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DEVELOPING KEY SUPPLIER RELATIONSHIP

Degree Programme in Business Management and Entrepreneurship

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AVAINTOIMITTAJIEN YHTEISTYÖN KEHITTÄMINEN

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Lopputyön tarkoituksena oli analysoida ja kehittää yhteistyösuhdetta avaintoimittajien kanssa. Kohdeyritys Carrus Delta Oy on pohjoismaiden johtava linja-autojen korivalmistaja. Tuotanto- ja toimistotilat sijaitsevat Liedossa lähellä Turun Kaupunkia. Carrus Delta Oy toimii tiiviissä yhteistyössä Volvo Bus Corporationin kanssa yhteisten globaalien toimittajien ja kaupallisten ehtojen myötä. Carrus Delta Oy valmistaa Volvo 9700 mallia kolmella eri korikorkeudella: 9700 S, 9700 H ja 9700 HD.

Lopputyön teoreettinen osuus koostuu kohdeyrityksen taustiedoista, avainmääritelmistä, ostotoiminnan aktiviteeteista sekä tärkeimmistä suorituskykyalueista, toimittaja-analyysista ja -yhteistyöstä. Toimittajayhteistyön johtaminen ja toimittajastrategiat ovat tämän työn tärkeimpiä osa-alueita. Tämän jälkeen teoriaosassa käsitellään laadullisen tapaustutkimuksen tutkimusmetodia ja sen prosessia. Lopuksi teoriaosassa käsitellään avaintoimittajille suoritettua kyselytutkimusta ja sen tulosten analysointia. Työn teoreettisessa viitekehyksessä käsitellään ensimmäiseksi toimittajien analysointia ja osiin jakamista, toiseksi käsitellään toimittajan suorituskyvyn johtamista ja kolmanneksi toimittajayhteistyön johtamista.

Empiirisen osan ensimmäisessä vaiheessa määriteltiin kriteerit avaintoimittajille teoriaan perustuen. Toimittajat valittiin tutkimukseen valintakriteereiden perusteella ja arvioiden materiaalin kriittisyyttä tuotantoon. Valintakriteereitä olivat vuosittainen materiaalivolyymi, maantieteellinen etäisyys, materiaalin kriittisyys ja läpimenoaika. Nämä toimittajatiedot kerättiin LEAN-toiminnanohjausjärjestelmästä.

Kysely avaintoimittajille lähetettiin 30 valitulle toimittajalle helmikuussa 2018. Toimittajakyselyn saatekirje liitteessä 1 kuvaa kyselyn osa-alueet ja vastausohjeet. Avaintoimittajakyselyn kysymykset liitteessä 2 kattaa ostotoiminnan suorituskyvyn osa-alueet. Kysely sisälsi 14 strukturoitua kysymystä ja kolme vapaasti vastattavaa kysymystä. Kyselyssä oli lineaarinen asteikko 1-5 ja monivalintakysymyksiä. Kyselyyn saatiin 19 vastausta, joka edustaa 63 % kokonaisvastausmäärästä. Kyselyn vastaukset jakautuivat 7 (36,8%) vastausta kotimaisilta toimittajilta ja 12 (63,2%) vastausta ulkomaisilta toimittajilta.

Kyselyn tulosten analysoinnin pääpainona oli vastausten yhteneväisyys. Kehitysehdotusten käytäntöön soveltaminen perustuu teoriaan ja työn tuloksiin. Kirjoittaja näkee toimittajayhteistyön kehittämisen kriittisiksi osa-alueiksi neljännesvuosittaiset toimittajan suorituskykyraportit, materiaalien kategoriat ja keskittymisen potentiaalisiin toimittajiin, uusi KPI toimitusten ilmoittaminen, tehokas toimittajastrategioiden käyttö ja aktiivinen toimittajayhteistyö sisältäen täsmällisen tiedon jakamisen.

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The purpose of the thesis was to analyze and develop relationship with key suppliers. Case company Carrus Delta is a leading coach manufacturer in Scandinavian. Production and office facilities locates in Lieto, close at a city of Turku. Carrus Delta has a tight collaboration with Volvo Bus Corporation with same global suppliers and commercial terms. Carrus Delta manufacturer Volvo 9700 model in three different body heights: 9700 S, 9700 H ja 9700 HD.

Theoretical part of the study consists of background information about case company, key definitions, purchasing activities and key performance areas, supplier analysis and relationships. Supplier relationship management and supplier strategies are key areas of the study. After that the theory covers the study methodology for the qualitative case study and its process. Final part of the theory describes the conducted key supplier survey and result analysis. Theoretical framework of the study is covering firstly the supplier analysis and segmentation, secondly the supplier performance management and thirdly the supplier relationship management.

First stage of the empirical part was to identify the criteria for the key suppliers based on the theory. Suppliers were chosen for the study by the selection criteria and by the evaluation of the material criticality for the production. Selection criteria were annual material volume, geographical distance, strategic materials and lead times. This supplier information was gathered from ERP-system LEAN.

Survey for the key suppliers was sent to 30 selected suppliers in February 2018. Cover letter of the supplier survey in appendix 1 describes the survey areas and answering instructions. Questions of the key supplier survey in appendix 2 are covering the key performance areas of the purchasing function. Survey included 14 structured questions and three open end questions. There was linear scale from 1 to 5 and multiple-choice questions. Survey answers were received 19 which represent 63 % of the total responses. Survey answers were divided between 7 (36,8%) answers from domestic suppliers and 12 (63,2%) answers from foreign suppliers.

Survey results was analyzed with the focus of similarities among the responses. Implementation of the development proposals is based on theory and for study results. Author see that critical aspects for the supplier relationship development are quarterly supplier performance reports, material categorizing and focusing to potential suppliers, new KPI Advanced Shipment Notification, effective use of supplier strategies and active supplier cooperation with accurate information sharing.

CONTENTS

LIST OF ABBREVIATIONS

ASN	Advanced Shipment Notification
CA	Customer Adaptation
EDI	Electronic Data Interchange
ERP	Enterprise Resource System
IT	Information Technology
KPI	Key Performance Indicator(s)
KSM	Key Supplier Management
NPD	New Product Development
MRO	Maintenance Repair Operations
PO	Purchase Order
RFQ	Request for Quotation
SCM	Supply Chain Management
SCRM	Supply Chain Risk Management
SEM	Supplier Evaluation Model
SMI	Supply Market Intelligence
SPM	Supplier Performance Management
SRM	Supplier Relationship Management

1 INTRODUCTION

1.1 Background and purpose of the study

The purpose of the study is to analyze and develop relationship with existing key suppliers. Target company Carrus Delta is a leading coach manufacturer in Scandinavian. Collaboration with Volvo Bus Corporation will lead functions especially with common global suppliers. This study will develop knowledge about key supplier's performance and development needs. My career will benefit from the study due of deeper understanding of supplier relationships and its areas. Supplier relationship management and performance are key areas.

First phase will be identifying the key supplier criteria from theory base and then select the key suppliers for the study. This study focuses only to key suppliers and their development areas. Then there is conducted supplier survey for the selected suppliers. Survey questions are based on the 11 key purchasing performance areas in Carrus Delta and in theory chapters three and four. Survey areas are shipments, quality, informing and forecasting, pricing, ordering and cooperation. These areas have a critical role for the functionality of the cooperation.

Results will be analyzed against the theory part with the focus of finding the development areas and are the consistent results among the suppliers. Theory will provide ground information for the research part, especially supplier strategies, risk- and relationship management. Further development proposals should be able to implement to daily operations if necessary.

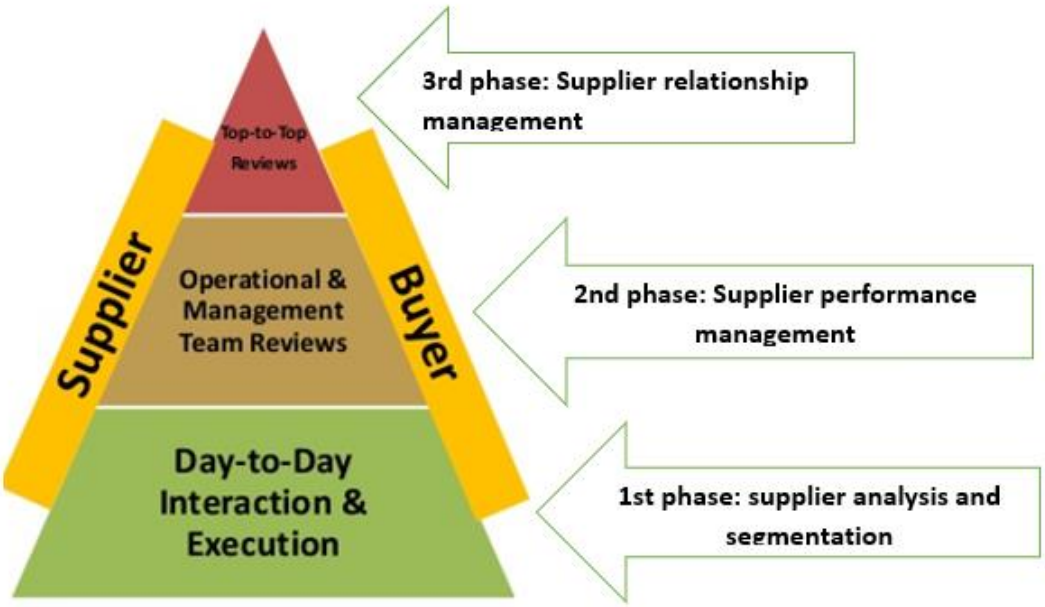


Figure 1. Theoretical Framework. (Rogers, S. 2009, 88; Institute of Supply Management ISM)

1.2 Theoretical framework

Theoretical framework of the study is based on the analyzing and developing relationship between the key suppliers and the purchaser. According to Rogers (2009, 88) supplier relationship is created in following phases **supplier analysis and segmentation, supplier performance management** (SPM) and **supplier relationship management** (SRM). Van Weele (2014, 66) states that the first phase of supplier management is reactive and opportunity driven, second phase is proactive with supplier performance development and third phase is supplier relationship management. Structure of the theoretical framework and theory are based on supplier management phases.

First phase **supplier analysis and segmentation** will define the criteria for key suppliers in chapter 4. Purchasing objectives are related to purchasing daily operations e.g. coordinating purchase orders. Main criteria from the Carrus Delta`s point of view are purchased volume, material criticality for the production, geographical distance and lead times. This supplier information is gathered from the LEAN-system.

Second phase **supplier performance management** will be based on the 11 key purchasing performance areas in Carrus Delta and for theory part in chapter 3 and 6. These phase operational and management objectives are focusing e.g. monitoring supplier performance and tracking agreed results. Questions of the supplier survey based on the key performance areas.

Third and final phase **supplier relationship management** (SRM) is consisting of strategic aspects e.g. conducting high level supplier performance reviews. Theory part in chapter 6 will handle the different kinds of supplier management strategies and covers the SRM. Results from the key supplier survey are analyzed against the theory and key performance areas. Focus is in developing relationships and the performance excellence.

Main research questions for this study are:

- Who are key suppliers for the case company?
- What criteria there are for key suppliers?
- How to analyze, develop and manage relationship with key suppliers?
- What are key performance areas with suppliers?
- How the supplier analysis is connected to purchasing function?

1.3 Case company Carrus Delta Oy

Carrus Delta – Building bus bodies since 1935

Case company is a coach body manufacturer Carrus Delta Ltd which is a leading in Scandinavia. Carrus Delta is a license manufacturer of the Volvo Bus Corporation (VBC). Production plant is located in Lieto Finland, near of the city of Turku and the main export countries in Scandinavian are Sweden, Norway and Denmark. There are approximately one hundred and ninety (190) employees, thirty white collars and one hundred sixty blue collars.

Carrus Delta manufacturer Volvo 9700 model in three different body heights: 9700 S, 9700 H ja 9700 HD. The bus can have two or three axles and the length can vary between 10,4 and 15 meters. Carrus Delta has also produced specially equipped buses for example ambulance buses. These kind of ambulance buses are targeted to unhurried medical need. Yearly production capacity is round 130 buses and the lead time of complete bus is six weeks. Key business functions are as follows:

- High quality bus bodies
- Customer orientation
- Stainless steel concept
- Long product life cycle
- High passenger comfort
- Safety
- Environment

(Carrus Delta website, 2018)

1.3.1 History background

1935 Autokori Oy – Turku is established

1973 Autokori Oy moves its operations to Lieto. Its subsidiary Oy Delta Plan Ab is founded.

1981 Ajokki Oy purchases Delta Plan Oy, Erikoiskori Oy and Kiitokori Oy. Together these companies form Ajokki Group

1986 Wiima Oy owner Ilmari Mustonen purchases Ajokki Group

1989 Ajokki Group changes its name to Carrus Oy

1998 Volvo Bus Corporation purchases Carrus Oy

2004 Carrus Oy changes its name to Volvo Bus Finland Oy

2008- A group of Finnish bus body building professionals, who have over 100 years of combined experience within bus body building industry, acquires the business of Volvo Bus Finland Oy Lieto Factory. The company is named Carrus Delta Oy

1.3.2 Organizational structure and strategy

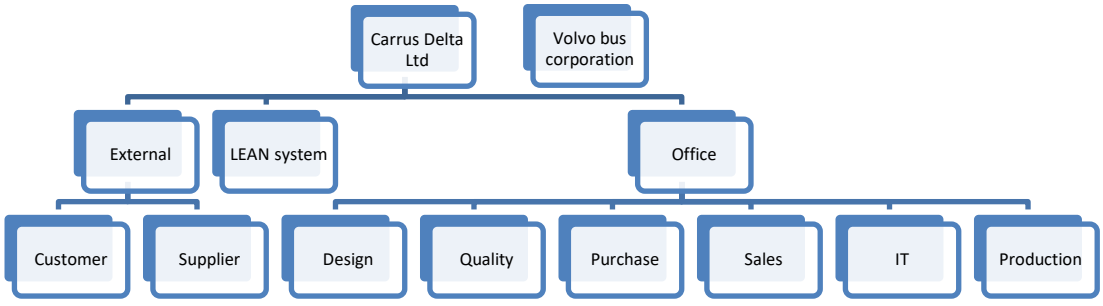


Figure 2. Organizational structure.

Carrus Delta`s mission is to understand customer and operational environment requirements and needs and fulfill those. Vision is to remain the position of the leading bus coach manufacturer in Nordic countries and also increase the sales outside of Scandinavian. Developing activities for highly specialized coaches is necessary in highly competitive business area.

Company strategy consists of always fulfill customer needs, comparing action for similar business function and improve constantly own functionality for answering competition in market, as well as, considering stakeholders requirements. Ownership of Carrus Delta is divided between of five Finnish long-term bus specialists.

Business environment and processes are gathered around customer needs and the main principle to maintain high level of product quality. Co-operation with Volvo Bus Corporation also leads the functioning towards high quality level and standards of Volvo thorough of common global suppliers and terms. There is close collaboration between functions and production phases are monitored tightly. Organizational structure is divided between external and internal operations. Business environment and processes are gathered around customer needs and special solutions.

2 KEY DEFINITIONS

2.1 Supplier management

Supplier management is a definition for a strategic supplier development and management. Strategic procurement includes the actions for supplier management. Supply market intelligence SMI refers to knowledge regarding available supplier market and the logic of supplier market behavior. Finding the new supplier sources is also a part of the supply market intelligence. Supplier management has a strategic point of view for decreasing the supplier quantity, partnerships, developing functions and innovations. (Iloranta, K.& Pajunen-Muhonen, H, 2012, 50).

2.2 Purchasing management

Purchasing management includes all the needed elements for the supplier relationship and its activities. Relationship activities should be according to company`s business strategy and interest. Focus of the strategy is in constant evaluating and developing purchasing activities with the supplier. Wider aspect of purchasing management is called supplier resource management. This includes cross functional actions and both sided acceptance of the key management areas. (Weele 2014, 10).

2.3 Supply chain management

Supply chain is process in which the products and services will be delivered to end-customers. (Tikka 2016, 22.) Wider term supply chain management (SCM) covers all the activities in the supply chain. It is managing of the information and economical resources. Demand chain management is a related term and a target is in customer satisfaction. Value chain is a term concerning the creation of added value in different level functions. Created value can be measured from the functions and from costs effectiveness. (Iloranta, K.& Pajunen-Muhonen, H, 2012, 51). According to Tikka (2016, 23) supply chain philosophy includes following critical principles:

- End customers will receive added value to their products or services
- Managing logistic processes in effective way
- Sharing actively information, costs and benefits
- Long term partnerships with all the parties in the chain

2.3.1 Overview of the supply chain in Carrus Delta

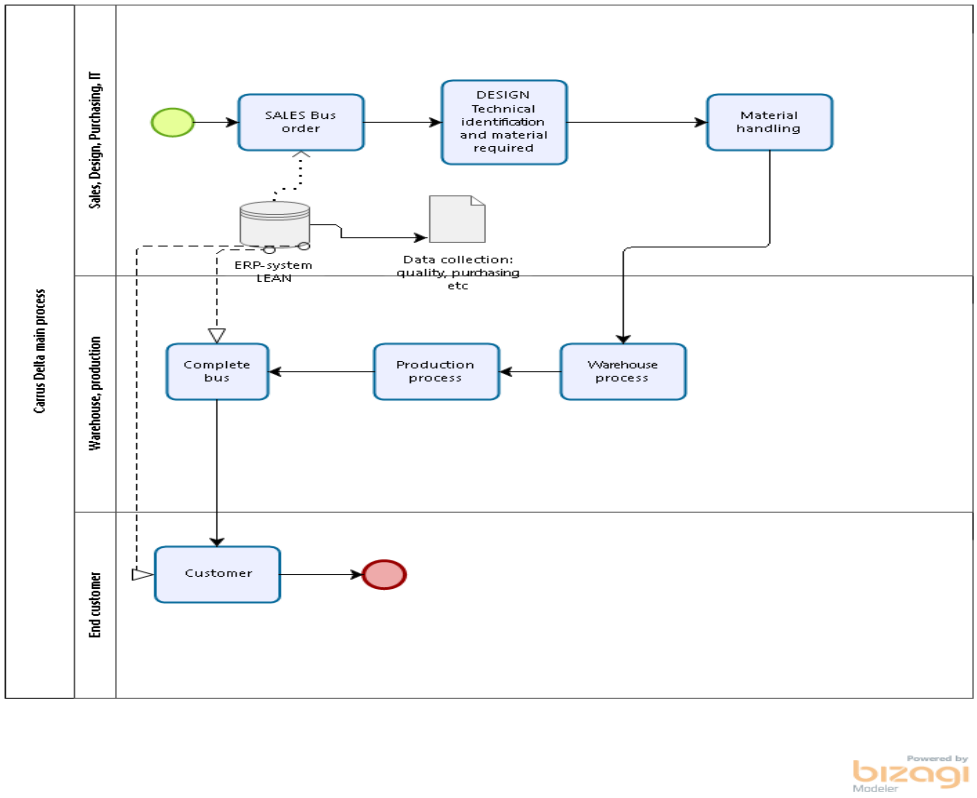


Figure 3. Overview of the supply chain in Carrus Delta

Key process of the Carrus Delta is to produce a complete bus in a certain time scale with the best quality and fulfilling the customer needs. Production lead time is round six weeks. Customer is the end user of the finished product and a supplier is a material and information provider to Carrus Delta. Main business functions are design, quality, purchase, sales, production and IT (Information Technology).

First the customer orders a bus or several buses and the sales confirm the order for the customer. After that the bus technical identification and material need calculation are created to system in design function. Required material will be purchased according to structure demand from several suppliers globally and locally. There are approximately 300 active suppliers in enterprise resource system (ERP). Carrus Delta is using the LEAN enterprise resource system. There are quite a lot of critical production materials e.g. glasses, aluminium plates, seats and chassis materials. These critical materials are followed carefully at weekly basis for receiving the materials in needed time.

3 PURCHASING

3.1 Different purchasing dimensions

Terms purchasing and buying have different kinds of aspects. Purchasing is more strategic approach including the need identifying, supplier selection and evaluation and forecasting. Buying or ordering are more operational terms with the purpose of placing orders to suppliers without the evaluation of prices, request for quotations, contracts and negotiations. Most limited term is call off which indicates electronic or oral announcement for receiving the agreed material from the supplier. Widest term is called procurement. This term is related to purchasing, but there is included overall responsibility of the purchasing functions. (Iloranta et. al., 2012, 49). Procurement has a critical role for receiving the competitive advantage for the company by integrating the purchasers and supplier's processes closer. (Christoffer 2008, 14.)

3.2 Purchasing role in the past and nowadays

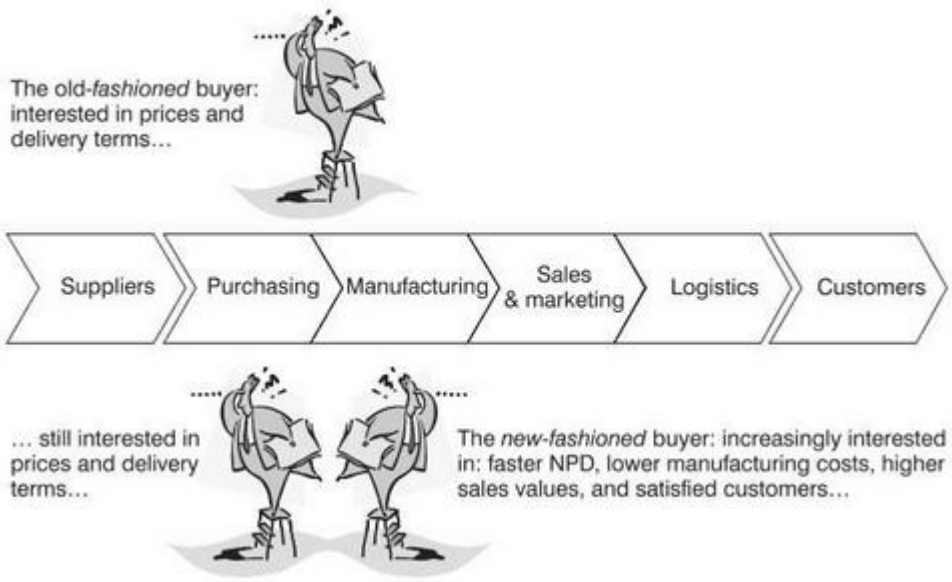


Figure 4. Differences between buyer`s activities in the past and nowadays. (Cheverton 2008, 143.)

According to Cheverton (2008, 135-136) purchasers has former been evaluated their competitiveness with the received discounts and number of the placed purchase orders. Suppliers high quantity has seen as a great value and the logistic chain from the supplier to purchasing unit were not appreciated. Nowadays the target is to decrease the number of suppliers and transactions related to purchasing. Decreasing the total costs, by optimizing the supply chain, is more valuable than the review of the material price level.

Nowadays the fast IT-connections will execute the operational purchasing. Purchasers will have the knowledge about the supplier's performance. Information of the product, manufacturing and business processes are available from the effective enterprise resource systems (ERP). Reporting and data analyzing are integrated parts of the purchasing. Nowadays the purchasing has seen as a value creating function with high level understanding of the key processes and needed competence.

There are following reasons for developing purchaser's performance (Cheverton 2008, 138):

- Effective purchasing will create value and increase the profit by the overall understanding of the cost structure in the supply chain.
- New product development will be faster with the effective purchasing.
- Supplier performance can be measured and analyzed by the information from the ERP-system.

3.3 Procurement

Procurement process starts from the need identification and then supply marker search is conducted. Best in class suppliers are selected and orders are placed for the securing of supplies. Procurement is being formed from three different levels. Operational procurement is based on daily activities such as ordering, delivery control and invoice handling. Processes has been highly automated through the ERP-system. Suppliers are well known and there is no need for contract negotiations. Strategic sourcing is based on contracting with the selected suppliers and the supplier performance is evaluated and rated. Focus is to create and maintain longer term relationships. Tactical procurement is based on contract management. Agreed contracts are focusing of the process and need understanding. (Harrison, A.& van Hoek 2011, 301-302).

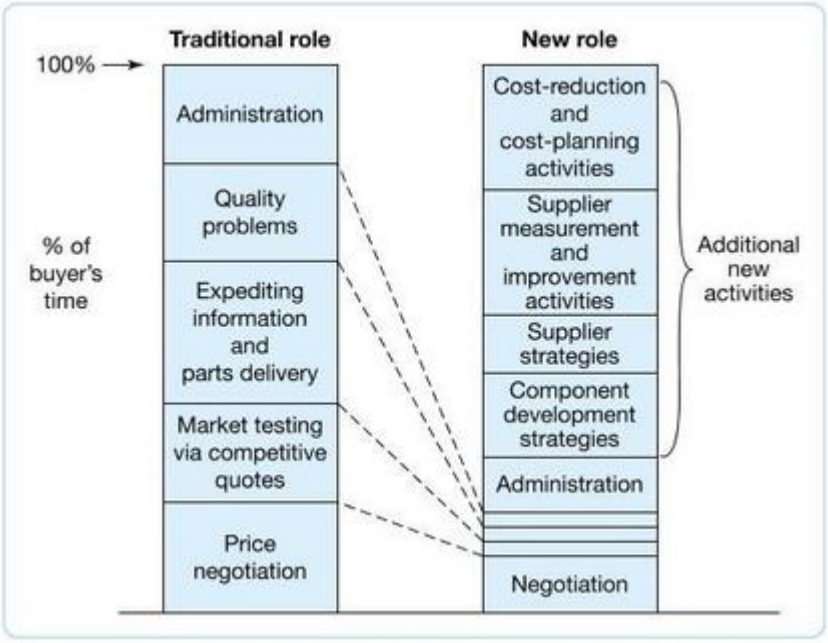


Figure 5. Purchasing new roles. (Farmer 1997, 5)

3.3.1 Key purchasing activities in Carrus Delta

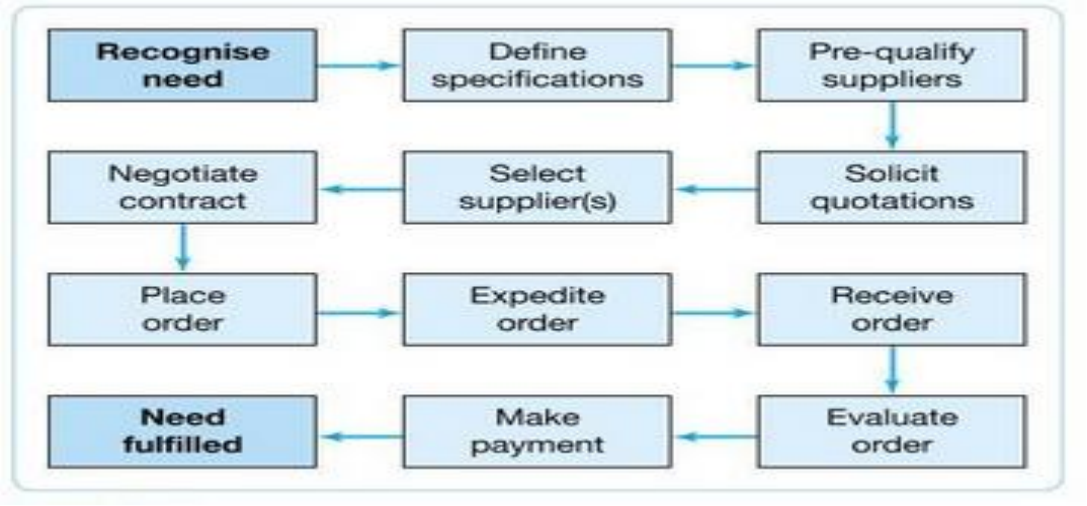


Figure 6. Common purchasing process. (Grant, D. 2012, 40.)

Purchasing process starts from the material need evaluation and contract review. Need evaluation will not be needed if there is a created structure for the material and demand for the production material in the system. In this case there are needed material steering information for the purchasing. Carrus Delta is using the Lean enterprise resource system. Contracted materials will be purchased via email purchase orders from the suppliers. For the new materials, a supplier evaluation and selection will be needed. Carrus Delta is requiring from a new significant supplier ISO9001&14001 quality standard.

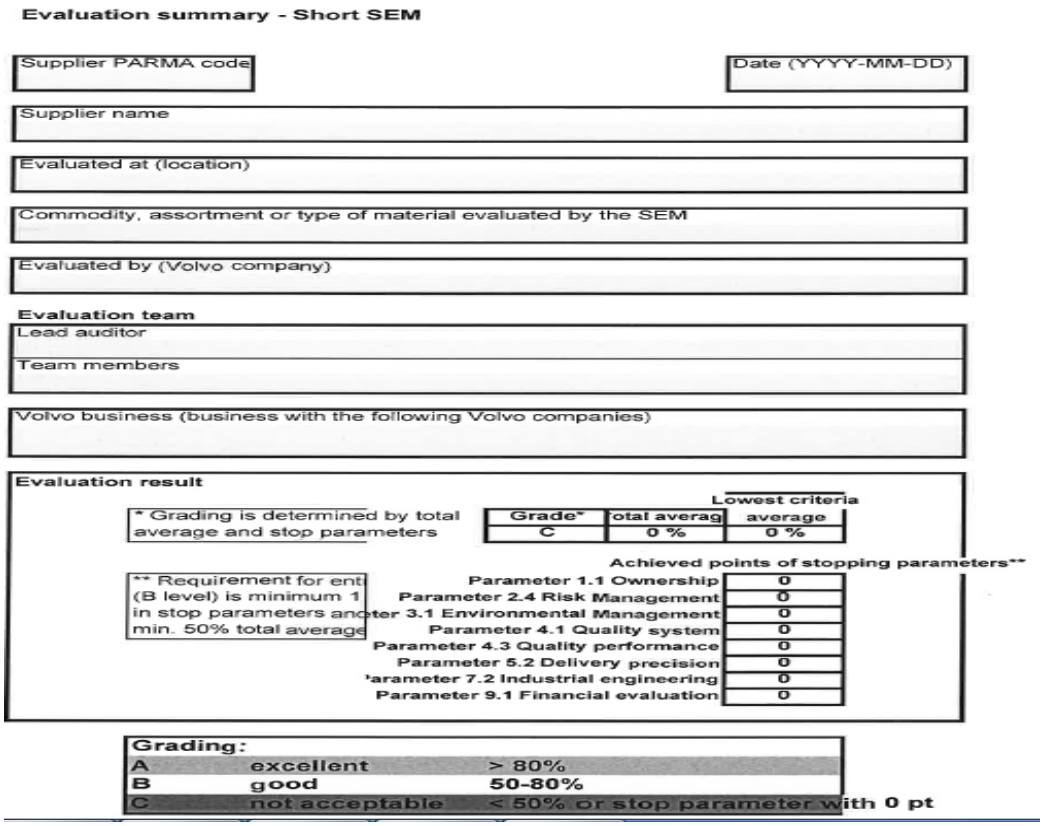
Purchasers are in charge of their assigned suppliers and material manager will approve new suppliers. New supplier information, based on the filled supplier form, are collected to Lean system. The designers define new materials based on the customer requirements and adaptations. Request for quotations (RFQ) will be send for chosen suppliers and received quotations will be agreed or rejected. Agreed quotation will affect to sending a purchase order (PO) to supplier and rejected quotation will start again the supplier selection process.

3.3.2 Material and supplier handling

Purchased materials are guided by the structure demand, buffer stock, and delivery time. Different kinds of materials e.g. raw materials and components are purchased with the focus of criticality for production and for stock value. These are strategic and bottle neck materials. Volume materials e.g. electric equipment are purchased by the manual impulse from the warehouse and the unit volumes are higher. These are called as leverage or routine materials. Closer review and definitions for the material divisions are in chapter 3. Strategic materials are closely monitored at weekly basis due of enabling to placing the orders in agreed delivery times and for ensuring the delivery at right time. Customer adapted (CA) materials are designed and purchased for some special customer need.

Purchase order template includes all the needed information for the correct shipment e.g. delivery type, part number(s), quantity, delivery date(s) and order confirmation request. Transport provider has been chosen from the tendering process and it is based on the proven history of the functionality. Normally deliveries are arranged by an economy mode as a road transportation. Urgent shipments are arranged by express mode.

Table 1. Supplier Evaluation Model – Short SEM. (Carrus Delta`s internal document).



Evaluation summary - Short SEM

Supplier PARMA code	Date (YYYY-MM-DD)
Supplier name	
Evaluated at (location)	
Commodity, assortment or type of material evaluated by the SEM	
Evaluated by (Volvo company)	

Evaluation team

Lead auditor
Team members
Volvo business (business with the following Volvo companies)

Evaluation result

* Grading is determined by total average and stop parameters

Grade*	total averag	Lowest criteria average
C	0 %	0 %

** Requirement for ent (B level) is minimum 1 in stop parameters an min. 50% total average

Achieved points of stopping parameters**	
Parameter 1.1 Ownership	0
Parameter 2.4 Risk Management	0
ter 3.1 Environmental Management	0
Parameter 4.1 Quality system	0
Parameter 4.3 Quality performance	0
Parameter 5.2 Delivery precision	0
arameter 7.2 Industrial engineering	0
Parameter 9.1 Financial evaluation	0

Grading:		
A	excellent	> 80%
B	good	50-80%
C	not acceptable	< 50% or stop parameter with 0 pt

As Carrus Delta is a license manufacturer with the Volvo Bus Corporation there will be in use common global suppliers with same commercial condition and terms. Volvo has evaluated and audit these common global suppliers and Carrus Delta will place purchase orders by the agreed prices, quality and lead times. Supplier evaluation will be based on the supplier evaluation model tool (SEM) as in table 1. Evaluation parameters are ownership, risk- and environmental management, quality, delivery, engineering and financial condition. Neglecting the condition will start the supplier`s reassessment. Great deal of the chosen local suppliers are based and contracted by the material suitability, prices and high quality. Detected quality issues are placed to LEAN-system and further handled with the supplier.

Volvo Bus Corporation has pointed key policies for the business environment that suppliers must fulfill. These regards further to Carrus Delta in the aspect of license manufacturer:

- Quality has an important role of measuring performance at customer experience point of view. Customer satisfaction, high quality products and services are included in quality policy.
- Safety policy ensures that the manufactured end products are according to safety regulations and demands.
- Environmental policy defines the criteria e.g. for considering complete life cycle of the products, polluting continual prevention and committing suppliers to these policies. This includes further to responsible sourcing procedures.
- Health and safety policy regards the creation of safe and healthy working environment. This includes implementing health and safety guidelines as well informing and monitoring risk possibilities.

Appendix 3. includes further information regarding environment policy and environment requirements for the suppliers of the Volvo Group. Guideline for the supplier`s self-assessment is ISO14001 quality standards. (Website of Volvo Group, 2018).

3.4 Purchasing performance

Purchasing performance can be defined as *"Related resources which are required to realize the previously established goals and objectives, especially it refers to the relationship between planned and actual costs."*. There is difference between the purchasing operational and the strategic aspects. Operational aspect relates to established relationships with best in class suppliers for achieving constant performance development in the supply chain. Strategic purchasing point of view regards to extensive contracts and high-level functionality of purchasing and business processes. (van Weele 2014, 290).

Table 2. Common purchasing performance indicators. (van Weele 2014, 293.)

Area	*Measurement aimed at*	*Continuous/ incidental*	*Examples*
Purchased materials prices and costs	Purchased materials cost control	C	Materials budgets, variance reports, price inflation, reports, purchasing turnover
	Purchased materials cost reduction	C	Purchasing cost saving and avoidances, impact on return and investment
Product/quality of purchased materials	Early purchasing involvement in design and development	I	Time spent by purchasing on design and engineering projects, initial sampling reject rate (%)
	Incoming inspection quality control and assurance	C	Reject rate (%), line reject rate (%), quality costs per supplier
Purchasing logistics and supply	Monitoring requisitioning	I/C	Purchasing administrative lead-times, order backlog (per buyer)
	Delivery reliability (quality and quantity)		Rush orders, delivery reliability index per supplier, materials shortages, inventory turnover ratio, JIT deliveries
Purchasing staff and organization	Training and motivation of purchasing staff	I	Time and workload analysis of purchasing department, purchasing budget, purchasing and supply audit
	Purchasing management quality		
	Purchasing systems and procedures		
	Purchasing research		

Purchasing effectiveness is related to used ERP-systems, objectives and guidelines, way of purchasing arrangements and the professionality of the purchasing staff. Van Weele (2014, 291-292) has presented four key performance areas in purchasing:

1) Dimension related to *material cost and pricing.* Controlling the purchased materials cost level is handled by measuring purchasing budget and cost change affect. Constant controlling of the purchasing prices is a base for the cost reduction activities such as searching new supplier or complementary material.

2) Dimension related to *materials and quality*. Purchasing function should be involved to new product development for the correct evaluation of the material cost and new supplier availability. Measures of the new product development are related to working hours of the designers and purchasers involved, number of technical changes and rejection rate of the samples. Measuring the quality aspect is formed from specification and number of rejections, new suppliers and quality agreements.

3) Dimension related to *logistics.* This includes the measurements of the current key activities such as lead-time, quantity of purchase orders and introducing new activities e.g. electronic data interchange possibilities. Also controlling the supplier`s delivery precision and correct batch sizes are included in this area. Supplier evaluation will be used for developing supplier performance.

4) Dimension related to *organization.* Employees in purchasing function are educated and their competence is in correct level. Purchasing management will perform according to purchasing strategy and the guidelines are up to date for maximizing the effectiveness. Information systems will support the operational purchasing activities.

3.4.1 Key purchasing performance indicators in Carrus Delta

There are 11 key performance indicators (KPIs) in purchasing function. These KPIs are monitored by yearly, quarterly or monthly basis with the assigned targets. Yearly monitored KPI is the stock accuracy based on the inventory result. Quarterly monitored KPIs are payment terms, number of active suppliers in system and supplier's delivery precisions. Highly important and monthly monitored KPIs are material cost changes, stock value, number of supplier`s quality issues and the received audit scores for the purchasing. Other KPIs are number of missing production materials, freight charges and new designed materials and their part numbers.

Carrus Delta is effectively using the KPIs for highlighting the problem areas and for guiding the operations to right directions. KPIs in use are suitable for ensuring the purchasing functionality and the provided information is necessary for developing actions effectively.

4 KEY SUPPLIER CRITERIA AND ANALYSIS

4.1 Key supplier selection

According to Cheverton (2008, 160-163) term pre-key supplier management (pre-KSM) refers to handling a total supply chain. Regarding the key supplier perspective, it is a positioning of key suppliers and handling those in accurate way. Analyzing the status of the key supplier purchaser should evaluate following questions:

- Decide the relationship type
- Result expectations and activations type
- Clear development areas
- Contracts and risks management

Evaluation of risks and development areas are subjective for the company. Understanding the supplier`s willingness for developing is a key issue. Collected numeric supplier information from ERP-system is a starting point for closer supplier evaluation. (Cheverton 2008, 163).

Traditional purchasing is often focusing 80 percent to suppliers who have a quite low significance and 20 percent to suppliers who have a greater value for the purchasing. Following factors are critical when analyzing the key suppliers and the dependable of them at a first stage (Cheverton 2008, 166-167; Van Weele, 2014, 163):

- Suppliers quantity
- Material availability
- Distance, same country or abroad
- Nature of depended, alternative solutions or one solution
- Unique product or process
- Competitors of the supplier or is there a monopoly status
- Difficulty and time of changing the supplier
- Supplier`s financial history

4.2 Supplier market

Supplier market are constantly changing and it involves greater understanding of the supplier and their procedures. Term supply market intelligence (SMI) is covering the global supplier market. Company leaders are constantly increasing their awareness of the global supplier market and what kinds of benefits there are available. They are also documenting the supplier's information for the further evaluation. Surviving in the constant change requires the ability to answer to customers need in creative way, combining own know how and opportunities.

Modern procurement, in request for quotation process, will gather widely information from the supplier market, evaluate the combination of own manufacturing and procurement, clear out multiple supplier alternatives and their quotations included the price structure. Multiple increased options are the result from the redefining of the needs. (Iloranta, K.& Pajunen-Muhonen, H. 2012, 133-135).

Supplier market analysis requires the deep level understanding of the supply market structure. This includes e.g. areas of supply, demand, industry structure and profit. Purchasers are commonly monitoring and developing problem areas with their suppliers. Measuring performance excellence is the ground for developing key actions. (Pearson 2010, 18).

4.3 Supplier analysis methods

Rogers (2009, 93-95) divides the supplier analysis in the combination of the three areas spend analysis, supplier assessment and supplier analysis. Spend analysis and supplier valuation are often included to supplier selection phase and supplier analysis phase is for selected supplier. Purpose of the supplier spend analysis is to understand all the elements of the purchases from a supplier e.g. total purchase volume and from where the volume is created, importance of the relationship and financial and legal risk factors. Second phase supplier valuation or assessment will ensure the supplier business capability by auditing the supplier`s key performance factors e.g. manufacturing and

quality processes, financial and business management, information systems and environmental aspects. According to Weele (2014, 349) there are four levels of the supplier assessment. Product level is focusing developing supplier`s product quality. Process level concerns the supplier`s production process its development. Quality assurance level refers to total inspection of the quality organization. Company level requires the high-level company auditing including financial aspects. Third phase of the supplier analysis is further divided to model of three fit. Strategic fit refers to revealing supplier`s core competencies and value propositions for the relationship. Operational fit reveals the actions for the strategic fit by planning and managing processes. Chemistry fit relates to interpersonal and communication with people in a certain cultural surrounding.

Table 3. Differences between supplier auditing and vendor rating. (van Weele, 2014, 351)

Aspect	*Supplier auditing*	*Vendor rating*
Orientation	Focus on future	Based on historical data
Application	New and current suppliers	Current suppliers
Nature	Mainly qualitative	Mainly quantitative
Scope	Broad, many aspects	Limited, few aspects
Work	Time-consuming	Standard data
Data processing	Subjective, manually	Factual, computerized
Relation with suppliers	Co-operation required	Based on internal administrative data

Supplier assessment can be executed by various ways. Commonly used supplier assessment methods are vendor rating and supplier auditing. Vendor rating is based on measuring the quantitative information e.g. pricing, quality and delivery precision. Measuring areas are based on key performance indicators available in company. Measures are performed by comparing price level with similar kinds of supplier, material rejection percentage and number of late or early deliveries. Supplier auditing is performed by specialist at certain time scale. Target of the auditing is to investigate the supplier`s production process and quality function entirely. Development areas are reported and further measuring procedures are commonly agreed. (van Weele, 2014, 349-350)

4.4 Product and supplier positioning

The purpose of the supplier positioning model is to clarify product importance and the status of the supplier relationship. Developing effective relationship requires deep understanding of the positioning at a first stage. Purchaser will evaluate effectiveness by positioning ordered products to purchasing portfolio and further to supplier`s portfolio. Supplier and purchaser must realize their power balance and dependency with each other. (van Weele 2014, 168).

Table 4. Purchasing portfolio criteria (Van Weele 2014, 163)

Impact on company's bottom line	*Supply risk*

▪ Volume compared to total purchasing volume
▪ Products share in overall cost price
▪ Products contribution to total company margin
▪ Cost savings potential through:
  ○ competitive bidding
  ○ volume agreements
▪ Price elasticity
▪ Rebate and bonus scheme
	▪ Branded product versus standardized product
	▪ Patent, i.e. licensed products
	▪ Availability of substitutes
	▪ Specific quality and logistics requirements (JIT)
	▪ Degree to which suppliers are prescribed by our company's customers
	▪ Supplier's share in buyer's purchasing volume
	▪ Buyer's share in supplier sales turnover
	▪ Market structure: free competition edition versus monopoly
	▪ Market situation: buyer's versus supplier's market
	▪ Political stability: (market) regulations, political unrest
	▪ Supplier production capacity utilization
	▪ Supplier's financial position
	▪ Supplier's switching costs

Table 4. describes the criteria for purchasing portfolio. There are two variables, purchasing impact for the profit and the risk of supply. These are analyzed against the supplier base and purchasing costs. On the left side are criteria which have affect to company`s profit and on the right side there are criteria of supply risk. Impact for the profit is analyzed by the material supply criteria. These criteria are for example total costs, purchased material volume, quality and the impact for the productivity.

High level of supply risk occurs when there is only one supplier available for purchased material and no alternative suppliers. These kinds of strategic materials often have a high share of the company`s end-product. Low level supply risk occurs in case

of purchasing materials from multiple alternative suppliers available and changing the supplier would not have high cost effect.

Table 5. Product and supplier portfolio by Kraljick (adapted Weele 2014, 164)

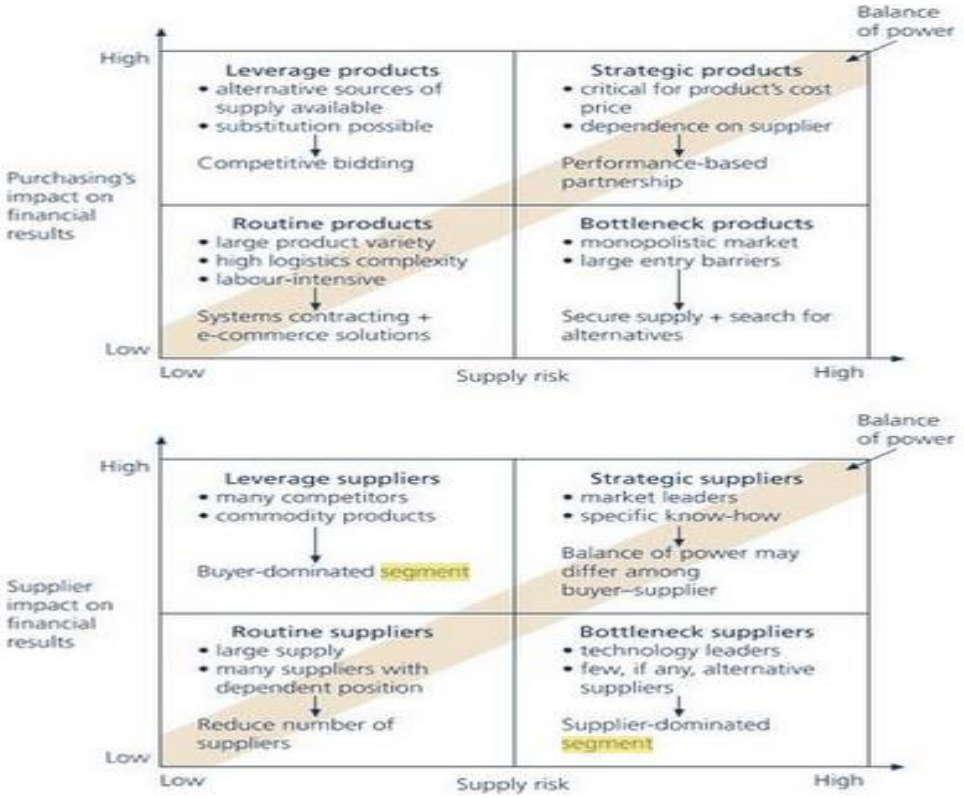


Table 5. represents the purchasing product portfolio and supplier portfolio. There is combination of two variables. Horizontal variable is the risk of supply and a vertical variable is the supplier`s impact for the company profit. Four segments of the matrix are presenting product and supply strategies for different category types.

There are presented three different segments and power balances among the parties. Buyer dominated segment the power is in purchasing function and the relationship with suppliers are not balanced e.g. in automotive industry where the manufacturer company may forecast the annual material need to supplier and the supplier must adapt for that information. Supplier dominated segment the relationship is opposite to buyer dominated situation. Supplier has reached the power at this segment by providing high technology or unique products e.g. in information technology. Balanced relationship

occurs when the supplier and buyer has reached the partnership level cooperation and they have common interest for developing operations and products. (van Weele 2014, 165).

Product portfolio consist of four different kinds of products or materials according the importance for the business.

4.4.1 Strategic products

Strategic products are often purchased from one supplier available and the products are highly customer adapted e.g. in Carrus Delta this kind of material is air condition devices for different kinds of bus models. These kinds of strategic materials have a great role for the material cost of the complete bus and the supplier cannot be replaced by another supplier due of exact customer adaptations and long-term contracts. End customers also relies for the quality of these strategic materials.

4.4.2 Leverage products

These kinds of products don't have special quality standards and there are several suppliers available in the market. Purchased material volume is high and the need is quite stable e.g. the gluing chemicals in Carrus Delta are leverage materials. Purchaser should actively send request for quotations for suppliers available for reaching the unit material cost reduction.

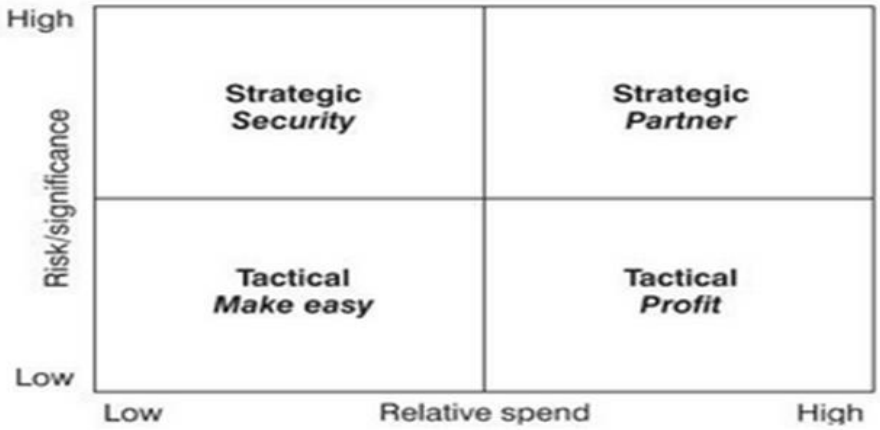
4.4.3 Bottle neck products

Bottle neck products usually has a low affect to material costs but there occurs to be a risk in the supply and the delivery times may varies. Coatings are these kinds of products in Carrus Delta. Purchaser should secure the supply of these products by placing orders in agreed delivery times and by providing the information of the annual need. In this case the supplier has the power against the purchaser.

4.4.4 Routine products

Routine products have a low material cost value and there are multiple suppliers available. There are no special quality standards and technical requirements e.g. the cleaning materials used in Carrus Delta. These kinds of materials should be purchased effectively by using the automation processes as much as possible. (van Weele 2014, 164-165).

Table 6. Supplier positioning and managing model. (Cheverton 2008, 167)



Peter Cheverton (2008, 167) has presented a substitutive supplier positioning model in table 6. There are four supplier types and strategies for each type. Supplier risk and significance are compared to relative spend share. First section **tactical make** easy the supplier has no great role with the purchaser and the spent time with the supplier is minimal. Second section **tactical profit** the top priority with these suppliers are conducting the best financial targets. Third section **strategic security** the main purpose is to secure the supply due of critical status of the delivered product. Fourth section **strategic partner** are the suppliers that should invest time for developing actions in collaboration.

4.5 Carrus Delta`s key suppliers

In this study the key supplier's criteria are annual material volume, geographical distances, strategic materials and lead times. This supplier information is gathered from LEAN system. Primary criteria are material volume and criticality for the production. This study focuses for the 30 key suppliers selected by these criteria. These 30 suppliers are divided between 13 domestic suppliers and 17 foreign suppliers. Material criticality with these key suppliers can be evaluate by the effect to production. These materials cannot easily be replaced by other substitutive suppliers and the effect to production continuity is highly affected. There are critical materials e.g. wiring harnesses, abs-plastic parts, body coatings, side hatches and multiple stainless-steel materials.

There are over three hundred (300) active suppliers in LEAN-system, but the target is to develop and manage the relationships with these chosen key suppliers. At theory base the supplier performance management is included to supplier relationship management. Main study areas are the supplier's ability to develop problem solving, high quality and delivery precision.

5 SUPPLIER RELATIONSHIPS

5.1 Relationship type

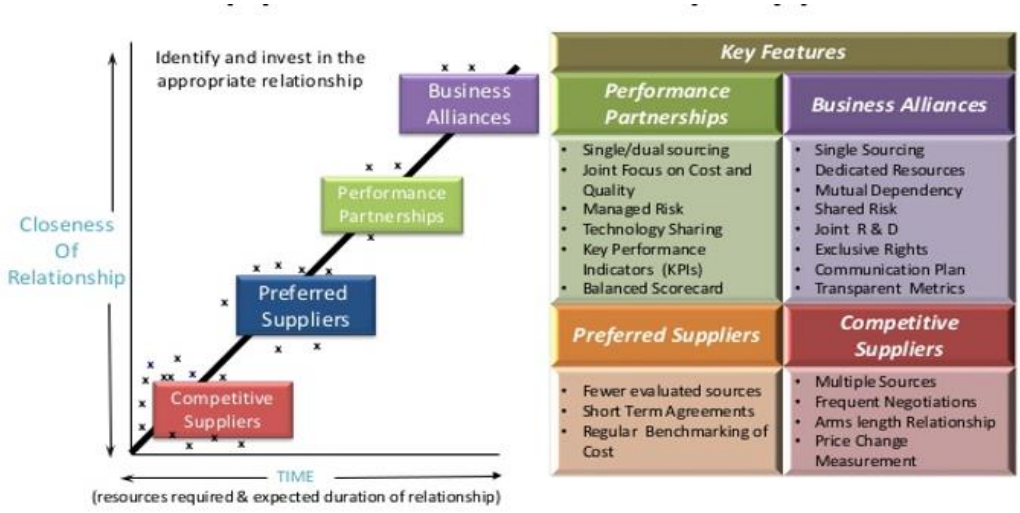


Figure 7. Supplier relationship types and key features (Institute for Supply Management ISM)

According to Harrison & van Hoek (2010, 264-270) there are five major relationship types in the supply chain. First level is called *Arm`s length* in which the relationship is based only on price and marketplace. Second level is *partnership* in which the parties are sharing exact information and trusting to achieving the goals. According to Weele (2014, 207) characteristics of the partnerships are long term buyer-supplier relationship, mutual commitment and sharing risks and rewards. Third level is *strategic alliance*. This relationship is built by two or more independent companies for achieving the common goal. *Joint venture* is the level four which is close to alliance with the difference of forming new entities for achieving mutual goals. Highest level of the relationship is called *vertical integration*. This type of relationship has one or multiple tiers and the direction of the relationship may be upstream, downstream or both.

5.2 Key factors of the supply chain relationships

There are found nine key factors when analyzing relationships in the supply chain. First is the performing the evaluation of the key or winning players. What kind of price levels there are, how are the products special and how they achieve to maintain high quality of the products. Secondly is the clearing out the purchasing process and decisions behind the process. Third is the monitoring the nature of the collaboration and are there electronic aspects e.g. ERP-systems involved. Fourth factor is related material and capacity planning and are there common focus for developing those processes. Le Dain et.al (2011, 62) highlights the supplier`s early involvement to new product development (NPD). This involves that the supplier must fulfil the technological capabilities and operational factors such as delivery, quality and cost. Fifth factor is requirements for the call offs and are there agreement how and when to change the delivery schedules. Price negotiations, as the factor six, are targeting price reduction and continuing mutual development. Then there are seen managing of the quality and research. How the partner is participating to quality process development and how they are involved in new product development and design. Stage nine regards the pressure and what is the suitable pressure level for developing performance. (Harrison & van Hoek 2010, 291)

5.3 Implementing of the strategic partnerships

According to Harrison & van Hoek (2010, 286) term strategic partner will refer to company which is sharing its supply chain functions with other company at the same business area. Strategic partnership is focusing to developing long term collaboration. This kind of collaboration has been performed at every level of the supply chain. Collaboration differs from coordination by the deep commitment to sharing technology and information systems. Companies are coming interdepended of the each other processes and information. Sakki (2003, 131) defines that key aspects of the partnership relationships are long term business action, open communication and risk sharing, both sided action plans and future vision of the business. Main aspect is to focus for key

business areas through of effective collaboration and time management. Implementing of the partnership, especially strategic ones, requires that the purchasing and supplier development teams will be involved to process at early stage. Information should be shared and analyzed effectively for receiving the common interest towards strategic processes. (Harrison & van Hoek 2010, 286-288).

5.4 Relationship power balance

Balanced relationship occurs when there are equal power balance and both parties are willing to appreciate the relationship and nurture it. Main aspect is to develop the balance between the key suppliers and the company. Balance should be greater towards to purchaser. (Weele 2014, 162,165) Especially in the strategic product area all the power aspects should be carefully viewed and analyzed. Negotiations with the suppliers will be fertile due of greater relationship power understanding. On the other hand, the contract drawn up with incorrect details may affect negatively to power of the purchaser for a long period. There are positive aspects when purchaser operates with two suppliers that are competing. It decreases the supply risk and provides complementary resources for the purchaser. Competing suppliers may decide to connect their functions for serving the buying company better. (Choi&Wu 2009, 13.)

According to Iloranta et al. (2012, 129) the power balance towards the supplier will decrease in following cases:

- Other companies have been taken over the major part of the supplier`s business
- Supplier market are narrow
- No possibility to use complementary solutions
- Balance between the companies supply chains has changed
- Product lead time or the time of finding substitutive supplier is long
- Changing the supplier will cause high expenses

5.4.1 Advantages and disadvantages of the partnerships

Table 7. Advantages and disadvantages of the relationships between the buyer and the supplier (Hall, J. 2000, 461).

Buyers	Suppliers
Advantages	*Advantages*
• Reduced manufacturing and labour costs • Improved quality • Reduced complexity and cost of assembly and buying • Supplier insurance • Cooperative relationships with suppliers • Contract predictability • Fair pricing assurance • Fair pricing assurance (open books) • Negotiated price reductions during contract life • Avoidance of bad press caused by reduction in personnel	• Contract predictability • Workforce and production more stable • Increased R&D effectiveness • Buyer allies with supporting firm's status • Buyer assistance • Influence on buyer's future decision making • Insider information on buying decisions • Firm becomes gatekeeper for competitors' innovations • Information about competition
Disadvantages	*Disadvantages*
• Increased dependence on supplier • New negotiating style • Less supplier competition • Increased management skills • Reduced personnel mobility • Increased communication and coordination costs • Increased support for supplier • New reward structures • Loss of direct contacts with secondary suppliers	• Cost information shared (loss of proprietary information) • Pressures to assume burden of all phases from design to warranty while improving quality and reducing costs • Decreased autonomy • Increased communication and coordination costs • Reduced personnel mobility • Potential pendulum reversal (i.e. no buyer–supplier trend is written in stone)

Advantages of the partnership relationships are formed from reduced supplier controlling and increasing the trusting level. Contracts are transparency and easy to follow. Achieved mutual trust is the base for strategic advantages like shorten lead times and investments. Accurate and constant information sharing between the partners will be the ground for effective functions.

Disadvantages of the partnerships are related to pricing, information sharing and opportunism. Pricing may be in high level or too low level and the pricing policies are not being understood. Sensitive information could be leaked to competitor due the lack of common agreement of information sharing. Suppliers opportunism and negative behavior can have highly affect or it could even be braking up the partnership. (Harrison & van Hoek 2010, 271).

6 SUPPLIER MANAGEMENT

6.1 Supplier strategies

There are four different supplier strategies for purchasing product segments. Performance based partnership should have built for the strategic products in which the power has been on the supplier`s side. Weele (2014, 162-163) has presented following questions for analyzing and developing supplier strategies:

- Is the company purchasing strategy according to company strategy and are the long-term requirements achievable?
- What is the status of the relationship and which areas are being balanced and which are dominant by other?
- Are chosen suppliers best in class for delivering strategic materials?
- What extend the contracts are covered for long period?
- What would be the major problem issues in supply chain and what is the effect for company profit?
- What future development opportunities are achievable with key suppliers? e.g. product and quality development, cost reduction.

Table 8. Four supplier strategies and their characteristics. (Weele 2014, 167).

Strategies / Characteristics	Partnership	Competitive bidding	Secure supply	Category management and e-procurement solutions
• Objective	• Create mutual commitment in long-term relationship	• Obtain 'best deal' for short term	• Secure short- and long-term supply • Reduce supply risk	• Reduce logistic complexity • Improve operational efficiency • Reduce number of suppliers
• Suitable for	• Strategic products (gearboxes, axles, optics, engines)	• Leverage products (commodities, steelplate, wire)	• Bottleneck products (natural flavours, vitamins, pigments)	• Routine products (consumables, supplies)
• Activities	• Accurate forecast of future requirements • Supply-risk analysis • Careful supplier selection • 'Should cost' analysis • Rolling materials schedules • Effective change-order procedure • Vendor rating	• Improve product/market knowledge • Search for alternative products/suppliers • Reallocate purchasing volumes over suppliers • Optimize order quantities • 'Target-pricing'	• Accurate forecast of future requirements • Supply-risk analysis • Determine ranking in supplier's client list • Develop preventative measures (buffer stock, consigned stock, transportation) • Search for alternative products/suppliers	• Subcontract per product group/ product family • Standardize product assortment • Design effective internal order delivery and invoicing procedures • Delegate order handling to internal user
• Decision level	• Board level • Cross-functional approach	• Board level • Purchasing	• Purchasing • Cross-functional approach	• Purchasing • Cross-functional approach

6.1.1 Performance based partnership

This strategy aims to monitor carefully about price and cost changes. Development direction of the supply market will be closely monitored also. Products in this category are strategic and leverage products which will have high impact for the company profit. Keeping in mind that the supplier has a greater power toward a buying company, it is necessary to monitor the changing market constantly. Power balance of the relationship can be guided to balanced power by an open cost calculation. Company will present detailed calculations about supplier`s pricing and then negotiations will be arranged for achieving better pricing levels.

The goal of the performance-based partnership is to create a mutual willingness for cost, process and improvement targets. Best in class suppliers have been analyzed and selected in the early stage of development process. Investigating aspects of the suppliers are e.g. financial stage, development potentiality and quality system.

6.1.2 Competitive bidding

Products in this segment are as a leverage and purchasing will be based on the competitive request for quotations. Due of great availability there are no high expenses or difficulties of changing the supplier or products. Purchasing strategy is to avoid placing long term contracts. Purchases are created from a low product price while maintaining the quality level and securing the supply. Market monitoring and supply investigations are also necessary in this segment. Leverage products can be contracted in corporate level and other business units of the corporation is able to use the agreed prices and lead times with the suppliers.

6.1.3 Securing the supply

Products in this segment are bottle neck products. Purchasing strategy will be based on securing the supply of these bottle neck products and on the other hand decreasing the dependency of the supplier. This could be executed thorough of searching of complementary products and suppliers. Testing costs of the complementary products could be at high level due of confirming the correctness of the products.

Risk analysis should be conducted for the short and long-term security of the supply. After measuring the impact of the bottle neck products for the company business will be the ground for agreeing the products lead times or the agreement that supplier will keep some quantity of the bottle neck products at own premises.

6.1.4 Category management

Category management policy is to build the efficient ordering process by using electronic catalogues. Employees can place orders for the selected suppliers which is called by call offs. Products in this category are used in maintenance, repair and operating functions (MRO) e.g. office and cleaning products. Payment policy should be evaluated in advanced whit the purpose of using the electronic catalogues.

6.2 Risk management

According to Dale (2004, 110) purchasing company should set the framework for the risk management. Framework for the company risk management includes e.g. value statements, performance measurable standards and indicators, supplier education programs and efficient IT-systems. Company may have too depended of one supplier and it is preferable to try to change this situation. Analyzing the strategic questions will provide guidance towards mutual partnership.

Wider term supply chain risk management (SCRM) focuses to four critical factors of the supply chain functionality. Hazard risk refers to disruptions due of accidents, crime or product quality. Financial risks are internal company risks or external supplier-based problems. Operational risks are related to operative functionality of the supply chain e.g. delivery problems and quality issues. Strategic risks are created from incorrect management decisions or external risks that are major for the company. (Trent 2017, 40-41).

6.3 Supplier relationship management (SRM)

Rogers (2009, 110) defines the supplier relationship management (SRM) as a close relationship with key suppliers and supplier's trustiness against the customer. Suppliers understand why they are key suppliers and how they could add value for the customer. Common goals and same core values with supplier will affect to sharing further the cultural issues. Common goals are defined in strategic level, but there is also involved the nature of the working environment and culture. (Jack & Powers 2015, 130.)

Supplier relationship management includes multiple positive aspects. Strength relationships are guiding operations and purchasing cost level in right direction. Balanced relationships require time for communication, listening and problem solving and involving suppliers to developing key processes at early stage. Trustiness against the

supplier will increase innovations and success rates and decrease the risk behavior. Positive operational level outcomes are quality aspects, shorter delivery times and material cost reductions. Strategic level outcomes are higher competitiveness, risk management and transactional efficiency. Information, qualitative and quantitative, about the supplier`s performance is gathered from ERP-systems and analyzed for avoiding the risks and for finding positive opportunities. Effective and supplier connected IT-functions and performance analyses are key aspects in SRM. (Supply Management, 2015).

Stephen (2009, 110-112) has presented key areas and actions for the supplier relationship management:

1.) High level understanding of the supplier`s key processes. This includes analyzing the status of the relationship and strategic directions. What kinds of reward systems and decision processes supplier is using?

2.) Defining of the key people for the managing relationships. Who has the power for setting up relationships and end those? Who are key contacts for the face to face meetings?

3.) Keeping the relationship and purchasing strategy in same direction. How will you ensure that the strategy and relationship are synchronized?

4.) Setting up common expectations and building the trust. How to balance strategic expectations and skills with cooperation? Building the trust requires proven track of achieved results, operating integrity, shoeing empathy and positive feelings and operational predictability.

Byrne (2002, 24-25) defines further areas for SRM e.g. correctness of the contract information, monitoring and measuring the supplier`s performance, developing processes in collaboration and cost reduction actions. SRM specialists are using the technology for managing SRM performance and they are segmenting the supplier base. Segmenting criteria are spent volume, quality of materials and relationships and supply chain importance. This segmenting enables the strategic handling for each segment. SRM specialist will also conduct holistic approach for SRM and involve collaboration.

6.3.1 New approach of SRM

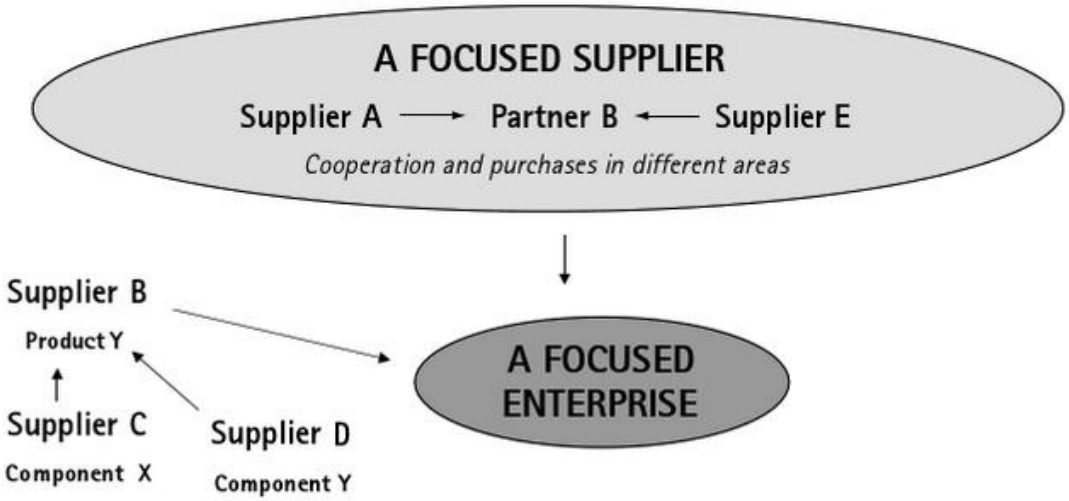


Figure 8. Company relationship to its suppliers. (Ostring 2003, 6).

New aspects of the supplier relationship management are realized and further connected to business. Highly important changes in SRM are longer covered contracts and the suppliers lower quantities. Lower quantity of the suppliers are producing complex and unique parts.

Suppliers are connecting and creating networks. These networks are established by few suppliers and they have possibility to deliver the complete product to company if necessary. Figure 8. describes the tiers with the suppliers. First tier supplier has a straight connection and relationship with customer. Suppliers in low tiers, as in second

or third tiers are connected to first tie supplier and are delivering information and material for them. First tie supplier is dependable from the lower lever tier suppliers. (Ostring 2003, 6).

6.4 Performance measurement

There are five key principles for choosing correct indicators for performance measurements. Firstly, the indicator has a tight connection to company strategy and targets. Understanding the business needs from the supplier`s perspective is crucial at this stage. Secondly, the indicator is simply and easy to understand. Chosen indicator must fulfill the company KPI criteria. Thirdly, the indicator is evaluated in its natural context where it is possible to influence for measuring and for further discussion with supplier. Fourthly, the indicator is wide enough and balanced against the targets. Fifth, the indicator will be used for constant process development and for monitoring the results (Iloranta, K.& Pajunen-Muhonen, H. 2012, 360; Webb, J. 2017).

According to Gordon (2005, 20) there are following critical factors when company is developing measurement instruments:

- Targets for the purchasing professionals are according to company`s purchasing strategy.
- Identify the best measuring indicators for the targets to reach.
- Develop the reporting system which is in accordance with the information base.
- Share the feedback with participants and discuss of the results.
- Collect information and experiences about the succeed of measurement and development.

Iloranta & Pajunen-Muhonen (2012, 369) has presented key questions for the supplier`s measurement indicators. **1.) Suppliers daily performance level.** How have the supplier conducted its operations e.g. quality, delivery precision, correct shipments and extra cost from incorrect shipments? How have the total costs decreased compared to achieved added value? **2.) Achieved and maintained strategic benefits from supplier`s actions.** What have we learned commonly? What benefits has been achieved from supplier`s technology and new projects. What kind of role has been with the supplier`s knowledge and reputation for the new and existing customers? How have managed to develop the supplier network?

3.) Constant development of the supplier's processes. How have the supply process improved? What kind of development direction there is with the total cost level? How have developed the end product, customer service and added value? **4.) Supplier`s and own organization creativity and innovativeness.** What kinds of new ideas and procedures has been developed? What kind of cooperation has been performed and how has the cooperation achieved? **5.) Support, benefits and cooperation that purchasing has provided to organization.** What benefits the purchasing function has provided to design, production, sales and logistics sectors? What kind of organizational cooperation has been performed, how has it worked and what has achieved?

6.5 Supplier performance management

Supplier performance is consisting of delivery precision, high quality level, informing, cost structure, technical support, flexibility and innovation. (Pooe et.al.2015, 1: Nair et.al. 2015, 2.) Purpose of the supplier performance is to develop and strengthen relationship between the purchaser and the supplier. Relationship areas includes trustiness, knowledge sharing and synergy. These are key factors when developing supplier`s performance, especially the trust against the supplier`s operations. Trust between the parties enables the sharing of critical resources and knowledge. (Pooe, D. et al. 2015, 1-3).

According to Fournier (2017) supplier performance management (SPM) is regarding of measuring, analyzing and managing the supplier`s performance. Focus is to reveal risk areas at early stage, decrease the cost level and perform actions towards constant development. Key areas of the SPM are supplier segmentation, risk and metrics management and target management. Commonly used performance metrics are quantity of placed purchase orders compared to orders received, advanced shipment notifications (ASN) compares variance between purchased quantities and dispatched quantities and delivery on time provides information for percentage of shipments on time. (O`Byrne, 2016.) Suppliers will benefit about their performance evaluation and they will further develop their competencies towards to customer needs.

Figure 9. Supplier-Partnering hierarchy. (Harvard Business Review 2004, 4)

Liker & Choi (2004) are indicating that supplier relationship development and management includes following key aspects:

- Understanding the supply market and the competition structure of the inner supply market. This includes the awareness of total cost structure and supply key processes.
- Considering the positive aspects of the competition between suppliers. Suppliers will understand that customer is able to handle the supply market and use other substitutive supply resources. This will increase the supplier effectiveness and customer service.
- Steering the supplier for developing its performance. This includes commonly agreed future goals, measuring the performance and results analysis.
- Sharing the correct information. Providing the needed information regarding the company situation will help the supplier to perform in current state and evaluate its own actions.
- Managing the common development. This includes the process steering and establishing cross-functional teams with highly valued suppliers.

7 STUDY METHODOLOGY AND IMPLEMENTATION

7.1 Qualitative research

The definition of the research will answer to questions what and how, what is the research problem and how to investigate that problem. Typically, there are two research categories basic and applied research. The interest in basic research is some phenomena and the purpose is extending the knowledge about the phenomena. Applied research purpose is to improve the quality of practice. (Merriam 2014, 3.)

Basic area is to find the cause of events and how to predict similar events in the future. The focus in qualitative research is to find answers to question how. According to Merriam (2014, 5) qualitative research tries to find out how people interpreters their experiences and how they construct their world, like for example how the players prepare to an important match. There is assume that the reality is constructed by a social behavior and there are many interpretations from a single event. Researchers tries to construct the knowledge from the event, not finding the knowledge. The focus is in participant's interest and in their interpretations from the event. (Merriam 2014, 15.)

According to Taylor, C., Wilkie, M., & Baser, J. (2006, 30) chosen data collection method must fulfill the criteria of reliability and validity. Reliability refers to that the data collection method is reliable with giving same results as studied earlier and will be studied in future. Therefor the measures cannot be changed. Validity refers to that the data collection method measures and collects the date what it was intended to.

7.2 Case study method

Case study focus is in some special case and experience. Case study is being used for finding behavioral patterns in some natural context e.g. in work place (Freebody 2006, 80.) According to Baxter & Jack (2008, 2) case study will answer to questions how and why. Other considerably issues are that you are not able to manipulate the behavior of the objects in study and there are as relevant surroundings as possible.

There are purposes or cases like exploratory and descriptive for case study. In exploratory case studies data collection and fieldwork are gathered by specific research questions and there is purpose to find out patterns of practices for testing other relevant theories of the issue. In descriptive cases the researcher starts with descriptive theory or there is a consumption that the problem might occur during the case. (Freebody 2006, 97.)

7.2.1 Case study process and analysis

First step in case study process is to clarify the research questions and understanding of the research inquiry. This stage also includes examination of case surroundings and personal and cultural aspects. Second phase is to plan how the data will be gathered in the case. There can be conducted multiple level analysis, for example when analyzing the people behavioral. Third phase includes the data collection in the field and analyzing the data. (Freebody 2006, 84).

Researcher must be a fundamental knowledge about the study object like organization and its functions. Language and concepts are proper for the target case and concentration is in process. Important point of view for case study research is a holistic view. That indicates an observation with detailing and studying many different aspects for understanding the relations and the process in its natural environment. (Gummesson 2000, 86.)

According to Gillham (2010, 17) the most important area in case study procedure is a framing of the good research questions. Good research questions are the kind of questions which will enable to achieve your goal and for which can be answered in research settings. Data collection method is observation which can be participated or structured. In participating observation, the researcher will actively be involved for the case. This approach is more descriptive and qualitative. In structured observation the researcher is watching outside of the case with carefully and specified way. This is more quantitative approach with counting and classifying the observations. (Gillham 2010, 46).

Analyzing the results of the case study should consider areas like the variety of different kinds of evidence, skill needed for reaching the evidence for coherent narrative, maintaining the determined focus for reaching the research questions and to make a coherent version of the theory explanations (Gillham 2010, 93-94.)

According to Gummesson (2000, 88-90) there are three major chritisims against the case study. First is a lack of statictical reliability and validy, secondly case studies are generating hypotheses, but are not testing those hypotheses and thirdly there is a generalization basis of the case studies. Generalization has two dimensions, large number of observations and indepth studies for identifying and analysing a certain phenomena. There are also positive issues in case studies, like challenging the existing order of the issues and the insight of the people lives will help uderstanding daily issues and attitudes. (Gillham 2010, 102).

7.3 Justification for the case study in this research

This study aims to find answers to who are key suppliers for the Carrus Delta, how those suppliers are functioning and are there found similar behavioral patterns e.g. is there available any action plan for the worst-case scenario in the supply chain. Interaction in this study is based between the key suppliers and purchasers in the supply chain process. As in the exploratory case studies, data collection and fieldwork are gathered by the specific research questions, in this study there are carefully planned and theory-based research questions.

Data gathering will be conducted by semi-structured supplier survey which also includes some open ends questions. Analysis of the research part will be based on the theory and similarities in functioning e.g. what kinds of relationships and risk management possibilities there are. Results are being analyzed against the theory, especially developing performance and supplier strategy. Data collection reliability and validity will be achieved by pre-testing the research questions and the functioning of the survey. Research questions are based on the purchasing key performance indicators and the supplier's willingness to develop cooperation and their problem-solving possibilities.

8 KEY SUPPLIER SURVEY

8.1 Content of the supplier survey

Survey for the key suppliers was conducted in February 2018. There was two weeks of answering time and the survey was sent from work email. Cover letter in appendix 1 included all the background information, survey sections and answering instructions. Supplier survey questions included areas of shipments, pricing, quality, ordering and informing and cooperation. Author see these areas are highly valued and tightly related to purchasing key performance areas and for supplier assessment in chapter 4. Survey included 14 structured questions and three open end questions. Last survey section was for free comments. Answering for the structured questions were mandatory and optional for the open-end questions.

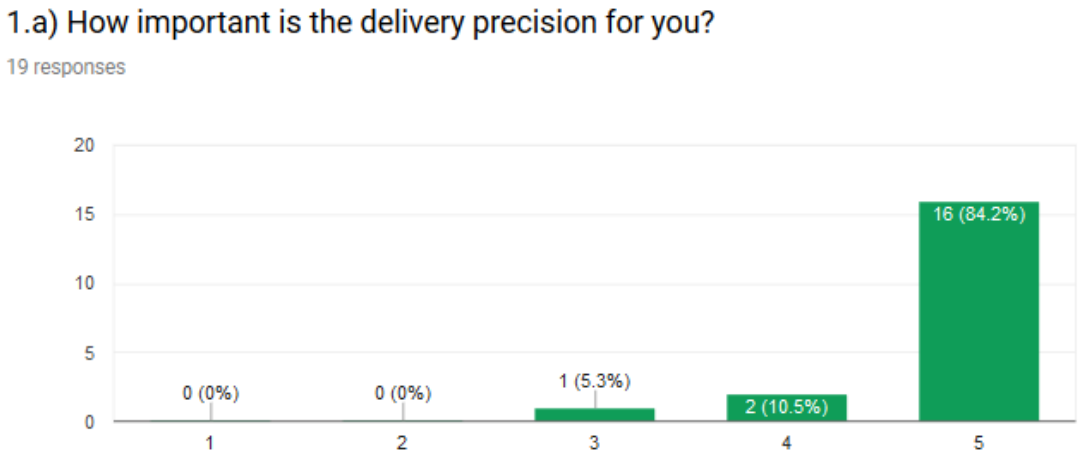
Supplier survey was sent to 30 key suppliers based on the certain selection criteria as stated in chapter four. Survey were answered by 19 suppliers and the answering percent rate was 63%. Survey answers were divided between seven (36,8%) answers from domestic suppliers and 12 (63,2%) answers from foreign suppliers. There were also nine responses for open end questions and six responses for free comments.

9 STUDY RESULTS AND ANALYSIS

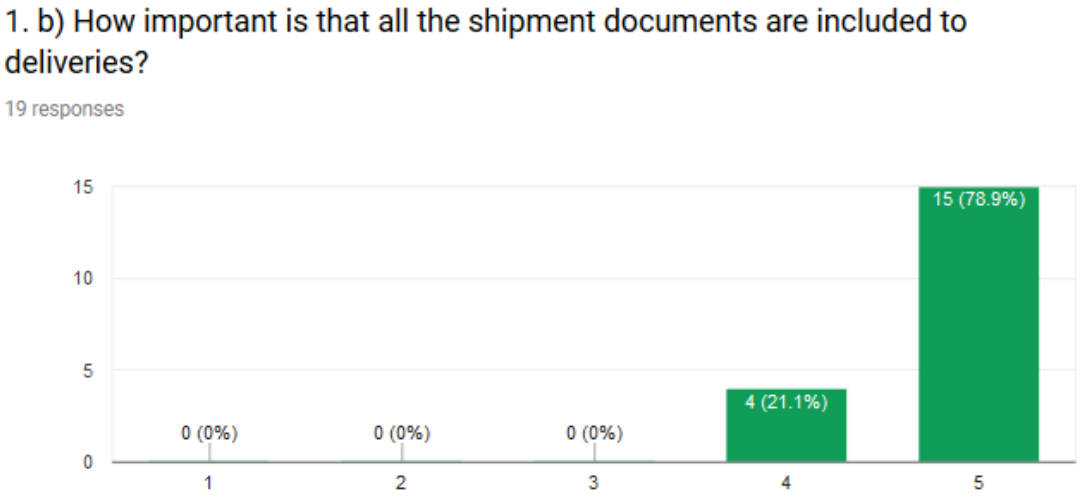
9.1 Results of the survey questions

Questions of the supplier survey included the linear answering scale from 1 to 5 or multiple-choice options. Scale 1 is low level valued and scale 5 is the highest level valued.

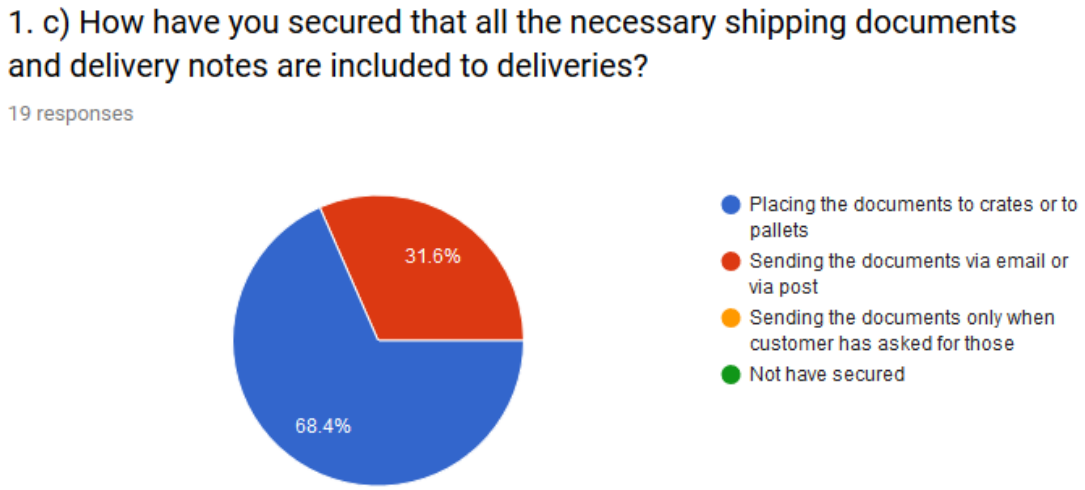
1 SHIPMENTS:



First question 1 a) was covering the importance of the delivery precision. 16 respondents (84,2%) see that the delivery precision is highly valued. Two respondents (10,5%) see that the role of delivery precision is important. Only one respondent (5,3%) see that delivery precision has a quite important role. Delivery precision is one of the KPI in use at Carrus Delta and this has a great role in material steering.



Second survey question 1 b) was covering the shipment documents. 15 respondents (78,9%) see that shipment documents are necessary to include to deliveries and those has a great role. Rest four respondents (21,1%) are indicating that it is quite important to include the shipment documents to deliveries. Shipment documents, including the delivery notes, will provide the needed information for the reception of the purchased materials and further for invoice handling.



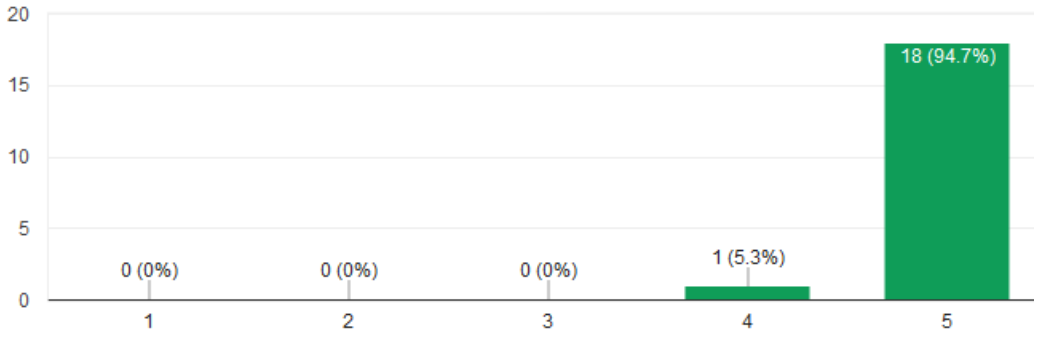
Question 1 c) was covering how suppliers are included the shipment documents to deliveries. There was multiple choice answering opportunity. Answers were divided between two options. Major part, as 13 respondents (68,4%), will place the shipping

documents to crates or to pallets. Rest six respondents (31,6%) will secure the shipment documents by sending those via email or via post. None of the respondents will send the documents only when asked or not have secured the documents to shipments. Responses indicates that suppliers are covering the shipment documents appropriately.

2 QUALITY

2. a) How important is the high quality of your end products?

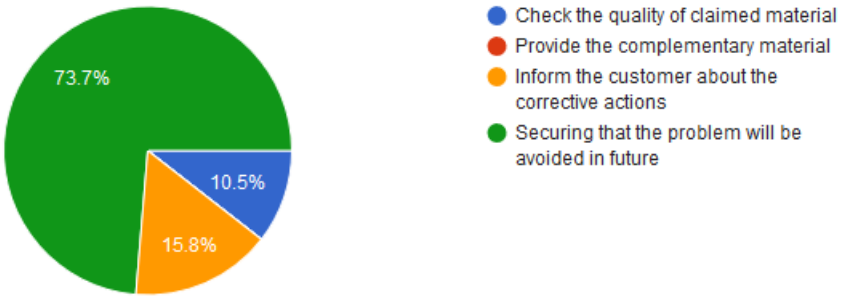
19 responses



First question of the second section 2 a) was handling the importance of the quality. 18 respondents (94,7%) considers that quality has a very important role in supplier`s end products and only one (5,3%) respondent feels that quality has an important role.

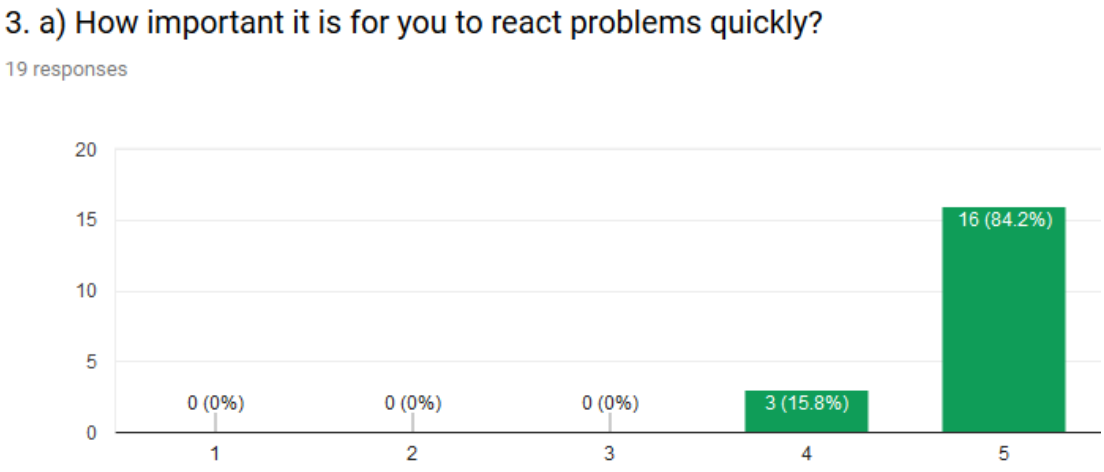
2. b) What are the most important aspects in quality handling? Please choose 1 best suitable option.

19 responses

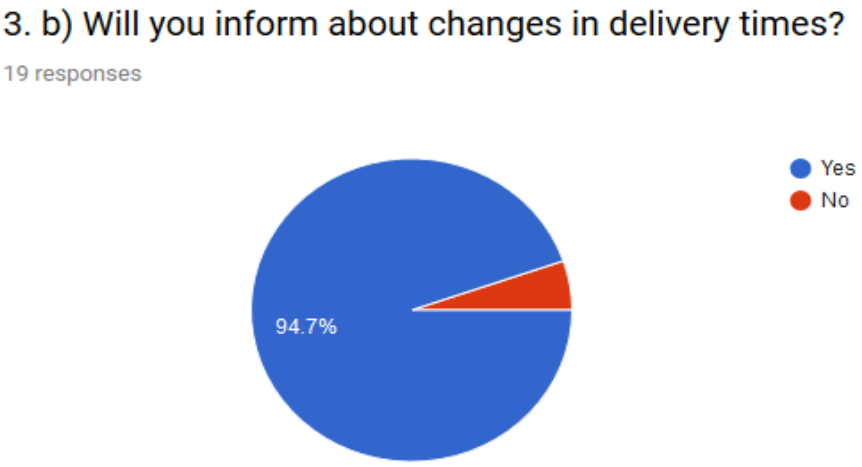


Second question 2 b) was covering the aspects of the supplier`s quality handling. Answers were divided between three answering options. 14 respondents (73,7%) see that it is most important to secure that the same quality problem will not occur in future. Three respondents (15,8%) see that most important action is informing the customer about the corrective actions. Rest two respondents (10,5%) will, as a first action, check the quality of the claimed material. None of the respondents will provide a complementary material as first stage of quality handling.

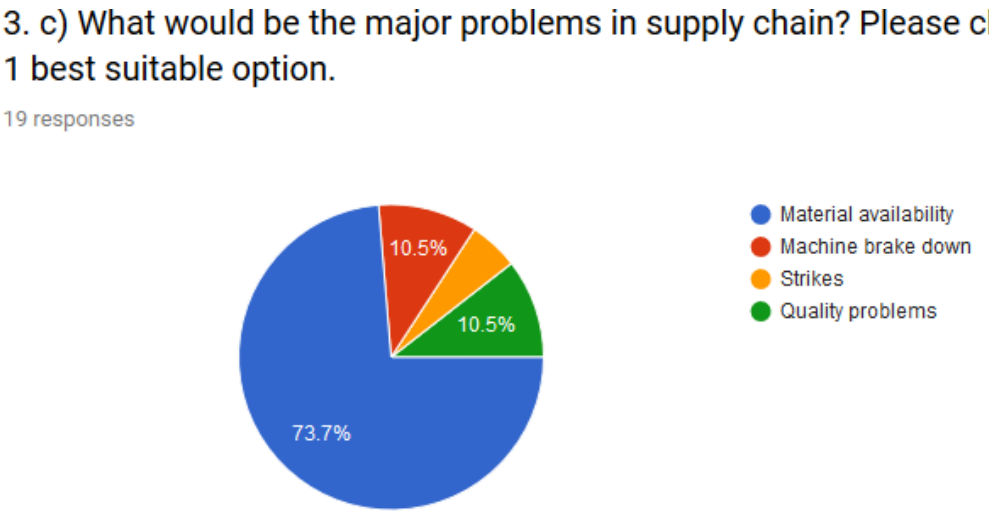
3 INFORMING AND FORECASTING



First question of the third section was regarding the problem reacting. 16 respondents (84,2%) see that it is highly important to react problems quickly. Three respondents (15,8%) see that it is important to react problems quickly. None of the respondents feels that quick problem reacting has not an important role.



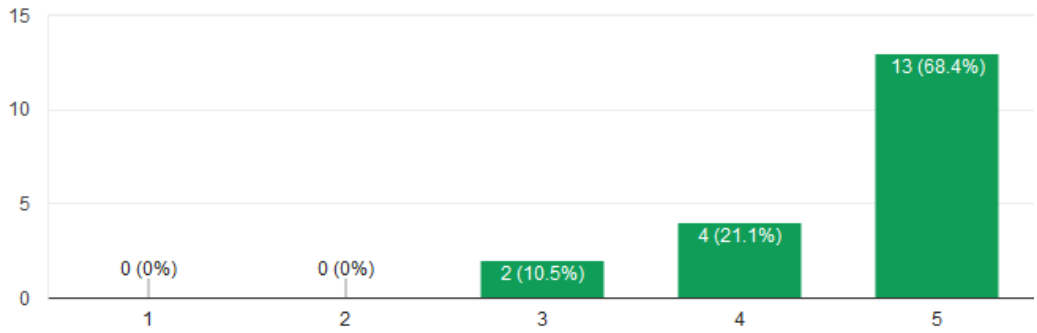
Second question 3 b) was covering to providing information about changes in delivery times. Major part of the respondents 18 (94,7%) will inform about changes in delivery times Only one respondent (5,3%) will not inform about changes in delivery times.



Question 3 c) was handling about the major problem issues in supply chain. There were four different answering options. 14 respondents (73,7%) see that the material availability will be the highest risk. Machine brake downs and quality problems have an equal role of 10,5% among the four respondents. One respondent (5,3%) see that strikes will have a major risk role in supply chain.

3. d) How important is the forecasting of annual material spend for you?

19 responses

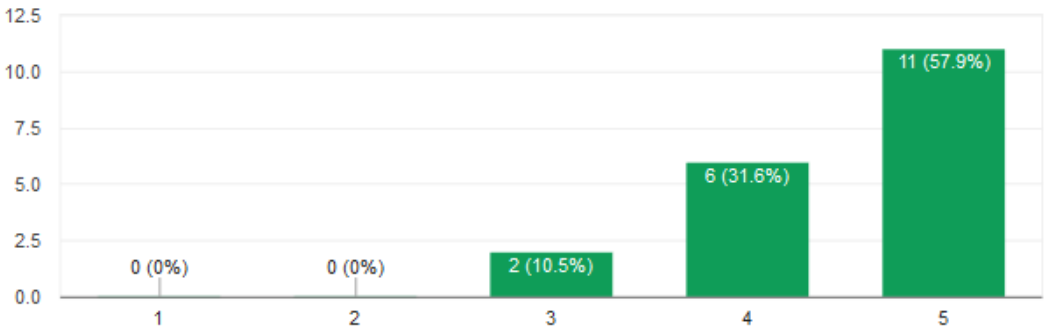


Final question 3 d) of the third section was covering the material forecasting. 13 respondents (68,4%) indicates that material spend forecasting has a highly important role. Four respondents (21,1%) see that it is important to provide the forecast information and the rest two respondents (10,5%) see that it is quite important to provide forecast information.

4 PRICING AND ORDERS

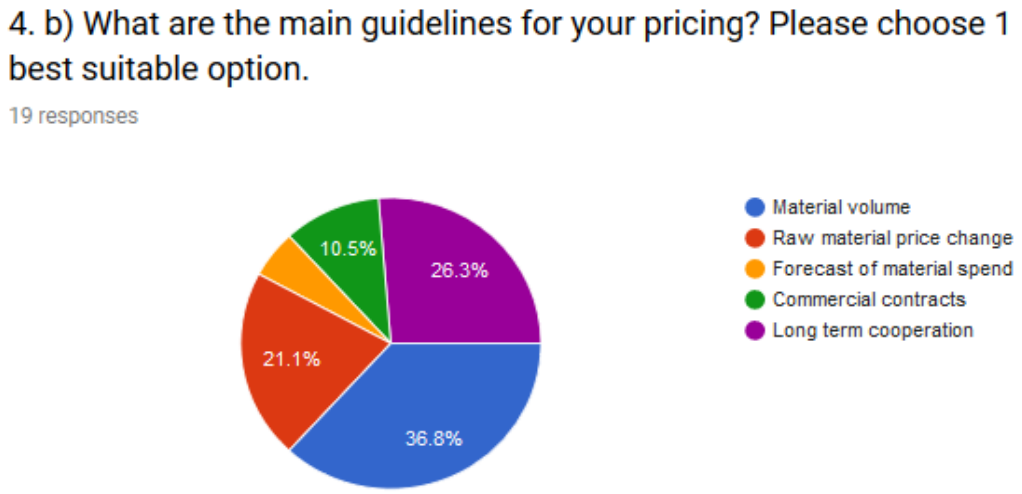
4. a) How important role has the effective pricing for you?

19 responses

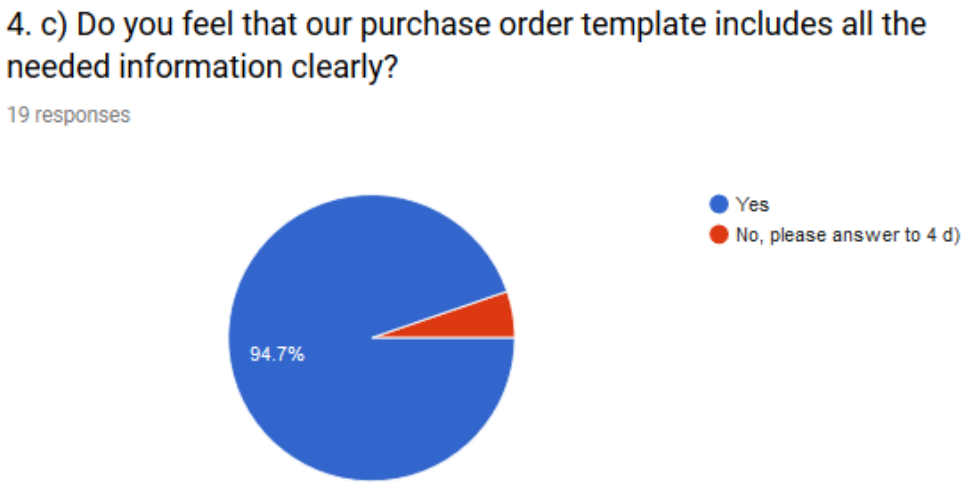


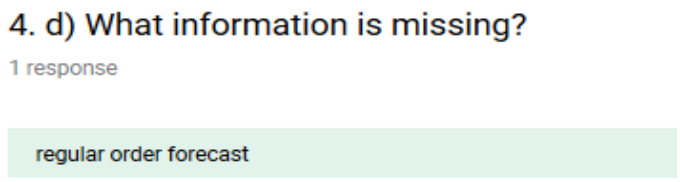
Question 4 a) was covering pricing. 11 respondents (57,9%) see that effective pricing has a highly important role. Six respondents (31,6%) see that pricing has an important

role and the rest two respondents (10,5%) see that pricing has a quite important role for them.



Question 4 b) was covering the guidelines for pricing. There were five multiple answering options to choose. Seven respondents (36,8%) see that material volume has the greatest role for pricing. Five respondents (26,3%) see that long-term cooperation will have a highest affect for pricing. Four respondents (21,1%) are indicating that raw material prices will have a greatest affect for pricing. Two respondents (10,5%) see that the commercial contracts have the highest affect for pricing and one respondent (5,3%) see that material forecasting will affect highest for pricing.



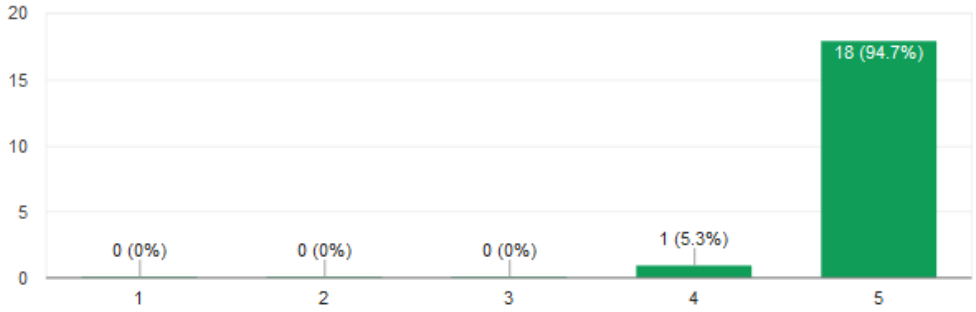


Question 4 c) was handling the purchase order (PO) template. Major part of the respondents 18 (94,7%) are indicating that the purchase order template used in purchasing function of the Carrus Delta will include all the needed purchasing information clearly. Only one (5,3%) respondent feel that that there is missing an information for the regular order forecasting.

5 COOPERATION

5. a) How important do you see the cooperation with Carrus Delta Ltd?

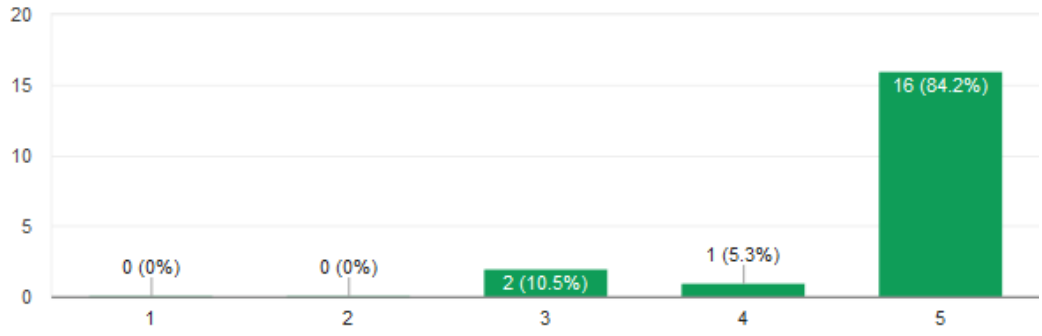
19 responses



Question 5 a) was covering the cooperation with Carrus Delta. 18 (94,7%) respondents see that the role of cooperation with Carrus Delta is highly important. One (5,3%) respondent indicates that it is important to cooperate with Carrus Delta.

5. b) Your interest to develop cooperation with Carrus Delta Ltd?

19 responses



Question 5 b) was covering the interest for developing cooperation with Carrus Delta. 16 (84,2%) respondents are indicating that they have high interest for developing co-operation and one respondent (5,4%) see that developing cooperation has an important role. Two respondents (10,5%) see that developing cooperation is quite important.

Question 5 c) was covering the development areas of the cooperation. This question was open ended. There were nine responses as follows.

- *We are specialists in light wights, composites sandwich panels and so on ... so our knowledge could be used better to make carrus products more competitive against other bus manufacturers.*
- *Maybe to receive some demand data (forecasts)*
- *Cooperation with Carrus Delta Ltd is working very well. But if they want to do some development, we are ready to discussion and development.*
- *Using different material components from our wide delivery program (i.e. roller blinds, roof hatches, locks and fittings, sound absorbers, sealings, handles).*
- *In my opinion the current cooperation is at sufficient level*
- *develop in different groups of products*
- *design service, expanding business*
- *e.g aluminium materials*
- *Air-conditioning equipment for electric buses*

Question 6 was for free comments. There were six responses.

- *We feel to be Partner and technical solution supplier for industrial Customers.*
- *Most likely Carrus could find lower price products but our knowledge, testing of materials and local support will make cost savings in the end.*
- *We would appreciate 12 months rolling forecasts.*
- *I would agree to EDI-scheduling and EDI-invoicing to support automatic processes.*
- *We wish to continue our long-term partnership as your supplier for automotive products in the field of audio/video entertainment systems for commercial vehicles.*
- *Thank you for a good cooperation with Carrus :)*

9.1.1 Analysis of the survey results

Regarding the shipments, respondents see that delivery precision is highly valued and that the shipment documents are included to deliveries. All respondents have secured the documents into deliveries. Delivery precision is one of the KPI in use at purchasing function of the Carrus Delta. Delivery precision is highly important among the key suppliers due of their role for providing strategic materials for the production. Reliability against the supplier`s delivery precision will steer shipments performing automatically.

High quality level of the supplier's end products has a very important role. As in the reclamation cases major part of the respondents see that most important aspect in reclamation handling is to secure that the problem will be avoided in future. Also informing the customer about the corrective actions are highly valued. Effective reclamation handling and result monitoring is one of the KPI in Carrus Delta. Carrus Delta and Volvo Buses are conducting periodically field audits for the coaches. Results of the audits will be informed to suppliers concerned and asked for corrective actions.

Role of the informing about changes and quick problem reaction are highly valued among the respondents. Informing about the changes in delivery times is crucial for the preparing of possible late deliveries. Major part of the respondents see that material availability problems will affect highly for the supply chain functionality and further to shipments. Forecasting of material spend is also highly valued with respondents.

Effective pricing has a highly important role with over 50 percent of the respondents. Most important aspects of the pricing are material volume and long-term cooperation. Raw materials price changes have also an important role for pricing. Only two respondents see that commercial contracts have the greatest affect for pricing. Regarding the purchase order template, the major part of the respondents is indicating that there is all the needed information for the ordering. Only one respondent is requiring the regular order forecast. Clear and informative purchase order template will function as a tool for the supplier`s supply process.

Importance of the cooperation with Carrus Delta is highly valued among the respondents. Developing the cooperation with Carrus Delta has a highly important role among the major part of the respondents. These responses will provide the needed ground information for this thesis and further to development proposals for the key supplier relationships.

Regarding the answers of the development proposals there are certain elements. Key factor among the responses is focusing to product range and what kind of new products there are available e.g. service design and aluminum material. There is also proposal that accurate material spend forecasting will develop the cooperation. Some of the respondents feel that the cooperation is at sufficient level with Carrus Delta. On the other hand, those respondents are ready for discussion about the development actions. Main area would be to analyze the product range and compare the material availability between different suppliers.

One respondent is proposing the electronic data interchanges (EDI) processes. These would develop e.g. invoicing processes towards automation. At the moment Carrus Delta is not performing with EDI processes but this possibility can be evaluated in future.

9.2 Conclusions and recommendations to purchasing function

Regarding the survey answers, there is, among the key suppliers, interest to develop cooperation with Carrus Delta. Theory part in table 7 describes the aspects of the four different supplier strategies. This study focuses to key suppliers and partnership and securing the supply strategies. Purchased materials in this category are strategic and bottle necks. Key activities for these strategies are accurate forecasting, analysis of the supply risk and search for alternative products. Compared to survey results, author see that accurate forecasting is easiest to implement to operational purchasing tasks. This was also asked for one respondent by adding the information to purchase order template. It also worth remembering that forecasts should be accordance with expected annual volume and the volumes can fluctuate.

Analysis of the supply risk is related to KPIs delivery precision and detected quality problems. These KPI values can be analyzed and further reported from the information of the LEAN-system. Respondents are indicating the importance aspects of informing about changes and for effective quality handling. Time for alternative material or supplier searching can be evaluated only by material and supplier availability and production possibility case by case.

Strategic and bottle neck materials should evaluate by grouping materials and compare if there are substitutive suppliers available. Request for quotations can create for e.g. 20 highest critical and volume materials. Target is to focus the material range for one or few key suppliers as related to survey answers" we *are specialists in light wights, composites sandwich panels and so on ... so our knowledge could be used better to make carrus products more competitive against other bus manufacturers* and "Mos*t likely Carrus could find lower price products but our knowledge, testing of materials and local support will make cost savings in the end.* Major part of the respondents see that the volume will affect highest for pricing. These kinds of materials are quite customized, but the raw materials are available and supplier's production capability is at sufficient level.

As stated in theory section 6, the purpose of the supplier performance management SPM is to reveal risk areas at early stage and develop actions constantly. New KPI for the purchasing function could be advanced shipment notifications ASN which compares variance between purchased quantities and dispatched quantities. Purchasing indicators are available and partly in use in LEAN-system. There is available information for delivery precision, late and early shipments, purchase order quantities and values and quantity of material receptions.

Although, author see that developing the relationships with key suppliers requires providing reports for supplier`s performance and for their development actions. This is also covered in figure 9 section "Supervise your suppliers" by sending monthly reports and providing constant feedback. Monthly report could include information about delivery precision, quality issues and other major risk areas. This method is suitable for problematic suppliers and it also requires common interest for these kinds of developing actions. Results can provide opportunity for creating deeper relationships.

Regarding the status of the relationships, there can be used for Weele`s evaluating questions e.g. which areas are balanced and which are dominant by others, are the chosen suppliers best in class, what would be major problems in supply chain and what kinds of development activities there are with key suppliers. Balance of the relationship with Carrus Delta`s key suppliers can be evaluated by the received customer service and accurate information, flexibility of the shipments and new material development. Criteria for best suppliers are e.g. creditability, willingness for new product development, quick response rate and clear history background. Major problems in supply chain are related to material availability. Forecasting the material spend will provide the needed information for avoiding material availability problems.

Balanced supplier relationships, as covered in chapter 6, requires open communication, problem solving ability and trustiness. These aspects can be developed by providing performance information and to commit for active cooperation. Operational and strategic relationship outcomes should monitor and develop constantly. Relationship power balance can be evaluated by using the product and supplier portfolio model in chapter 4. Evaluating starts from the analysis of material impact for the profit and the risk for supply. This study focuses for key suppliers and strategic and bottle neck products of them and there for the portfolio model provides comprehensive starting point for grouping suppliers and products.

Purchasing process is defined clearly and monitored tightly now. Although author see that there should perform actively for KPIs development areas e.g. by providing monthly or quarterly reports of supplier`s performance and development areas. Results of the KPIs should evaluate straight in the end of the follow-up time and inform the supplier about the performance. Further development actions are commonly agreed with the focus of positive supplier relationship development.

Author see that following aspect summarizes the key areas for the supplier relationship development:

- Monthly or quarterly performance reports and feedback to supplier
- Material evaluation, categorizing and concentrating to potential suppliers
- New KPI Advanced Shipment Notification
- Effective use of supplier strategies e.g. material forecasting, evaluating supply risk and alternative suppliers
- Active supplier cooperation and sharing accurate both sided information

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APPENDIX 1

COVER LETTER
DEVELOPING SUPPLIER COOPERATION

Please find a link for survey questions related to my Master Thesis project. I am conducting my Master of Business Administration (MBA) studies and this survey is a research part for developing supplier cooperation with Carrus Delta Oy. Questions of this survey are consisting of shipments, pricing, quality, ordering and informing and cooperation. I would be highly appreciated if I would receive your answers within two weeks, 19/2/2018 at the latest. Answering takes only 5 minutes. Please start answering from the section *FILL OUT FORM* and add your email address in the beginning of survey.

CARRUS
CARRUS DELTA OY

Thank you in advance for your answers!

SUPPLIER SURVEY

SURVEY SECTIONS:

1.) Shipments
2.) Quality
3.) Informing and forecasting
4.) Pricing and orders
5.) Cooperation

1.a) How important is the delivery precision for you? *

	1	2	3	4	5	
Low	○	○	○	○	○	High

1. b) How important is that all the shipment documents are included to deliveries?

	1	2	3	4	5	
Low	○	○	○	○	○	High

1. c) How have you secured that all the necessary shipping documents and delivery notes are included to deliveries?

- ○ Placing the documents to crates or to pallets
- ○ Sending the documents via email or via post
- ○ Sending the documents only when customer has asked for those
- ○ Not have secured

2. a) How important is the high quality of your end products? *

	1	2	3	4	5	
Low	○	○	○	○	○	High

2. b) What are the most important aspects in quality handling? Please choose 1 best suitable option.

- ○ Check the quality of claimed material
- ○ Provide the complementary material
- ○ Inform the customer about the corrective actions
- ○ Securing that the problem will be avoided in future

3. a) How important it is for you to react problems quickly? *

	1	2	3	4	5	
Low	○	○	○	○	○	High

3. b) Will you inform about changes in delivery times? *

- ○ Yes
- ○ No

3. c) What would be the major problems in supply chain? Please choose 1 best suitable option.

- ○ Material availability
- ○ Machine brake down
- ○ Strikes
- ○ Quality problems

3. d) How important is the forecasting of annual material spend for you? *

	1	2	3	4	5	
Low	○	○	○	○	○	High

4. a) How important role has the effective pricing for you? *

	1	2	3	4	5	
Low	○	○	○	○	○	High

4. b) What are the main guidelines for your pricing? Please choose 1 best suitable option.

- ○ Material volume
- ○ Raw material price change
- ○ Forecast of material spend
- ○ Commercial contracts
- ○ Long term cooperation

4. c) Do you feel that our purchase order template includes all the needed information clearly?

- ○ Yes
- ○ No, please answer to 4 d)

4. d) What information is missing?

5. a) How important do you see the cooperation with Carrus Delta Ltd? *

	1	2	3	4	5	
Low	○	○	○	○	○	High

5. b) Your interest to develop cooperation with Carrus Delta Ltd? *

	1	2	3	4	5	
Low	○	○	○	○	○	High

5. c) What kind of development areas there would be?

Short-answer text

6. Free comments

Long-answer text

2. VOLVO GROUP ENVIRONMENTAL POLICY

The Volvo Group's goal is to be ranked as a leader in terms of Environmental Care among the world's top producers of transport-related products, equipment and systems. The Volvo Group's Environmental Care programme shall be characterized by a holistic view, continual improvement, technical development and resource efficiency. These means shall give the Volvo Group a competitive advantage and contribute to sustainable development.

Holistic view

In our efforts to reduce the environmental impact of our products, operations and services, we shall:

☐ take the complete lifecycle into account

☐ take a leading position regarding environmental care, everywhere we operate around the world

☐ comply with legal and other applicable requirements as a minimum standard

☐ make pollution prevention a prerequisite for all operations

☐ engage suppliers, dealers and other business partners within our sphere of influence to adopt the principles in this policy.

Continual improvement

Environmental Care shall be integrated in all our operations and be improved continually by:

☐ formulating, communicating and monitoring clearly defined goals

☐ engaging our empbyees

Technical development

We shall strive to exceed our customers' and society's demands and expectations by:

☐ active,pioneering research and development

☐ developingtransport solutions with a low environmental impact

☐ promoting the development of harmonized legal requirements

☐ continually reducing our products' fuel consumption, emissions, noise and impact on climate change

☐reducing the use of environmentally harmful materials.

Resource efficiency

By taking the complete lifecycle of our products and industrial operations into account, we shall:

☐ minimize our consumption of natural resources

☐ minimize and responsibly manage our waste and residual products.

3. ENVIRONMENTAL REQUIREMENTS FOR VOLVO GROUP SUPPLIERS

- Suppliers are also responsible for their respective sub-suppliers for deploying these requirements through their supply chain.
- Suppliers must comply with applicable environmental legal requirement.
- Supplier must confirm that the product composition fulfils legal requirements for relevant markets
- Suppliers must have knowledge of the Volvo Group Environmental Policy.
- Suppliers of production materials and services on regular call off' s and schedules, shall be third party certified to ISO 14001or EMAS (Eco Management and Audit Scheme). According their specific Business criteria, each TD/BA can adapt where the full requirements will be implemented, after approval from Volvo Group Environmental Committee.
- Suppliers must be able upon request to report on their environmental work, including organisation, fulfilment of legal demands, and environmental results.
- Suppliers shall maintain an open dialogue with Volvo Group concerning achievements, trends and possibilities for environmental improvements.
- Environmental related data from production, products and transport must be available upon request for Volvo Group to enable environmental assessments (ex. Life Cycle Assessment).
- A supplier that is responsible for planning and choosing packing materials for products delivered to Volvo Group should do it in such a way that the total environmental impact is minimised in accordance to legal requirement.
- Suppliers should handle excess and rejected materials in a manner which minimizes impact on the environment.
- Suppliers shall consider recycled/recyclable materials when selecting materials and design solutions.

4. GUIDELINES FOR SELF ASSESSMENTS

4.1 Purpose

The purpose of the self assessment is to give Volvo Group an overview of the environmental status of its suppliers. Focus on implementation of ISO14001 or EMAS, fulfillment of the Volvo Black, Grey and Red lists and the possibility of reporting on International Material Data System, IMDS. Give information, if all the suppliers situated in the European Union (EU) and non-EU suppliers of chemical products, are in compliance with the REACH legislation.

Volvo Group expects its suppliers to demonstrate professionalism, transparency and ensure traceability of records (if & when required) when providing answers to the self-assessment questionnaire.

4.2 Environment - Use of the questionnaire

This questionnaire is part of the Supplier Evaluation Model (SEM) for Volvo, giving the score for the environmental assessment.

The supplier is requested to decide whether the assessment should be filled out for each operation site (delivering to Volvo Group), or be combined for all sites. The supplier shall document each Volvo Supplier number (Parma number) that is covered by the answer to the questionnaire.

Volvo Group reserves the right to conduct audits at supplier's premises (including their subcontractors where applicable) either by themselves or through their authorized service providers such as an external audit services company on be-half of the Volvo Group, to assess the compliance levels claimed by the suppliers via this self-assessment questionnaire.