 4, ARR: 0, IRR: 3 Other: 16 (these included "manual calculations" etc.)
Differences in evaluation (national/international)	17x same, 6x different evaluation

Table 1: Analysis of the survey

As can be seen in the table above, the answers in how companies evaluate their supply chains vary too much, so no pattern was visible.

The figure below demonstrates details about the reliability of the answers to this question.

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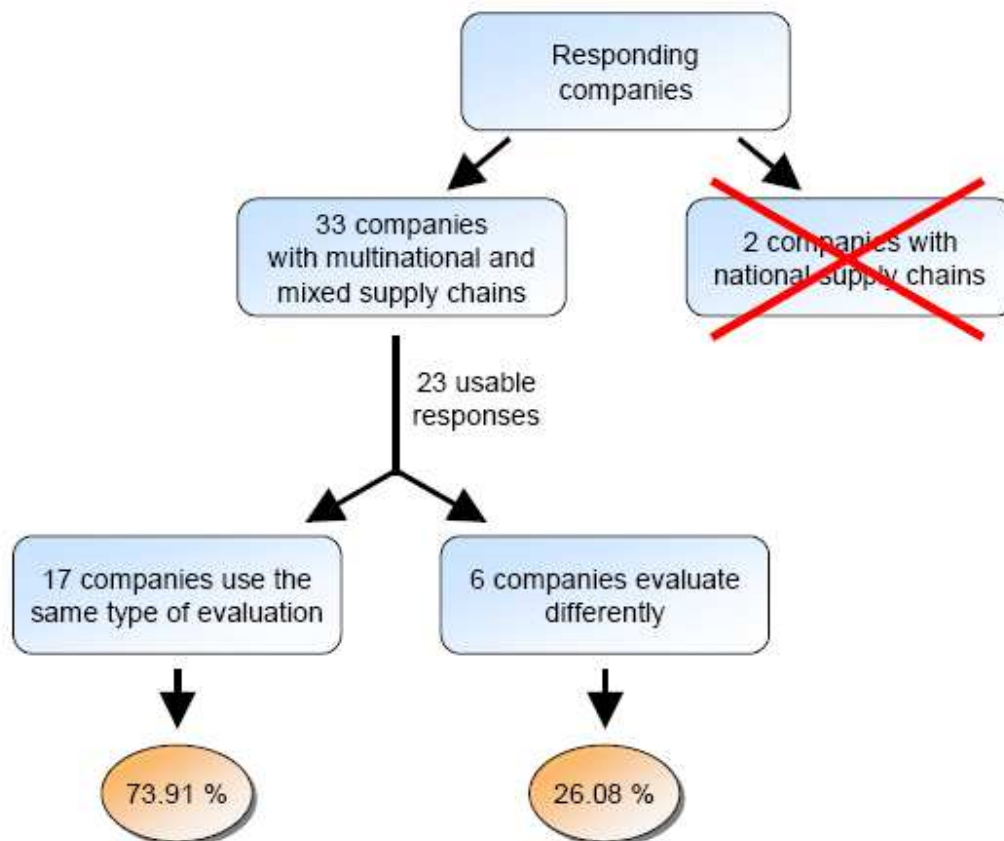


Figure 12: Differences in the evaluation of multinational and national supply chain

We think that we can develop one model to evaluate and compare multinational and national supply chains because nearly 74 percent of the usable replies from organisations with multinational and mixed supply chains utilise the same sort of evaluation for their supply chains.

Criticism of the survey

We must keep in mind, as with other self-administered questionnaires, that the researchers had no control over the responding partner. As a result, there is no guarantee that the correct person responded or that the person who submitted the response was also the one who responded. We assume, however, that the person who responded was the proper person with the right knowledge to address our queries.

Chapter 7: Finding

This project was created with the objective of measuring and comparing domestic and international supply chains. Two theoretical cases were used to test the model. The end result was positive: the model performed as expected. Furthermore, the model meets the conditions we mentioned at the outset of our investigation. As a result, the authors of this dissertation strongly suggest that this model be used to evaluate supply chains.

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Chapter 8: Conclusion

When comparing or deciding between alternative supply chains in order to make long-term investment decisions, this model could provide suggestions for process-based manufacturing organisations. Because it offers modification possibilities and corrective elements to take into account varied political and economic circumstances, the model is very suitable for analysing transnational supply chains. Such adjustment options could include the selection of the most important criteria, as well as qualitative and quantitative factors, with risk and the time value of money serving as corrective factors.

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Chapter 9: Recommendations

This project was written on a broad scale in order to include as many business areas as feasible. Our goal with this direction was to create a model that could be used by as many firms and industries as feasible.

First and foremost, such study may be conducted in a more focused manner. This would allow the researcher to delve further into the chosen company sector and get more precise expertise.

It would also be fascinating to do in-depth study into several company sectors and make direct comparisons between them. This may expand knowledge in the supply chain study field, but it is more difficult to propose a generic model the more complex the research is.

It might also be interesting to investigate interdependencies across assessment methodologies, such as if the size of a company or its industry affects supply chain evaluation.

APPENDICES

Appendix 'A'

Dear Friend,

As you know with Liberalization and Globalization our economy is appearing up to severe competition both internally and externally. In its wake completions assumes immerse importance.

As part of my PGDSCM, I have chosen the project objectives as "**Supply Chains Evaluation in BEIL Infrastructure Ltd**". For this, I am interested in getting your valuable responses to the questionnaire that follows.

All responses to the questionnaire are to be utilized only for this project and also in an aggregated form. It is not necessary for you to reveal your identity should you so desire. However it is of almost importance that your responses are frank, forthright and reflect your true opinion. Specifically, I seek your kind co-operation in adhering to the following points:

- 1: Please give your responses to all questions/statements and do not leave any of them blank.
- 2: Please tick mark (✓) your response in only one of the columns against each Question/statement.
3. There are not right or wrong responses to the question/statements that follow in the questionnaire. What is important is your own personal frank and forthright opinion on various aspects

Yours Sincerely

Name

Questionnaire

Hi,

The paper is about comparing the companies' mode of evaluating supply chains. We would be grateful if you could answer a few short questions.

Your answers will of course be treated anonymously if you wish.
Thank you in advance!

Please tick where possible, if necessary motivate your answer:

1) Do you produce simple (low-end) or complicated (high-end) products?

Simple *Complicated* *Other?*_____

2) Are your supply chains *international* or *only national*?

international

only within country

both

3a) Do you have any type of evaluation of your supply chains?

Yes No

3b) If yes, which?

SCOR model (Supply Chain Operations Reference model),

NPV analysis (Net Present Value),

DuPont model,

CVP analysis (Cost-Volume-Profit),

Payback period,

ARR ratio (Average Rate of Return),

IRR ratio (Internal Rate of Return),

Other, please specify: _____

3) Why do use that kind of evaluation?

5a) If you have *national and international supply chains*, do you evaluate them the *same way or differently*?

Same Differently

5b) If you use different methods, which are these?

6) Name and position in your company?

Name : _____

Position: _____

Want to stay anonymous

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BIBLIOGRAPHY

Aronsson, H. (2000). Three Perspectives on Supply Chain Design, Linköping: Linköping Institute of Technology.

Bell, A.L. (1969). Breakeven charts versus managerial graphs. "Management Accounting", N.P, n.p. (USA).

Chadwick, L. (1991). The Essence of Management Accounting. London: Prentice Hall.

Christopher, M. (1998). Logistics and Supply Chain Management: Strategies for Reducing Cost and Improving Service. N.P, Great Britain: Prentice Hall.

Chartered Institute of Management Accountants (1989). Management Accounting – Official Terminology of the CIMA. London: CIMA.

Coulthurst, N. J. (1985, Feb.). Capital Investment appraisal techniques – DCF v. traditional methods. The Accountant's Magazine (Scotland).

Coulthurst, N. J. (1985, May). Capital Investment appraisal techniques – IRR v. NPV. The Accountant's Magazine (Scotland).

Dearden, J. (1988). Management Accounting: Text and Cases. New Jersey: Prentice Hall.

DeCoster, D. T., Ramanathan, K. U. and Sundem, G. L. Accounting for managerial decision-making. N.P, England: John Willey and Sons, Ltd.

Drury, C. (1988). Management and Cost Accounting. London: Chapman and Hall.

Emmanuel, C., Otley, D., Merchant, K. (1993). Accounting for Management Control. London: Chapman & Hall.

Friberg, G. & Nordstrand, K. (2003), Interview at Nolato Alpha AB, Kristianstad.

Gerdin J. (1995). ABC-Kalkylering. Lund: Studentlitteratur.

Hill, Ch. W. L. (2003). International Business: Competing in the Global Marketplace. N.P, Irwin McGraw-Hill.

Horngren, Ch. T., Datar, S.M., Foster, G. (2003). Cost Accounting: A Managerial Emphasis. New Jersey: Pearson Education, Inc.

Lindmark, A. & Klein, J. (2003), Interview at Tetra Pak Packaging Material AB, Lund.

Lindroth, R. (2001). Reflections on Process-based Supply Chain Modelling and Analysis, Lund: Lund University.

Robson, C. (2002). Real World Research (2nd edn), Oxford: Blackwell.

Ross, S. A., Westerfield, R. W., Jordan, B. D. (1998). Fundamentals of Corporate Finance. Boston – New York: Irwin, McGraw – Hill.

Saunders, M., Lewis, Ph., Thornhill, A. (2003). Research Methods for Business Students. 3rd edition. Harlow: Prentice Hall.

Scapens, R. W. (1985). Management Accounting: a review of contemporary developments. N.P. Macmillan.

Supply Chain Council (2003). SCOR 6.0 Overview Booklet. N.P. Supply Chain Council.

Tucker, F. G., Zivan, S. M., Camp, R. C. (2001). How to measure yourself against the best. N.P, n.p.

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