

HANDBOOK FOR SUPPLY CHAIN RISK MANAGEMENT

*Case Studies, Effective Practices
and Emerging Trends*



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PART I

MANAGING RISK IN GLOBAL SUPPLY CHAINS

Chapter 1:

INTRODUCTION TO MANAGING RISK IN GLOBAL SUPPLY CHAINS

Supply Chain Risk Overview

- Failure to manage supply chain risk effectively can have significant negative impact on organizations
- Economic, political, and social developments increase the chances that disruptions will occur as supply chains are becoming more complex
- Additional factors increasing risk profile:
 - Rapid technological changes
 - Advances in product markets
 - Higher customer expectations for better products, lower prices, and quicker response times

Content Overview

Chapter 2

- Ila Manuj and Paul Dittman
- Investigation into the current state of risk management in global sourcing and the barriers to incorporating risk considerations in global sourcing decisions

Chapter 3

- Josef Oehmen
- Case study of three Swiss enterprises and the risks they face in their global sourcing decisions from china

Content Overview (cont.)

Chapter 4

- Michael Smith
- Case Study of how the Chamber of Commerce in Asheville, North Carolina has worked with major manufacturers in the region to create a transportation alliance

Chapter 5

- Simon Burtonshaw-Gunn and Malik Salameh
- Case study details how Blue Sky Aviation considered a series of high level strategic options to establish a strong presence in the Chinese aviation market through strategic collaboration

Content Overview (cont.)

Chapter 6

- Jerry VanVactor
- Discusses the concept of Performance Based Logistics (PBL), and how it is enhancing healthcare supply chain management in southern Afghanistan

Chapter 7

- Bjorn Egil Asbjornslett and Odd Torstein Morkve
- Case study of risk acceptance for greenhouse gas emissions and energy consumption in maritime supply chain systems

Content Overview (cont.)

Chapter 8

- Arben Mullai and Ulf Paulsson
- Case study of a major oil spill in the Baltic Sea, and how it effected maritime associated risk

Chapter 9

- Wojciech Machowiak
- Case Study of a natural gas crisis, and how politics effected the supply chain risk

Content Overview (cont.)

Chapter 10

- Cagri Haksoz and Ozgur Arslan
- Survey of procurement specialists of Energisa Group, a leading Turkish energy organization, and the hedging strategies currently employed

Chapter 2 – Ila Manuj and J. Paul Dittman

CURRENT STATE OF RISK MANAGEMENT IN GLOBAL SOURCING

Trend of Increased Global Sourcing

Benefits

- Lower Cost of Labor
- Cheaper Raw Materials
- Access to Technology

Challenges

- Currency Fluctuation
- Political Changes
- Economic Changes
- Lead Times
- Increases in Inventory
- Quality
- Inventory Ownership
- Legal Recourse

Current State of Risk Management in Global Sourcing Decisions

- Audited ten companies with a broad global sourcing footprint
- Audit interviews covered areas such as logistics, inventory management, sales, forecasting and demand management, purchasing, information systems, store operations, product management and merchandising, finance, sales, marketing, and human resources
- Managers responsible for global sourcing perceived their area of the operation to be more susceptible to risk than their counterparts in other departments

Types of Risks

Cost

- In-Transit Inventory
- Stock-Outs
- Obsolescence
- Damages due to variable lead times
- Currency fluctuations
- Rising wages in low-cost sourcing regions
- Cost of ensuring security
- Natural disasters
- Port congestion
- Intellectual Property loss

Quality

- Suppliers lack of capacity to replace defective parts and materials
- Long term reliability of supplies (warranty concerns)
- Actual value realization of low-cost region supplies if quality is lacking

Types of Risks (cont.)

Lead Time

- Lack of control due to customs, port congestion, capacity constraints, geopolitical issues
- Impact to customer service – promised delivery dates

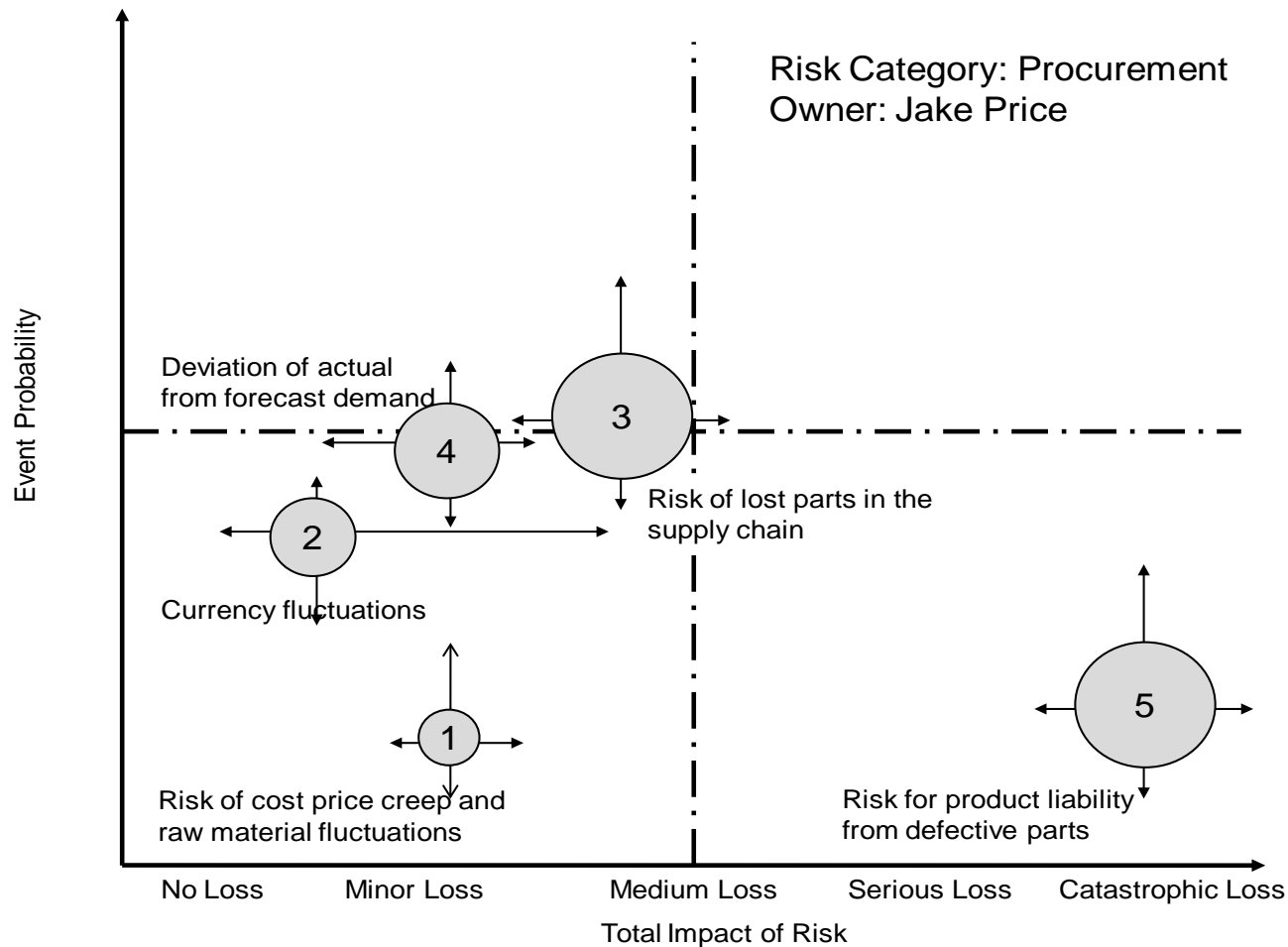
Security

- Increased likelihood of violating the integrity of cargo due to terrorism, vandalism, crime, sabotage, and piracy
- Potential for criminal smuggling exploitation inside cargo containers

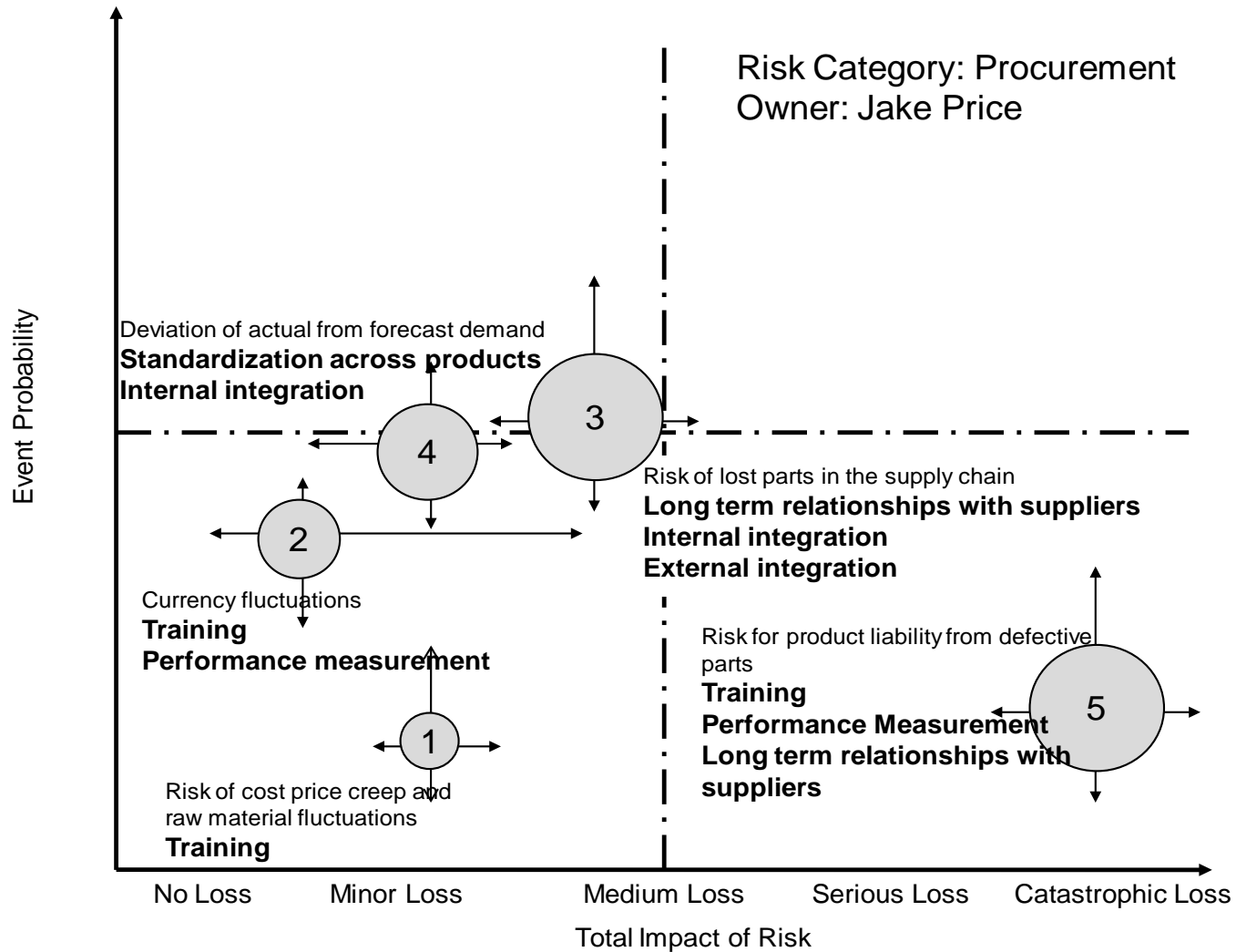
Barriers To Incorporating Risk

- Regional parochialism
- Cost as the main driver of sourcing decisions
- Lack of visibility
- Increased rate of new product introductions
- Rigidity to change sourcing patterns
- Lack of training

Framework For Incorporating Risk



Framework For Incorporating Risk (cont.)



Strategies For Reducing Risk

- Global organizational and total cost focus through performance measurement
- Long term relationships
- Internal and external integration
- Standardization across products
- Staggered new product introductions
- Global sourcing manager training

Conclusion

- The state of risk management in global sourcing decisions is sophisticated and complex. Based on an audit of ten leading global organizations, the most prominent risks were shown to be cost, quality, lead time, and security. Many different barriers hinder the incorporation of risk considerations into global sourcing decisions
- Based on the research provided for this case study, numerous strategies were formed to assist global sourcing managers to evaluate risks in their decisions, link the risks to barriers, and design strategies to overcome these barriers, leading to more robust and less risky global sourcing decisions

Chapter 3 – Josef Oehman

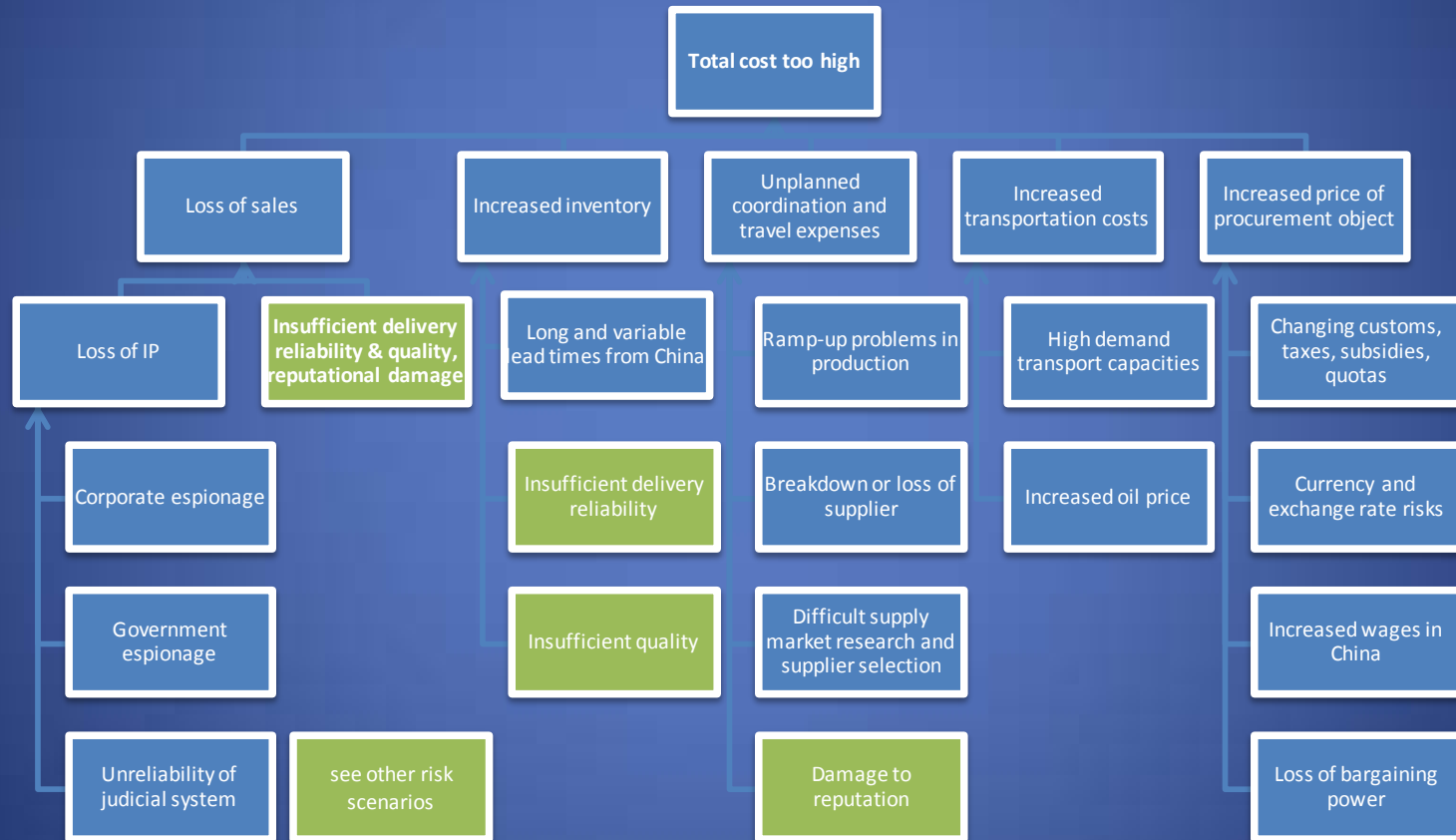
THE SUPPLY CHAIN RISKS OF GLOBAL SOURCING

Introduction

- The People's Republic of China saw continuous and stable economic growth in the late 2000's, with GDP increasing at a rate almost 9X that of the United States in 2008
- Sustained growth has made China an attractive sourcing market, production site, and sales market for Western companies
- Case study summarize research performed at three Swiss small and medium-sized enterprises (SMEs) in the years 2007-2009, and detail the four main supply chain risk scenarios found by these companies

Risk Scenario 1

“Total Costs Too High”



Risks Associated with “Total Cost Too High”

- Loss of sales
- Loss of intellectual property
- Unreliability of the judicial system
- Increased inventory
- Unplanned coordination and travel expenses
- Increased transportation cost
- Increased price of procurement object
- Currency and exchange rate risks
- Increased wages in China

Risk Scenario 2

“Insufficient Delivery Reliability”

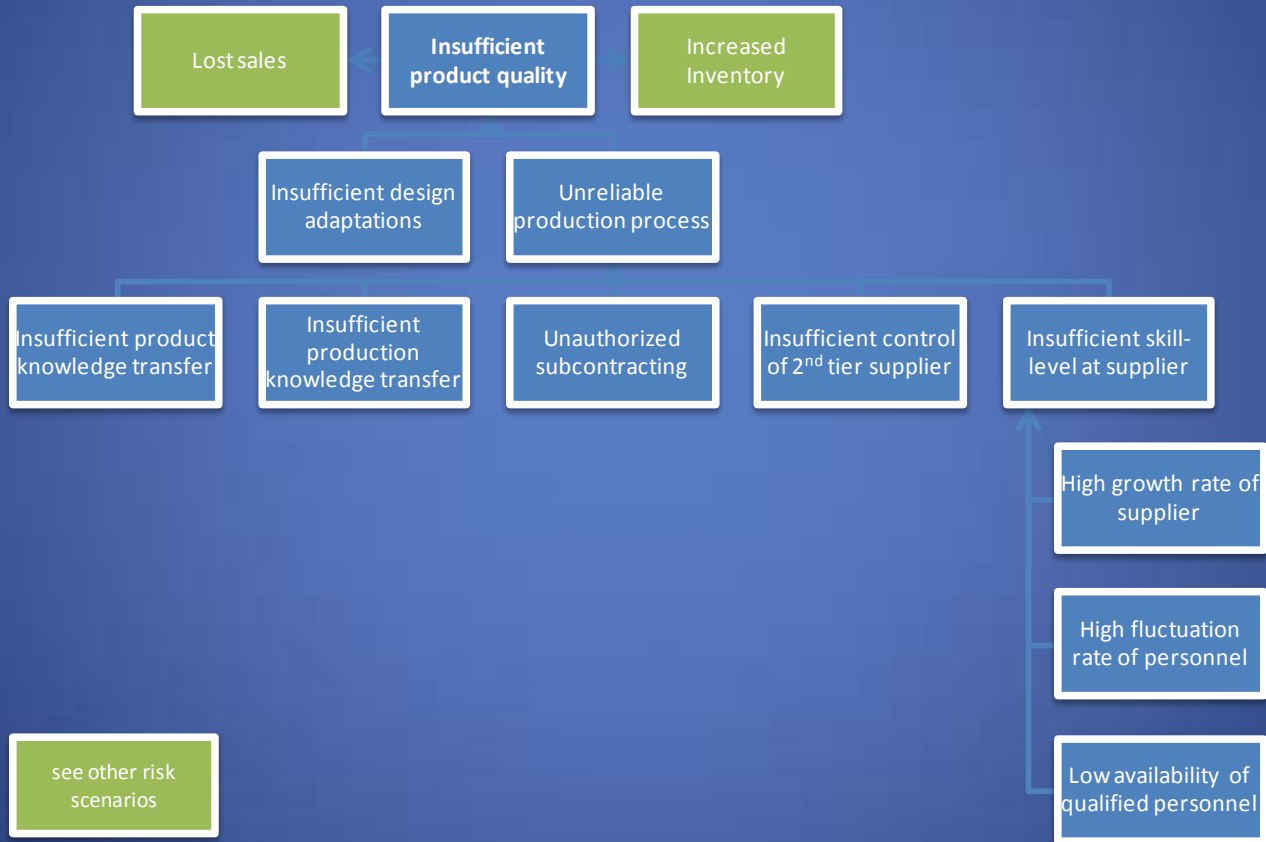


Risks Associated with “Insufficient Delivery Reliability”

- Breakdown or loss of supplier
- Difficult supply market research and supplier evaluation
- Loss of bargaining power

Risk Scenario 3

“Insufficient Quality”



Risks Associated with “Insufficient Quality”

- Insufficient design adaptations
- Insufficient skill level at supplier

Risk Scenario 4

“Damage to Reputation”



Risks Associated with “Damage to Reputation”

- Non-conformance to regulations and insufficient communications management
- Environmental damage
- Social unrest

Conclusion

- This case study described the supply chain opportunity three Swiss businesses sought out in sourcing from China, and the risk management processes and tools they used to make this decision
- Each company had a similar risk exposure in the China sourcing decision. Even though each had different risk mitigation measures to meet this exposure, some common themes among the companies did emerge, such as identifying and assessing the risk, transparency, intellectual property rights protection, and the management of bargaining power in buyer-supplier relationships

Chapter 4 – Michael E. Smith

**TOO BIG FOR THE INDIVIDUAL FIRM:
CREATING COOPERATIVE NETWORKS TO
SOLVE DIFFICULT SUPPLY CHAIN RISK
CHALLENGES**

Introduction

- Supply chain risk management (SCRM) is a relatively new concept for supply management professionals
- Case study summarizes how some firms are taking a cooperative approach to dealing with risks that are beyond their immediate control
- Provide steps supply managers can use to develop similar opportunities that will help recognize and mitigate supply chain risk sources that could have a substantial impact on their firm's performance

Limitations of Current Approaches to SCRM

- Current focus on risk at the level of direct suppliers, with the focal point being supplier performance as opposed to the firms relationship with the supplier
- Performance issues may be linked to a risk common in all similar suppliers
 - Considered an industry risk
 - Beyond the control of the individual firms
- Currently there is little guidance for managers in dealing with these types of risks
- The future of SCRM will require more cooperative social actions among groups of firms to influence risk experienced at more general levels

Freight Transportation as a Source of Shared Risk

- A common supply risk shared by many firms is transportation due to many systemic factors beyond the control of individual firms
- At a time when firms are operating with low levels of inventory, variation in deliveries can cause added stress in difficult economic conditions
- The Chamber of Commerce in Asheville, NC has worked with manufacturers in there region to develop a transportation alliance, helping to mitigate this risk

The Value of Cooperative Efforts

- The Western North Carolina Transportation Alliance represents the interests of number of firms with common shipping interests
- Members have realized lower risk exposure with continued shipping flexibility in a cost competitive manner due to there cooperative efforts and better use of freight assets
- Limiting these risks has added value to the firms without major capitol investment or untimely government action

Developing Cooperative Efforts

- The Western North Carolina Transportation Alliance was started as a college project by an employee of Volvo Logistics North America
 - Key concept of the project was that transportation challenges faced by individual firms could be lessened by exchanging knowledge and data related to transportation needs and plans with other firms
- This type of alliance is rare
 - Research has shown that many Chambers of Commerce lack the initiative and understanding to create such cooperative efforts
 - Education provided by supply management professionals will help in the facilitation of these type of interactions

Chapter 5 – Simon A. Burtonshaw and Malik G. Salameh

DEVELOPMENTS IN ORGANIZATIONAL PERFORMANCE THROUGH STRATEGIC SUPPLY CHAIN COLLABORATION

Introduction

- Supply chain management has grown beyond just purchasing to planning, implementation, and control of suppliers with the goal of delivering a more integrated service to its customers
- Few companies can achieve this on their own, especially on a global scale
- Strategic alliances and partnerships have increased to meet these circumstances
- This case study will review the example of “Blue Sky Aviation,” and what high-level strategic options were considered in establishing a stronger presence in the Chinese aviation market

Understanding The Indigenous Airport Market and Operational Environment

- Due to economic and political reasons, air travel in China has only become prominent in the past 30 years
- Airspace has been given over to civilian or dual usage with the military only recently
- A detailed market and SWOT analysis of existing and proposed airports was created to assist Blue Sky understand the Chinese Aviation Market

SWOT Analysis Results

Strengths	Weaknesses
<ul style="list-style-type: none"> • Company name, credibility and global status. • Proven core competencies in airport developments. • Proven prime contract management capability gained through other international projects • Company's funding capability. • Risk management capability. • Large scale program/contract integration experience. • Existing partnerships. • Substantial expertise with JV's and strategic alliances. • Balance sheet strength. • Blue Sky's capability to innovate and provide strategic and tactical solutions for technically complex high value projects in difficult markets 	<ul style="list-style-type: none"> • Blue Sky's perception that airports are non-core business by internal stakeholders. • Unwillingness to fund any form of long term business development activity. • Ineffective market research, market analysis and customer analysis through in-country presence. • Organization performance focused; therefore financials need to show short-term return. • Understanding of economic regulation and macro environment including political, legal, social, cultural, technical and economic factors. • No large-scale successful regional experience. • Credibility linked to other aviation projects. • Company could come under pressure to produce results because of the high cost of being in country, making it more difficult to slowly adapt to prevailing market conditions • Joint ventures may be a suitable option in other parts of the Blue Sky's portfolio, even with a large equity stake in ; they can often be an uneasy marriage. • Unreasonable demands from local suppliers and officials require trust and confidence in the Chinese partner's local expertise, to solve these problems with joint ventures in mind.

SWOT Analysis Results

Opportunities

- Leverage for other sales/services directly or indirectly through airport prime such as radar, aircraft, equipment, and training.
- Build long-term strong relationships and regional presence for company.
- Planned economy and 5 year plan provides opportunities, both within and external to the plan.
- Scale of deliverables and associated risks provide some good barriers to entry.
- Chinese partner is key enabler to success; Blue Sky has strength to leverage high level UK Government support.
- CAAC (Civil Aviation Authority of China) injecting more commercialisation into airport systems using private finance; to include hotels, rail links, ground handling, concessions, cargo terminals and maintenance facilities (no equity limit applies to these airport services)
- Merger and consolidation amongst the top and 2nd & 3rd tier airlines respectively, due to safety or financial health reasons may provide a source for a JV partner (CAAC rationalising member airlines into 3 main groups)
- Much needed expertise in airport operations (including safety) not just commercialization consultancy could provide a tactical entry point to the Chinese market.
- Debt-for-equity swaps may provide solutions to possible partnership issues for indebted enterprises that have good prospects and wide networks (may require management influence from investor to be successful).
- Chinese subsidiary of a foreign investment organization will allow it to be listed on the Chinese stock exchange.

Threats

- Lack of high level political support consider: essential to have the highest level relationships.
- Lack of inclusion in the five year planning horizon may constrain business and market opportunities, unless business opportunity under consideration can be shown to be critical in the Five Year Development Plan timeframe.
- Intellectual property infringements have proved taxing for all foreign investment organizations, especially under Chinese law and in the maintenance of harmonious JV relationships.
- Business capture costs much higher than human capital costs.
- Equity stake may have to be hard cash and not partially provided through the value of human capital and knowledge (more prominent in less developed provinces).
- Lack of visibility of PRC Government's latent needs, wants and desires, could restrict the success rate of securing new business.
- Targeting airport developments outside of key metropolitan and favoured tourist areas may prove high risk as these have historically accounted for 95% of traffic volume.
- Acting in accordance with indigenous supply chain capabilities may prove a hindrance because of the maturity of the systems utilised.
- Gradual abolition of special privileges and incentives to foreign investors in an attempt to level the playing field between foreign and domestic companies.
- Historical legacies such as the "cradle to grave" guarantees of employment will have an impact on long term business partnerships and the level of protectionism (very prominent in Civil Aviation industry – privileged status).
- Chinese dependency on political decision making.

Business Analysis

- Based on the market research, Blue Sky Aviation developed a partnering value proposition, considering the major factors that would effect there business strategy options
- A partnered support performance management system based on key Performance indicators (KPI's) was created to generate buy-in from the internal stakeholders and governance
- A partnership approach ,while attractive, still holds inherent risks
- The risks associated with the Blue Sky Aviation business strategy are shown using a traditional PESTLE (Political, Economic, Social, Technology, Legal, Environmental) approach

Conclusion

- When a supply chain partnership approach is regarded as an attractive and appropriate entry vehicle, this strategic choice is not without risk, and needs to be proactively addressed
- Strategic partnering is unlikely to yield the full performance benefits in the short term. For a long term alliance to be successful, there will need to be significant organizational investment to help foster and encourage a culture capable of embracing significant change

Chapter 6 – Jerry D. VanVactor

PERFORMANCE BASED LOGISTICS IN CONTINGENCY HEALTH CARE OPERATIONS

Introduction

- Health care related supply chain management is very unique and specialized
 - Short shelf life of supplies
 - Heightened potential of stock outs and shortages
 - Consequences of stock outs (i.e. patient injury or death)
- Military or crisis medical events only exacerbate these challenges
 - Array of personnel involved
 - Unpredictability of emergency situations
- This case studies the medical operation in a militarized zone of Afghanistan, and the importance of Performance Based Logistics in managing risk

Performance Based Logistics Explained

- Performance Based Logistics (PBL) management strategies represent a capabilities based approach to supply chain management
 - Link resources to value chain activities
 - Provide more flexibility to stakeholders to make trade-offs that balance performance, time, and available resources
- PBL management describes supply chain management as a complete package of services and support, coordinating the different aspects of a value chain, and doing so without losing the quality of a product or customer satisfaction, while continuing to keep costs low

Importance of Performance Based Logistics

- Lowering the effects of unexpected surges in demand, such as combat scenarios
- Cost savings due to increased communication between suppliers, supply managers, and end users, such as the use and availability of generic vs. name brand drugs

Logistics Footprint

- PBL for healthcare in Afghanistan carries many inherent risks due to the operational environment
 - Transportation
 - Distribution
 - IM/IT
 - Security
 - Lack of national infrastructure
- Three main areas of consideration
 - Inventory
 - Capacity
 - Time

Operational Availability – What About Risk?

- Military supply chain operations routinely encounter operational risk, and should be continually assessed to reduce the impact on personnel and mission readiness based on the varying degrees and types of risk commensurate with the operation
- Risk mitigation plans are necessary to understand future demand and the replenishment process, and should include processes for adjustment as requirements change
- The efficient flow of supplies among separate entities is better managed when risk is shared among multiple, collaborative stakeholders

Mission Reliability

- Reliability plays a significant role in readiness, and is a measure of the system's ability to achieve mission success objectives
- Sustainability involves developing supply chain response capabilities that meet the continually evolving needs of a customer without compromising the suppliers' abilities to meet future demand
- Inherent in these concepts is the responsibility of the end-user to communicate identified demands to suppliers as soon as possible

Cost Per Unit Usage

- Cost in medical supplies is a significant component of health related expenses
- Understanding customer demand accommodation rates are a more realistic statistic concerning the volume of supplies used, as opposed to looking at just cost

Conclusion

- Performance based logistics is about results, and is comprised of an integrated and affordable performance package designed to optimize readiness through long-term support arrangements
- Health care logistics and supply chain management are highly complex, and can be hard to manage due to lack of expertise and ill-interpreted translations regarding supply chain metrics. Performance based logistics provides an approach with greater flexibility for the stakeholders, and encourages more creativity and innovation among the practitioners

Chapter 7 - Bjørn Egil Asbjørnslett and Odd Torstein Mørkve

RISK ACCEPTANCE OF GEEC[®] RISK IN MARITIME SUPPLY CHAIN SYSTEMS

Introduction

- GEEC is an abbreviation for “Greenhouse gas Emissions and Energy Consumption”
- Maritime supply chain or maritime logistics can be defined as a logistics system in which sea transport constitutes a major part of the logistics chain
- This case study provides information on how to evaluate both cost effectiveness and lower greenhouse emissions for a new shipping opportunity using multi-objective programming

Tender Requirements

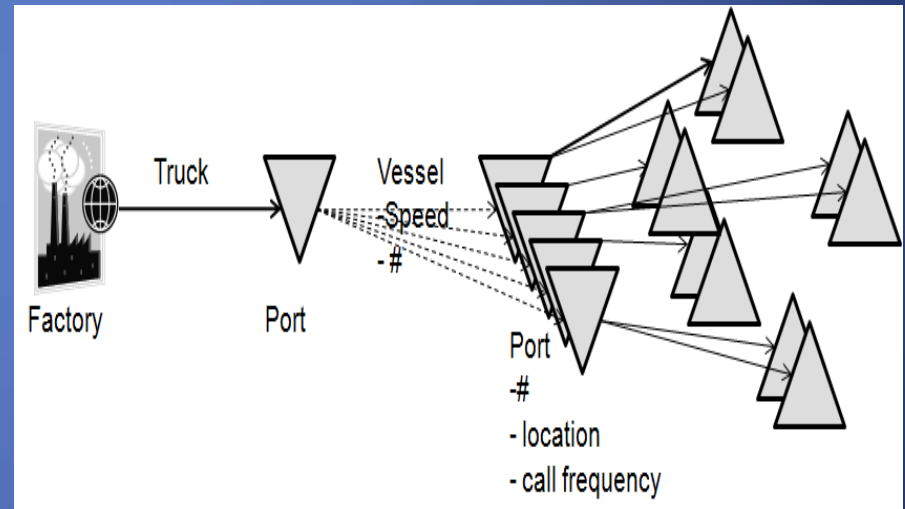
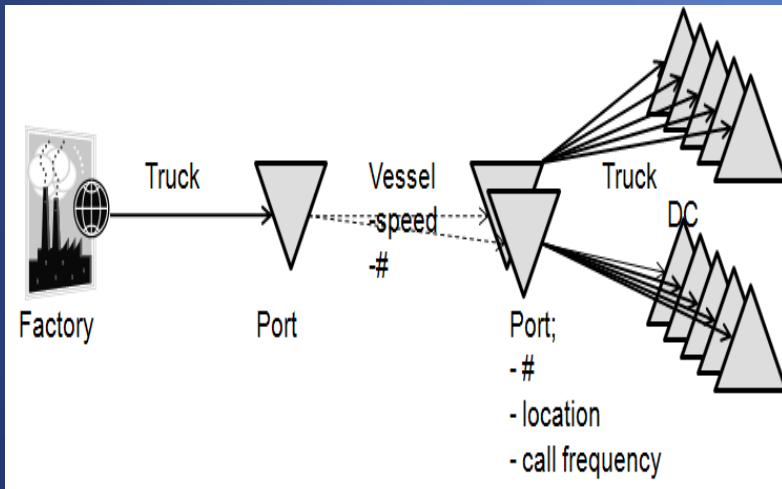
The cargo owner tender requirements included:

- Volume and volume distributions
- Sailing patterns/schedule
- Vessels to be used
- Environmental performance of the suggested transport system
- Logistics system

Factors for Consideration

- GEEC Shipping answered the invitation to tender, providing the owner with information about :
 - Proposed maritime routes
 - Description of vessels to be used
 - Frequency for each route to be served
 - Total system costs and costs per load
 - Total GHG emission and energy consumption
 - Carbon footprint for a unit of transported cargo
- GEEC Shipping also provided a description of alternative transport systems based on operational changes in the system
 - Analysis of routes
 - Types and numbers of ships
 - Frequency and volume distribution to each port of discharge for alternative solutions
 - Distribution from port of discharge to distribution centers

GEEC Supply Chains for Analysis



SC Tender Requirements

To meet the requirement of the tender, GEEC Shipping created a proposal and analysis framework for the following areas:

- Establish a cost and carbon footprint baseline
- Establish a SC design based on minimum cost optimization
- Establish a SC design with minimum CO₂ emission optimization
- Risk evaluation of a cost and CO₂ emission position
- Seeking a cost effective risk acceptance through modeling a balanced cost/ CO₂ emission, in a transparent way that meets cargo owners' need for information

Multi-Object Programming and the Efficient Frontier of the Balanced Solutions

- Through their cost analysis, GEEC shipping realized that there were considerable cost and emission differences between the optimized SC design solutions
- A multi-objective programming model seeks to find efficient solutions in which no improvement in one objective function may be obtained without degrading other objective functions.
- GEEC Shipping created a balanced model for their objective function that gave weight to both cost and emissions. Graphing this function showed that marginal cost reductions would lead to substantial increases in emissions.

The Cost Versus CO₂ Emission Risk Picture Trade-Off

- The GEEC Shipping analysis showed that they could reduce the SC cost position considerably from the “as-is” situation, but there would be some increase to that cost if an owner wanted to lower the carbon emission levels
- The next step was to calculate the level of cost savings and CO₂ emission reduction that would satisfy the owners risk acceptance criteria, which was found to be a split focus between the two of 90/10

Conclusion

- Through the use of multi-objective programming, GEEC Shipping was able to meet the tender requirements as set out by the owner, and provide a solution that lowered costs as well as brought emissions levels within the risk acceptance level of the owner

Chapter 8 – Arben Mullai and Ulf Paulsson

AN ANALYSIS OF A MAJOR OIL SPILL CASE IN THE BALTIC SEA

Introduction

- Large quantities and types of dangerous goods are frequently transported and handled in the Baltic Sea Region (BSR) with increases expected to double or triple by the year 2015
- This case study of a major oil spill in the BSR is used to help enhance the understanding of maritime risks and propose measures for improving risk management

Case History

- On March 29th, 2001 a tanker ship and a bulk carrier ship collided in the western Baltic Sea between Germany and Denmark, dumping 2,400 tons of fuel oil in the sea
- The fuel oil drifted to land, seriously affecting the marine environment, public and private properties, and activities ashore in this environmentally sensitive and economically important area



Risk Analysis

The main steps of the risk analysis in this case study are:

- System definition
- Hazard identification
- Exposure and consequences analysis
- Risk evaluation and presentation
- Final conclusions and recommendations

Risk Analysis Steps

System Definition

Supply Chain – A network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumers

Hazard Identification

- Exploring the causes and contributing factors by providing answers to the question “what went wrong?”
 - Loss of steering
 - Disturbance in the steering system
 - Inadequate seamanship

Risk Analysis Steps (cont.)

Exposure and Consequences Analysis

- Oil Clean-up
- Human consequences
- Marine environment consequences
- Maritime transport
- Supply chains
- Publicity, media, and legal implications

Risk Evaluation and Presentation

- Severity of aggregated consequences – 4 on ALARP region
 - People, severity ranking of 5
 - Assets, severity ranking of 4
 - Environment, severity ranking of 3
 - Reputation, severity ranking of 2

Risk Analysis Steps (cont.)

Final Conclusions

- Collision occurred as the result of an unfortunate combination of technical failure, human factor errors, and unfavorable weather conditions
- The response operations made a difference in the consequences of the oil spill

Recommendations

- Perform detailed quantitative studies on maritime risks
- Establish risk criteria for individual countries based on quantitative risk studies
- Efforts should be made to improve cooperation in response to incidents

Chapter 9 – Machowiak Wojciech

POLITICAL RISKS IN CONTEMPORARY SUPPLY CHAINS: THE CASE OF THE NATURAL GAS CRISIS

Introduction

- Natural gas (NG) is growing increasingly important in the world's energy balance today and will continue to be important in the near future
- The Russian company GAZPROM Group possesses the world's largest natural gas reserves, with many surrounding countries procuring their gas supplies solely from Russia
- Events in 2009 showed how dangerous this dependence can be, and the importance of managing political supply chain risks

2009 Russia-Ukraine Gas Crisis

- In January of 2009, several EU countries were left either completely without or with substantially lessened gas supplies due to a supply halt at the Russia-Ukraine border
- Many factors contributed to this, but actions mainly of a political nature played essential roles in the course of events
 - New GAZPROM pipelines to serve the EU
 - Ukraine's desire to become part of NATO

PGNiG (Polish Oil and Gas Company)

Fundamental risk factors in the gas supply chain for a company such as Polish Oil and Gas Company:

- Excessive dependence on a single supplier
- Insufficient stored gas reserves
- Limited capabilities of increasing gas production from domestic resources
- Existing infrastructural facilities
- Wrong or disadvantageous records and clauses included into gas supply contracts with GAZPROM

Conclusion

- It is impossible to completely avoid or eliminate political risk in supply chains. Some risks may be “management proof” or uninsurable, but efforts should still be made to minimize risks
- To position yourself for political risk management and necessary strategic decisions, a variety of sources including diplomatic and intelligence reports, legislator terms of office, political and social events, and political tendencies should be closely monitored as understanding them is fundamental to the successful management of political risks

Chapter 10 - Çağrı Haksöz and Özgür Arslan

ENERJISA: MANAGING PROCUREMENT RISKS IN THE TURKISH ENERGY INDUSTRY

Company Background

- Enerjisa is owned by Sabanci Group, Turkey's biggest industrial and financial conglomerate, and Verbund, one of the most profitable energy utilities in Europe
- Enerjisa aspires to be the leader in the Turkish electricity market, with strategic goals such as:
 - Having a diverse generation portfolio
 - Reaching a minimum Turkish market share of 10% by 2015
 - Privatization of electricity distribution and generation industry in Turkey
 - Expanding into other fields of energy activities internationally
- Involved in power generation, electricity wholesale and trading, and power distribution

Procurement Manager Responsibility at Enerjisa

Existing Power Plants

- Procuring raw materials
- Spare parts
- Chemicals
- Maintenance services
- Misc. supplementary materials

Investment Projects

- Preparing contracts and commercial specifications
- Opening tenders and negotiating with companies
- Requesting and evaluating offers
- Purchasing goods and services

Managing Risks in Procurement Management

This case study shows the five main practices of procurement risk management at Enerjisa:

- Procurement risk awareness: drivers of procurement risk
- Procurement risk assessment
- Risk hedging and mitigation
- Managing learning and procurement talent
- The path forward

Procurement Risk Awareness: Drivers of Procurement Risk

- Supplier related risks
- Market related risks
- Disruption risks
- End-customer demand risks
- Environmental risks
- Regulatory/political risks
- Strategic risks

Procurement Risk Assessment

- Enerjisa uses mainly judgmental methods and heuristics to assess their procurement risks
- Currently there are no formal mathematical tools designed for procurement risk assessment, but designing such tools is in progress
- Enerjisa computes the business impact of supply price/cost increases by experience
- Procurement risk is explicitly considered while selecting and evaluating suppliers

Risk Hedging and Mitigation

- Enerjisa uses many different operational hedging strategies
 - Creating relationships with suppliers
 - Establishing a portfolio of suppliers
 - Restricting a supplier in one region to only one project
- Financial hedging strategies used including insurance and designing supply contracts with beneficial terms and conditions
- Financial instruments such as forwards, futures, and options are not commonly used
- Mitigation of procurement risk is also performed at Enerjisa through closely monitoring the financial health of their suppliers

Managing Learning and Procurement Talent

- Learning and knowledge creation is a focus
 - Cross learning through different projects
 - General and specialty training
- Talent selection for new employees is based on four main criteria:
 - Potential to grow and learn (primary selection criteria)
 - Enthusiasm
 - Experience
 - Market and industry knowledge

The Path Forward

- The future outlook for Enerjisa is quite positive due to their procurement risk management strategies
- The development of a sound company procurement culture is crucial, and as types of risks and their dependencies increase, the procurement teams must continue to hone their skills

PART II

TOOLS, TECHNIQUES,
AND
APPROACHES

Chapter 11 –

INTRODUCTION TO TOOLS, TECHNIQUES, AND APPROACHES

Introduction

- While Part I of this book focused on supply chain risk from a global perspective, Part II takes a more granular view at the industry and firm levels to provide insight as to how organizations can prevent risk occurrence or recover quickly when problems do arise
- The eight chapters included in Part II include examples of firm practices from the financial, automotive, and aerospace industries, as well as case examples and approaches such as incorporating information systems, strategic sourcing, and analytic tools for assessment and managing supply risk

Content Overview

Chapter 12

- Kurt Engemann, Holmes Miller, and Natalie Denger
- This case describes the process of developing a business continuity strategy from initial project initiation through its evolution and deployment throughout the corporation

Chapter 13

- Constantin Blome, Volker Groetsch, Michael Henke, and Christopher Tang
- This case study compares and contrasts two firms in the automotive industry and their respective approaches in gathering and incorporating data for measuring bankruptcy risk

Content Overview (cont.)

Chapter 14

- Oliver Lavastre
- This case study examines the aerospace industry, and what tools managers can use to choose low risk suppliers, verify their activities, secure product flows, and encourage them to create solutions for managing the supply chain

Chapter 15

- Doug Voss and Keith Helfrich
- Describes a software solution called “Common View” that consolidates data from multiple systems to uncover potential and actualized problems along the supply chain

Content Overview (cont.)

Chapter 16

- Cliff Thomas
- Provides suggestions as to how firms can cost effectively ensure supply chain continuity through analysis of well documented supply chain risks and business disruptions, and some emerging threats

Chapter 17

- Reham Eltantawy and Larry Giunipero
- A case study of an organization that has implemented strategic supply management activities that have reduced risk exposure at both the first and second tiers upstream the supply chain

Content Overview

Chapter 18

- Barbara Baudenzi
- Describes the application of an approach to managing risks on projects called PRORAM as applied to SELEX Sistemi Integrati Spa in Italy

Chapter 19

- Ulf Paulsson and Arben Mullai
- A case study detailing how three companies in various industries applied a disruption risk exposure estimation model

Chapter 12 – Kurt J. Engemann, Holmes E. Miller, and Natalie M. Dengler

MANAGING SUPPLY CHAIN RISK IN FINANCIAL SERVICES

Introduction

- Contingency planning is a highly regulated aspect of the financial services industry
- The history of the firm includes numerous mergers over the years
- Risk assessments important in addressing:
 - Ease of growth into the system
 - Customer conversion
 - Staff training

Supply Chain Risk

- In the mid 1980's, the firm established a group whose focus was operational risk management , propagating a corporate wide contingency planning program
- Facets of this planning program of supply chain risks include:
 - Direct and indirect supplies
 - New York Federal Reserve Clearing House
 - Ongoing increases in customer expectations for immediate service
 - Plans of both customers and competitors

Initial Project Development and Implementation

- A centralized group in the Product and Production Risk Management Department to create a business continuity strategy
- Developed a “good practices” guide for the firm, with specific processes to be used by each business unit for creating the business continuity plan
- Processes address:
 - Project Initiation and Management
 - Risk Evaluation and Control
 - Business Impact Analysis
 - Developing Business Continuity Management Strategies

Business Continuity Plan Implementation

- Plan implementation involved putting the selected criteria alternatives into place, testing the plan, and documenting the plan
- Awareness and training programs put in place to create employee awareness and enable all participants to understand their roles
- Reviews of the continuity plans were performed annually or after any major changes in a service delivery mechanism to ensure the plan was accurate, timely, and complete
- These plans have evolve over time to address the changing organizational, technological, and risk environments

Conclusion

- Through proactive management, a major financial service firm was able to address their risks through contingency planning
- These plans were created, implemented, and continually evolved to adjusting business needs

Chapter 13 – Constantin Blome, Volker M. Groetsch, Michael Henke, and
Christopher S. Tang

A COMPARATIVE STUDY OF FINANCIAL AND OPERATIONAL MEASURES IN THE AUTOMOTIVE INDUSTRY

Introduction

- The current economic crisis has played havoc with many automotive manufacturing companies
- Supplier bankruptcy can result in poor firm performance
- This case study compares two European automotive manufacturing companies, and how these companies with different supply risk management systems (SRMS) mitigate the impact of supplier bankruptcies

Characteristics of the Distinct Supply Risk Management Systems

PrimCar

- Extensive, slightly excessive SRMS, which emphasized the early detection of supply risks
- Deemed to be proactive

MassMobile

- Lean philosophy, used only common sources of information and limited the additional effort for collecting further data
- Deemed to be reactive

Experience With Supplier Bankruptcies

PrimCar

- On average, each supply manager dealt with 4 strategic suppliers filing for bankruptcy
- Key indicators of a supplier bankruptcy were in house notices, request for changes in payment terms, supplier behavior, and personnel fluctuations

MassMobile

- On average, each supply manager dealt with only 1 strategic supplier filing for bankruptcy
- Key indicators of supplier bankruptcy were risk management system warnings, mismatches of supply and demand, rumors, and the suppliers themselves

Reaction to Supplier Bankruptcies

PrimCar

- Crisis management team stepped in to control supplier relations
- Changes in terms for payment times, paying for tools or materials in advance, payment directly to second tier suppliers
- Management support of suppliers

MassMobile

- Supply manager were accompanied by risk managers to control supplier relations
- Financial aid, changes to payment terms, partnerships yielding a long term competitive advantage as opposed to short term profits

Conclusion

- Increasing the scope and volume of supply risk information increases the likelihood of preventing risk mitigation by drawings wrong conclusions
- True cooperative behavior yields more effective risk mitigation than non-cooperative, false, or faked cooperative behavior

Chapter 14 – Oliver Lavastre

**A TOOLKIT TO SECURE SUPPLIES FOR
EFFECTIVE SUPPLY CHAIN RISK
MANAGEMENT IN THE AIRCRAFT
CONSTRUCTION INDUSTRY**

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Introduction

- Quality, cost, timing, and flexibility pressures are among the main factors driving the emergence of supply chain risks
- In this case study, the supply chain risks of a large global aircraft manufacturer, PlaneCo, are examined in regards to supplier relations and tracking in their electrical components division

An Overview of the Supply Chain Risk Management Tool

- To conform with the four typical supply chain risk management methodological steps (risk identification, risk assessment, decision and implementation solutions, and risk monitoring and control) PlaneCo has created four tools for their own SCRM process:
 - Choosing low risk suppliers
 - Monitoring and verifying supplier activities
 - Securing operational product flows
 - Involving the supplier

Tool 1 – Choosing the Lowest Risk Supplier

- PlaneCo not only considers the risks associated with this partner, but also the risk management process used by the partner. This is checked throughout the product's life cycle
- Supply security is based on provider information and management of risk
 - Identify risks
 - Ranking risks
 - Choosing which risks to mitigate
- Once this Supplier Risk Register is created, managers discuss what impact this will have on the supply chain risk management

Tool 2 – Monitoring and Verifying Supplier Activities

- Once the Risk Register is produced, a Supplier Control Review tool is created that details the activity checks required of the supplier
- Closely scrutinized throughout the life cycle of the product, and information is collected by a fourth party logistics provider
- The periodicity of SCR is dependent on the ranking of the supplier provided by the Risk Register, ranging from bi-annual to three year reviews
- The fourth party logistics firm is also reviewed to ensure they are collecting and sharing the appropriate information with the suppliers that conforms with the risk management plan

Tool 3 – Securing Operational Product Flows

- PlaneCo secures materials for its production through Consigned Vendor Manage Inventory (CVMI)
- Stocks of material are located with PlaneCo, but belong to the supplier until the time they are used for production
- Advantageous to PlaneCo and its suppliers both financially and logistically, improving the supply chain through:
 - Faster information transfer
 - Improved planning
 - Enhanced reactivity
 - Overall performance improvement
- Tools to overcome disadvantages include:
 - Traceability of components
 - Initial investment
 - Changes in the billing process

Tool 4 – Involving the Supplier

- PlaneCo contractually obligates their suppliers to be responsible for No Conformity Costs (NCC) to mitigate the risk of low quality products or logistical performance
- The purchasing department of PlaneCo capped the total potential penalty to suppliers at 3% of turnover per quarter
- Goal of the program is to increase supplier performance, not penalize them excessively
- This program has evolved to address supplier concerns and mitigate the chance of supplier price rising due to the potential for penalties

Conclusion

- Securing supplier component flow to PlaneCo was the primary objective in supply chain risk management
- Several SCRM tools were implemented to achieve this goal
- In theory, these tools appear simple to set up and use, but in practice they are complex, and take proactive management from both suppliers and the client
- It is imperative to understand the real advantage of using SCRM and what improvement can be made to enhance the effectiveness and efficiency of SCRM tools

Chapter 15 – M. Douglas Voss and Omar Keith Helferich

USING INFORMATION TECHNOLOGY TO MITIGATE SUPPLY NETWORK RISK

Introduction

- As firms implement supply chain strategies they become more dependent upon their suppliers and their risk of supply disruption increases
- Firms must find a way to incrementally improve supply chain strategies without adding counter-productive inventory and mitigate disruption risk through the exchange of information
- This case study profiles how two U.S. firms use a web base software called CommonView to mitigate supply network risk by monitoring suppliers and exchanging information both internally and externally

Risk Mitigation: The Role of CommonView

- Many supply chain relationships and strategies are based upon acknowledged dependence, which implies that performance of one supply chain partner is heavily contingent upon the performance of another
- Purchasing firms must take proactive steps to audit and assess supplier performance, and communicate this internally and externally
- Supply chain risk management software (SCRMS) such as CommonView can help with this, providing a centralized location to store, find, and communicate the conformance information required of the supplier to the firm

The Risk-Based Supply Chain Monitoring Process

- There are several activities that compose the implementation and use of a SCRMS tool such as CommonView:
 - Define risk based supply chain standards
 - Identify and select participating suppliers
 - Supplier assessment tools
 - Defined certification and audit cycle

Conclusion

- Purchasing firms are faced with the need to ensure product safety, security, and quality
- Assessing suppliers on any of these domains is a daunting task requiring appropriate information technology and processes
- With its many benefits and features, a tool such as CommonView may hold the key to successfully achieving this task

Chapter 16 – Cliff Thomas

PRACTICAL APPROACHES TO SUPPLY CHAIN CONTINUITY: NEW CHALLENGES AND TIMELESS PRINCIPLES

Introduction

- Business continuity involves the planning and resource utilization required to recover critical functions following a business disruption
- A well implemented business continuity program requires leadership and dedication of resources across an enterprise
- Businesses seeking to address supply chain continuity challenges must prioritize activities based on:
 - the pain that will be felt if they are not performed
 - identify and mitigate the threats that cause the pain
 - develop recovery procedures for critical functions
 - validate the program effectiveness through ongoing review, training, and testing of procedures and capabilities

Supply Chain Continuity

- Managing supply chain continuity involves:
 - Proactive supplier selection criteria
 - Oversight and validation of supplier recovery capabilities
 - Employment of contingencies when suppliers fail to deliver
- Costs can be heavy when a supplier does not deliver as promised, such as lost jobs, damaged brand identification, and lawsuits
- Many suggestions have been posed over time as how to mitigate these risks, but the art of supply chain continuity management lies in its implementation

The Next Generation of Threats – Information Security and Globalization

- Information technologies are firmly entrenched in virtually all business operations
- Supplier information security breaches have the potential to cause greater harm than would other types of supplier disruption
- Maintaining direct personal relationships with suppliers is essential
- A greater level of trust and understanding of suppliers' risk, mitigating controls, and response measures is needed as supply chains become more globalized

Payment Card Industry Case Study

The Heartland Breach

- Heartland is one of the largest credit card payment processors in the United States
- In 2009, Heartland disclosed that it was the victim of the largest criminal breach of credit card data in history
- Criminal implanted a software into the Heartland system with the intent of stealing credit card payment data and selling it to other criminal enterprises
- Normal business operations were disrupted at thousands of banks and merchants
- Over a million credit card users were prevented from making purchases with their compromised cards

Data Security Case Study

Community Credit Union

- In the banking industry, supplier oversight is of particular concern because the extent to which the automated systems are managed by external suppliers whom are entrusted with sensitive customer data
- In 2009, a controlling partner of an external data processing firm was arrested and charged with bank fraud for siphoning more than \$1 million from the Community Credit Union through the illegal use of passwords provided for data processing system repair
- These types of cyber-threats are nefarious as their impacts are less tangible to detect than stolen physical merchandise

Globalization Case Study

Menu Foods

- To meet production demands, the company Menu Foods, the largest producer of wet dog and cat food in North America, began purchasing wheat gluten from a wholesaler called ChemNutra, who was provided supplies by a Chinese firm called Xuzhou Anying Biologic Technology Development
- It was discovered that this wheat gluten contained melamine, a unwanted chemical that in turn caused the death of many cats and dogs, with a financial backlash causing Menu Foods close to \$45 million

Practical Supply Chain Continuity Approaches

- Prioritize well
- Establish supplier continuity standards
- Incorporate continuity measures into the procurement process
- Consider supplier access to sensitive data
- Strive for simplicity

Conclusion

- Managing supply chain continuity comes at a cost, but the potential for loss provides compelling argument for its serious consideration
- Organizations will benefit by first establishing internal business continuity capabilities, and then aligning supply chain continuity requirements with those priorities

Chapter 17 – Reham Eltantawy and Larry C. Giunipero

STRATEGIC SUPPLY MANAGEMENT: THE LITMUS TEST FOR RISK MANAGEMENT IN A THREE ECHELON SUPPLY CHAIN

Introduction

- It is increasingly being recognized that strategic supply management means visualizing a bigger picture beyond the first tier of the supply chain
- This case studies the issues faced by a contact lens producer (Vitalk) in dealing with constantly late deliveries from their cardboard carton supplier (North Ocean Cartons) due to inconsistencies from a second tier supplier (Pearl Paper Company)

Research Methodology

- Action Research (AR) is one form of case study that can produce relevant research findings because it deals with real-world organizational and managerial problems. AR was used in this study which entailed actively working with individuals from Vitalk, North Ocean Cartons, and Pearl Paper Company
- AR projects are cyclical in nature with phases of
 - planning
 - action
 - observing
 - overall analysis
 - reflection as a basis for new planning and actions

Analysis: Risk Management Failures

- The analysis of the AR research showed several failures in the risk management techniques used by Vitalk. Some of the tools used for this risk management were:
 - Using long term contracts
 - Enabling technology and the supply chain
 - Partnering arrangements with key supply chain players
 - Implementing demand driven inventory system
- Expectations for this risk management were not met, and the analysis showed this was due to an absence of strategic supply management

Interventions: Strategic Supply Management

- The suggested solution to the Vitalk supply chain shortcomings was expanded strategic supply management by directly cooperating with the second tier supplier
- Improved inventory management and contracting processes with the suppliers, as well as interdepartmental communication flow were major changes that helped facilitate the new strategic supply management approach

Results:

Improved Risk Mitigation and Performance

- Reduced lead-time of the complete process
- Defined reorder levels
- Reduced inventory and safety stock levels
- Optimized forecasting systems
- Devised inventory management system
- Established Information sharing system
- Decreased set up cost
- Increased annual savings

Conclusion

- Engaging in strategic supply management practices can benefit multiple parties in the chain
- Management from the multiple parties must work together to understand what the current problems are, how each member is effecting these problems, and what strategic changes can be put into place to mitigate these problems

Chapter 18 – Barbara Gaudenzi

ASSESSING PROJECT RISKS WITHIN THE SUPPLY CHAIN OF SELEX SISTEMI INTEGRATI (FINMECCANICA)

Introduction

- PRORAM (PROject Risk Assessment Method) is an approach for assessing risks in project by extending the analysis to the relationships with suppliers and customers
- This case study details the firm SELEX Sistemi Integrati, a world leader in the provision of systems and radar sensors for Homeland Security, air defense, battlefield management, naval warfare, coastal and maritime surveillance, air traffic control, and airport solutions
- SELEX Sistemi Integrati is a project-based organization, where an effective risk management strategy requires the ability to protect both individual projects and also the entire portfolio in a supply chain-wide perspective

Preliminary Considerations about Project Risk Assessment Within Supply Chains

- PRORAM's intent is to provide a framework for evaluating both self standing project-risks and the correlation between supply chain risk and demand risk in order to support the organizations management in achieving the strategic objectives of the company
- PRORAM is based on the identification of four drivers for the successful management of project risk:
 - Risk assessment should be linked to objectives
 - An integrated team of managers should be involved in risk assessment
 - The objective of project risk assessment should be defined as soon as possible
 - The risk assessment methodology should be linked to the actual company's environment and risk management practices

Project Risk Assessment Method: Phases and Practical Evidences

- PRORAM was implemented within three phases:
 - Identifying project's objectives
 - Building the risk factors panel
 - Drawing directions for risk estimation
- The PRORAM's evidences confirmed the effectiveness of the traditional project risk management procedures in SELEX Sistemi Integrati whose outputs were substantially aligned with PRORAM
- Project complexity, changes in customer requests, and the shortening of order cycles represent crucial elements which increase the vulnerability of projects, and suppliers should be the drivers for improving performance

Conclusion

- The SELEX Sistemi Integrati case study confirmed that although projects are inherently risky, the project risk assessment cannot be limited to the project itself but should be extended to the analysis of external relationships with suppliers and customers, which significantly affect the projects risk exposure
- Experience and knowledge of managers is an essential prerequisite for improving the risk assessment policies and coping with the emerging issues of network relationships

Chapter 19 – Ulf Paulsson and Arben Mullai

ESTIMATION OF DISRUPTION RISK EXPOSURE IN SUPPLY CHAINS: THREE CASES

Introduction

- The purpose of this research was to compare three different cases involving disruption risks, and to introduce a “disruption risk exposure model” for identifying and estimating disruption risks in the supply chain
- Furthermore, the purpose is to analyze the three cases with the help of the estimation model presented, and to briefly discuss the risk handling methods presently used

Case Alfa

- Large international company operating on a world market with advanced IT-based products for industrial use
- Product – Basic module, in five different variants
- Supply side – 80 different components
- Production – Several parallel production sites in three continents, but more than 90% production in one site
- Demand side – Customer tied to a certain supplier

Case Beta

- Big international company operating on the European market within the chemical-technical sector
- Product – Mix of different chemicals and product variants
- Supply Side – Deals with suppliers based on VMI
- Production – Numerous sites, nothing unique
- Demand Side – High need for the product, but many suppliers

Case Gamma

- Medium sized company producing expensive, high quality electronic consumer products with an advanced design
- Product – Expensive electronic consumer products
- Supply Side – Electronic components have a high rate of change, design components change slowly
- Production – One production facility
- Demand Side – Sold in many markets to a number of retailers

The Disruption Risk Exposure Estimation Model

- Perspectives:
 - Focal Unit
 - Continuity in the supply chain flow
 - Pre-period time perspective
 - Pre-event and post even handling
- Estimation Model
 - Disruptions affecting the focal company can originate in each of the three parts of the supply chain: supply side, production, and demand side
 - Regardless of what side the disruption is on, it can spread to other parts of the supply chain where it can be eliminated, increased, or decreased depending on the circumstances in that part of the chain
 - Risk is measured in one of five levels, from very low to very high

Risk Patterns for Each Case

- Alfa
 - Several serious risks especially in relation to supply and production. Aggregated supply chain disruption risk regarded as high
- Beta
 - Company has low disruption risk and a low aggregated risk level
- Gamma
 - Company has low disruption risk and a low aggregated risk level

Risk Handling Methods

- Alfa
 - Presently Used – Dual or multi-sourcing, buffer stock
 - Potential Methods – Use less unique or more standard products, spread production more equally between plants
- Beta
 - Presently Used – VMI agreements, parallel production units, added shift/overtime capacity
 - Potential Methods – Change product descriptions and use less flammable chemicals in its products. Install different fire cells
- Gamma
 - Presently Used – Small buffer stock, overcapacity in production
 - Potential Methods – Expand buffer stock, create parallel production units

Conclusion

- The three cases represent three quite different risk situations.
- Many factors affect the disruption risks in the supply chain, and companies use many different risk-handling methods, some of which we might not have considered as a risk handling method
- The model presented can be used in a number of different ways, such as part of a regular risk audit or as a tool to start discussions on supply chain flow risk issues, which could yield information about perceived risks and ideas of how to handle them