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Reflections on Supply Chain Research and Practice

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Supported by
The International Academy for Marine Economy and Technology, The University of Nottingham Ningbo Campus, China
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Editors: KS Pawar, H Rogers and E Ferrari

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INTRODUCTION

We are delighted to welcome our friends and colleagues, both old and new, to the 20th International Symposium on Logistics in the historic university setting of Bologna, Italy. Bologna was chosen as both an attractive venue, as it is home to the world's oldest university, as well as being a city with ongoing strong links to industry (especially in the automotive and metal fabrication sectors). To mark the occasion of our 20th symposium, we have chosen the theme of "Reflections on Supply Chain Research and Practice". We hope this gives participants the opportunity to reflect upon how logistics and supply chain management has changed since the symposium was held for the first time in Nottingham, UK in 1993. During this time, a great many changes have occurred in this discipline (ranging from technologies, processes and methods), affecting both industry and academia alike.

For us as event organisers, it is especially gratifying to see that this year's symposium will once again be a truly international event having attracted submissions from across the globe. This, together with the healthy balance of participants who have contributed regularly to the symposium over the years, combined with many first time participants who inject new ideas and points of view into the community, promises to make the event an enjoyable and valuable experience.

A particular strength of the ISL community is the enthusiasm of the participants. As the number of parallel sessions during the programme is kept low, many participants value the personal touch and community feeling that this engenders. Having the opportunity to receive personal feedback during the formal sessions, coupled with discussions and debates at the many informal events that the symposium offers, invariably results in a memorable experience.

As before, all abstracts and/or full papers were reviewed by two academic experts from the field of Logistics and Supply Chain Management. This book of proceedings containing the abstracts of the accepted papers, has been organised according the following categories:

- Risk, Disruption and Complexity Management
- Supply Chains and Networks
- Collaboration and Relationships in Supply Chains
- Environmental Sustainability and Green Logistics
- Transport and Distribution
- Maritime and Port Logistics
- Knowledge Management and E-Business in Supply Chains
- Decision Support Techniques, Technologies and Processes
- Service Supply Chains
- Food and Agriculture Logistics
- Supply Chain Performance Management
- Education and Training

To date ISL has been held in Europe, Africa, Australasia and Asia (please see full list below). Following last year's successful event in the emerging economy of Vietnam we are very much looking forward to meeting you all at this year's symposium in Bologna, Italy.

Last but not least we would like to take this opportunity to express our sincere thanks to all the presenters, delegates, reviewers, Advisory Committee members, invited guest speakers and local organising team for their interesting and worthwhile contributions. Finally, our special thanks go to Mrs Lesley Gray for her excellent administrative support and Mengfeng Gong for her support and help in preparing the proceedings.

Professor Kulwant S Pawar, Professor Helen Rogers and Professor Emilio Ferrari – July 2015

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Section 1: Risk, disruption and complexity management

RESPONDING TO THE DISRUPTIONS EFFECTIVELY – RESEARCH RESULTS ON THE SUPPLY CHAIN FLEXIBILITY

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Purpose of this paper: Turbulent environment means for managers a need of building flexible supply chains that are able to respond to the sudden disruptions, both in the area of demand and supply. The purpose of this paper is to discuss how to build the *flexibility in supply chain* and to present the results of the survey conducted in 2013 among the companies operating in the B2B market.

Design/methodology/approach: A two-phase methodology design based on literature review and post survey was used. The literature provide with flexibility term and the flexible supply chain whereas the research provide the findings basing on 182 surveyed companies.

Findings: The gathered data show that the main activities performed by the companies in terms of ensuring supply chain flexibility are: having double sourcing and keeping higher safety stocks. Companies concentrate today not only on buffering but also on different activities that support reducing uncertainty, e.g. sharing information actively.

Value: The paper presents unique research results.

Research limitations/implications (if applicable): The presented research has the character of a pilot study.

Practical implications (if applicable): this article brings supply chain managers the answer what is the supply chain flexibility in a comprehensive way. The research results can assist managers during decision making process on how to build the competitive supply chains in a dynamic environment.

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ENHANCEMENT OF SHORT-NOTICE EMERGENCY EVACUATION RESPONSE DURING BUSHFIRE: A MULTI-OBJECTIVE EPSILON–CONSTRAINT OPTIMISATION APPROACH

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Abstract
A bushfire is an important public health and safety issue in Australia. Late evacuation in bushfire is a crucial stage of emergency response, which requires a quick emergency response to potentially a life threatening condition. Inadequate time to evacuate residents has resulted 119 deaths in the Black Saturday 2009 bushfire in Victoria, which is 68 per cent of total fatalities. Hard constraint of limited evacuation time window (clearance time), uncertainty associated with the direction and intensity of bushfire, road disruption, and elderly and disabled evacuees pose challenges to timely evacuation of people. A decision support system, which is capable of computing timely allocation of resources, is thus required to enhance the capacity of fire services agencies. This paper develops a multi-objective optimisation model for assigning shelters and vehicles and evaluating routing options to transfer late evacuees from assembly points in bushfire affected areas to shelters. Three bushfire scenarios are generated to incorporate constraints of restricted time-window, potential road disruptions, the capacity and availability of rescue vehicles and shelters. The multi-objective problem is solved by ε-constraint technique. The objective functions are simultaneously optimised to maximise the total number of late evacuees by minimum assignment of rescue vehicles and shelters. This model develops a decision support system for fire agencies to minimise resource utilisation and maximise coverage of bushfire affected areas.

EXPLORING THE IMPLICATIONS OF NATURAL RESOURCE SCARCITY ON MANUFACTURING SUPPLY CHAINS

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Purpose - Concerns about natural resource scarcity are growing as some of these resources are critical for the successful functioning of firms, but also because of these firms' inability to secure them. In turn, this results in the increase of dependency of firms on other firms. Research into the appropriate strategies for minimising such dependencies and uncertainty caused by the scarcity of natural resources is still insufficient in the field of supply chain management. Drawing on resource dependence theory (RDT), the paper presents hand-on experiences from manufacturing companies and explores the conditions under which a specific natural resource will lead on buffering and/or bridging strategies. Moreover, the implications of the above strategies on organisational performance are investigated.

Design/ methodology/approach– Based on RDT a conceptual model is developed and validated through the means of exploratory research. Our empirical work includes the collection of qualitative data through 23 semi-structured interviews with twelve companies that have water, energy, metals, rare earth metals and oil as their main key natural resources.

Findings - The study reveals that buffering strategies are used to a great extent mainly when the scarce resource is important, while bridging strategies are preferred when there are a few alternatives suppliers for the scarce natural resource. Both strategies are employed when accessibility for the scarce natural resource is hindered. These strategies can improve resource efficiency by minimising costs and emissions, and minimising water and energy usage but also give the opportunity to companies to gain a competitive advantage.

Research limitations/ implications-The paper attempts to contribute to theory development by developing a framework grounded on RDT that explicitly recognises the contingent factors that determine the dependence that leads to specific supply chain strategies for key scarce natural resources. Last but not least, our study contributes further to the identification of the impacts of these strategies on resource efficiency and competitive advantage. It is the first study that these elements have been examined within a conceptual model under the emerging role of natural resource scarcity. Our study also attempts to fill academic gaps regarding the empirical examination of natural resource scarcity strategies in the supply chain context.

Practical/ Policy Impact- This research provides direction to manufacturing companies for adopting the best supply chain strategy based on specific antecedents in order to cope with the uncertainty of insufficient natural resources in supply chains. This research may help companies to reduce its dependence on specific resources and in turns suppliers while increasing its resource efficiency and thus enhance its competitive advantage in times of natural resource scarcity. The analysis raises also some policy implications for example the need for having higher pricing of water or specific regulations that can motivate companies to minimise resource usage.

Originality/value- Whilst there is a growing recognition of the need to handle the issue of natural resource scarcity, there is a scarcity of empirical work investigating what supply chain strategies should be utilised.

Keywords: Natural Resource Scarcity, Resource Dependence Theory, Supply Chain Strategies, Manufacturing Companies

THE EFFECTS OF DIFFERENT SUPPLY CHAIN INTEGRATION STRATEGIES UNDER DISRUPTIONS: A SIMULATION STUDY

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Purpose of this paper
Our purpose is to study the dynamics of supply chain integration (SCI) strategies with different dimensional focuses -- i.e. information integration with low relational integration (Scenario 1), information integration with high relational integration (Scenario 2), and operational integration (Scenario 3) (Leuschner, Rogers, & Charvet, 2012) -- under three types of disruptions -- i.e. a producer capacity disruption, a logistics service provider (LSP) capacity disruption, and a demand disruption.

Design/methodology/approach
A system dynamics simulation is applied to study a supply chain with three actors: a producer, a LSP, and a retailer. The complexity of supply chains, especially those which encompass several actors, warrants a perspective that considers the supply chain structures and the feedback inherent in these structures, which is provided by system dynamics modelling (Wilson, 2007).

Findings
We expect that our findings are consistent with the evolutionary perspective of SCI: information integration may have given firms a competitive advantage as a first step in SCI. It allows firms to remain competitive, but may not be sufficient to excel and achieve supra-normal margins. Working as partners, rather than simply transferring information, leads to the greatest benefits (Kulp, Lee, & Ofek, 2004). Target solutions for supply chains using different SCI strategies will also be provided.

What is original/value of paper
Through system dynamics simulation, our paper is among the first to present and compare the dynamics of different SCI strategies under disruptions, test the evolutionary perspective of SCI, and provide target suggestions for supply chains using different SCI strategies in the context of disruption recovery.

Keywords
Supply chain integration, supply chain disruptions, system dynamics.

Category of the paper
Research paper.

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THE IMPACT OF THE SOURCE OF DISRUPTION IN A MULTI-STAGE SUPPLY CHAIN

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Purpose of this paper:
The purpose of this paper is to assess the impact of the source of disruption in a multi-stage supply chain, and to analyse the effectiveness of mitigating policies implemented to minimize the impact. The paper evaluates supply chain performance in terms of service levels, fill rates, and average stockout quantities under various disruption scenarios.

Design/methodology/approach:
The paper studies two types of policies – proactive versus reactive – proposed to mitigate the impact of supply disruption, where a proactive measure may lead to a reduction in disruption frequency and a reactive measure facilitates a faster recovery to a normal state. The end customer demand is random and supply disruptions can occur at any stage (either upstream or downstream) in supply chain. An analytical framework of supply disruptions and mitigating approaches is provided, and numerical experiments are conducted to assess the effectiveness of the two streams of policy.

Findings:
Results from simulation experiments primarily show that the effectiveness of mitigating policies is contingent on the source (i.e., the origin or the relative position within supply chain) of disruptions. In terms of product availability measures (e.g., fill rates and service levels), proactive policies tend to provide greater protection when disruptions occur upstream in the supply chain, whereas, reactive policies display higher effectiveness when disruptions take place downstream and their impacts are limited locally to retail locations. In terms of percentage improvements in product availability, however, both proactive and reactive measures display higher improvement with predominantly upstream disruption scenarios than with downstream disruption scenarios.

Research limitations/implications:
The study incorporates random processes in demand and supply disruptions via simulation experiments. It is noted, however, that it does not fully capture behavioural aspects of business decision making that may occur during disruptive events.

Practical implications:
Contemporary trends of supply chain consolidations, global sourcing, and lean operations have all exposed businesses to increased vulnerability to supply disruptions, which further raises the need to build capacity to strengthen business continuity under supply chain risk. Financial implications of building supply chain resilience versus responding to disruptive events after the occurrence warrant further investigation.

Value:
This study provides unique insights and practical framework to researchers and practitioners alike in understanding the right mitigating approaches to protect against supply disruptions. The paper is instrumental in identifying settings under which different mitigating policies could be effective in providing much needed supply chain resiliency.

Keywords:

supply chain disruptions; mitigating policies; source of disruption; simulation

Article Classification:
Research paper

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DEVELOPMENTS IN SUPPLY CHAIN RISK MANAGEMENT – A LITERATURE ANALYSIS FOCUSED ON RISK HANDLING

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Purpose: In the last decades, the speed of changes has accelerated. According to this, the analysis of future developments and the identification of risks and chances and with it supply chain risk management became more important. For this reason, today it is more and more essential to be prepared for the unforeseeable (Appel 2012). The importance of risk management was stated already a few years ago, in 2008, as a result of a survey under 21 experts: the need of risk management on the level of companies as well as on the level of supply chains had been identified. However, while the awareness of risks is definitely available, the actual state of the realisation and establishment of risk-related measures allows a margin for further improvements (Kersten, Hohrath and Winter 2008). Therefore, our literature analysis is focused on the developments in supply chain risk management. The developments of risk handling in supply chains are in the centre of our attention.

Approach: For the literature analysis, a multistage approach is chosen. At first, relevant books in the field of supply chain risk management are searched. Thereby, German and English literature is consulted. Relevant sources are online databases, whereby our literature analysis is based on the following: scholar.google.de, www.wiso-net.de and search.ebscohost.com. The selected search terms are supply chain risk management, risk handling, the combination of them as well as the German equivalents of these terms. As period, the last two decades are regarded. Adapted from Tandler and Essig (2013), in a second step, the snowball technique is applied. This means, that the reference lists of the so far relevant literature are used to identify further references. All identified publications are inspected closely. Relevant literature is noted with the principle statements.

Findings and Value: The literature analysis gives an overview about the developments and the status quo in supply chain risk management, a topic, which becomes more and more important. The regarded publications can be divided into

- publications with theoretical considerations to supply chain risk management and the different strategies, measures and processes, which deal with the identification, the assessment, the handling and the control of supply chain risks.
- publications about case studies and empirical studies in supply chain risk management.

In both cases, the analysed publications are also considered with regard to the significance of risk handling in supply chains. Based on the previous results, further need for research is presented. Also further need for action in supply chain risk management relating to risk handling is highlighted.

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BUILDING A CASE FOR COLLABORATIVE RISK MANAGEMENT WITH VISIBILITY OF RISKS ACROSS SUPPLY NETWORKS: INVESTIGATING THE EFFECT OF SUPPLY

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Purpose of this paper: **network characteristics**

The purpose of this paper is to analyse the need for collaborative risk management in supply networks with visibility of risks across firms in the network, to outline the possible benefits and challenges firms in the network can expect to face from such a collaborative approach and to understand the characteristics of supply networks which will make such a collaborative approach appropriate. Thus, the research questions addressed in this research are as follows:

1) Is there a need to ensure visibility of risks across firms in a supply network and to develop a collaborative process to manage risks in the network?
2) What are the benefits and challenges associated with such a collaborative approach?
3) How do the supply network characteristics influence the need for ensuring visibility of risks and for developing a collaborative process to manage risks in a supply network?

Design/methodology/approach:
The objectives of the research are achieved by conducting review of supply networks, supply chain risk management, supply chain collaboration and information sharing literature coupled with secondary data analysis and case studies.

Findings:
This research underscores the need for collaborative risk management for managing risks in a supply network and proposes that the appropriateness of a collaborative approach will depend on the specific roles of the focal firm and the suppliers, the degree of network dynamics (Harland et al., 2001), the degree of balance in the buyer-supplier and supplier-supplier relationships (Choi and Wu, 2009) and the extent of endogeneous and exogeneous uncertainties faced by network firms (Trkman and McCormack, 2009).

Value:
There are limited studies on assessment, analysis and management of risks at the supply network level. The existing literature do not provide guidance on how companies in a supply network can develop common understanding of the risks and reach a mutual agreement of mitigating those risks. It is also unclear whether visibility of risks across member firms and using a collaborative approach for managing risks in the supply network utilizing the better visibility can help manage risks better in a network. This research addresses the above gaps through an analysis of the literature and secondary cases and develop propositions for further empirical analysis.

Research limitations/implications (if applicable):
The research is carried out considering specific databases and journals. Further research needs to be done using a systematic literature review and also to validate the propositions through empirical research.

Practical implications (if applicable):

This research underscores the need for collaborative risk management for managing risks in a network. At the same time the research pointed out contextual factors which have an impact on the benefits of a collaborative risk management approach. Thus, firms within a network need to assess the suitability of the approach and should refrain from either following a purely internal risk assessment and mitigation or making it completely collaborative.

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TOWARDS A SUPPLY CHAIN CYBER RISK AND RESILIENCE RESEARCH AGENDA - A SYSTEMATIC LITERATURE REVIEW

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Purpose of this paper
The increased dependence of supply chains on information technology has exacerbated the impact of cyber risks (Dedrick et al., 2008), ranging from the breach of data confidentiality, to the destruction of data and the disruption of supply operations.

There is a robust body of knowledge which has allowed the development of models, frameworks, tools and techniques to understand and manage supply chain risk (Khan et al., 2011). However, the evaluation of cyber risks and resilience in the supply chain has been less explored.

The purpose of this paper is to contribute to identifying the gap in theory through a systematic review of the literature. Specifically the focus is on 1) developing a definition for cyber risk and resilience in the supply chain, and 2) suggesting a research agenda for this area.

Design/methodology/approach
A systematic literature review was conducted, based on documented guidelines (Tranfield et al., 2010), of peer-reviewed articles in the databases Scopus, Web of Science, Jstor and Google Scholar.

Findings
Our research seems to suggest that it is possible to develop a definition of cyber risk and resilience in the supply chain. The research also suggests that there are a number of ambiguities in the use of terminology associated with cyber risk and resilience when understood from different knowledge domains, which needs to be considered by those using these definitions.

In addition, the research seems to suggest that the application of cyber risk and resilience theory is in an early stage of development, with existing models emphasizing complementary aspects, but with important gaps and without a unifying framework that can be tested empirically. This paper goes on to derive a proposed research agenda in this area.

Value
The identification of gaps in cyber risk and resilience, and the resulting research agenda contribute towards a structured development of a knowledge area which is gaining increasing importance for the management of modern complex supply chains.

Research limitations
Since this a literature review, it is based on secondary sources, rather than primary sources.

Practical implications
A research agenda contributes to structuring further development of models and knowledge frameworks the area.

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QUALITATIVE IMPACT ASSESSMENT OF DISRUPTIONS (POLITICAL) ON THE TEXTILE SUPPLY CHAIN PERFORMANCE

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Abstract

Purpose: Textile manufacturing firms are heavily dependent on each other for the seamless and integrated information, materials exchanges and flows within or between firms. Any disruption in the flow of information or materials could potentially lead to huge production or performance loses, such disruptions could occur due to systems failure in information flow, terrorist attacks, labour strike, natural disasters, transportation delays and political instability. Organisations are looking for promoting timely and efficient flow of information and goods, securing supply chains from external threats and mitigating vulnerability to disruptions. There are a number of studies that have investigated transportation risks, impacts of natural disaster such as flooding or bushfires on supply chains or disruptions associated with systems failure. However, there is a very little attention on examining the impacts of political disruptions on supply chain performance. Political instability is usually understood as a condition under which political legitimacy, social order and governance are challenged(Senija Causevic, 2013). The purpose of this paper is therefore to investigate the relationship between political instability, supply chain disruptions and supply chain performance with particular reference to the textile industry in Pakistan.

Design/Methodology/Approach: In this research a qualitative methodology was adopted to explore the depth of meaning, gaining insight and deeper understanding of the processes involved in establishing relationships between political instability and supply chain performance. Given the sensitivity associated with political instability, a set of semi-structured interviews were conducted from 25 different textile manufacturing firms. In the presence study, the importance is given to generate rich data to help gaining insight and deeper understanding of key issues. Transcript were then coded and analysed in NVivo software. Case and cross-case analysis were also undertaken.

Findings: The results of this study confirm the significance of political instability or disruptions on supply chain and its impact on supply chain performance. The political disruptions affect the performance of the chain and create risks. Wars, revolutions or any changes in the government policies like tax policy, employment laws, regulations, tariffs, will impact organizations and chain's members. The effects are more pronounced and tangible when the partners of the chain are from various countries. Results indicate that political instability in Pakistan has negative impact on supply chain that in turn effect on supply chain performance. The key disruptions noted are: transportation bottlenecks, time delay, natural disasters, labour strike and plant shutdown etc.

Research Limitations: The major limitation is that only textile industry has been used to collect data during interviews. Future research can be conducted across other industry sectors.

Practical Implications: Based on the results of this study, the authors argue that supply chain performance does not only dependent of supply chain efficiency but also dependent on external political instability, which causes major supply chain bottlenecks, transportation delays and labour mobility.

Value/Originality: This is one of the few research papers that has investigated the impact of political instability on supply chain performance in the textile industry in Pakistan.

Keywords: political instability, Supply chain, supply chain performance, textile industry, and organizational performance.

Paper Type: Research Paper

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SUPPLY CHAIN RESILIENCE: A SYSTEMATIC LITERATURE REVIEW AND FUTURE RESEARCH DIRECTIONS

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Abstract

Purpose: Supply Chain Resilience (SCRes) has recently gained increasing attention from practitioners and researchers. Therefore, this paper aims to present a systematic literature review to build in-depth knowledge and to understand recent trends on SCRes.

Design/Methodology/Approach: A systematic review on SCRes has been undertaken to evaluate and categorise academic journals published in Association of Business School (ABS) Academic Journal Quality Guide over a period of (2002-2015). The most relevant articles are included in this study.

Findings: The outcome of systematic literature review (SLR) provide insight into the present and future direction of SCRes. It also demonstrates a number of key themes and research directions.

Practical Implications: The systematic approach taken for the review of literature will provide an insight and future directions to both practitioners as well as researchers.

Originality/Value: The holistic approach provides more insight and comprehensive knowledge in order to understand conceptual development on SCRes.

Keywords: Supply Chain Resilience, Resiliency, Systematic Literature Review, Resilient supply chain

Paper type: Literature Review

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ESTABLISHING A FRAMEWORK FOR THE EFFECTIVE DESIGN OF RESILIENT SUPPLY CHAINS WITH INHERENT NON-LINEARITIES

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Purpose of this paper: Previous control theory research on supply chain dynamics has predominantly taken a linear perspective of the real world, whereas nonlinearities have usually been studied via a simulation approach. Nonlinearities can naturally occur in supply chains through the existence of physical and economic constraints, for example, capacity limitations. Since the ability to flex capacity is an important aspect of supply chain resilience, there is a need to rigorously study such nonlinearities. Hence, the purpose of this paper is to propose a framework for the dynamic design of supply chains so that they are resilient to nonlinear system structures.

Design/methodology/approach: Building on an existing framework to design supply chains (Naim and Towill, 1993) from a real world situation through data capture, modelling, analysis and onto redesign recommendations, we synthesize current research on supply chain resilience and recent developments in nonlinear control theory techniques. We then apply the knowledge gained to develop a new framework and demonstrate its application via a real world case study.

Findings: An updated framework is provided for the synthesis and design of nonlinear supply chain dynamics models and a future research agenda is developed. The framework improves the understanding of the system's behaviour and the impact of nonlinearities on system response. Consequently, supply chain resilience can be enhanced.

Value: The real world is nonlinear and the existence of such nonlinearities makes the understanding of system dynamics difficult. This paper has an academic value since the proposed framework aids system dynamics researchers to gain better insights into complex nonlinear model structures and acts as a precursor to simulation based approaches.

Practical implications (if applicable): The proposed framework may be applied in an industrial context for analysing nonlinearities in a real-world system. The framework provides a process by which supply chain designers gain more insights into nonlinear system dynamics behaviour without going totally relying on time-consuming simulation activity on its own.

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INFORMATION BASED APPROACH FOR DISASTER RISK MANAGEMENT

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Purpose of this paper:
With increased natural and man-made disasters disrupting the supply chain and logistics network, it has become vital for disaster relief operations to proactively identify and mitigate the risks. Mitigation, preparedness, response and recovery are four stages during any disaster management. Each stage faces different challenges in terms of information gathering, interpretation and dissemination for the quick relief operations. In the modern internet era, Information and Communication Technology (ICT) is proving to be critical throughout the disaster management cycle. Systems thinking concepts are applied in this research for capturing various activities involved during disaster management cycle. ICT based applications are identified for each stage to propose a conceptual model for disaster risk management. The research attempts to provide a holistic, systematic and technology driven risk mitigation approach for robust disaster management.

Design/methodology/approach:
The extent of relief operations is very much dependent on the information availability and sharing. Challenges within disaster management do not only depend upon the nature of disaster but also on the activities involved in different stages of the relief operation. In order to develop new strategies for disaster management, understanding of different activities and up-to-date information regarding modern tools and techniques is vital. In this research natural and man-made disaster data for past decade is holistically studied to understand different set of activities involved during each stage of the disaster cycle. These activities are further classified based on sources of disaster and speed of occurrence. Appropriate ICT techniques are identified for each stage following recent disaster cases. Following systems thinking approach, a conceptual ICT based disaster management model is proposed for robust relief operations. The research intends to test the viability of model during future disaster events.

Findings:
The systems concepts for modelling disaster cycle activities and mitigation strategies provide answers to the complex behaviour of risks. By combining holistic and structured approaches for conceptual modelling, the research provides a unique platform for Information based disaster risk management. ICT approach provides real time networking for participation, coordination, planning and monitoring during disaster management.

Value:
The outcomes of this research will help academicians and practitioners in closing the gap of understanding the complex behaviour of entities interacting during disaster management.

Research limitations/implications:
The model will be further developed and tested during future disasters.

Practical implications:
The ICT based approach to disaster management is expected to help supply chain and logistics practitioners in providing robust relief operations.

References:

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Section 2: Supply chains and networks

DEMAND-DRIVEN INNOVATION IN MATERIAL PLANNING AND CONTROL: A REVIEW OF EARLY IMPLEMENTATIONS

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Purpose of this paper
The paper reports on research into decision-adoption process experienced by companies as they consider implementing Demand-driven, as an alternative to traditional ERP-based approaches planning and control.

Design/methodology/approach
A focus group with three experienced consultants was undertaken to gain expert opinion of the Demand-driven adoption process, and a broad appreciation of the innovation. An in depth investigation into the adoption process was undertaken through participant observation in the adoption-decision and implementation process.

Findings
The research suggests that Demand-driven is a significant innovation that is well grounded in established principles of Operations Management/Supply Chain Management, and that it will continue to diffuse due to low entry costs and ease of trialability.

Research limitations/implications (if applicable)
The qualitative research presented here is based on a modest data set, and further research will be required to develop/challenge the findings and improve validity. Interviews with users, site visits and analysis of published case studies will be particularly important to triangulate the findings.

Practical implications (if applicable)
The research suggests that the barriers to adoption are relatively low. Demand-driven represents a significant challenge to the orthodox MRP/DRP approaches that are embedded in today's ERP systems.

What is original/value of paper
Demand-driven is a significant development which, so far, seems to have escaped the attention of the academic community.

Keywords
Demand-driven, ERP, adoption-decision

Category of the paper
Research paper.

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GLOBAL SUPPLY CHAIN OPTIMISATION: CASE STUDY FROM THE INSULATION INDUSTRY

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Purpose:

The purpose of this paper is to describe and quantify cost effective improvements in a supply chain, derived from a case study in the Insulation industry. Supply Chain issues within this industry are largely unexplored in extant literature. The focus will be on Just-In-Time replenishment and the creation of a hybrid supply chain, e.g. leagile, techniques (Christopher, 2011).

Methodology:

Due to the complex nature of the investigation, this research uses a qualitative approach, specifically the case study method, providing rich and in-depth data (Yin, 1989; Oakley, 1999).

The study has three phases: First, a structured literature review will be carried out. Second, data will be gathered from the case study. Third, qualitative data will be coded and analysed while quantitative data, which also results from the case study, will be modelled and analysed using statistical methods to detail theoretical and practical implications of the new knowledge.

The case study focuses on a large global company nicknamed Insulation Inc. for the sake of anonymity, which is one of the largest manufacturers of insulation products and systems for all major application areas for buildings.

The researcher team will be working in Insulation Inc.'s headquarters and at several European locations, together with the company's supply chain team. Data will be collected through interviews, company documents and from the company's ERP system.

Findings:

A first important finding from the literature is the gap in operations management research within the manufacturers of insulation products. The empirical data showed that the supply chain was burdened by many large and expensive storage facilities, long transport time, large safety stores and a complex network of supplies. Subsequent analysis derives into suggested improvement options, for example options like lending storage on an as needed basis, consolidating storage facilities, prioritizing customers and geographical areas, and lowering safety stock. Furthermore, implementing Just-In-Time replenishment and a hybrid supply chain were investigated.

Value:

This paper contributes with empirical research within operations management in a sector which has not been well-researched. Furthermore, the paper produces results which can be useful for both practitioners and the research community by (1) analysing a current supply chain set-up in the insulation industry, and (2) suggesting improvements to create a cost-effective and competitive supply chain strategy in this industry.

Research limitations:

This paper focuses on a detailed case study. To further validate the results the findings should be tested in other companies within this industry or other equivalent industries and later in companies in other industries.

Practical implications:

This study is focused on industrial applicability. The suggestions in this paper can serve as guideline to practitioners in similar companies towards the creation of a more cost-effective and leagile supply chain.

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ECO-FRIENDLY RISK-AWARE SUPPLY CHAIN NETWORK DESIGN USING A LOCATION ROUTING PROBLEM; THE CASE OF THE LPG INDUSTRY

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Purpose – Liquefied Petroleum Gas (LPG) has become one of the major fuels in developed countries. The final price of LPG is hugely dependent on logistics costs. There are several studies on facility location and routing planning in fuel distribution systems; however, these are interdependent and the overall cost of the chain may be unjustified if they are considered separately. This paper sought to propose a new multi-objective multi-period location-routing problem (LRP) for the design of a two-echelon LPG supply chain network, and solve it using NSGA-II. The main contribution of this study is to highlight the significance of risk and green factors, by simultaneous incorporation of externalities including CO2 emission, congestion, wear and tear, and noise pollution, and risk factors containing transportation risk and site risk.

Methodology – LRP arises from the combination of two NP-hard problems, facility location and vehicle routing. It can therefore be considered an NP-hard problem. According to the review of the literature, the majority of the LRP models have been solved using Genetic Algorithm, Simulated Annealing or Tabu Search methods. Due to the nature of multi-objective problems, a population-based algorithm was considered to be the best option, and as a result, NSGA-II, one of the best global search approaches for multi-objective cases, was selected to solve the proposed model. The population exposure and congestion factors are estimated using ArcGIS software based on a press release report from the South Korean Ministry of Land, Infrastructure and Transport. The candidates for the inland storage tanks were chosen by running the location-allocation application in the ArcGIS software considering a sort of criteria.

Findings – The proposed model suggests constructing intermediate storage tanks in the supply chain network of the case study, making it possible to store LPG in small quantities and in places which are not congested. Furthermore, the total traversed distance, and in turn total emissions, in outbound logistics will be considerably reduced.

Value – This article is one of the very few studies which simultaneously addressed risk and green factors in the design of supply chain network. The outcomes of this study would be useful for practitioners in Industrial engineering and Logistics.

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CITATION ANALYSIS OF LOGISTICS AND SUPPLY CHAIN RESEARCH FROM INTERNATIONAL SYMPOSIUM ON LOGISTICS ARTICLES

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Purpose of this paper:
The study of research patterns could enhance understanding of logistics and supply chain field. To determine the research patterns citation analysis is considered as an appropriate methodology. Hence, this study aims to provide the citation ranking of journals and conferences in the logistics research area. International Symposium on Logistics as one of top conferences in the domain of logistics and supply chain is the main focus of this paper. In addition to above aim this study makes attempt to investigate whether logistics is a multidisciplinary research domain. If so from which disciplines logistics researchers draw their ideas?

Design/methodology/approach:
The research data is extracted from papers in the proceedings of ISL 2012 to 2014. Citation analysis is conducted on a total of 293 articles and 9062 references appeared over three year period in ISL2012-2014.

Findings:
Research patterns are obtained using total citations, citations per journal or conference, and overlapping citations. We then provide the citation ranking of journals and conferences.

Value:
Peer-review based journal and conference ranking considers mainly logistics journals and conferences. This research employs citation based ranking, as an alternative approach to rank logistics journals and conferences. It considers any cited journals and conferences regardless of domain.

Research limitations/implications (if applicable):
The findings of this study are based on a three year period. Extending the time span would provide more in-depth results.

Practical implications (if applicable):
Ranking of journals and conferences in the logistics and supply chain discipline can help better understand the research areas and can assist researchers to decide where to publish their works to maximize the research impact.

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CUSTOMER VALUE CREATION THROUGH SUPPLY NETWORK AND RELATIONSHIP MANAGEMENT – PARTICIPATORY RESEARCH METHODS IN THE CREATION OF A PRACTICAL APPROACH

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Purpose of this paper:
Supply chain networks are certain inter-organization structure directed at achieving certain purpose, but also interconnected business relationships involving social aspect (Gadde et al. 2003; Paulraj et al. 2008). Customer value is created throughout the supply chain, such that each phase increases or decreases value and individual actors play important roles in customer value creation. Knowing what customers currently value is not sufficient; instead, gaining competitive advantage requires exploring what customers will value in the future. The purpose of this paper is to introduce the participatory future research methods as a tool for helping companies identify the most relevant future trends and how they will affect future customer value, network decisions and relationships in the business-to-business context.

Design/methodology/approach:
The paper is based on literature review and case study in the form of an expert group workshop. In the literature review the current state of network management and relations related to network relationships and customer value creation were studied. The case study consisted of interviews and futures workshop. Managers and experts from 6 companies in different industries were interviewed in autumn 2014. In the workshop, which was organized in January 2015, the aim was to consider the most meaningful trends affecting the customer value creation and network related decisions. The workshop was carried out by using the future research methods with trend analysis discussion. The workshops are among the participatory research methods used to facilitate group processes to deal with actual problems concerning the group.

Findings:
Depending on the perspective the values determining decisions and customer value creation can be different. Knowing and being aware of future trends, megatrends and their effects on customer value are essential for making optimal, future-oriented strategic business decisions. Future customer value determinants have an influence on the relationships within a network, since future customer value determines the core capabilities needed and valued by the partners. The final value that customers desire determines the nature of the member actors' core capabilities, which will be valued by the other network members. In an attractive

relationship to gain some value a party needs to offer some value in exchange (Hald et al. 2008). With respect to supplier collaboration and network relationships collaborative improvements should be developed in the future.

Value:
The paper combines the approaches of network relationships and customer value creation. The paper introduces the future research methods as a tool for helping companies identify the most relevant future trends and how these trends affect future customer value creation. Future research methods enables systematic approach to constract practical concept to exploiting determinants of value creation.

Research limitations/implications (if applicable):
The paper contributes to the literatures on forming relationships in the networks, the role of trends in customer value creation and customer value determinants in network relations.

Practical implications (if applicable):
With regard to practice, this paper contributes especially to the identification of future customer value and meaning of trends for company network relationships and decisions related to supply networks. The recommended actions are proposed and the practical tools for the companies are introduced.

Keywords
Customer value, trend, network relationships, futures workshop

Category of the paper
Research paper

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DEVELOPING MASS CUSTOMIZATION AND SUPPLY CHAIN MANAGEMENT IN HIGH TECHNOLOGY INDUSTRY COMPANIES

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Purpose of this paper:
In today's highly competitive business environment, activities for serving customers have to be performed effectively and organized around an efficient and customer centric supply chain. These are also the key preconditions for adopting mass customization strategies. The purpose of this paper is to introduce a new method to develop mass customization and supply chain management in high technology industry companies. The developed method is described in detail in the paper.

Design/methodology/approach:
The paper is based on literature review and case study in form of workshop, which was organized two times as an intensive three days face to face module training. Each day had specific focus and as a result the new method was provided. The aim was to provide participants with the holistic knowledge about the product customization positioning in company's strategy and to provide new ideas and tools for improving existing supply chain processes.

Findings:
The main finding is that the developed method suits well for developing mass customization and supply chain processes in global high technology industry company.

Value:
The introduced and tested method in the paper gives the new approach for both academic discussion as well as practical developing possibilities in companies.

Research limitations/implications (if applicable):
This paper presents a new methodological approach for developing efficient supply chain management and mass customization.

Practical implications (if applicable):
The paper gives recommendations on how companies can develop their mass customization, supply chain processes and knowledge. Moreover it proposes recommended actions and introduces a new tool.

Keywords:
Mass Customization, Supply Chain Management, Workshop, Method, High Technology Industry

Gategory of the paper:
Research paper

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ANALYSIS OF THE ISL COMMUNITY – A SOCIAL NETWORK PERSPECTIVE

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ABSTRACT

Purpose of this paper:
The community surrounding ISL has been developing for more than two decades. Organizationally, it has relied on the participation of few key persons during this time, while the larger scientific community has been more dynamic. Over the years it has evolved and developed into an interactive and dynamic community where the participants are able to share, network and develop their ideas and concepts into more meaningful short and long-term collaborative research projects. Therefore, the purpose of this paper is to investigate the development of this particular scientific community utilizing social network analysis. This is valuable not only for the ISL conference stakeholders as such, but also to larger logistics and supply chain research community.

Design / methodology / approach:
The study is based on the social network analysis of the co-authorship data from the ISL conferences between 1993 and 2014. Co-authorship is used as an indicator for realized collaboration, and several different measures are used to assess the impact of key authors and collaborators.

Findings: This study provides an important, yet sparsely addressed viewpoint to the dynamics of scientific communities by examining the structural development of the ISL conference. In particular, as we have a rarely available longitudinal data, spanning over 20 years, we can observe how the co-authorship patterns have developed over last two decades.

What is original/of value in paper: The value of the study lies in the knowledge it provides about the development of scientific communities, firstly by illustrating which factors have influenced the structural development of the community and secondly, by increasing the understanding about the key persons in the community and their role in the network.

Practical impact: The presented study offers a broad viewpoint to be considered in managing the ISL community. By better understanding the structure of the network the organizers can better utilize the potential that lies in it, and the authors are able to identify interesting potential collaboration opportunities.

Keywords: ISL; scientific community; co-authorship; social network analysis;

CYCLE STOCK OPTIMISATION IN THE FRACTAL SUPPLY NETWORK

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Purpose of this paper:

The aim of this research paper is to investigate the effect of replenishment frequencies on both transportation and inventory holding costs in fractal supply network. This enables the practitioners to optimise the cycle stock at different stages of the supply network including inventory and transportation costs.

Design/methodology/approach:
Fractal supply network and mathematical presentation of cycle stock, inventory and transportation models are developed. The proposed mathematical models and a hypothetical fractal supply network are implemented and validated using Supply Chain GURU Software in order to optimise cycle stock at different stages of the proposed supply network and in turn minimise both inventory and transportation costs.

Findings:
Application of the proposed mathematical models has led to a reduction in the total logistics cost comparing to the base model. It is evident that the proposed models provide a systematic method through which practitioners should be able to decide upon the cycle stock, frequency of delivery and transportation mode.

Research limitations/implications (if applicable):
The proposed models have been applied on a hypothetical data; therefore, more application on real industrial data is required.

Value:
There is some research focused on fractal as well as logistics capabilities. However, in terms of fractal supply network and its logistics capability, there are very few of technical research carried out in this area. In this research paper, the fractal supply network features are introduced to enhance the practitioners understanding of this type of relationship. In addition, the proposed models provide an appropriate method to optimise the cycle stock and decompose of a complicated supply network into smaller entities (i.e. fractals) with a unified goal to achieve and ability to adapt to the dynamic nature of today's markets.

Keywords
Fractal supply chain, cycle stock, supply chain optimisation, inventory cost, transportation cost.

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SUPPLY CHAIN VISIBILITY IN HI-TECH: – UNDERSTOOD *YET* MISUNDERSTOOD

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Purpose of this paper:
SCV is not a new concept though its understanding and execution has been underpinning in hi-tech industry has always been a challenge. Increasing visibility is critical strategy for hi-tech industry in the context of
increasingly demanding, complex and multi-tiered supply chain networks.
Paper is based on the industry experience and hence is an attempt to bring clarity into the understanding, execution and relevance of SCV with business drivers viz. Cost, Compliance, Customer Experience, Supplier Experience and Revenue.

Design/methodology/approach:
Objectives have been achieved by establishing an experiential based framework which would help hi-tech industries to relook at their operations and map it to the proposed framework. Framework has been tested among various clients and a derivative of the work is being presented here.

Findings:
Our findings are no different to what hi-tech industry has already been reporting. Some examples are given below:

- Lack of awareness and control over specific product orders and shipments -
- Volatile demand of proliferating products, services and bundling options
- Constantly reducing supply lead time demands from customers
- Globally distributed demand base and supply base and narrowing quality tolerances
- Regulatory requirements e.g. Restriction on Hazardous Substance (RoHS), security regulated import/export, serial number tracking
- Optimizing product lifecycle to develop and launch products more competitive and more profitable

Value:
Paper brings the fresh perspective to already challenged hi-tech industry based on multi-client experience. It would provide guidance to all Supply Chain Managers to relook their methodologies for SCV and assess gaps, if any, with the recommended view point.

Research limitations/implications (if applicable):
Paper is based on client experiences. No primary research has been conducted, though relevant examples from secondary research will be provided.

Practical implications (if applicable):
Paper would force Supply Chain Managers in hi-tech industries to rethink and relook their existing design of SCV. Paper would help establish a structured approach to SCV.

References:
Client references are driven by Non-Disclosure Agreements (NDA) and hence cannot be provided.

PREDICTIVE ANALYTIC MODEL FOR CYCLIC FORECASTING

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Purpose- Systematic forecasting is a critical function in supply chain and manufacturing business, especially for companies that face cyclical demand. Under-forecasting results in potential revenue loss and significant labor overtime cost to compensate for the extra demand volume. Over-forecasting, on the other hand, yields extra inventory as a costly liability. Companies with cyclical demand need analytics to predict and prepare for the future business through an effective business plan. Furthermore, such analytic tools must provide capabilities of adaptive forecasting for the users to frequently change their forecasting parameters and methods. The objective of this paper is to share the knowledge gained by the authors in the development of an analytic tool for cyclic forecasting and its validation at a case company.

Design- Certain types of business models may go through several cycles of demand per year. An example may include manufacturing companies that supply agriculture tools and products to their customers in the field. Not only four seasons may require different agri-products but also various extreme weather conditions as well as governmental economic incentives may result in random changes in demand cycles. Forecasting for such a business environment requires reliance on the historical cycles of demand as well as accurate, current field and market information provided to the management. The management judgment, in addition to the predictive model, plays an important role in demand forecasting (R. Fildes, P. Goodman, 2007).
The forecasting model discussed in this paper utilizes three factors in developing an analytic tool for a business model that experiences cyclic demand year: Correlation analysis, demand patterns similarity and scaling for each of demand cycles per year. Utilizing these filtering methods, the analytic model selects a set of best leading indicator years that collectively can be combined into an overall predictor called the Predictive Model which furthermore can be utilized for future forecasting. The created Predictive Model, which consists of bundled correlated years with similar demand shapes and proper scaling, can be used as the input to the automated forecasting engine to generate future monthly forecasts.
The techniques of Moving Averages, Weighted Moving Averages, and Exponential Smoothing (T. Wallace, R. Stahl, 2002) are used as a set of options for the analyst to compute short-term future forecasts. However, regardless of the forecasting method's sophistication one must always compute the forecasting accuracy. Previous research has included comparative analysis of different methods for forecasting error measurements (A. Davydenko, R. Fildes, 2012). In this paper, we have used a practical measurement called MAD (mean absolute deviation) for the forecasting error.

Findings- We have automated the above forecasting engine by writing a code in Visual Studio with an emphasis on ergonomics of the user-interface. This automated forecasting analytic tool has been tested successfully by a company that faces cyclical demand. Our paper will include this experience.
Value- This paper will discuss the process by which one can create an analytic tool to forecast cyclical demand. Furthermore, it attempts to provide a balance between objective forecasting and management judgment and hence it offers a sense of realism for the future researchers creating similar business analytics.

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Wallace, T., Stahl, R. "Sales Forecasting: A New Approach," T.F. Wallace & Company, 2002

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RESTRUCTURING THE SUPPLY CHAIN TO MEET CUSTOMER DEMANDS-THE SUPPLY CHAIN RESPONSIVENESS OF A SWEDISH WHOLESALER

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Abstract

Keywords: supply chain responsiveness; global sourcing; relationship management

Paper category: Research paper

Purpose of this paper
Global sourcing practices, driven mainly by opportunities for cost savings, has extended the supply chains and many Western European and US buying companies struggle with more supply chain parties involved, increased and unpredictable lead times, cultural dissimilarities, and information scarcity. At the same time end customer demands become more volatile and requirements on customised products with shorter delivery lead times increases. To improve effectiveness (rather than efficiency) in the supply chain, strategies for improved responsiveness are of fundamental importance. The purpose of this paper is to explore the strategies adopted for increased responsiveness in a wholesaler's global sourcing practices.

Design/Methodology/Approach
As an empirical basis for the paper, a single case study of Swedish wholesale company selling workwear clothing and associated product is reported. To structure the presentation and illustrate the concept of responsiveness, the strategies are mirrored in a framework based on a literature review on supply chain responsiveness presented by Reichhart & Holweg (2007).

Findings
This paper presents a number of hands-on strategies for improved supply chain responsiveness conducted by a Swedish wholesale company, including the use of Regional Operational Managers, collaborative relationships, vertical integration and product categorisation.

Value
The paper contributes with empirical data on responsiveness strategies, which generates a practical understanding of the topic, and relates it to existing theoretical framework on supply chain responsiveness. Based on other literature on responsiveness (Hoyt et al., 2007; Christopher & Holweg, 2011), it is argued that the existing theoretical model of supply chain responsiveness presented by Reichhart & Holweg (2007) should be extended by antecedents for a responsiveness orientation as a means to create a more holistic understanding of the concept. In addition, the paper argues that the key for successful supply chain responsiveness is in the case company not power. Instead the success is based on an appropriate relationship with other supply chain members. With the best control and information about end customer demands, the task for the wholesaler becomes to orchestrate these members, despite limited possession of power.

Research limitations/implications
The research presented in the paper is explorative and consists of one single case study. The research aims at first hand to demonstrate the importance of supplier relationship management when restructuring a supply chain, and does not present a complete palette of measures for how to do this.

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Christopher, M. and M. Holweg (2011). "Supply Chain 2.0": managing supply chains in the era of turbulence. *International Journal of Physical Distribution & Logistics Management*. Vol. 41 No. 1, pp. 63-82.

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Section 3: Collaboration and relationships in supply chains

MAPPING EMERGING THEMES AND DOMINANT ASPECTS IN SUPPLY CHAIN COLLABORATION (SCC)

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Purpose of this paper:
Nowadays it is a common premise that working collaboratively with upstream and downstream members along the Supply Chain (SC) affects not only the performance of the dyadic-level relationship, but of the SC as a whole. Subsequently, a significant amount of research has been devoted on understanding and improving the collaborative forms exhibited among SC members, particularly focusing on the elements of collaboration. There have been several approaches to clustering the elements of SC collaboration in order to understand the complex nature of their interaction (e.g. Slack and Lewis, 2002). With more than 750 academic citations, Barratt (2004) identified a very sound proposition about the key elements of SCC that need to be managed, largely clustered under collaborative culture (e.g. external & internal trust), managing change (e.g. cross-functional activities), and strategic elements (e.g. intra-organisational support). However, some ten years on, SCC remains a topic of interest and debate (e.g. Ramanathan and Gunasekaran, 2014). We aimed to identify and critically assess the scope of the outcomes of recent publications on SCC, by contextualising the main elements under investigation.

Design/methodology/approach:
Academic papers published during the years 2004 to 2014 were selected to assist the identification and clustering of recent research developments in relation to SCC in relation to the relevant elements of collaboration under investigation. The selection of journals in the areas of SC and logistics management that are in the ABS ranking list offered a wide breadth of publications in the area under investigation. The papers were systematically analysed with relevant codes and themes using NVivo, which assisted in the clustering process. This was followed by an in-depth analysis of the dominant and emerging topics and issues discussed in the papers, identifying links and emerging patterns.

Findings:
The approach followed, in combination with the use of NVivo as an instrument to systemise the analysis, assisted in identifying pertinent and current themes of interest dominating the SCC literature. Based on the identified findings, the paper provides a critical summary of the links among emerging research patterns that shape the current and future SCC research landscape.

Value:
The paper identifies the main elements of SCC and the relevant aspects that have been the dominant themes and their associated aspects, identifying emergent recent developments. The identification of the intersections between research outcomes and emerging patterns contributes to an informed anticipation of future research avenues. The paper is relevant to academics, as it identifies trends in research. It is also anticipated that the information on current issues in relation to the SCC elements will be useful to SC managers as well.

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Ramanathan, U. and Gunasekaran, A. (2014), "Supply chain collaboration: Impact of success in long-term partnerships", *International Journal of Production Economics*, Vol. 147, part B, pp. 252-259.

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IDENTIFYING INTER-ORGANIZATION COLLABORATION TYPES AND RESEARCH ADVANCEMENTS IN SUPPLY CHAIN CONTEXT

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Purpose of this paper:
The important role of collaboration in supply chain has been demonstrated by many researches before (Ramanathan & Gunasekaran 2014); therefore it is valuable to identify different types of collaboration in supply chains. The main purpose of this state-of-the-art paper is to make a synthesis analysis on collaboration in supply chains by literature review of all relevant articles, conceptualizing collaboration in supply chains and providing implications for future research.

Design/methodology/approach:
This study is based on a systematic literature review by using a meta-analysis of scholarly literature on collaboration in supply chains. Three steps were used for a content analysis, including material collection, and text-mining. Material collection was based on a designed keywords list and specific subjects restrictions; category selection and text-mining were used for categorization and extraction of publications on collaboration in supply chains.

Findings:
A total of 1250 papers are reviewed for descriptive analysis which shows a general increase in trend of research on this topic. A further analysis is undertaken based on 509 papers, extracted and classified along different categories and corresponding sub-categories. Selling, coordination and textile and apparel industry are the three most common subcategories/topics in their corresponding categories. Collaboration in supply chain in current research is still at a relatively low level, and there are still a lot of potential for investigating higher level of collaboration in future research.

Research limitations/implications:
Along various supply chain stages, logistics is the most promising direction for future research considering it as a still under-explored area of research compared to manufacturing and selling. Further, as papers employing mathematical or other modelling methods are increasingly given more attention in the recent years, this research field could be more attractive to researchers within operational research with relevant modelling background.

Original/Value:
Review papers on collaboration in supply chains are mainly about investigation on the performance (Adams, Richey, Autry, Morgan & Gabler 2014, Vereecke & Muylle 2006). However, none of the existing scholarly paper constructs an overview of research on supply chain collaboration through a systematic literature review method. Besides, there are no studies conceptualizing or identifying different types of supply chain collaboration. This research is valuable to researchers working on collaboration in supply chains and companies seeking supply chain collaboration in different industries.

Keywords: Collaboration; Supply Chain; Review

Category of the paper: Literature Review

References:

Adams, F. G., Richey, R. G., Jr., Autry, C. W., Morgan, T. R. & Gabler, C. B. (2014). Supply Chain Collaboration, Integration, and Relational Technology: How Complex Operant Resources Increase Performance Outcomes. *Journal of Business Logistics,* 35(4), pp. 299-317.

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THEORIES UNDERPINNING SUPPLY CHAIN COLLABORATION: A LITERATURE REVIEW

Kwok Hung Lau[1] and Meihua Gu[2]
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[2]School of Business IT & Logistics, RMIT University

Purpose of this paper: This paper reviews the current literature on the various theories underpinning supply chain collaboration and contributes a set of findings that capture the state-of-the-art in the field.

Design/methodology/approach
A literature review approach was adopted to capture, classify and summarize the main body of knowledge on the underpinning theories for supply chain collaboration. A total of 89 articles on supply chain collaboration have been systematically reviewed with respect to the objective(s) of the study and the underpinning theories used.

Findings
The findings reveal that the most often used theories underpinning supply chain collaboration include resource based view (RBV), transaction cost economics (TCE), and network theory (NT). Nevertheless, agency theory (AT), social exchange theory (SET) and institutional theory (IT) have also been applied. The choice of underpinning theories tends to depend upon whether the focus of the study is placed on the outcome or the process of collaboration.

Research limitations/implications (if applicable)
Despite a vast body of literature on supply chain management and collaboration, there is still no common consensus on the appropriate theories to use to underpin the behaviour. Research effort in this regard is relatively limited. This may be due to the complexity and diversification of supply chain collaboration behaviour and the difficulties in data collection which, looking positively, provide rich opportunities for further exploration.

Practical implications (if applicable)
The findings may provide valuable reference and guideline to practitioners in terms of the various perspectives and strategies which can be adopted in collaborating with supply chain members.

What is original/value of paper
This study provides valuable reference to researchers who intend to apply management or social theories to account for the need for collaboration among supply chain members. It highlights the appropriateness and the inadequacies of the various theories for underpinning certain aspects of supply chain collaboration. The study also reveals that supply chain collaboration is such a complex and diverse activity that a single or unified theory to underpin the behaviour is currently unavailable.

Keywords
Literature review; Supply chain collaboration; Underpinning theories

Category of the paper
Literature review

References

Eisenhardt KM (1989) "Building theories from case study research", *Academy of Management Review*, Vol. 14, No. 4, pp. 532-550.

Halldórsson A (2007) "Complementary theories to supply chain management", *Supply Chain Management: An Internal Journal*, Vol. 12, No. 4, pp. 284-296.

Wernerfelt B (1984) "A resource-based view of the firm", *Strategic Management Journal*, Vol. 5, No. 2, pp. 171-180.

CONCEPTUALIZATION AND SCALE DEVELOPMENT OF COLLABORATIVE SUPPLY CHAIN

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[2]Paris VIII University 2
[3]ParisVIII University 3

Purpose of this paper

The relationship between upstream and downstream partners in a supply chain of the manufacturing industry has become more complex due to increasing global competition, and thus, the management and integration capacity of the supply-chain partners is important to the success of a company. Collaborative supply chains play a crucial role in a complex manufacturing environment .In a collaborative supply chain, two or more independent companies can jointly plan and operate a supply chain to achieve greater operating advantages. This paper examines the nature and characteristics of collaborative supply chain concept and provides a comprehensive definition of this concept. Our purpose is to investigate an instrument measurement of collaborative supply chain.

Design/methodology/approach
Through an extensive literature review, our research conceptualizes collaborative supply chain as seven key components: information and communication technology, information exchange, goal congruence, decision synchronization, incentive alignment, resource sharing, and joint knowledge creation. We use the expertise of judges for content validity assessment through rigorous statistical analysis including Q-sort method and Zaichkowsky's procedure.

Findings
This research has developed content and face valid instruments for collaborative supply chain, which is useful to researchers who investigate collaboration among supply chain partners. All the scales have been verified through Q-sort method.

Research limitations/implications (if applicable)
Our research makes several important and novel contributions, most notably, the development and face validation of a multifaceted scale for the measurement of collaborative supply chain. In fact the accurate definitions and measures of collaborative supply chain has provided a rich and structured understanding of what occurs in a supply chain or network.
They also facilitate empirical research efforts because the relationships among constructs can be better captured with better definitions and measures .The definition and measurements can serve as a powerful tool for managers to form effective collaborative relationships. It can help companies reduce the chance of collaboration failure by addressing these seven key dimensions of collaborative supply chain. Future research should apply the measures developed here for real case.

What is original/value of paper
Based on our knowledge, no study to date has integrated these components in an unified framework. In fact Information and communication technology has been missed as a key component of Collaborative supply chain. This study seeks to provide a rich and structured understanding of collaborative supply chain. It provides a comprehensive definition of collaborative supply chain.

Keywords
Collaborative supply chain, Expert Judge, measurement scale

Category of the paper
Literature Review.

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NEGOTIATING SUCCESSFUL BUYER-SUPPLIER RELATIONSHIPS: A PRACTITIONER PERSPECTIVE

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Purpose of this paper
This paper focuses on the creation of buyer-supplier relationships and the associated activities that are required to maintain the relationship, including consideration of when relationships might go 'sour' as another perspective, by default, on what contributes to successful partnerships.

Design/methodology/approach
Following a review of the literature from the past 20 years (mainly focused on supply chain-related journals) to identify potentially important success factors, primary research was carried out with practitioners.
This took the form of in depth interviews with purchasing managers of large multi-national companies. The data collection consisted of 36 interviews with interviewees from eight successful companies. The interviewed (mainly senior) managers were located in Germany and the USA. The focal companies were all large, multinational corporations from the high technology and automotive industry with revenue exceeding 1 billion Euros and over 10,000 employees. Each interview was carried out in a structured way using a 12-item research questionnaire and lasted about 45 to 60 minutes.

Findings
The analysed responses of the practitioners provide new insights into the attitudes and actions that contribute to success. The responses revealed that although E-procurement solutions are of increasing importance, face to face contact between buyers and suppliers is still deemed to produce the best results. Furthermore, no single communication channel is used in isolation to manage the buyer-supplier relationship. To cover the many contingencies of increasingly complex supply chains, companies rely ever more on very detailed contracts. The respondents felt that the more detailed the contracts, the better the relationship will be.

Good buyer-supplier relationships thrive or fail depending on personal relationships. The respondents reported that an important element in successful buyer supplier relationships is the existence of an effective supplier performance and feedback process. To avoid the situation of a relationship going sour, buyers and suppliers need to communicate openly (identifying root causes, discussing expectations, and developing and implementing corrective action), this being one of the reasons for their preference for comprehensive contracts. Additional insights will be discussed in the full paper. However the clear message is that supply chain performance is highly dependent on the nature and depth of buyer-supplier relationships.

Value

The data-rich nature of the individual interviews provide first hand insights by senior managers as to the important aspects of negotiating procurement deals for successful long term supplier relationship management. The key themes to emerge though an analysis of the managers' responses enabled us to develop a negotiation-centric supplier relationship management model.

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THEORIES UNDERPINNING SUPPLY CHAIN COLLABORATION: A LITERATURE REVIEW

Kwok Hung Lau[1] and Meihua Gu[2]
[1]School of Business IT & Logistics, RMIT University
[2]School of Business IT & Logistics, RMIT University

Purpose of this paper
This paper reviews the current literature on the various theories underpinning supply chain collaboration and contributes a set of findings that capture the state-of-the-art in the field.

Design/methodology/approach
A literature review approach was adopted to capture, classify and summarize the main body of knowledge on the underpinning theories for supply chain collaboration. A total of 89 articles on supply chain collaboration have been systematically reviewed with respect to the objective(s) of the study and the underpinning theories used.

Findings
The findings reveal that the most often used theories underpinning supply chain collaboration include resource based view (RBV), transaction cost economics (TCE), and network theory (NT). Nevertheless, agency theory (AT), social exchange theory (SET) and institutional theory (IT) have also been applied. The choice of underpinning theories tends to depend upon whether the focus of the study is placed on the outcome or the process of collaboration.

Research limitations/implications (if applicable)
Despite a vast body of literature on supply chain management and collaboration, there is still no common consensus on the appropriate theories to use to underpin the behaviour. Research effort in this regard is relatively limited. This may be due to the complexity and diversification of supply chain collaboration behaviour and the difficulties in data collection which, looking positively, provide rich opportunities for further exploration.

Practical implications (if applicable)
The findings may provide valuable reference and guideline to practitioners in terms of the various perspectives and strategies which can be adopted in collaborating with supply chain members.

What is original/value of paper
This study provides valuable reference to researchers who intend to apply management or social theories to account for the need for collaboration among supply chain members. It highlights the appropriateness and the inadequacies of the various theories for underpinning certain aspects of supply chain collaboration. The study also reveals that supply chain collaboration is such a complex and diverse activity that a single or unified theory to underpin the behaviour is currently unavailable.

Keywords
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Category of the paper
Literature review

References
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Halldórsson A (2007) "Complementary theories to supply chain management", *Supply Chain Management: An Internal Journal*, Vol. 12, No. 4, pp. 284-296.

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INFORMAL RELATIONSHIPS AND THEIR IMPACTS ON SUPPLY CHAIN MANAGEMENT

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Purpose of this paper:
Interpersonal contacts have been identified as having an important role in supply chain management (Lee and Humphreys, 2006), especially where the cultural concept of informal relationships have a major influence on both social and business norms. Understanding the underlying structure of informal relationships and their impacts can help businesses and supply chains to tackle difficulties and yield performance improvements. The objective of this paper is to investigate the impacts of informal relationships in supply chain management (SCM) through a systematic review of the literature.

Design/methodology/approach:
The systematic literature review comprised identifying published academic research on informal relationships and supply chains, covering the period from 1994 to 2013 inclusive. To identify relevant articles, two sets of searching terms were combined. The first included the names given to different forms of informal relationship (e.g. guanxi, wasta), and the second covered various dimensions in supply chains, including supply, logistics, procurement and production. This resulted in the identification of 315 relevant papers. Further filtering to identify those papers where the substantive research was on informal relationships resulted in a final sample of 95. Content analysis was used to synthesise the research and identify various clusters of supply chain impacts. The alignment between these impacts and the core values and motivations for informal relationships were also considered.

Findings:
Informal relationships are still an evolving area in supply chain management. Twelve different clusters of supply chain impacts were identified, among which, the most emphasised factors are relationships (48 papers), procurement (31), production (27), reducing uncertainty (18) and supplier management (16). Within each individual theme, various dimensions were synthesised based on the literature in supply chains. For example, 'relationships' includes the studies in logistics outsourcing (Chen et al., 2010) and relationships with competitors (Wong and Tjosvold, 2010). Informal relationships seem to work as an 'invisible' institutional forces and impact upon integration and collaboration, stakeholder management and strategic planning in different topics of supply chains.

Value:
There is a lack of consolidated research examining the impact of interpersonal relationships in SCM, and so this work represents a valuable contribution. Further, various research opportunities for future study have been identified in this review work.

Research limitations/implications:
The review particularly focuses on examining the current research dynamics and the influences of informal relationship on SCM. One limitation is that many of published studies were based on Chinese culture and guanxi. Therefore, other terminology (such as wasta from the Middle East) was less represented in this database.

Practical implications:

Visualising the key themes and issues supply chain managers face in dealing with social-cultural diversity in emerging markets can help practitioners come up with improved strategies to develop effective supply chains.

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MULTIAGENT SYSTEMS TO PROMOTE TRANSPORT COLLABORATION IN DEVELOPING COUNTRIES: A LOOK AT AGENT BEHAVIOUR SETUP

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PURPOSE OF THIS PAPER:
Transport stakeholders have always identified efficient transportation as the success and growth to their business. Collaboration have been seen as a means to promote efficient transport among stakeholders. However collaboration has always been seen to be lacking in developing countries. Multiagent systems (MAS) has of late been researched and prototyped by many as key to aiding future collaboration among transport andlogistics partners (Robu et al., 2011, Moonen, 2009, Dullaert et al., 2009). The aim of this research is to show the possible solutions MAS can provide to promote collaboration within the transportation industry of a developing country.

DESIGN/METHODOLOGY/APPROACH:
The research followed a literature and software study into the variations of transport MAS designed, tested and implemented. This formed the basis for an empirical component that evaluated selected systems and looked at the suitability of these to mimick a developing country's transport players. The evaluation also looked at agent behaviour and characteristics of MAS in a transportation environment. This was applied and modelled with the characteristics and processes of transport stakeholders in a developing country to assess outcomes of collaboration that was used or evaluated.

FINDINGS:
Exploration in the capabilities of MAS show that they can through the use of algorithms promote cooperative and negotiating features, and can be particularly applied to a decentralised environment like transportation. The customisation of agents according to transport user requirements allows for potential autonomous representation and provide for a potential uninterrupted service. The message formats based on Agent Communication Language (ACL) explained by Schleiffer (2004) form the basis for all required fields to achieve consensus during agent communication and behaviour setup, and could be applied to the limited environment of a developing country .

VALUE:
This paper contributes to the overall application of MAS to different environments by applying and testing its current capabilities to the characteristics and requirements of a developing country. Transport stakeholders can benefit through the exploration of MAS as a possible solution, while agents software developers can construe future behavioural characteristics.

RESEARCH LIMITATIONS/IMPLICATIONS (IF APPLICABLE):
This research focussed on the modelling agent behaviour in a developing country scenario, and produced some results on the applicability of MAS solutions. However the engineering aspects of agents form the true basis to understanding behaviour and need further exploration into its techniques and systems.

PRACTICAL IMPLICATIONS (IF APPLICABLE):
Understanding transport collaboration and seeing its benefits are often difficult in a developing country where own benefit and gain is the norm. Trust and common benefit are the deciding

factors for stakeholders considering collaboration. MAS that aim to achieve the best result for all transport players can provide for a new form of fair and controlled collaborative success.

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EXPLORING THE RELATIONSHIP AMONG INDUSTRIAL CLUSTERING, BUSINESS ECOSYSTEM AND BUSINESS STRATEGY – AN EMPIRICAL STUDY ON THE FASTENER SUPPLY CHAIN IN TAIWAN

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ABSTRACT

Purpose

Despite of the offshore migration of many fastener companies to China over the past 25 years, Taiwan still ranks top five in fastener supply with a total exporting value of $4.2 billion in 2012 after 60-year development of the industry. Currently, there are about 1300 fastener manufacturers in Taiwan and 900 of them are located in a narrow strait stretching about 60 km in the southern part of Taiwan. The conglomeration of the same industry in a small area demonstrates the existence of "industrial clusters", where companies have the potential to share resources and to implement division of work. Since most fastener manufacturers in Taiwan are small and medium enterprises (SMEs), clustering can facilitate collaboration and resource sharing among them (Wu et al., 2012). However, clustering is merely a conglomeration phenomenon and differs from collaborative roles setting in business ecosystems. Actually a business ecosystem encourages roles setting after cooperation with other actors within different fields and integrates their resources and capabilities so as to achieve the value maximization (Iansiti and Levien, 2004). Moreover, both clusters and business ecosystem are resulted from business environment. Nevertheless, the impact of clustering and business ecosystem on business strategy formulation is relatively neglected by previous studies. Therefore, we endeavor to investigate the relationship among clustering, business ecosystem and business environment as well as explore the impacts of clustering and business ecosystem on business strategy.

Research approach

After review of related literature, we proposed a conceptual model having four constructs of business environment, industrial clustering, business ecosystem formation, and business strategy and drew five hypotheses accordingly. Data were collected via structured questionnaires mailed to companies of fastener industry in Taiwan. A total number of 310 questionnaires were mailed. After excluding non-usable data, the final sample size of this study was 153. Due to the small sample size, we used PLS rather than AMOS to test the hypotheses.

Findings and Originality

From the PLS results, only one of the five the hypotheses (H4) is not supported. The relationship between industrial clustering and business strategy is not significantly associated suggests that industrial clustering alone does not constitute business strategy for companies. Only when there is some kind of roles setting after collaboration and information/risk sharing activities among companies in the cluster, such business ecosystem can affect business strategy. Little research has endeavored to distinguish industrial clustering from business ecosystem and examine their impacts on business strategy. This research conducted an

empirical study to explore the relationships among clustering, business ecosystem and business strategy and the findings suggest that building or participating at the business ecosystem to form business roles would affect how businesses operate.

Keywords: Industrial clustering; business ecosystem; business strategy

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FLOW POOLING AS LATERAL COLLABORATION

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Purpose of this paper:
The purpose of this paper is to analyse the Multi User Concept (MUC) approach, a combination of vertical and horizontal collaboration across different actors in a supply chain.

Design/methodology/approach:
This research is based on a narrative literature review and a quantitative case study using modelling and simulation.

Findings:
On a supply chain level, the model shows significant advantages for the MUC approach in terms of cost and service levels. However for some of the actors, there is only very limited individual improvement. Therefore they have no incentive to join with the other companies, meaning that the feasibility of the cooperation is placed in danger.

Value:
This paper represents one of very few papers outlining challenges in distribution collaboration, based on an empirical sample.

Research limitations/implications (if applicable):
Though an extensive literature review was made, this papers is based on a single case model.

Practical implications (if applicable):
Despite having a large potential, there are several critical issues to consider before approaching the implementation of Multi User Concept. This paper provides, from the view of the individual actors, valuable insights for implementation and design.

Category of the paper
Research paper.

Keywords: Horizontal collaboration, distribution, freight transportation

A TAXONOMY OF TRANSACTION SPECIFIC INVESTMENTS AND EFFECTS ON COOPETITION IN LOGISTICS OUTSOURCING RELATIONSHIPS

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Purpose of this paper
The pursuit for greater efficiency has forced vendor and client firms to make transaction specific investments (TSIs) that commit substantial resources in logistics outsourcing transactions. TSIs will not only generate higher value for investing firms, but also induce problems like haggling and counterpart opportunism for investing firms due to their sunk-cost commitment or hostage nature. The synthesized consideration of these dual results inspires firms that, in transactions which they have TSIs, they should simultaneously cooperate to achieve the maximum utilization of TSIs and compete to protect their TSIs. This study attempts to identify variations of TSIs made in logistics outsourcing relationships and explore how such variations are related to outsourcing coopetition.

Design/methodology/approach
This study will explore (1) the structural pattern of TSIs consisting of both TSIs from the vendor and TSIs from the client; and (2) the configuration pattern of TSIs in relation to cooperation behaviors in information sharing and joint action, and competition indicators in opportunism and transaction costs. In doing this, we test the investment matrix and hypotheses proposed using cluster, ANOVA, and structural equation modeling analysis to 264 data collected from client firms in logistics outsourcing relationships in an emerging market.

Findings
The results validate the matrix of specific investments we proposed and confirm a systematic configuration between each situation in the investment taxonomy and corresponding coopetition behaviours in information sharing, joint action, opportunism, and transaction cost.

Research limitations
This paper didn't include the performance implications into the TSIs matrix. Future research can continue this inquiry by incorporating performance into the matrix in order to find the optimal structure of the TSIs-coopetition coupling that leads to superior performance. Besides, our theoretical framework and hypothesis testing were designed in client-vendor outsourcing dyads. Future research can replicate this to other forms of dyads.

Practical implications
By using the TSIs matrix, managers can map their firms' levels of TSIs and coopetition behaviors with respective partners and decide which clusters their relationships fall in and then strategically decide whether their TSIs and coopetition structures need to be adjusted.

What is original/value of paper
This study will develop a 2×2 investment matrix, offer new theoretical and managerial insights into connections between coopetition behaviors and partnership investment, and make contributions to both the literature and practice of logistics outsourcing relationship management.

Key words
Logistics outsourcing relationships; Cluster analysis; Coopetition; Transaction specific investment

Category of the paper
Research paper

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LOGISTICS TRIADIC COLLABORATION AS A TOOL FOR STABILITY AND INTEGRATION IN SUPPLY CHAINS IN AUTOMOTIVE INDUSTRY

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Purpose of this paper: The main purpose of this paper is to explore the collaborative relationships and their influence on stability and integration in supply chains, with the focus on logistics triad, which is considered as a base unit of analysis.

Design/methodology/approach: The exploratory research on collaboration relationships in logistics triad is completed by using a literature review and a case study, whereby a focal company is observed during the 6 month period. Questionnaires and interviews were done with employees within several levels of hierarchy, main 3PL provider and a large customer in the automotive industry in Germany.

Findings: Based on the observation of the formed triadic relationships of the focal company and her partners within a logistics triad, which includes a 4PL provider, a conceptual model of collaboration is developed, with identified areas of interest and alignment of short-term and long-term goals.

Value: Presented findings implicate that founding of a strong logistics triad is essential in achieving greater integration and stability in supply chains. The presented model can be beneficial for both practitioners and researchers in better understanding the role and importance of all players in logistic triads, whether from buyer, supplier or logistics service provider perspective.

Research limitations/implications: Identified research limitations are derived mainly from the used methods in research. Case study is limited on one company. Different types of questionnaires and interviews, as the matter of fact, may deliver results based on subjective views on collaboration. Future research in this area should cover bigger sample and include quantitative methods in order to get more accurate, reliable results. Also, future directions of research should be oriented towards the quantitative measurement of reducing the price pressure in supply chain and the effects on overall supply chain, even on a supply network level.

Practical implications: Practical implications of this paper can be identified as providing the managerial guidelines for better positioning their individual companies within a logistics triad, their relationships and collaborative performance. One of the most important, a practical finding is the significant impact of the price pressure release and stronger focus on quality and performance in a three way relationship on integration and building stable supply chains.

Section 4: Environmental sustainability and green logistics

USING FUZZY DEA TO SELECT GREEN SUPPLIERS CONSIDERING CARBON FOOTPRINTS

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ABSTRACT

Purpose –This paper proposes a Fuzzy Data Envelopment Analysis (FDEA) model to evaluate suppliers' green efficiency so that an appropriate supplier can be determined.

Design/methodology/approach –This paper adopts a FDEA approach to select suppliers according to their greenness. Production costs, lead time, and supply chain carbon footprints were used as the input criteria, and quality and demand quantity were used as the output criteria.

Findings –This study found that suppliers with low carbon footprints exhibited poor efficiency, which may be attributed to the additional effort required to select raw materials. Suppliers must consider the balance between carbon footprint reduction and costs, and buyers must consider environmental criteria when selecting green suppliers.

Originality/value –Although the green supply chain is considered a trendy research topic, a carbon footprint is seldom considered a major criterion for supplier selection. Our paper is among the first to use suppliers' carbon footprints to evaluate their green performance.

Keywords: Green supply chain, Carbon footprints, Fuzzy DEA.

SUPPLY FOR REMANUFACTURING: THEORY AND PRACTISE

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Purpose of this paper:
Increasing demand, the volatility on commodity markets and the scarcity of resources challenge resource supply for industries. Therefore, remanufacturing becomes an alternative resource for spare parts. Despite the market potential for remanufacturing and existing tools and knowledge on reverse logistics, automotive remanufacturing suffers from supply issues. Identifying reasons for this issue encouraged for this work.

The investigation of issues of core supply for reman led to a procurement practice at an independent remanufacturer that is somehow contradicting literature, thus motivating this research. The objective of this paper is to elucidate the identified discrepancies and discuss their implications for a further research agenda.

Design/methodology/approach:
A pilot case in the remanufacturing industry showed somehow contradicting assumptions and suggestions between literature and practise. This case of an independent German remanufacturer induced a closer examination, with a literature review and an interview with the remanufacturer's CEO. Findings will lead towards additional case studies that iteratively support theory building, based on a grounded theory approach. Examples exist for the application of grounded theory in economics and SCM. The approach shall contribute to a better understanding of actual market barriers and to the evaluation of incentives in remanufacturing supplier relations.

Findings:
The case revealed two mayor insights. (1) The supply issue is real and forces the remanufacturer to build up his own production for new components in addition to remanufacturing. (2) The remanufacturer applies the deposit model in a differing way than assumed by literature. Although it is similar, the difference is essential because both the remanufacturer and the wholesaler profit from the changes.

Value:
Based on existing research on remanufacturing supply chains, this paper discusses theoretical solutions and identifies practical issues. The contribution of this paper is a first step towards a more in-depth study on relationships in remanufacturing. The paper provides insights from a case study that supports the theory development process as intended by the chosen approach. Therefore, the paper supports researchers in aligning their research to market practice. Practitioners could gain valuable insights due to increased transparency.

Research limitations/implications:
However, these findings are limited due to the early stage of the research. Still, the practitioner supported some assumptions and explained them in more detail. Further analysis would have to relate the findings to the character and importance of transaction cost, principal agent theory and related trust issues in supplier relationships. Conducting further

investigations would contribute to knowledge on how the supply for remanufacturing can be improved and further ensured.

Future research regarding supplier relations in remanufacturing could cover surveys focussing on core prices and incentives. In addition, interrelations with other supply markets such as those for recycling would increase transparency further.

Practical implications:
Regarding the supply strategies and supplier relations, the research identified relevant differences between literature and practice as well as complements. Applied incentives and a different deposit system show how independent organizations establish trust based relationships in order to reduce costs in remanufacturing. Accordingly, industry might consider to revise or to adjust business models for remanufacturing.

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CHALLENGES IN HUMANITARIAN LOGISTICS MANAGEMENT: AN EMPIRICAL STUDY ON PRE-POSITIONED WAREHOUSES

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Purpose of this paper:
The ultimate goal of humanitarian relief logistics is to deliver the right supplies in the right quantities to the right locations at the right time, so save lives and reduce human suffering within given financial constraints. Pre-positioned warehouses at strategic locations are essential for this purpose to ensure the availability of supplies when required and to facilitate faster responses. However, some NGOs find it risky to operate pre-positioned warehouses because it is both complicated and expensive given the limitations in finance and resources. Indeed, pre-positioned warehouses for humanitarian relief create various types of risks, but they haven't been fully explored yet. This study, therefore, aims to investigate the challenges in humanitarian relief operations relating to pre-positioned warehouses. In specific, this research focuses on the interactions between various risk factors within the humanitarian logistics management in order to understand how those challenges are generated and enhanced.

Design/methodology/approach:
The study adopted multi-phase mixed methods, combining semi-structured interviews and Interpretive Structural Modelling (ISM). Firstly, it explored the main risk factors of pre-positioned humanitarian distribution centres by interviewing with practitioners in the humanitarian aid organisations. 25 Face-to-face and telephone interviews were administered with 25 personnel at the managerial or higher level in the organisations. Secondly, the risk factors found out in the interviews are analysed by ISM, an analytic framework to encapsulate the relationships of specific elements in a complex system. After receiving the opinions of 10 experts on the pairwise relationships among the risks, the stepwise process of ISM generated the interactive structure of these risk factors.

Findings:
The interviews unpacked 17 representative risk factors that have considerable impacts on maintaining pre-positioned warehouses, such as high inventory cost and failure in forecasting. The directed graph from ISM showed that the risks consist of three levels, namely threats to the values of humanitarian logistics operations (Level 1), disturbances in logistics activities (Level 2) and disruptions by external factors (Level 3). Among them, Level 2 risks were enhanced by three closed loops of risk interactions, mainly centred on high transport cost.

Value:
This research empirically identified various risks in operating pre-positioned warehouses for humanitarian logistics and created a structure of risk interactions in order to understand how the challenges are generated and enhanced.

Research limitations/implications (if applicable):
This study confined its scope of research to the risks stemming from operations of pre-positioned warehouses. Future research can expand the research scope to the entire process of humanitarian relief logistics.

Practical implications (if applicable):
The risk profile can provide a checklist for humanitarian logistics practitioners to assess the level of risks in their operations. Given the levels and feedback loops of risk factors, they can also find out which risk factor should be intensively mitigated to reduce the risk level.

THE ATTITUDE TOWARDS ENVIRONMENTAL SUSTAINABILITY OF LOGISTICS SERVICE PROVIDERS: A COUNTRY COMPARISON

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Purpose of this paper
Third-party logistics service providers (3PLs) have started to transform their operations and strategy to be more effective from a green perspective. The purpose of this paper is to explore the adoption of environmental sustainability practices and factors facilitating and hindering green efforts in a sample of Italian and UK 3PLs.

Design/methodology/approach
We adopted a two-fold research methodology. First, a structured literature review on the adoption of green initiatives by 3PLs was carried out. Such review allowed identifying two research questions that were subsequently addressed through a comparative case study analysis involving eight 3PLs operating in the Italian and UK markets.

Findings
The 3PL companies show a certain degree of diversity in the adoption of green initiatives, due to the different range of offered services and the importance associated to environmental issues. Results indicate that 3PL in both countries are focused on the adoption of initiatives in the area of operational efficiency of transport and distribution activities. The green efforts of UK companies are much more driven by cost efficiency and the need to mitigate company risk. The Italian 3PLs are more pressed by actions undertaken by competitors. In addition, the key role played by customers in driving the implementation of green logistics initiatives clearly emerges.

Research limitations/implications
This paper contributes to deepen the knowledge on how 3PLs in two different countries respond to changing market conditions driven by green pressures. The study contributes to the growing debate on 3PLs' strategy development from an environmental sustainability perspective. Its main limitation relates to the restricted number of case companies investigated that hinder the generalisability of findings.

Practical implications
The paper describes the green initiatives implemented by 3PLs into their operations and the influencing factors that affect such process. The paper provides indications that can help managers of 3PL companies in positioning their business compared to the current practices and attitudes of 3PLs operating in different countries.

What is original/value of paper
The extant literature on green practices in the 3PLs' industry provides findings predominantly from a single country perspective. Comparative studies among 3PL companies operating in different countries may be beneficial. This could help in understanding differences and commonalities of green practices adoption as well as drivers and barriers for investing in green actions for theory and practice. Considering the existing gap of knowledge, such an analysis could stimulate further research in this field.

Keywords
Green practices and influencing factors, Italian and UK logistics service market, Case study analysis

Category of the paper
Research paper

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DETERMINANTS OF ENVIRONMENT MANAGEMENT PRACTICES ADOPTION FOR LOGISTICS COMPANIES IN MALAYSIA

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Purpose of this paper:
This paper aims to analyze the factors influencing the adoption of environment management practices in Malaysia logistics industry. The determinant factors are composed of technological, organizational, environmental, and environmental awareness and attitudes dimensions.

Design/methodology/approach:
A questionnaire survey on the environment management practices adoption of Malaysia logistics companies was conducted, and 204 samples were analyzed from 1,144 companies. The Dillman Total Design Method was used in conducting the survey.

Findings:
Research results reveal that relative advantage and compatibility of environment management practices, organizational support, quality of human resources, regulatory pressure, and governmental support have significantly positive influences on the adoption of environmental management practices for Malaysia logistics companies. Environmental uncertainty and environmental management practice's complexity have significantly negative influences on environmental management practices adoption. However, the influence of customer pressure is not significant for Malaysia logistics companies. This paper also suggests implications and opportunities for future research.

Value:
The model and variables in this paper propose a new understanding about determinants factors in adopting environment management practices in the logistics companies. It also envisioned offering a lens in which further research can be directed to enhance environmental reputation and outcomes of firms through new environmental management practices and the sustainable long-term competitive advantages of the firms.

Research limitations/implications (if applicable):
The generalizability of the findings is limited as the study focuses only on logistic industry in Malaysia

Practical implications (if applicable):
The model suggests applied clarifications to problems encountered by logistics companies, and will be relevant to a wider audience of logistics industries. The framework is intended to clearly advise senior executives of the importance of adopting environment management practices. Companies that plan to adopt environmental management practices will be able to make managerial decisions based on the findings from this research.

Keywords:
Technological dimension, Organizational dimension, Environmental dimension, environmental awareness and attitudes dimension,
Environmental Management Practices.

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DEVELOPING SUSTAINABLE SUPPLY CHAINS IN GREECE, ITALY, POLAND AND UNITED KINGDOM – RESEARCH RESULTS

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Purpose of this paper: The main purpose of this paper is to present the range of green practices required for developing sustainable supply chain in SME sector. It gives contribution to environmental aspects disused in relation to the sustainability concept. The article also presents the results from research conducted in an international project - PrESS (http://pressproject.eu/) aimed at promoting green thinking and transferring a decision support tool to the business practice.

Design/methodology/approach: A two-phase methodology design based on literature review and survey was used. The literature is a source of the knowledge about supply chain sustainability whereas the research provides findings based on 227 surveyed companies.

Findings: The findings of the research cover the range of green practices used by chosen companies in Poland, United Kingdom, Greece and Italy.

Value: The paper presents unique project and unique research results on companies which face the challenge of environmental protection improvements and developing supply chain sustainability.

Research limitations/implications (if applicable): The presented research includes a preliminary sample of the companies.

Practical implications (if applicable): The article shows the scope of environmental practices that are being implemented by companies. This can support supply chain managers during taking decisions on directions of product and process improvement.

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DEVELOPING EVALUATION SYSTEM OF GREEN SUPPLY CHAIN USING "SELF-ASSESSMENT SYSTEM" (INTERNAL AUDIT)

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Purpose of this paper:
Considerations have based on the attempt to find answers to the question, whether it is need a evaluating system for green supply chain. If so, what kind of tools and methods should be used for such an evaluation. It has not yet developed a unified evaluation system, which could be used for different types of supply chains.
The subject of green and sustainable supply chain is described in the literature for over 25 years. Also it is showing interest in business practice and implement various elements and principles of green supply chain. During the implementation of processes paid attention to environmental aspects and sustainable development. Therefore, it should consider what tools to use to evaluate such a chain. Analysis of the literature and practical implementations indicates, that the most commonly are used in the supply chain single tools, there is no collective assessment instruments. It turns out, however, that the use of the individual components, such as: ISO 1400X or ecological audit may be insufficient for a full assessment of the chain.

Given the above aspects puts itself to the following hypotheses:

H2: Properly selected components and parameters of audit for green supply chain may indicate how and which parts of the chain should be assessed, at what angle and how often

Design/methodology/approach:
To achieve the objective of the research will be conducted review and study of literature, reports and case studies. Deductive method will be used.

Findings:

The presented considerations are one of the stages of research. Indicated features and components of audit for green supply chain, as one of the elements of the assessment, are to be used as a contribution to the discussion and create a full assessment instruments for green supply chain.

Value:

Originality of considerations lies in the presentation of new, author`s solutions (components) included in the frame widely understood audit for green supply chain.
On the basis of available and already often used tools, methods, you can create an assessment tool (form will audit), which will serve as a benchmark and enable comparison of their position (and the degree of greenness of chain) to other organizations operating in the market. The proposed tool with the indicated, examples of elements of the assessment can be widely used in business practice as well as in the scientific field. On the one hand, it will give the opportunity to evaluate the chain and on the other to compare their position in the market.

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A SUSTAINABLE ECONOMIC PRODUCTION QUANTITY MODEL USING EXTENDED EXERGY ACCOUNTING

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Purpose of this paper
This paper presents a sustainable Economic Production Quantity (EPQ) model based on Extended Exergy Accounting (EEA), which has been proposed as a tool to attain environmental, social and economic sustainability in firms, societies and countries.

Design/methodology/approach
We first modify the EPQ model to account for energy and greenhouse gases (GHG) emissions costs. Next, we perform the EEA analysis. Numerical examples are presented to illustrate the behaviour of the EOQ-EEA model.

Findings
The results show that the exergetic cost of a system may better reflect the true amount of consumed resources. The results also showed that the classical approach of determining the EPQ that minimises total inventory costs may no longer be appropriate as this results in a significant exergy loss. The results further showed that having a more experienced/productive workforce (even when associated with higher wages) improves the exergetic performance of the system.

What is original/value of paper
The paper uses a mechanical engineering concept, exergy, to study the sustainability of an inventory (logistics) system. It uses joules rather than monetary units as a measure.

DIMENSIONS AND CONTINGENCIES OF CORPORATE SOCIAL RESPONSIBILITY IN SMES' SUPPLY CHAINS

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Purpose of this paper:
This research aims to conceptualise the dimensions of CSR in supply chains and then demonstrates the degree of implementation of these CSR practices from SMEs perspectives. The objectives of this research are three-fold. The first is to conceptualise the dimensions of CSR in supply chains, highlighting which dimension is prioritised in the practice. The second is to demonstrate to what degree SMEs implement CSR practices. The third is to explore the contingencies that drive and enable SMEs' CSR practices based on the institutional theory and the stakeholder theory.

Design/methodology/approach:
A large-scale questionnaire survey was conducted with SMEs in South Korea. A total of 200 questionnaires were distributed via email to the SMEs based in the Gyeongbuk Province of South Kore, and 87 usable questionnaires were collected. The data were analysed by analytic hierarchy process (AHP), a 2X2 matrix and ANOVA to demonstrate the SCR implementation level and the contingencies behind it.

Findings:
SMEs tend to focus on explicit CSR practices that can be easily identified their customers. On the contrary, operational issues hidden to the customers are not considered in SMEs' practices. ANOVA analysis empirically showed that stakeholder and institutional pressures are valid in the performance of SCR practices. However, the level of pressures was largely biased to

customers, government and regulatory pressures, which means that SMEs are more reactive rather than proactive to implement CSR practices.

Value:
This research investigated CSR practices within supply chains particularly from the SME perspectives, which have not been fully explored in the supply chain management discipline. In addition, it will empirically analyse the contingencies of CSR implementations using survey data.

Research limitations/implications:
This study has a limitation in conducting the survey with SMEs in one country, which may reduce the generalisability of this research.

Practical implications:
The conceptual model to evaluate the degree of SCR implementation can be used as an index to compare the CSR level of the SMEs.

DRIVERS AND BARRIERS TO SUSTAINABLE FREIGHT TRANSPORTATION: INDUSTRY EVIDENCE FROM UK AND INDIA

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Purpose of this paper
This paper discusses the issue of drivers and barriers to sustainable freight transportation (SFT) implementation in UK and Indian enterprises. With 23% of global carbon-dioxide emissions originating from the transportation industry, it is imperative that significant emphasis and effort be squarely put in controlling its environmental impact. Globally, more than 8 billion tons of freight moves in international transportation and it continues to grow. In this context, both UK and India have high freight traffic however in terms of achieving SFT, both countries still have critical limitations. Even more, the international literature on SFT implementation incentives is facing severe gaps, most of the work being focused on the general supply chain level. To this end, understanding the drivers and barriers to SFT implementation is first of all globally critical (besides UK and India).

Design/methodology/approach
In this context, this paper adopts an exploratory approach with both qualitative and quantitative methods in terms of understanding the SFT drivers and barriers for UK and India. Data collected from research publication, research reports, policy documents, 35 (qualitative) valid key logistics stakeholders including industry experts and policy makers and a set of 41 (quantitative) key transportation stakeholders from UK and India provided a basis for identifying and verifying drivers/barriers to SFT.

Findings
The findings show that environmental sustainability in freight transportation should definitely be incorporated in enterprises' business models and incentives for this adoption should be increased, while the barriers require targeted strategies in order to be overcome.

Research limitations/implications (if applicable)
The main limitation of this research resides in the small sample used for the interviews.

Practical implications (if applicable)
The findings provide vital data for industries which support them with the implementation of green freight transportation by confirming incentives and by identifying potential pitfalls and training needs.

What is original/value of paper
This paper is one of the first researches that initiate the discussion on transnational drivers and barriers to green freight transportation implementation.

Keywords
Sustainable freight transportation, drivers, barriers

Category of the paper
Research paper

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FORMATION OF ENVIRONMENTAL PRACTICES: EVIDENCE FROM CHINA

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Purpose of this paper
There is evidence that not all firms engender homogeneous responses even in the face of similar pressures. Then, what explains the heterogeneous responses? This study investigates how firms began responding to environmental issues based on institutional theory, resource-based view, and organizational theory. The purpose of this study is to empirically investigate the following two questions. The first one is to examine whether top management support work as a bridge between the external and internal pressures and the adoption of environmental practices and, if so, in what ways? And the second one is what external and internal pressures trigger top management support towards the adoption of environmental practices?

Design/methodology/approach
It proposes a framework and then conducts survey to examine whether top management support lead to the adoption of environmental practices and what factors trigger their environmental concerns. 148 valid responses collected from manufacturers in Pearl River Delta, China are utilized to test the theoretical model. Structural equation model is used for statistical analysis.

Findings
The results reveal that government's economic incentive policy and global customers' green demand have significant positive influences on top management support towards environmental practices, while economic concern has a significant negative influence on top management support towards environmental practices. Specially, government's command-and-control policy, local customers' green demand and organizational inertia do not have significant impacts on top management support towards environmental practices. In addition, top management support is positively correlated to both environmental culture and environmental practices, environmental-friendly culture is conductive to the successful implementation of environmental practices.

What is original/value of paper
First, responding to the call from the literature, this study extends the discussion of the role of top management support on the adoptions of environmental practices, which is particularly important for China given its predominantly centralized power and hierarchical culture, thus contribute to a theoretical understanding of firms' diversity of environmental practices. Second, by dividing government pressure into command-and-control policy and economic incentive policy dimensions, market pressure into global and local customers' green demand pressure dimensions, we examine the individual effect of different dimensions rather than focusing solely on the whole effect of government and market pressures tailored to the Chinese context. Third, we introduce environmental culture as a bridge between top management support and environmental practices, thus extend the focus on firm or supply chain level issues to employee or operational level issues in extant literature.

Keywords
Top management support, pressure, environmental practices

Category of the paper

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GREEN PROCUREMENT CHALLENGES IN PUBLIC HOSPITALS: A CASE OF QUEENSLAND STATE

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Abstract

This study investigates challenges of implementing green procurement in Australian public hospitals. We develop a framework of green procurement that incorporates five major challenge-categories and 19 challenges, and structure the problem as an analytic hierarchy process (AHP) model. Under AHP set-up we interview health-procurement executives to prioritize critical challenges of the problem. The research identifies that the key challenge-categories of green health procurement are related to government initiatives and organisational support. Identified critical challenges are lack of legislation on green procurement, senior management support, lack of financial support, clear strategic goals on green, and government incentives for green purchase. The identification of critical challenges will help policy makers to develop sustainable hospital purchasing strategies for practice, and create a model for other public sector organisations to follow.

Key words: Analytic hierarchy process, Australia, Queensland, Green procurement challenges, Public hospitals.

Paper category: Research paper

A THREE-DIMENSIONAL EMERGENCY SYSTEM FOR OIL SPILLS DURING OCEAN TRANSPORTATION

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Purpose:
Recently, with frequent occurrence of oil spills in the marine environment, emergency system for these accidents has received increasing attention. The aim of this study was to develop a three-dimensional visualization system for the management of emergency disposal of oil spills, including the scheduling of emergency resources, real-time monitoring of vessels, and simulation exercises.

Design:
The system developed in this study was based on Web GIS. Google Earth API was applied for the 3-D display of oil spills and emergency resources like vessels. Keyhole Markup Language (KML) was utilized to input the information of ports, vessels, and oil spills into Google Earth. Such information was received or transformed from the data of remote server or GPS signals. Vessel tracking was simulated according to the inputs. The system was built in B/S structure in consideration of portability and usability.

Findings:
Web GIS is an efficient tool for the visualization and analysis of information on oil spills. A 3-D system based on Google Earth has been successfully developed to visualize and manage the resource scheduling, simulation exercises, and real-time monitoring for oil spills at sea. And this system has already been put into practical use.

Value:
This study has integrated a variety of techniques to develop a visualization system, which serves as a great support for decision makers and contributes considerably to the management of emergency disposals of oil spills in China.

Keywords:
Marine oil spill; 3D simulation; Web GIS

Category:
Research paper

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Section 5: Transport and distribution

LOGISTICAL DIMENSIONS OF MULTI-CHANNEL MANAGEMENT: THE NEGLECTED ROLE OF THE SALES FORCE

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Purpose of this paper: When a company simultaneously manages several distribution channels, a question arises concerning a pooling of logistical resources between them. This policy, in particular, aims at making important economies of scale regarding transport, order preparation and storage. One of the main issues is that the sales force of a channel (for example, in shop sales) is rarely trained to face a logistical failure encountered in another channel (for example, Internet sales). The aim is to show that an active integration of sales staff in the organisation of supply chains could improve the service delivered and the level of satisfaction of multi-channel clients.

Design/methodology/approach: The paper is based on a literature review regarding multi-channel management and logistical pooling in order to build a conceptual framework. This conceptual framework is confronted with the French multi-channel distribution field using three case studies. They highlight the differentiated role that is held by the sales force in management of returns of defective goods. The information emerges from an analysis of secondary data resulting from the professional press.

Findings: The research, of exploratory nature, underlines that the sales force does not always access available information from other distribution channels. The unavailable information concerns the client's order process in other channels, and the possibilities of service recovery available in the whole supply chains (for example, stocks of products in warehouse to replace defective products). This makes the global management of different channels difficult and threatens logistical pooling.

Value: The paper underlines the importance of the sales force in service recovery management, in particular when a defective product must be replaced and that a new product must be put at the client's disposal. The usual analysis of the sales force is done based on marketing and HRM studies, in particular to study the implication of sales staff and role conflicts (role of client's representative, role of defence of the company's interests). Yet, when it has logistical data available regarding product flows, the sales force can increase customer satisfaction, for each of the distribution channels and for all channels.

Practical implications: As the sales force holds an increasingly important role in the service recovery, to do so it must have real time data available regarding flows passing in logistical networks. This data enables the seller to be quick to react in case of problems by offering an acceptable replacement solution to the client (for example, a defective product after an Internet order replaced by a product available in a warehouse and delivered at home within 24 hours). Companies must therefore facilitate the access to logistical information for sales

forces, which implies an organisational decompartmentalisation between the marketing and the supply chain activities.

Key words: Logistics, Multi-channel management, Sales force, Service recovery

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THE IMPACT OF THE SHORTAGE OF TRUCK DRIVERS ON LOGISTICS: CASE study of Japan

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Purpose of this paper
This study is intended to analyze the effect of the shortage of truck drivers on logistics. In Japan, the shortage of truck drivers is currently one of the most severe problems in logistics. Companies have needed to change their logistics practices as well as to shift to alternative means of transport, in order to respond to these circumstances. This study will clarify the changes occurring in logistics as a result of the labor shortage.

Design/methodology/approach
This paper will use information collected from individual company interviews as well as data gathered from existing newspapers and magazine articles, to identify and classify the types of measures companies have taken to respond to the shortage of truck drivers.

Findings
Companies have started practicing a modal shift which has changed the means of transport from trucks to railway and coastal shipping. Although truck transport has provided a low cost and convenient service, companies have nonetheless decided to change to railway and coastal shipping. This modal shift makes it possible to reduce the number of trucks needed and lowers CO2 emissions, contributing to green logistics.

Secondly, the use of 'cooperative transport' with rival companies has been introduced. Although companies severely compete with each other in terms of production and sales, they have taken steps to build cooperative relationships with one another for their logistics needs. By introducing co-operative transport, the efficiency of truck loading has been increased and will eventually lead to a reduction in the number of operating trucks.

Finally, inefficient practices and operations in logistics, such as small order amounts which led to the more frequent delivery of smaller quantities of goods, delivery at rigid just-in-time schedules, and long waiting periods for trucks in distribution centers as they are unloaded or loaded, have improved.

What is the original/value of this paper
There have been few studies analyzing the changes in logistics in terms of a labor shortage. In developed countries, the working population is inevitably decreasing. It is also inevitable this labor shortage will have an effect on logistics. This research into what we are experiencing within Japan, can serve as a basis for new perspectives in logistics.

Keywords
Truck driver shortage, Cooperative Delivery System, Model Shift in Transport

Category of the paper
Case Study.

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FRAMEWORK FOR STRATEGIC PLANNING IN SME ROAD TRANSPORT COMPANIES – WORKSHOP METHODOLOGY AS A PRACTICAL APPROACH

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Purpose of this paper
The road transport industry is traditionally comprised of very operationally-managed businesses, especially in small- and medium-sized companies. In a continuously and increasingly dynamic business environment, road transport companies also serve as actors in a diversity of supply networks, which should determine their role, targets, service supply and positioning. This situation demands a clear strategic approach as well as effective leadership to recognize and determine essential approaches. This paper provides an example of a series of workshops involving various stakeholders to create a framework for strategic planning in the road transport industry. In this work, there is a clear connection between research and practical solutions.

Design/methodology/approach
The study is based on both an integrated literature review and a series of eight workshops with diverse stakeholders, which adds empirical case study evidence to the research. A discovery-oriented approach was applied; based on the literature review, expert group discussions served as the primary method of data collection. Workshops align well with the participatory research approach, which uses facilitated group processes to deal with actual problems concerning the group. The entire process utilised interactive development: after each workshop, the next topics were re-planned and fine-tuned according to responses gained from workshop participants.

Findings
This study provides an important approach by combining supply chain management and the logistics literature; therefore, the research results offer a practical framework applicable for diverse interest groups. The findings suggest that strategic development in the road transport industry requires wide-ranging examination and special attention in terms of understanding the attributes that promote and hinder the strategy creation process.

Practical implications (if applicable)
The presented study offers a new viewpoint in the form of a framework to be considered in strategy-level development and planning for road transport companies. By better understanding the attributes involved and their relevance to logistics, transportation companies can increase performance while affecting progress in the entire road transportation system.

What is original/value of paper
The paper provides new information about the utilization of workshop methodology in the transportation system context, which is traditionally a less-active business area in terms of

research and development. This paper presents the essential nature of different elements of strategy-level development while shedding light on the challenges and development areas for different network levels in this business area.

Keywords
Transportation, supply chain management, strategy planning.

Category of the paper
Research paper

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RESTRUCTURING DISTRIBUTION NETWORKS IN HUMANITARIAN LOGISTICS: THE CONCEPT OF "FREIGHT VILLAGES"

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Purpose of this paper
The purpose of the paper is to investigate the contributions and limitations of introducing in the humanitarian logistics field the concept of "freight villages", currently used in the commercial world. The objectives of the paper are the following: (1) to analyze the environmental settings and constraints of humanitarian logistics, (2) to investigate the characteristics of commercial freight villages and (3) to evaluate the effect on relief operations of transferring freight villages to the humanitarian aid.

Design/methodology/approach
The study employs a single case study design, describing the Haiti earthquake in 2010, in order to examine the potential effect of freight villages on the performance of emergency response. Additionally, a SWOT analysis was used to evaluate the concept of humanitarian freight villages.

Findings
Freight villages address one of the most important challenges for the relief organizations - the limited collaboration. They would contribute to the disaster relief operations in different areas: (1) collaboration among humanitarian organizations (by decreasing the costs of collaboration and facilitating the sharing of warehouses, transportation vehicles, equipment, knowledge and information), (2) preparedness of the aid organizations by pre-positioning relief goods, (3) benefits for small and medium sized humanitarian organizations and (4) the performance of emergency response (speed, flexibility and costs). However, several limitations have been identified, including the high investments costs for restructuring the distribution networks in order to introduce freight villages.

Research limitations/implications (if applicable)
The main limitation of the paper refers to the scarcity of quantitative data about the performance of commercial freight villages. Additionally, an analysis of multiple case studies would considerably improve the results. The concept could be enhanced by further research regarding the suitable locations, the number of humanitarian freight villages and the possibility of a combined freight village with both commercial logistics providers and humanitarian organizations as tenants.

Practical implications (if applicable)
The introduction of the concept in real life would positively influence the emergency response, which means the relief items would arrive faster and to a larger percentage of the affected population.

What is original/value of paper
While most of the studies in humanitarian logistics focus on the relief operations through the existing distribution networks, this paper introduces a new concept which requires the restructuring of current humanitarian distribution networks. Moreover, to the best of the author's knowledge, the concept of freight villages has never been used in humanitarian aid.

Keywords
humanitarian logistics, freight villages, collaboration

Category of the paper
Research paper

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WHO CONTROLS CARBON EMISSIONS FROM TRANSPORT AND WHO CARES? INVESTIGATING THE MONITORING OF CO_{2E} FROM A LOGISTICS SERVICE PROVIDER'S PERSPECTIVE

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Purpose of this paper:
This article explores the environmental impact of logistics service provider (LPS) activities in the light of increased customer priorities and the fragmentation of the industry. It also explores the extent to which LSPs can actually monitor the environmental impact of logistics activities in the supply chain.

Design/methodology/approach:
The research is based on a narrative literature review, an interview study, a case survey, and three in-depth case studies. A framework on sustainability challenges in supply chains derived from the literature is used to structure and analyse the findings.

Findings:
Despite the ambitious environmental schemes communicated by several LSPs, they show little interest in and exert little control over the actual emissions generated from their transport operations. It is clear from the results that any real concern for environmental solutions that negatively impact the cost and time requirements from customers of logistics services are not yet a reality.

Research limitations/implications (if applicable):
This paper implies that LSP sustainability cannot be investigated in isolation if a company does not manage its proprietary resources.

Practical implications (if applicable):
Environmental policies among different LSPs appear to be similar, but differ in practice. This emphasizes the importance of follow-up control by environmentally aware logistics service buyers.

Value of paper:
This paper represents a novel approach as to how LSP environmental policies should be viewed. It highlights the concrete need for action to achieve the environmental targets of 2020 and 2050 for carbon emissions from road transports.

Keywords: Environmental logistics, Green logistics, Freight transportation, LSP, Haulier

PRODUCT RETURNS MANAGEMENT: VALUE CREATION AND APPROPRIATION IN A SUPPLY CHAIN TRIAD

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Abstract

Purpose
This study investigates how value can be created in the product returns process and how this value is appropriated by different parties in the supply chain.

Design/methodology/approach
A case study methodology was adopted. In depth interviews were undertaken with executives in a retail organisation, two of its suppliers and the 3PL appointed to manage product returns.

Findings
Value is created in the supply chain from product returns beyond the residual asset value of the product. This value derives from both tangible and intangible cost and benefit elements. Value is created by process alignment facilitated by the 3PL which leads to resource effectiveness and operational efficiency. Appropriation of value depends on relationship factors among the parties in the returns chain.

Research limitations/implications
A single case study of a product returns chain shows in depth understanding of value creation dynamics but is limited in its generalisability. This study lends itself to a longitudinal follow-up study. An exploration of the role of relationship factors would extend our understanding of value appropriation in product returns management.

Practical implications
The role of the 3PL as facilitator was crucial in the creation and appropriation of value in this case. Organisations that have limited supply chain management experience in the forward supply chain might find it fruitful to explore the contribution that a 3PL can make in creating value in product returns management.

Value
The focus on value in the management of product returns and the exploration of value in a triad of related organisations are distinctive contributions to the research literature.

Keywords
Product Returns, Value, Retail, Supply Chain, Case Study, Triad, 3PL

Category
Research Paper

ECO-EFFICIENCY ANALYSIS FOR PACKAGING AND DISTRIBUTION OF BOTTLED MINERAL WATER

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Context. *Eco-logistics* represents logistics and distribution activities when environmental aspects are involved in the planning and managing of the related distribution network. Eco-logistics considers all logistics activities, from transportation, storage and warehousing, packaging and labelling, vehicle loadings and delivery, and, at the same time, it involves conscious use of resources and materials, as well as the monitoring of emissions and fuel consumption of the distribution process, the use of manufacturing technologies and advanced ecologically materials.
Considering the relevance of the mineral water consumption in Italy, in this work an eco-logistics application example to bottled mineral water distribution is presented.

Purpose. The main purpose of this research is to compare the use of PET plastic bottles and glass bottles for drinking water. Both economic value as well as environmental impact are involved in the analysis, considering production, use and end-of-life phases for both bottle types.
Bottled mineral water production process is extremely simple, and management costs of the plant are relatively low, when compared to other products. Considering packaging and logistics, they are characterised by a high pollution potential, but at the same time, a proper combination of packaging materials and distribution network can lead to economic and environmental benefits, thus achieving eco-efficiency goal.

Design/methodology/approach. Two models are proposed, in order to evaluate the eco-efficiency of bottled mineral water in the cases of PET and glass. For models development, the typical sizes of packaging are taken into account, namely the 1.5 litres PET bottle and the 1 litre glass bottle; however, the functional unit considered for comparison analysis is 1 litre. Economic evaluation involves all relevant cost components, while for the environmental impacts assessment the GEMIS software and database is used.

Findings. Numerical analysis demonstrates that, under certain assumption, PET bottles ensures lower costs, mainly due to the relevance of transport costs, higher for glass bottles, related to the whole distribution chain. On the other hand, glass bottles demonstrate better environmental results, thanks to lower environmental impacts in production and end-of-life phases. A sensitivity analysis on different models parameters is also presented.

Originality/value. The presented models are intended to be useful tools to acquire consciousness on costs and environmental impacts of the two main diffused packaging sizes for mineral water distribution, considering all life-cycle phases of bottles.

Keywords.
Mineral water, packaging, eco-logistics.

Category of the paper
Research paper.

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A TYPOLOGY ON LAST MILE DISTRIBUTION SYSTEMS

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Key Words: Last mile distribution systems, Typology
Abstract: This paper investigates typologies of last mile distribution systems (hereafter LM). It begins by observing the evolving LM's and demonstrating the limitations of the extant typologies in the literature. The research develops from two LM typological building blocks, *i.e. typological character* and *character state*, and draws potential configurations defined by coherent arrangements of a defined list of candidate typological characters. These configuration patterns are tested by mapping emerging
LM's against the newly defined typological characters, leading to a new LM typology. The research contributes theoretically to LM's typological pattern recognition, typological advancement, and typological development of other organisational types; and practically to LM's practice database expansion, benchmark development, and innovation source provision.

LAST-MILE LOGISTICS STRUCTURES: A LITERATURE REVIEW AND DESIGN GUIDELINE

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Purpose of this paper
An initial survey into the articles in this field revealed that, despite the significant last-mile logistics (LML) innovations and experimentations, the extant knowledge on LML structures and the associated design variables has been limited. In addition, it is inconsistent and fragmented, and is therefore detrimental to system design. To date, there has not been a comprehensive review undertaken to consolidate knowledge on last-mile distribution structures applied in urban cities. Such understanding can lead to a consistent way to describe these structures and provide a design guideline to guide managers in designing last-mile distribution networks.

As a result, this paper seeks to address this gap and build an updated LML descriptive knowledge encompassing LML structures and the associated design variables, through conducting a systematic literature review. It is envisaged that the guideline translated from the descriptions will provide an accessible entry point to guide managers in designing last-mile distribution networks for logistics operations in urban cities. Last but not least, the review helps to identify important areas for future research.

Design/methodology/approach
The LML-related literature in the areas of operations management and supply chain within a time span of 15 years since 2000 to 2014 has been reviewed to gather previously researched LML structures and the associated design variables. Textbooks, dissertations, unpublished working papers, and conference papers were excluded to maintain a high level of rigorousness, with the exception of International Conference on City Logistics, which is considered a highly relevant conference to this review.

Findings
This paper has conducted a comprehensive literature review on LML definitions, structures and the associated design variables, based upon which a more synthesised LML definition is proposed, and the variances of LML structures against the design variables mapped via an application matrix. A set of LML design guideline is then proposed following the review, culminating with four future research opportunities.

Value
This paper consolidates the knowledge in LML structures, which is presently fragmented and provides a set of dimensions to aid the consistent descriptions of the characters of LML structures.

Research limitations/implications (if applicable)
This research is focused on the distribution structures and the list of dimensions to describe the structures. Future work can be extended to review the impact on upstream activities such as production and replenishment to understand the end-to-end effects, as well as including the return channel and consolidation schemes that are relevant in the LML context.

Practical implications (if applicable)
Outcome of this research enables firms to better understand the types of distribution structures and the associated design variables and therefore being able to better design last-mile distribution structures given a set of essential dimensions to consider.

Keywords
Urban Logistics, Last-Mile, Literature Review

Category of the paper
Literature Review

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A SIMULATION MODEL FOR TRANSPORT SOURCING IN SUPPLY CHAIN

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Purpose of this paper:
Transport is among the most outsourced logistics activities, and cost reduction is considered as the one of the most cited reasons for outsourcing. However, in developed distribution network, there should be some circumstances where own-account transport can reach the economy of scale and so be cheaper than external carriers. In this paper, we examined the impact of temporal demand characteristics on transport sourcing decision. Consequently, we also looked for the economic rationale for total transport outsourcing, because the costs are the most cited reason for outsourcing. The research objective was to develop a tool for an optimal, or almost optimal transport fleet sizing and sourcing according to the temporal characteristics of transport demand throughout supply chain.

Design/methodology/approach:
We developed a relatively simple two-echelon hierarchical simulation model based on a real case, by using the academic version of the object-oriented software GoldSimPro, its tool Optimizer, and MS Office Excel for systematization of input and output variables into the spread sheets and graphics. We considered a system with three available transport "sources": own-account fleet, contract carrier and transport market.

Findings:
The main model outputs are an optimal fleet size and demand assignment to the different transport sources in the planning horizon. The numerical experiment shows that, in relatively developed market, a combination of multiple transport sources - a customized solution - gives better results than use of any of available single transport sources. Requested utilization of own-account fleet, transport contract details with carrier and demand characteristics have a significant impact on share of vehicles from particular sources.

Value:
The main conclusion of the research is that it is better to use a flexible, customized multi-source approach, than "either-or" approach and widespread total transport capacities outsourcing ("one size fits all") decision.

Research limitations/implications (if applicable):
Simulation model development requires balance between time consumption for model development and accuracy of the results. The model is developed according to the real historical data of an oil company. Further development and improvement of model could go toward its wider applicability and removing constraints and, consequently, increasing its practical value and utility. Supply chain strategy and transport market characteristics have a strong impact on transport demands characteristics, available options and selected criteria for transport outsourcing.

Practical implications (if applicable):
The "either-or" sourcing solution is usually a simplification of the problem. Optimal or satisfactory solutions are usually related with a customized transport sourcing mix. A company should incorporate the permanent process of planning and decision-making on transport fleet sizing and sourcing on a strategic level of management.

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Section 6: Maritime and port logistics

TOWARDS GREEN PORT MINDFULNESS: DRIVING FROM INSTITUTIONAL FORCES AND MEDIATION OF TOP MANAGEMENT

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Purpose of this paper
The paper attempts to fill the literature gap and the much desired industry needs by researching on green port from the management perspective. Therefore, this study aims to develop an original framework of green port mindfulness to explore the driving forces from institutional environment on green port mindfulness through the mediator top management.

Design/methodology/approach
This study summarizes the concepts of institutional theory and green port management to develop an initial framework to enhance green port mindfulness. Structural equation modeling (SEM) is applied to verify the research framework.

Findings
This study utilizes SEM to explore the influences of three forms of institutional forces (mimetic, coercive, and normative) and top management on green port mindfulness. The empirical results of this study demonstrate that institutional forces have positive effects on green port mindfulness via top management.

Value

This study integrates the institutional theory and top management to develop an initial conceptual model of green port mindfulness to explore its managerial implications and determinants. The analytical framework and results investigated in the paper would be useful references for green port development.

Keywords
Institutional Theory; Top Management; Green Port Mindfulness

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AN SWOT ANALYSIS ON THE LOGISTICS PERFORMANCE OF MAJOR CONTAINER PORTS IN ASIA

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Purpose of this paper:
Due to Taiwan is an island with ocean environment, insufficient nature resource, small area and high density of population, the international trade and the maritime transportation are the important ways to develop the Taiwanese economy. The developments of the international trade and the maritime transportation port depend heavily on the seaport.
Containerization and hub-port are the major trends in the present container transportation market. In order to become a hub-port, it is necessary to have sufficient hardware, facilities, and excellent logistics performance in ports. The purpose of this paper is to realize the logistics performance of ports in Asia and to improve the service quality of logistics performance of ports in Taiwan.

Design/methodology/approach:
The paper will use SWOT analysis approach to analyse and compare the key logistics performances of major ports in Asia. The major ports in Asia include the ports of Japan, Korea, China, Taiwan, Hong Kong, Singapore, Sri Lankas and India etc.

Findings:
This paper will explore the disadvantages of logistics performance of seaports in Taiwan and suggest Taiwanese ports to learn the advantages of logistics performance of other seaports in Asia.

Value & Practical implications:
Finally, this paper would provide some suggestions and strategies to Taiwanese maritime departments and the managers of Taiwanese ports for improving the logistics performance of container ports in Taiwan.

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CONTAINERISED EXPORTS FROM JAVA: THE IMPACT OF POLICIES TO REDUCE GHG EMISSIONS

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Purpose of this paper:
The purpose of this paper is to analyse the impact of policies to reduce GHG emissions from containerised exports from Java using stated preference data of exporters and freight forwarders.

Design/methodology/approach:
A stated preference (SP) study is used to examine the preferences of exporters and freight forwarders in Java relating to port and inland mode choice. The experimental design generates 8 (eight) alternative combinations of port and inland mode, and 4 (four) of which are presented in each SP choice task. Each alternative presented is described using 2 (two) port attributes (port cost and number of ship calls), and 4 inland mode attributes (inland mode cost, inland mode time, inland mode reliability and GHG emissions). The SP-only and joint SP-RP data are used to estimate the model using Multinomial Logit (MNL), Nested Logit (NL), Mixed Multinomial Logit (MXMNL), and Mixed Nested Logit (MXNL). The best estimation results are used to simulate impacts of a range of potential policies.

Findings:
The best model is MXNL for SP-only data, and MXMNL model is the best model for estimation using joint SP- RP data. The results showing that increases in inland mode cost, inland mode time, inland mode GHG emissions, and port cost all have very significant negative effects on choice utility. On the other hand, inland mode reliability and frequency of ship calls have positive influence on the decision maker when choosing between inland mode and port alternatives.

Simulation results from these two models show that two policies of reducing fuel subsidies for road transport and giving incentives to reduce rail freight rates would provide the most significant encouragement to modal shift from the road mode to the rail mode. However, the largest reduction in GHG emissions can be obtained through policies of reducing fuel subsidies for road transport and placing restrictions on times and routes permitted for the freight road transport operations.

Value:
The main contribution of this research lies in its analysis of the exporters' and freight forwarders' attitudes related to GHG emissions, and the potential affects of policies that may be implemented to reduce GHG emissions. The novelty of this research is in its development of a joint model of inland mode and port choice from the exporters' or freight forwarders' perspective using SP-only and joint SP-RP data collected for this purpose.

CONTAINER SPACE OPTIMIZATION: A SIMULATION-BASED CASE STUDY

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Purpose of this paper:
The present research is an attempt to find and benchmark a method for optimizing and making a loading plan to achieve higher container space utilization with the use of computer software.

Design/methodology/approach:
In this case study an optimization method based on simulation are used to ascertain whether it is possible to cut down transportation cost and cycle time.

Findings:
The use of optimizing software and applying logistics reduces container shipment volume and saves logistic costs and delivery time, resulting in enhancing overall customer satisfaction and enabling the company to become more competitive in the market.

Value:
A key concern in the transportation industry is to design efficient and effective loading schemes for maximizing container space utilization, thereby reducing container shipment volume and saving logistics costs and delivery time. This research offers a method for optimizing a loading plan and number of cartons to achieve container space utilization through use of optimization computer software.

Research limitations/implications (if applicable):
The major limitation is this study has been carried out based on one single company's situation which is unique to this particular context.

Practical implications (if applicable):
Based on the findings of this study the practitioners will have the tool to optimize their container space utilization.

Keywords: Container, Supply chain, Optimization, Software

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A STUDY ON THE ANCHORING SITES SELECTION FOR LAYING UP VESSELS

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Purpose of this paper:
According UNCTAD (2014), the number of container ships laid up had reached almost 11 per cents in 2009, but this number was about 3.4 per cents at the end of 2013. Idle container fleet at end December in 2013 is 779,230TEUs, and this figure is quickly decreased to 227,862 TEUs at end of December in 2014(Alphaliner, 2015). There are two major approaches a carrier can use to deal with the oversupply of container ships: slow steaming and laying-up ships. Laying-up vessels during market recession and reactivating them when the market is recovering is a regular practice in the shipping industry. The research aims at finding the degree of importance of various constructs/criteria influence carriers' laying-up sites selection for their unemployed vessels, and evaluating the degree of attractiveness of four popular vessels laying-up sites in Asia.

Design/methodology/approach:
The research firstly carries out a semi-structure interview with executives of ten ocean carriers and marine insurance brokers to summarize the factors influencing carriers' laying-up site selection, followed by an AHP questionnaire survey to understand the degree of importance of laid-up sites selection criteria and the degree of attractiveness of the four major Asian laying-up sites in this study.

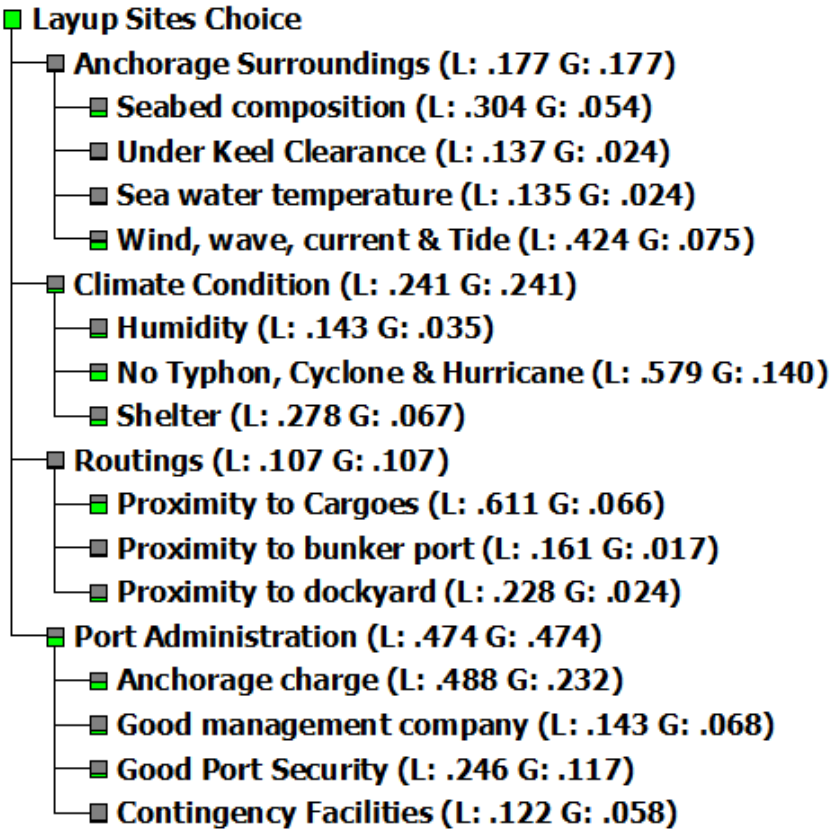
Findings:
Using four major constructs with fourteen criteria, four popular vessel layup sites are evaluated by operation executives of eleven ocean carriers. Port administration (0.474), climate condition (0.241), and anchorage surroundings (0.177) are perceived to mbe the top three important constructs in terms of vessel lay-up site selection decision-making.

Anchorage charges (0.232); typhoon, cyclone & hurricane (0.140); and port security (0.117) are the top three important criteria influencing ocean carriers' lay-up sites selection (see Table 2). Among the four sites in this study, Laem Chabang Port, Hong Kong Port, Port of Tanjung Pelepas, and the
Manila port are perceived to be the best, second best, third best, and fourth best lay-up anchorage sites(see Table 1).

Table 1 Rankings on the attractiveness of popular lay-up sites for shipowners

Alternatives	
China Hong Kong	.300
Philippine, Manila	.127
Thailand, Laem Chabang	.318
Malaysia, Tanjung Pelepas	.255

Table 2 Degree of importance for the constructs/criteria influencing lay-up sites selection for unemployed ships



Value:
According to the authors' knowledge, this is the first research using a quantitative technique to evaluate the attractiveness of different vessels lay-up sites. Ocean carriers can use these research findings to objectively choose the best lay-up site for their unemployed vessels during a recession in the shipping market.

Research limitations/implications (if applicable):
This research surveys Taiwanese shipowners' opinions on factors influencing their vessels' possible lay-up sites selection. Of the eleven carriers responded, only one of them has a 12-monthes warm lay-up experience for one of its ship. Another container carrier executive mentioned his company simply has a vessel lay-up experience for a very short period of time which is about only a week. Thus the responses from these shipping executives are mostly their stated preferences, not their revealed preference. There might be a big gap between their stated preferences and their actual decision-making behaviour.

Practical implications (if applicable):
Although attracting unemployed vessels to lay-up outside the port area is not a usual practice for a port authority, yet this research reveals the 'port administration' construct has the highest degree of importance influencing shipowners' decision-making concerning their vessels lay-up site selection. Most ports authorities do not prefer too many unemployed vessels laid-up in the anchorage area outside their ports. Thus charging adequate anchorage fees on the warm and cold lay-up vessels might have a great effect to deter these shipowners to arrange too many of their employed vessels outside a port.

References:
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THE PANAMA CANAL AND THE RACE AMONG US EAST COAST VERSUS WEST COAST PORTS

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The widening of the Panama Canal, scheduled for completion in 2015, may fundamentally change the flow of Asian goods imported to the US. Ports all over the East Coast of the US are racing to upgrade their infrastructure to be ready for the bigger ships that will be coming through the Canal. These ports will then be better equipped to compete with the larger West Coast ports for goods from/to Asia. This struggle between US West Coast and East Coast ports will re-direct some of the flow of cargo from Asia and so re-allocate economic opportunities. Here we examine this struggle from the points of view of transportation cost and of inventory cost and conclude that not all ports are affected equally. Some ports are thrown into very particular struggles and may be surprised to find out who their competition is. We show the west-east divide for cargo from Asia under various pricing scenarios and conclude that although price is an important factor for the attractiveness of the maritime route through the Canal, the safety and reliability of this route are key elements to enable its sustainable growth.

Purpose of this paper:
What are the reason(s) for writing the paper or the aims of the research?

The Panama canal has been the source of many conjectures as to impact on US East Coast ports. This paper explores this issue from the point of view of shippers.

Design/methodology/approach:
How are the objectives achieved? Include the main method(s) used for the research. What is the approach to the topic and what is the theoretical or subject scope of the paper?

The objectives are achieved by an innovative use of multimodal cost based voronoi diagrams from which the dominance regions of ports can be derived. This has never been done before to our knowledge.

Findings:
What was found in the course of the work? This will refer to analysis, discussion, or results.

We show the US west-east divide for cargo from Asia under various pricing scenarios and conclude that although price is an important factor for the attractiveness of the maritime route through the Canal, the safety and reliability of this route are key elements to enable its sustainable growth.

Value:
What is new/original in the paper? State the value of the paper and to whom.

The use of cost based voronoi diagrams and to establish the boundaries of hinterland dominance of ports is new and original. It is of value to shippers, port operators and authorities as well as shipping lines.

Research limitations/implications (if applicable):

If research is reported on in the paper this section must be completed and should include suggestions for future research and any identified limitations in the research process.

Addition of additional types of costs in the analysis for more granular decisions.

Practical implications (if applicable):
What outcomes and implications for practice, application and consequences are identified? Not all papers will have practical implications but most will. What changes to practice should be made as a result of this research/paper?

Can be used for policy and price setting by authorities, shipping lines and logistics service providers.

References:
THREE relevant references must be provided.

ANALYSING RISK IN SHIP FINANCE

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Purpose of this paper: There are many ways of financing ships, from traditional bank lending to private placements and public issues of debt and equity. They are all associated with different risks and the investor/lender has to make a decision based on the return in order to justify exposure to the risk. Compared to other industries, the shipping industry has only been exposed to the capital market more recently. Beginning in the 1990s shipping companies have started to turn to the global capital markets to raise finance, through either equity or debt. During the period 2004 to 2007, there was an increased number of shipping industry initial public offerings (IPOs), secondary offerings, and issuance of high-yield bonds. However, while issues such as corporate failure and financial distress have been well researched in the accountancy and finance fields, its application within the shipping industry has only been considered in a small number of papers. To the best of our knowledge, no study discusses the insolvency of shipping firms at a company level, leaving a significant research gap. There remain many unanswered questions such as: how do shipping firms reach the point of failure/bankruptcy? How can the financial risk of listed shipping firms be evaluated? Thus this paper aims to evaluate the risk factors shipping companies face in the capital market environment.

Design/methodology/approach: This paper explores corporate failure and financial risk in globally listed shipping firms. Data is analysed using a binary logit model. 484 globally listed shipping companies were selected under the marine transportation sector available from the Bloomberg database, of which 158 were delisted, ranging from 1992 to 2014. Through constructing corporate failure prediction models, this paper identifies evaluation indicators of financial risk associated with listed shipping companies. It further examines the different characteristics of financial risks in shipping and investigates how these characteristics vary over time, and particularly since the financial crisis.

Findings: Since the financial crisis of 2008, bankruptcy amongst firms in the shipping world has been a familiar theme. Corporate finance has never been more in focus within the shipping industry which remains in a precarious situation. Our results show the impact of various financial ratios reflecting gearing, liquidity, profit, activity, cash flow, Market and Industrial specific variables on the financial performance of listed shipping companies, and further, the risk associated with financing ships in the capital market environment.

Value: The shipping industry is unique in its financial characteristics: It is capital intensive, highly volatile in both freight rates and ship prices. It exhibits strong cyclicality and seasonality, and attracts high trade volume. It is a sector which has a unique corporate structure as it is normally highly geared and relies extensively on debt financing. Shipping is also a conservative sector favouring traditional finance and has only tapped the global capital market much later stage than other industries. In this sense, the shipping industry deserves its own enquiry into its financial characteristics.

Research limitations/implications (if applicable): The findings will be of interest to traders and investors in shipping markets, as well as banks and shipowners in the ship finance sector.

Section 7: Knowledge management and E-business in supply chains

CONTROL AND MONITORING FOR E-FULFILLMENT IN FASHION

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ABSTRACT
More than before fashion is sold through e-channels and this implies an increase in e-logistics. Shop selling stagnates. But as fashion sales handled through e-channels is becoming a substantial part of the business, successfully managing such a channel is a challenge for almost all fashion retailers. This research maps the logistics structures of the different fashion e-tailers, and obtains insight in the patterns how products are distributed and returned. The involved logistics structures differ strongly from the logistics structures towards fashion shops in the High Street, especially for its return flows. We describe which parts of the logistics flows are most vulnerable, and which KPI's are applied to meet these challenges. We found that Dutch fashion e-tailers use a wide variety of distribution structures for e-business and sometimes use different KPI's as compared with regular supply chains. Delivery appears to be an important part of the total customer experience. Controlling, applying KPI's and improving efficiency during the e-fulfilment phase is considered essentially by companies to become more competitive and financially successful. We found that the number of KPIs seems to be related to the width of the product range and the price level. Our research gives a clear view how fashion chains are coping with e-logistics and how this relates to existing theoretical models. Especially the control on goods returned, which has not been done much before in-depth. This is important to know, as fashion chains urgently ask for a better understanding of the questions how to manage e-tailing and which KPI's may suit to what conditions. The research offers several practical recommendations to the industry on this aspect.

Keywords: fashion e-channels, key performance indicators, E-fulfilment, returned fashion goods

INVESTIGATING E-FULFILMENT IN GULF COOPERATION COUNCIL BUSINESS-TO-CONSUMER MARKETS

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Purpose of this paper:
This paper reports on a literature review and research objective development pertaining to a current PhD research project on electronic commerce (EC), specifically e-fulfilment, in Gulf Cooperation Council (GCC) business-to-consumer markets (B2C).

Design/methodology/approach:
The literature investigated three categories of actors and related literature streams: pure player (PP) and multi-channel (MC) e-stores; third-party logistics (3PL) service providers; and consumers within the six GCC countries. Research objectives and semi-structured interview questions were developed and interviews have been conducted with 54 interviewees: 16 consumers, 28 EC firms or retailers and 10 3PL service providers.

Findings:
The literature trawl found different issues in offline and online markets, factors affecting EC and e-fulfilment, food and non-food EC, interactions between EC and logistical processes to achieve e-fulfilment, and the growth of EC in the GCC and its economic impact. The following three research objectives were developed from that review: what are extant electronic commerce (EC) and related e-fulfilment logistics processes in GCC B2C markets; are there significant differences between international and GCC e-fulfilment purchase and delivery methods; and to what extent does culture affect e-fulfilment processes in the GCC?

Value:
The study should provide three important outputs: a solid understanding of various methods in developing and managing e-fulfilment logistics services; an exploration of e-fulfilment in developing countries, particularly the GCC nations which is under-researched; and how they can benefit from other experiences regarding current infrastructure and cultural effects.

Research limitations/implications:
The data analysis is currently being undertaken and hence and findings from the field work and data collection are not yet available.

Practical implications:
The study should provide EC firms or retailers and 3PL service providers with insights into the state of EC and e-fulfilment in the GCC and suggest new strategies to make these practices more efficient, effective and relevant.

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THE IMPACT OF INFORMATION TECHNOLOGIES ON LOGISTICS SERVICE PROVIDERS' OPERATIONS – A CASE STUDY

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ABSTRACT
Essentially, logistics provision comprises of the organisation and management of two process flows: the physical flow, concerned with the storage and movement of product, and the information flows, that exist to support the physical flow services. This research focusses on the latter more intangible flow, which is increasingly being focused on and developed by logistics service providers (LSPs) and thus used to support their ambitions to differentiate their business offering from competitors.

The study explores two related questions in this area:

- how can a LSP use its ability to manage information flows to support performance improvement; and,
- why, from a theoretical perspective, should a LSP strive to improve performance through enhanced information management capabilities.

A case study methodology is adopted and through combining primary and secondary multiple methods an in-depth review of the information system that has been developed by a world-leading LSP is focused on for the research. The Resource-based View theory, is used to appraise and assess the competencies and combined capabilities that this LSP has managed to build-up through the development of its information technology systems and processes.

The findings are perhaps somewhat paradoxical in that rather than the LSP using its clear prowess in information technology to "entrap" customers, it instead deploys a layered approach and for some customers allows a "free movement" approach which differentiates itself from competitors. This finding runs against the strategic ambition of developing "stickiness" for customers, thus making it harder for them to leave to take their business elsewhere, leading, in theory, to longer more durable inter-organisational relations and contracts. Instead, by providing more of what some customers may actually want, 'a plug and play' mentality, the LSP is providing an alternative way to differentiate themselves though their development and use of information systems, to attract, retain and develop their business customer base. Thus, we argue that traditional lock-in strategies, while useful for securing repeat business, can have a detrimental effect on customer satisfaction. Instead, enabled by recent ICT advances, flexible information linkage provisions bring new alternative competitive advantages to LSPs.

A STRATEGIC SUPPLY CHAIN MANAGEMENT STUDY ON CERAMIC MANUFACTURING INDUSTRY IN SOUTH ASIA

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Ceramic industry of South Asia has a very prominent history that dates back several centuries. The historical ruins of the region are a proof to the rich diversity of ancient craftsmanship and the skills of the craftsmen themselves. The distinctive designs and exquisite elegance of the ceramic products manufactured by the South Asian ceramic industry vividly illustrate the influence of this rich heritage.

South Asian Porcelain trade mark is well known to the world as a result of this rich heritage and has created a high demand globally for quality ceramic ware made in South Asia, the growing competition from neighboring countries and competing through cost management using Supply chain management tools as a competitive weapon has made global competition much tougher to countries in South Asia.

Purpose of this paper:
This paper provides an over view of the ceramic cluster in South Asia and the Ceramic manufacturing supply chains are investigated to find out the Supply Chain Management problems exist within the Ceramic manufacturing organizations in South Asia.

Design/methodology/approach:
This includes general industrial operations analysis on key six areas of supply chain management including the supplier relationship, customer relationship, company culture, information sharing, demand management and waste reduction which focused to find out the supply chain management practices which are currently practiced and not practiced in the South Asian ceramic industry.

Findings:
This research consists findings on how these six areas affected the "utilization of Supply Chain function strategically" though a comprehensive correlation analysis. The research paper further more discusses the areas, which South Asian manufacturers need focus and the benefits that can be gained by developing their supply chains to gain the competitive advantage over local and international competition.

Value:
This research was carried out recently to develop the knowledge in optimization and utilization of supply chain management tools strategically in the ceramic manufacturing industry in South Asia. This can be recognize as one of the initial reaches done to minimize the knowledge gap in the given context.

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A STUDY ON DELIVERY NETWORKS THAT SUPPORT OMNI-CHANNEL RETAILING, WHICH INTEGRATES ONLINE AND OFFLINE SALES

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Purpose of this paper
As sales at bricks and mortar (BM) stores decline as a result of the growth in online shopping, and as the mode of contact between retailers and consumers diversifies as a result of the widespread use of smartphone, SNSs and blogs, a new sales mechanism, called "omni-channel retailing," has emerged since around 2011. A major consideration when introducing omni-channel retailing is how to build two different types of delivery network: one for delivering products sold at online stores and one for replenishing stocks at BM stores. This paper examines the two above-mentioned delivery networks, and proposes different types of delivery networks that minimize product delivery loads.

Design/methodology/approach
The following two alternatives have been considered for delivery networks. Alternative A is to build two independent delivery networks but operate them in such a way that there will be some coordination between them. Alternative B is to make the delivery network for replenishing stocks at shops carry some online-shopped products. We have built a delivery model in which online shoppers can receive their products at handover points near their homes. We ran simulations based on this model to compare the two alternatives in terms of the number of delivery destinations and the delivery distance. This evaluation used the ratio of the number of those online shoppers who receive products at handover points other than their homes to the number of all the online shoppers as a parameter, δ.

Findings
First, we compared the two alternatives in terms of the number of delivery destinations. Alternative B involves more delivery destinations than alternative A for almost any value of δ. The difference between the two alternatives decreases with an increase in δ and becomes zero when δ=1. Next, we compared them in terms of the delivery distance from the storage center. It was found that Alternative B, in which the network for replenishing stocks at BM stores carries as many online-shopped products as possible, involves a lower travel distance than alternative A. These findings show that Alternative B is better in terms of the product delivery loads.

What is original/value of paper
To our knowledge, there have been no previous studies that examined two product delivery networks with different modes of operation from the perspectives of how to implement and manage a mechanism for omni-channel retailing efficiently.

Keywords
Omni-channel, delivery network, handover points, delivery distance, simulation

Category of the paper
Research paper

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ANALYTICAL FUNCTIONS FOR COMPUTING TIERED DISCOUNT SCHEDULES

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Purpose of this paper
Current volume-based single or multi-tiered discount schedules are published in tabular form. As such they have discontinuous and infinite derivatives. This renders them unwieldy in analytic computations in the fields of economics, management sciences and others where analytic derivatives are required. This disadvantage is further manifested in game theory models and other numerical computations and simulations.

Design/methodology/approach
We explored numerous mathematical approaches to formulating multi-tiered discount schedules that have analytic and continuous derivatives.

Findings
This paper details the construction of well-defined analytic functions that accurately retain all quantitative features of single and multi-tiered tabular discount schedules with the added advantage that all their derivatives are continuous and analytically computable. In particular, these functions accurately reflect all price tiers in the published tables as well as all the volume breakpoints at which prices transition from one level to the next occur.

Practical implications (if applicable):
This methodology enables computations that require analytic derivatives of tiered pricing. The paper will feature an example in which price discounting competitions between vendors of healthcare supply items is resolved using methods from the field of Management Science. In this example, the analyticity of the derivatives enables the user to gain critical qualitative and semi-quantitative economic and business insights into the drivers of this competition as well as pros and cons of different discounting strategies. Such insights could be gleaned with numerical, non-analytic, computations.

Value
Originality of the paper – This is the first publication of analytic discount schedules that have continuous and finite derivatives. Furthermore, the paper explores the special "healthcare-like" discount structures in which the second year discounts depend on the first year volumes.

Value – The analyticity of the derivatives of multi-tiered discount schedules enables their facile incorporation in the fields of economics, management sciences and others including game theory models for inter-vendor price competitions.

Research limitations/implications (if applicable): Not applicable.

Keywords: Discount Schedules, Sigmoid Functions, Tiered Discounts

Category of Paper: Research Paper

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APPLYING 3DCE FOR VALUE CREATION IN SECOND-HAND CLOTHING CHAIN: A SWEDISH STUDY

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Purpose of this paper:
Second-hand clothing value chains in the global north are mostly fragmented, non-integrated and semi-industrialized thus creating various challenges to sustained value creation (Brooks, 2013). In this context, simultaneous products, processes and supply chain redesigning – three-dimensional concurrent engineering (3DCE) – offers a critical lens to explore the existing value creation activities and identify the challenges.
The purpose of this paper is to explore the value creation activities in the reverse value chain of second-hand clothing by applying the lens of 3-dimensional concurrent engineering (3-DCE).

Design/methodology/approach:
The conceptual framework of the paper is based on 3DCE and end-of-use activities along value chains. The research adopts a mixed method by combining desk research, at first, to map the Swedish second-hand clothing value chain actors and flows. This is followed by semi-structured interviews with the identified actors, viz. Swedish retailers, second-hand retailers, charities among others to obtain a clear picture of their involved value creation activities. Further a focus group study was conducted to explore the challenges and missing 3DCE linkages need for collaborative effort towards value creation.

Findings:
Preliminary findings show that various actors are engaged in the second-hand clothing value chain mainly through product- and process- redesigning both individually and concurrently. Product redesigning included various end-of-use (EOU) activities like 'design for redesign' by using eco-friendly materials, implementing reuse and repurpose options to improve the quality aspects of the design phase, etc. Process redesigning highlighted waste elimination through process changes (Ellram et al. 2008), like new waste collection and sorting initiatives (I:collect), etc. This also included adjustments in manufacturing methods and equipment for remanufacturing. Concurrently this created 'new' value addition activities through restyling, reshaping or embellishing of second-hand clothes as defined by Fletcher (2008, p. 103). Along process-supply chain redesigning linkages, actors were engaged in reverse logistics and garment life cycle assessments to improve the environmental performance. However, analysis showed that actors were mainly involved in un-coordinated efforts in the value creation activities in closed-loop networks. Even though some degrees of collaboration existed between retailers and charities for open-loop recycling, but these were only on a semi-industrial scale. To make the 3DCE linkages work successfully for value creation a collaborative channel structure for key collection and sorting processes and also in repurposing were adjudged to be critical.

Value:
This paper has mapped the actors and flows in the reverse value chain for clothing in Sweden in terms of the value creation activities along 3DCE linkages. This understanding has revealed that the value creation activities presently are un-coordinated and occurs in closed-loop networks. To address these challenges collaborative initiatives are critical and this would make 3DCE work successfully for sustained value creation. Further this will create opportunities for 'new' collaborative networks and channel structures, consistent standards for pricing and merchandizing assortments, implementation of new routines etc. Knowledge advancements contribute to the concepts of collaboration and business models in reverse value chains.

Future research and limitations:
Future research could be carried out in identifying what are the success factors for collaborative entrepreneurship in reverse value chains and in conducting action research to design 3DCE linkages.
Limitations exist in terms of internal validity of the research. Authors do not provide a rival explanation to the value creation activities apart from that of 3DCE linkages. Moreover, the proposition that 'new' collaboration and channel structures would lead to holistic 3DCE linkages to render sustained value creation is canonical but lack of empirical evidence to it yet.

Practical implications:
The implications of the paper are vital for major actors in the second-hand clothing value chain to take a collaborative effort in value creation. Further, the 3DCE lens provided to the context would lead to clearer understanding of value creation activities, and 'where' and 'how' to invest to create a much coordinated, collaborative local production network.

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Section 8: Decision support techniques, technologies and processes

AN AGENT-BASED SIMULATION APPROACH FOR EVALUATING THE EFFECTS OF PICKER BLOCKING IN A RECTANGULAR WAREHOUSE

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Purpose of this paper
This paper investigates the effects of worker congestion (also referred to as pickerblocking) in manual order picking. The latter is one of the most costly and time-intensive logistics processes. The purpose of this paper is to evaluate order picker routing methods that minimize picker blocking and thus improve the performance of manual order picking warehouses.

Design/methodology/approach:
This study uses an agent-based simulation approach (ABS) and models common order picker routing methods. By employing an ABS, the behavior of individual agents (workers) and their interactions with the environment can be modeled. In doing so, emergent phenomena on the effects of picker blocking and order picking performance can be captured

Findings:
The results of our simulation model show that the largest gap routing strategy (in comparison to return, s-shape, midpoint, composite and combined strategy) is the most suitable for rectangular warehouses with 2 to 15 order pickers working at the same time in the same storage area, as it leads to the lowest congestion. It is also shown that ABS is well suited for investigations in the field of picker blocking.

Value:
The effect of picker blocking considering several routing methods has thus far been relatively understudied in the literature. In addition, this paper is one of the first approaches to employ ABS to the phenomenon of picker blocking.

Research implications:
This research could be expanded by considering other storage assignment rules, such as class-based assignment. In addition, we implemented a single routing strategy for all order pickers. The effects of picker blocking under consideration of several combinations of routing and storage assignment methods can be studied in an extension of this paper. ABS allows answering additional research questions with the special focus on the individual behavior of single agents.

Practical implications:
Warehouse managers aim at reducing travel time in order picking processes. If several order pickers work in the same storage area, congestion among workers may have a negative impact on travel time and thus order picking performance. Based on the results of this paper, warehouse managers can depict a routing strategy which minimizes travel time under

consideration of picker blocking for several order pickers in a rectangular warehouse. Practitioners should put effort in implementing the largest gap strategy to reduce the negative effects of picker blocking.

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OPTIMAL INVESTMENT OF INDUSTRIAL ROBOTICS AND AUTOMATION IN CASE OF AN AUTO-PARTS PLANT IN THAILAND

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Abstract
Purpose of this paper: This paper aims to optimally invest industrial robotics and automation. Their optimal investment leads to the minimized costs and the maximized benefits incurred in an auto-parts plant in Thailand.

Design/methodology/approach: The most significant process of an auto-parts plant in Thailand is selected first. Then the related industrial robotics and automation are studied in terms of costs and benefits. They influence decision making which industrial robotics and automation optimal to be invested.

Findings: There are several industrial robotics and automation. They spend variously and costly, whereas generating various and high benefits. Hence, the costs and benefits are analyzed for all of the individual robotics and automation. One of them is invested when minimizing costs along with maximizing benefits.

Value: In case of an auto-parts plant in Thailand, the industrial robotics and automation is invested on the basis of decision makers' working experiences. To avoid such the subjective decisions, this paper is proposed as a decision support system for the optimal robotics and automation investment.

Research limitations/implications (if applicable): This paper uses only one process with one case of auto-parts plant in Thailand. It is implicated when applied to other processes or other case studies.

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INVESTIGATING COOPERATIVE INNOVATION CAPABILITIES: AN EMPIRICAL STUDY OF DANISH MANUFACTURING SUPPLIERS

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Purpose of this paper:
The last two decades have seen a significant increase in research effort regarding the role of suppliers in the innovation and New Product Development processes of customer organisations. This research has largely been conceptual in nature and it has favoured the customer's perspective. The research outlined in this paper sets out the results of an empirical study that investigates the coordination and relationship management approaches used between suppliers and customers involved in cooperative innovation and New Product Development.

Design/methodology/approach:
The analysis is based on the findings of a major survey of Danish manufacturing suppliers. The data set is based on almost 1000 usable returns and constitutes a huge repository of supplier experience regarding supplier development, relationship management, and inter-organisational innovation practices.

Findings:
The findings of the study highlight the importance of cooperative inter-organisational activities in the early phases of the innovation process. Many of the activities could not be directly attributed to the innovation activities themselves, but are part of a wider set of organisational interactions that provide a framework for on-going cooperative actions. The large data set generated by this research investigates the following hypothesis:
"For collaborative innovation/NPD to occur between supplier and customers organisations, a specific set of inter-organisational coordination and relationship management methods must be implemented."

Value:
To counterbalance the aforementioned gaps in the literature, an empirically based supplier viewpoint has been sought regarding the value of supplier involvement in the customer's innovation process and the methods actually used to develop this capability. The paper is of value to both researchers working in the supplier innovation and supplier capability development areas and practitioners looking to identify what approaches are most suitable to enhance their cooperative interorganisational innovation process.

Research limitations/implications:
This study was undertaken in Denmark with manufacturing suppliers, which are predominantly small companies operating in niche markets.

Practical implications:
As mentioned above, the study highlights practices that can be applied by organisations actively trying to develop cooperative innovation processes between themselves and their suppliers/customers. It also adds to the literature on identifying the characteristics of innovative suppliers which can be used in the supplier evaluation and supplier development processes.

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MEASURING SUPPLY CHAIN ADAPTABILTY: A CASE STUDY ANALYSIS IN SOLAR PV INDUSTRY

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ABSTRACT
Purpose
To cope with the volatility of demand and supply, a supply chain can no longer just think of cost and responsiveness, but should consider agility and adaptability as well (Lee, 2004). Christopher and Peck (2004) also suggested that companies should take resilience into consideration, which contains flexibility and agility. Solar PV industry experiences volatility of demand and supply, changing patterns in manufacturing and distribution in the US, Europe and Asian regions and strong governmental influence through feed-in tariffs and minimum import prices, which results in price fluctuations in this industry. The selling price of solar module has been increasingly volatile. For example, it experienced raises from 2001-2007 after a rapid plunge in 2000 but the price plumped down even more seriously from $3.5/W in 2007 to $0.98/W in 2012, i.e., a four times drop in price in only five years. As the price declined dramatically, demand ramped up and the markets became overheated. If companies cannot adapt and evolve carefully, inventory, production/installation capacity, labors, etc., will all be seriously affected by this volatility. Thus, some of the solar module industry in the US and Europe started to move their plants to countries with lower labor costs. Those that cannot adapt to this volatile change in price and demand may eventually go bankruptcy and lose their leadership in this industry. There are several metrics such as efficiency, responsiveness and agility that can be used to measure the competitiveness of a company from supply chain perspectives; nonetheless, adaptability is still a new and largely unexplored area. As a result, this study aims to develop a mechanism to measure supply chain adaptability under radical environment by building up case studies and extracting potential elements for adaptability metrics of solar module industry
Research approach

Because adaptability in supply chain is an abstract concept, besides performing literature review, we interviewed several industrial experts in Taiwan and Germany to come up with a more definite definition of supply chain adaptability in solar module industry. We then studied some solar module companies in Taiwan, China and Germany based on the company reports, industry statistics, literature review and semi-structured interviews. Lastly, we summarized all the data through a coding process to come up with an understanding of supply chain adaptability, i.e. response mechanisms to long-term market changes

Findings and Originality
The five case companies specialize in different parts of solar module supply chain and demonstrate different emphasis regarding the adaptability of supply chain. Based on our hypotheses of adaptability, the case studies and company interviews, we came up with factors that will be essential when assessing the adaptability of a company from supply chain perspectives. With further analysis, we can also see that depending on the position you are in the supply chain, you many implement different adaptability strategy to cope with the change of the market environment. We see a thorough understanding of the design parameters for supply chains influencing adaptability as a first step to develop, in future research, a measurement system for supply chain adaptability.

Keywords: Supply chain; adaptability metrics; solar module; qualitative research;

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IMAGE ANALYSIS AS KEY TECHNOLOGY FOR LOGISTICS AUTOMATION SOLUTIONS

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Purpose of this paper:
Due to increasing competitive pressure, companies are forced to improve the efficiency of their logistics processes. In particular handling processes offer great potential for automation to make logistics processes more efficient and cost-effective. New developments in sensor technology in the field of 2D and 3D cameras enable flexible automation solutions which can be used in dynamic working environments. This paper describes image analysis methods and their application to logistics use cases such as container unloading and depalettizing.

Design/methodology/approach:
The main method combines 2D and 3D image information for semantic scene analysis. The key benefits and disadvantages of each sensor information regarding logistics scenarios are presented. 2D images describe textures and characteristic edges between objects. 3D information cover distance information and can be used for shape recognition. Each sensor information is analysed independently with methods and techniques from the field of artificial intelligence. The results are combined and analysed by object recognition methods. Thereby, different kind of logistics objects are recognized and can be used for automatic handling.

Findings:
The results shown great potential for developing automatic handling systems for logistics applications. Especially in the area of automatic unloading systems of containers or depalettizing solutions. They describe benefits of new sensor technology for improving supply chains using modern ICT technology adapted to the requirements of logistics processes. Additionally, the results can be easily adapted to different logistics application scenarios.

Value:
The paper shows that combining 2D and 3D image information enables new possibilities in the development of flexible automation systems. The results can be transferred to various logistics processes and use cases. Therefore, they could be interesting for practioniers in the field of automation and for people interested in modern ICT technologies.

Research limitations/implications (if applicable):
Due to the dynamic environments a few scenes are not complety and correctly analysed. In this case, the analysis of 2D and 3D leads to unsufficient results. Therefore, the object recognition module is not able to get correct results. Here, using machine learning techniques could improve the results. They can be applied in each step from 2D and 3D analysis to the final object recognition step.

Practical implications (if applicable):
The paper shows clearly the benefits of image sensor technology. Additionally, image analysis methods in the 2D and 3D domain are described and their impact and applicability to logistics processes is shown. Furthermore, existing systems for handling of logistics goods are shown and the possible improvements by using the presented method are described.

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CUSING A VNS METHODOLOGY APPROACH TO SOLVING A MULTIPRODUCT EOQ-BASED INVENTORY PROBLEM WITH STORAGE SPACE CONSTRAINTS IN THE COMPANY LAFANTANA

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ABSTRACT

Purpose:

Examination and solving of dynamic discrete EOQ model applicability for inventory control in La Fantana company in Serbia.

Research approach:

Company La Fantana, Serbia is a leader in the field of bottling and distribution of water and water coolers in Serbia. This paper analyzes LA Fantana company inventory system, with continuously changing state. Changes of state are registered at the ends of the defined time period. Considered time period is one year. Dynamics of system are described by discrete equations and inequalities. Structure of inventory system is generally known and has deterministic character, while the variables in the system may have deterministic and stochastic character. Inventory control problem set in this paper is modeled and presented in spreadsheets, in accordance with the problems defined in company La Fantana. Spreadsheets are used for building of simulation model of a discrete controlled object. To solve this NP (Nondeterministic Polinomial) hard problem, we have developed Variable Neighborhood Search (VNS) algorithm based on the local search technique, and we have preliminary examined efficiency of heuristcs with a several numerical experiments. The results obtained from discrete dynamic spreadsheet models are compared with actual inventory data obtained in La Fantana company for year 2013.

Findings and Originality:
The main objective of this study was to develop a dynamic discrete inventory simulation EOQ model in spreadsheets, in accordance with the problems defined in company La Fantana. Simulation model should be able to present a dynamic of inventory system, and to give solution of the inventory control problem in an acceptable simulation time for discrete periods in one year. VNS algorithm was developed in order to facilitate definition of number of orders. As the result of the study, we were able to present here VNS algorithm that generates a feasible set of ordering scenarios.

Research impact:
Mathematical apparatus, that is used to solve the problem of managing, is optimal control of the discrete system. Inventory problem, set in this paper, is modeled and presented in spreadsheets. Spreadsheet is used for building of simulation model of a discrete controlled object. Discrete controlled object is represented by simulation model of inventory management problems, with clearly separated: the law of dynamics, control domain and performance criterion. In this paper we will try to present that dynamic simulation spreadsheet inventory model can be used as reliable and easy way to present a static inventory models. The Variable Neighborhood Search (VNS) methodology represents one of the most effective metaheuristic methodologies which has been successfully applied to a huge variety of both global and combinatorial problems. The VNS approach uses a finite number of given neighborhood structures N_k, $k = 1,2,...,k_{\max}$, and the corresponding neighborhoods

$N_k(x)$ of a solution *x* which contains all "neighbors" of *x* with respect to the neighborhood structure N_k . In each VNS iteration the neighborhood of the current solution can be systematically changed according to the given neighborhood structures in order to find a better solution than the current one. In this way the search process could avoid "traps" of local optima and it could be directed to some new regions of the search space.

Practical impact:
The contribution of this paper by should be prove that the dynamic simulation spreadsheet inventory model can be used as reliable and easy way for planning and inventory control in company La Fantana. Model will be applied over the real data collected in the company in 2013. Model results will be compared with company's data for year 2014.

Keywords:
Multiproduct EOQ inventory problem, Discrete time system control, VNS, NP-hard.

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A STUDY OF THE COST-MATRIX MODEL AND 3D PRINTING TECHNOLOGY WITH FOCUS ON PROCESSING AND LOGISTIC ACTIVITY: APPLICATION FOR A WIREFRAME MANUFACTURING COMPANY

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Purpose of this paper:
3D printer allows a multi-dimensional replication of a solid object, while it also enables a virtual shape of any item from a digital graphic file. The invention of this new printing device has helped generate an important innovation in manufacturing field. Nevertheless, the new invention has yet produced little academic and professional discussion over an applicability of this device to actual operation of manufacturing companies.

Against this current background, the paper attempts to explore a gap between the current manufacturing process and the process using 3D print technology in the context of wireframe manufacturing company, in regard to the cost, activity and added value. The paper applies both the IDEF0 and cost-matrix methods to make clear of the cost and the activities of the processing and logistic fields.

Design/methodology/approach:
In regard to analysing the process in the wireframe manufacturing company, the paper proceeds the study by using a methodology, "the IDEF0." The method appears useful for distinguishing the activities. It also makes clear a hierarchical feature as well as a nested structure of the new activities. The current study has adopted two different types of the IDEF0 figures, i.e., the usual process and the process using 3D print technology.

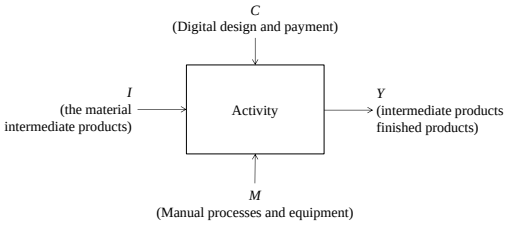

Figure 1: Activity of IDEF0
Using these two types of processes, this study first calculates the cost structure through the Cost-Matrix model. Second, this paper estimates the time consumption of logistics and the staying time of inventory.

Findings:
The paper highlighted two different issues. First, the paper has tried to examine: Of the two methods, which process is better as a cost saving measure. The paper has discussed this from the view of cost considerations by using the quantitative cost-matrix method. Second, the paper has touched on the time consumption aspect of process. Central to this inquiry is the question: How fast the companies would be able to deliver the product to consumers. A number of issues would be pertinent to this question. For example, this paper has tried to explain relationships between the time consumption and the total volumes of the wire (Figure 2). From that Figure 2, the paper has found a suitable changing point between the usual manufacturing process and 3D method.

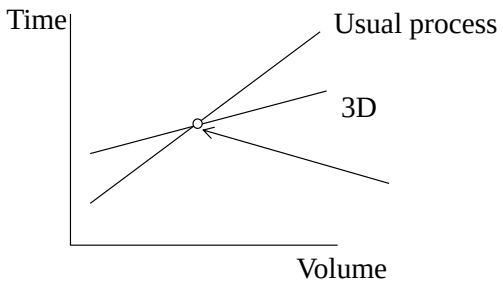

Figure 2: The changing point
between the usual manufacturing process and 3D method

Value:
One of the most important outlooks of this study is to examine possibility of 3D printer in terms of manufacturing processes, product inventory, and logistic filed. Value of this paper is to discuss these issues from "cost" and "time."

Research limitations/implications (if applicable):
The current research may have several limitations. It is restricted in terms of application to other companies, while it is also restricted in relationships to corporate strategy.

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KNOWLEDGE DISSEMINATION IN VALUE NETWORKS: CASE STUDY INSIGHTS FROM 3D PRINTING

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Purpose of this paper: 3D Printing (also termed Additive Manufacturing), the production of three-dimensional physical objects through layer-by-layer formation of matter based on a digital blueprint (Gebler et al., 2014) has been described as being novel, disruptive, and even the third industrial revolution (Prince, 2014). 3D printing technology has been around for longer than 20 years (de Jong and de Bruijn, 2013); however the technology has matured over the recent past and is increasingly deployed in consumer households, industrial prototyping, and even forms a part of industrial production processes (Gebler et al., 2014).
Many countries' governments and organisations are heavily invested in this technology. Singapore for example budgeted US$500 million over a five-year period to invest in skills development around 3D Printing technology. The USA has launched the "America Makes" program which is focused on 3D Printing technology. Further countries such as the UK, Korea, Germany and Australia have also initiated significant programs around the technology. The purpose of the present study is to understand the innovation process within value networks on the case of 3D Printing.

Design/methodology/approach: Two case studies have been conducted. Site visits took place in the US (at organizations affiliated with the National Additive Manufacturing Innovation Institute (NAMII) now termed 'America Makes' headquarted in Youngstown, Ohio) and the UK at the Lancaster University Product Development Unit (LPDU) in the North West. Both centres form an integral part of their local value networks. In total seven interviews were conducted with senior members of those centres of excellence and the accompanying value networks.

Findings: Both centres are located in former manufacturing strongholds of their respected countries and aim to advance technology innovation at a pace much faster than any once company could on its own through the integration of innovative resources. However, the design of those centres is fundamentally different.
The "America Makes" program is an artificial network structure with the newly created institute using what is best described as a 'Spider in the Web' approach. The design allows for tighter control and easier funding mechanisms; however, the centre's organization at times does not align with objectives of individual stakeholders, which slows down the innovation process. Further, a lack of understanding amongst members about how the individual members function has hindered integration and the start of projects.
LPDU has existed for over 12 years and the value network has developed organically over time. The network structure is best described as loose and can be best described as the "Dandelion" approach. LPDU is a major knowledge source for the participating members and is perceived as a crucial node within the network. This network structure is market-driven

(needs based) and heavily built on collaboration and trust; however crucial investment into this structural design remains challenging.

Value: The study provides some early insights into different centre of excellences' attempts to drive innovation processes through value networks.
Collaboration within the network is fundamentally important; hence, new centre designs need to be carefully designed in order to take advantage of existing well-functioning value networks. At the same time networks need to catalyse innovation and attract major investments.

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A NOVEL INTEGRATED DECISION SUPPORT PLATFORM FOR THE DESIGN AND MANAGEMENT OF A JOB-SHOP MANUFACTURING SYSTEM OF FOOD PERISHABLE PRODUCTS

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Abstract
The food processing industry is growing with retailing and catering supply chains. Efficiency, safety, quality, service level and sustainability are key objectives in both food production and distribution systems. In particular, with the raising complexity of food products to meet consumers requirements and food habits, the food production system are progressively shifting from processing line to processing job-shops. Job-shop is the most complex manufacturing system configuration, affected by multiple items (i.e., food, toppings, dressings, ingredients), resources and machines, and complex working cycles. The generic working cycle is the result of multiple concurrent and not concurrent tasks (i.e., processing operations), carried out by different human and/or automatic resources in multiple working stations.
These systems present several storage and buffering areas and many assembly tasks, which are critical for perishable products sensible to environmental and physical stresses. Logistic efficiency, cost reduction, food quality and food safety are key goals in managing the food production system.
Aim of this paper is the development and application of an innovative interactive simulation-based platform for the design of a job-shop system in a manufacturing facility of perishable food products. This is the result of the integration of multiple models and supporting decision methods in capacity-constraints multiple resource environments. Several key performance indicators (KPI) can be evaluated, including logistics and operations metrics, product shelf-life erosion, energy consumptions, etc. A case study from catering industry demonstrates the effectiveness of the proposed simulation based modelling.

Keywords: food industry, job-shop, visual interactive simulation, decision support system, perishable products, shelf-life, visual interactive simulation.

LINKING SUPPLY CHAIN RISK MANAGEMENT AND STRATEGIC TECHNOLOGY PARTNERING – TOWARDS A CONCEPTUAL FRAMEWORK FOR IMPROVED ORGANISATIONAL PERFORMANCE

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Abstract

Purpose – When companies have to create innovations with new products and enter new markets in order to remain globally competitive, they also need to make innovations in selected supply chain areas and handle potential risks. On the basis of this premise, we aim at identifying key management issues that arise in operating in a supply chain network context surrounded by an uncertain environment and consequently identify the basic capabilities required in managing supply chain risks. Hence, the purpose of the paper at hand is to explore the causal nexus of relationships linking firm innovativeness, strategic technology partnerships (STP) and supply chain risk management (SCRM).

Design/methodology/approach – This research focuses on the effort to ease bridging the gap between two principal research disciplines and highlight the potential value of strategic technology partnering (STP) and supply chain risk management (SCRM) against risks, disruptions and uncertainties. Through the adoption of social capital theory (SCT), the author examines variables that may influence cooperating firms to rely more on strategic technology-based global sourcing for major components when highly specific assets are involved to countermeasure potential supply chain risks. We use theory building to create a conceptual framework and to guide propositions for future research.

Findings – The SCRM-STP capabilities identified are flexibility, speed, quality, learning and exploitation capabilities, visibility, collaboration, trust, commitment, as well as innovative and technological capabilities. It is proposed that successful supply chains operating within STPs are better equipped to handle supply chain risks and may outperform their competitors in at least some of these capabilities. Structural capital improves sharing of relevant information, thus reducing uncertainty. Relational capital reduces mistrust and fosters mutual committment between network actors. Cognitive capital enhances the level of collaboration required to effectively cope with unexpected events.

Originality/Value – The main contribution of this paper is that it links SCRM and STP through SCT as the theoretical foundation by proposing a set of capabilities. This paper further contributes to the supply chain management (SCM) research by advancing the understanding of both positive effects of SCRM and drivers of strategic technology partnerships. It responds to the question, "What enables firms to mitigate supply chain risks effectively?" from a strategic and innovation management perspective that has received less attention in the previous academic studies. We contribute to the development of the emerging theory of SCRM and STP by integrating notions from social capital theory, SCM and strategic management.

Paper type Conceptual paper

Keywords Supply chain risk management, strategic technology partnering, capabilities, social capital theory, supply chain risk(s), innovation

MODELING INTENTION TO USE 3PL SERVICES: AN APPLICATION OF THE THEORY OF PLANNED BEHAVIOR

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ABSTRACT

Purpose of this paper

This paper develops a model to identify the factors that influence the business customers' intention to use third-party logistics (3PL) services using the theory of planned behavior (TPB).

Design/methodology/approach

A quantitative approach to data analysis is adopted by applying the structural equation modeling method. Data is collected using a survey questionnaire, which are administered to 243 organisations – a response rate of 24.3 percent.

Findings

The results show that the TPB model has a good fit to the data. Attitude, subjective norms and perceived behavioral control are the key drivers underpinning the intention to use 3PL services. Respondents are more likely to use 3PL due to their perceived social pressure. Positive attitude tends to favour the use of 3PL; however the respondent's perception about their ability to control such as skill, resources and opportunities, to act and make a decision directly impact on intention. Multi-group invariance test shows no significant difference in intention between 3PL users and non-users, indicating similar responses to attitude, subjective norms and perceived behavioral control.

Research implications

This research provides an evidence base for organisations to help formulating strategies to improve decision-making process of 3PL outsourcing. It is suggested that organisations who value the benefits of 3PL outsourcing should create an inclusive and collaborative working environment to: promote positive attitude; implement strategies to minimise the impact of perceived social pressure; and empower managers in improving decision-making. This behavioral change within an organisation would potentially increase the use of 3PL services, which in turn enhance productivity and improve economic efficiency.

Value of paper

The application of TPB in 3PL context is a new area of research because there had been no previous research attempts to estimate the impacts of attitude, subjective norms and perceived behavioral control altogether on the intention to use 3PL.

Section 9: Service supply chains

BUSINESS RISK MANAGEMENT WITH ASYMMETRIC INFORMATION FOR SERVICES SUPPLY CHAIN

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Purpose of this paper:
This study investigates risk mitigation strategies for tourism industry in service supply chain under which service providers engage in trade with high-risk service customers or tour operators, which may hide payment intention from their creditor.

Design/methodology/approach:
In addressing this issue, traditional revenue maximization thinking in operations management is disregarded. Given the intervention of information asymmetry and the trade-off between defaulting risk and financial income, this study employs mechanism design theory to devise a menu of contracts for choices of trade credit and price discount to acquire private payment intention from the risky travel operators. With possessing the truth of customers, effective mitigation strategies are then suggested in this study.

Findings:
We confirm that tour operators always select the contract that reveals payment intention by offering commensurate financial compensation for information rent. Based on our analysis, our findings indicate that hotels should adopt risk transfer strategy and risk acceptance strategy for high-profit high-risk operators and high-profit low-risk operators, respectively. Conversely, risk avoidance is suggested for low-profit operators, regardless of risk.

Value:
Most existing studies in service supply chain focus on utilizing statistical models for default risk assessment or prediction. On the contrary, risk management mechanisms other than risk prediction, such as the use of contractual approaches to distinguish and select between low-risk and high-risk buyers, are rarely discussed in service supply chain literature.

Research limitations/implications (if applicable):
Being uncertain of the willingness of agents to pay, a hotel should design a contract in such a way that encourages partners to cooperate and increases willingness to pay. The hotel should also provide information rent to agency customers with good or poor credit to encourage sincere cooperation and discourage incurring bad debt. Under cooperative efforts, hotels should also consider the effect of bad debt and the probability of its occurrence. Rejecting cooperation is recommended for poor profit. We conclude that high-reward and low-risk cooperation drives hotels to adopt the risk transfer strategy. A high-reward and high-risk cooperation prompts hotels to employ the risk adoption strategy, which focuses on how to accept risks and effectively weaken their effects before and after they occur. The risk avoidance strategy is employed under two conditions: low-reward and low-risk, and low-

reward and high-risk conditions, which revolve around methods used to avoid certain special risks.

Practical implications (if applicable):
On the basis of the default intention of tour operators, hotels in real-worlds are willing to engage business with high-risk customers but there is no tool to mitigate the associated risks. Hotels should provide more preferential policies to agencies (e.g., providing information rent), regardless of whether agencies with high willingness to pay exhibit increased market share or whether agents with low willingness to pay exhibit increased paying ability. In practices, the agencies are discouraged from disguising themselves or choosing to incur bad debt for the sake of individual profit.

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IDENTIFICATION AND ANALYSIS OF PERFORMANCE INDICATORS IN PRODUCT-SERVICE SUPPLY NETWORKS

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Purpose of this paper
A product-service supply network is a structured configuration of people, technology and shared information that interacts with other product-service supply networks (PSSNs) to create value [1]. In order to achieve the objective to create value, managers should understand what the value determinants in their business context are [2]. In our previous research we have presented the process of identifying customer value in PSSNs and ideas of generic value creation determinants [2, 3]. We have continued our research in greater depth with a detailed case analysis and analyzing Key Performance Indicators (KPIs) in PSSNs. We propose a model if how to identify and analyze functional, economic, emotional and symbolic determinants, and to take those in to PSSN performance assessments.

Design/methodology/approach
The findings in this paper are based on the review of available literature and on the empirical case data from six case studies that have been interviewed with a semi-structural questionnaire. Additionally, two experts groups have been organized and members became from the same companies under study.

Findings
We look at today's business ecosystems as a network of organizations providing products and services. We argue that managerial focus today should be on the management of PSSNs, instead of traditional supply chain between supplier and customer. For the management of PSSNs, managers are required to understand and identify value creation determinants, and then to analyze and measure operations.

Value
Our paper extends traditional supply chain KPIs with emotional and symbolic determinants, which are essential for the decision making, but it is hard to create measurement indicators for those [1, 2]. The paper increases the understanding of supply chain performance assessment in both an academic and a practitioner perspective, and giving overview of KPIs for emotional and symbolic value determinants.

Research limitations/implications
Despite research concern emotional feelings and human decision-making, neither human behavior sciences nor psychology literature has been used, which is a limitation of this study.

Practical implications
Practitioners should pay attention to organization competences, what is needed for value creation and business targets, and how resources are fit to needs. By using our proposed model, companies can identify and analyze their PSSNs performance better than by using existing models.

Keywords
product-service supply networks, value creation, performance assessment

Category of the paper
Research paper

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INTERPRETING THE CONCEPT OF 'VALUE' WITHIN THE LEAN PARADIGM

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Purpose of this paper:
The Lean paradigm (Womack & Jones, 1996) remains extremely influential on operations and supply chain practice and research. The first two of the five 'Lean Principles' advanced by Womack & Jones as a prescription for becoming Lean concern the concept of 'value'. These are: (1) *Understand value from your customer's perspective* (2) *Map the value stream.* However, the significant personal experience of the authors of this paper in applying the Lean paradigm suggest continued ambiguity of this most fundamental concept within both the Lean literature and practice. Our initial investigations suggest a gap in the literature on this topic, and Lean practitioners treating the concept of 'value' as axiomatic. As a consequence and to the detriment of the project concerned, Lean intervention projects in practice invariably start at the second principle, and without any discussion, identification or consensus among the project team concerning the actual 'value' that is to be mapped. Over the past three ISLs we have presented papers that have explored and characterised the conception of 'value' within the field of Logistics and Supply Chain Management generally (see Francis *et al*., 2014). In this paper we now apply the content analysis method developed within the papers above specifically to the Lean literature. Its purpose is to yield rigorous insight into how the concept of value is conceived within this body of material, and hence provide utility to both academics and practitioners working within this area.

Design/methodology/approach:
This will be a content analysis paper with a multi-stage research design.
The first stage will involve the development of a key word (KW) search strategy to identify relevant publications (eg *'Lean thinking', 'Lean production', 'Lean supply'* etc). Our intent will be to identify the [20] most highly cited publications for each such KW search query. These results will be pooled and duplicate publications removed to form a focal publication set (FPS) for subsequent analysis. Please note that much of the Lean literature is *atheoretical* in nature, so the searches will not be restricted to journal papers. The KW queries will instead be run across two bibliographic database sources that provide such citation statistics: SCOPUS to identify the most highly cited peer reviewed journal papers, and GOOGLE SCHOLAR for the most highly cited publications generally (including books, conference papers and reports etc.)

Once the FPS has been established, it will be descriptively analysed in various ways (by host publication type, time span, sector etc) to cast further insight into its diffusion pattern. This will be followed by a final stage involving a thematic analysis (excavating, coding and interpreting) of the content of the FPS to characterise the way(s) that value is conceived within this body of material.

Findings:
At the time of writing, this project is a work-in-progress and findings have not yet been established. However, as indicated above, it is hoped that these findings will reveal the way(s) that 'value' is conceived within the Lean literature. It is also hoped that a by-product of the descriptive analysis stage of the research design will be to produce further insight into the diffusion and genealogy of the Lean literature and hence validate the findings of Holweg (2006); one of the most highly cited publications on Lean.

Value:
Whilst exhibiting limitations (next), the content analysis approach adopted within this paper is innovative. However, its main value lies in its challenge to the axiomatic treatment of the fundamental subject of 'value' that has characterised the Lean paradigm since its inception.

Research limitations/implications (if applicable):
There are two main limitations. The first of these lies in the construct of the KW phrases used in the search strategy. Clearly, the nature of the KW phrases used in the queries will determine the publications subsequently identified to form the FPS. The second limitation is the self-imposed practical constraint of limiting the analysis to the top [20] publications identified in each case.

Practical implications (if applicable):
Ultimately, it is hoped that this stream of work will result in the development of a new practical technique to be used at the outset of future Lean projects that facilitates an effective understanding of the conception of value of *all* the supply chain partners concerned, and hence significantly improves the efficacy of such an intervention. We believe that the framework we presented at ISL last year (Fisher *et al*., 2014) provides a useful starting point for the development of such a technique.

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IMPLEMENTATION LEVEL OF SHIPPER AND TRANSPORT PROVIDER PRACTICES WITH AN IMPACT ON THE LOAD FACTOR

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Purpose of this paper
The purpose of this paper is to examine current practices of load factor utilisation of road transport. The research question is: To what extent and how do shippers and transport providers consider operational and strategic factors that affect the load factor?

Design/methodology/approach
A literature review identifed factors affecting the load factor. To what extent and how these factors were considered in current practices were examined in a study of two large transport providers and five large shippers in transport-intensive industries in Sweden. Data were captured in two interviews at each company with the transport manager and the environmental manager, and from environmental reports of the companies. Insights related to the load factor regarding operational and strategic practices, and the environmental performance of transportation were captured.

Findings
Transport providers work a lot with operational factors that have a direct impact on the load factor, but more strategic factors with an indirect impact on the load factor, such as packaging design, ordering patterns and storage strategies are less considered. The indirect factors often requires interorganisational collaboration and strategic decisions. However, there seem to be limited collaboration and integration between shippers and transport providers regarding the load factor and the factors that affect it. In addition, the people making strategic decisions appear to be unaware of such detailed issues as a low load factor. To improve the load factor further, more collaboration between shippers and transport providers and between different shippers are needed. Thereby, strategic considerations can be considered.

Value
The overall potential to improve the load factor through collaboration described in the literature is only obtained to a limited extent. The shippers and the transport providers seem to lack insight into each other's businesses, which hinders improvements in load factor from collaboration. The paper discusses what is lacking to obtain the unused potential and extend current knowledge of the factors that affect the load factor.

Research limitations/implications
The paper extends the current knowledge about the implementation level of practices affecting the load factor. It provides an empirically-based problematisation of challenges of the less implemented factors. Future research should develop improved models for cost and benefit sharing to increase the load factor. The empirical data are from companies in Sweden with an international presence. To reduce the geographical factor, studies in other countries should be conducted.

Practical implications

The possibility of collaboration for improving the load factor is discussed. Suggestions for factors to consider and how to increase collaboration between shippers and transport providers are discussed.

Keywords: Collaboration, Environment, Load factor, Transportation

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TRIAL OF UNATTENDED STORE SERVICE IN TEMPORARY HOUSING IN A DISASTER AREA

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Purpose of this paper
We report on our trial to set up an unattended store service with a simplified POS system with prepaid cards, designed for a use in such a trusted community as temporary housing in the disaster area after the Great East Japan Earthquake and Tsunami on March 11th, 2011. As the location of temporary housing is decided presumably according to the availability of space in which a hundred small houses could be built, they are located far from town without easy access to shops and transport services in disaster area. Survivors living at such housing found it inconvenient for daily shopping. We tried and solve this problem by setting up a self-service system with a prepaid card. We have been running the service more than two years and found some issues. The paper discusses the issues and findings.

Design/methodology/approach
We operate the service with a support from an administrator of the temporary housing. We send merchandise from our site to the disaster area. We have set up a store service in recovery housing in another disaster area, in which a regional coordinator of the area helped us to get merchandise locally.

Findings
In temporary housing, people tend to get together in a common room in which the store is located. On the other hand, recovery housing is more habitable compared to temporary housing, in terms of quality of building, so that residents would stay in their own flats and would not get together so often in a common room. We have another issue that elderly people would not be willing to use prepaid card or any system oriented interface, however, once they saw young children using, they become more willing to learn how to use the system from them.

Research limitations/implications (if applicable)
We need to cooperate with local stores, so that local foods and items could be provided. Accordingly, local stores could extend their business.

Practical implications (if applicable)
The store could function as storage for an emergency. Moreover, we could use our service in shelters at the time of disaster to distribute foods using prepaid cards as a token, so that people can pick up only what they want out of the distributed foods. We could apply our service to different situations such as an intra-office store.

What is original/value of paper
The originality of our paper includes our trial of unattended service for trusted community in the disaster area. The paper could be informative to those interested in such an unattended store service in various situations. On-line services are popular, but those tangible services would be useful where people have plenty of time but do not have so many entertainments around.

Keywords
unattended service, shopping support, service for an emergency

Category of the paper
Case Study

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OFFSHORING AND BACKSHORING IN THE BRITISH FASHION AND APPAREL INDUSTRY: A LITERATURE REVIEW

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Purpose of this paper:
For decades, manufacturing has been off-shored from high-cost to low-cost locations. However, there is now evidence of backshoring to advanced economies (Kinkel, 2012). Yet, both phenomena are not well understood. The aim of this paper is to investigate how literature explains the mechanisms of development and restructuring of production networks, and provides reasoning for alternative locations of its parts, including causes of backshoring. The example of the British fashion and apparel industry is chosen as it has experienced both trends and well researched globally but not for the UK. It brings together the issues of globalisation and local institutional change in explaining organisation and governance of production networks. The fashion and apparel industry is concerned with the issues of agility and leanness (Christopher et al., 2004; Bruce et al., 2004). We analyse how these issues relate to locational decision making and investigate whether, and if so, how the necessity of maintaining more sustainable production networks influences their geography in favour of backshoring.

Design/methodology/approach:
This research reviews academic and practitioner literature on offshoring, outsourcing, FDI and related subjects, fashion and apparel industry; industry and market analyses. The literature is classified by theoretical approach, methodology, main subject, industry, and part of the production network researched.

Findings:
The analysis concludes that:
- literature employs well known theories to explain locational decisions of firms: resource-based theory, transaction costs theory, FDI theory, etc.;
- fashion and apparel industry is customer/consumer-driven and evolve in ways characteristic for industries with fast 'clockspeed', which determines buy-make decisions and geography of suppliers;
- mainly large companies are involved in offshoring and backshoring; more attention should be paid to SMEs;
- Eastern Europe and South-East Asia play different roles in offshoring/neashoring processes;
- manufacturing is the main stage to offshore to the low-labour-cost regions; processes of offshoring the design should be researched more; backshoring of manufacturing is expected as labour and other costs in South-East Asia increase; other reasons of back- or nearshoring relate to "fast fashion" mode typical for high proportion of firms and upgrading of manufacturing firms.

Value:
This paper contributes to understanding of the mechanisms of relocation of various operations within fashion and apparel industry production networks and reasons for backshoring. Its findings can influence the research and policy agendas on manufacturing and design activities in the UK.

Research limitations/implications (if applicable):
The research is limited to the UK fashion and apparel industry.

Research Implications (if applicable):
The research findings can be used in management and decision making and to inform policy directed at returning manufacturing to the UK.

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MOVING TOWARDS INTEGRATED SOLUTIONS IN LOGISTICS SYSTEMS – EMPIRICAL EVIDENCE ACROSS SERVICE SUPPLY CHAINS

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Purpose of this paper:
The purpose of this paper is two-fold. First, it aims to contribute to the continuing discussion about systems integrators and providers of service solutions in the context of logistics outsourcing. Second, it aims to explore transaction cost related constructs in logistics systems in order to understand outsourcing and organisational boundary decisions within this context. This study therefore addresses the research question of

a) *What approach to governing an outsourcing relationship do different types of providers of logistics services take?* and

b) *How does theory support a service-led integrators strategy*?

The starting point for the contribution of this paper is to distinguish between different roles and responsibilities that providers of logistics services take or engage with in an industrial outsourcing relationship. The present study builds on the ongoing and longstanding academic debate about outsourcing or insourcing practices (Holcomb and Hitt 2007, Tsai et al. 2012); focusing on service provision proposes different levels of service integration between a provider (supplier) and customer (buyer) of logistics services. These services range from standard and commodified transport and warehousing activities offered by logistics service carriers (LSCs), to more integrated distribution networks that are offered by logistics service providers (LSPs), and on to the highly integrated and adapted systems solutions offered by logistics service integrators (LSIs).
The research builds on and is inspired by the recent shift in operations and logistics management from providing sole products and services to providing a bundle of services and solutions (Håkansson and Wootz 1979, Araujo et al. 1999, Selviaridis et al. 2011, Selviaridis et al. 2013). Growing interest in the governance of 'integrated solutions' (Mattsson 1973, Wise and Baumgartner 1999, Prencipe et al. 2003, Hobday et al. 2005, Brady et al. 2006, Davies et al. 2007, Jacob and Ulaga 2008) and that of the service transition literature, raises the question of what are implications of such integrated solutions for service providers? Commonly, transaction cost economics (TCE) serves as a theoretical basis to explain outsourcing decisions and relationships referring to the nature and mode of governance forms (Williamson 1975, 1985) within the inter- and intra-organisational boundaries of the firm.

Design/methodology/approach:
A multiple case study design (George and Bennett 2005) was adopted in order to develop knowledge and build on existing theory in operations management (Voss et al. 2002). Data were collected through semi-structured face-to-face interviews with logistics and supply chain managers from a total of 20 European providers of logistics services in 2014. Prior to the analysis, the firms' service offerings (collected via online databases and internet sources) were categorised according to their different levels of integration, reflecting LSCs, LSPs, and LSIs. Theoretical constructs from TCE help to analyse and identify drivers and factors that affect the adequate governance relation for each service. A broad range of sample firms allows us to better identify theoretical similarities and differences in our findings (Dubois and Araujo 2007). The present study concludes in a narrative, with the provider of logistics services as the unit of analysis.

Findings:
By evaluating a broad range of firms that offer similar and complementary services to their customers, we found that the governance and relational forms are not only dependent on TCE related factors such as asset specificity, uncertainty, and frequency but more linked to the overall integrator role and service-led capabilities of the provider firms. These factors also appear to include the relative positioning in the supply chain and the ability to translate information and transfer risk.

Value:
Today, business environments are changing considering increasing geo-political and socio-economic uncertainty, which affects supply and demand on a global scale. By understanding the drivers and role of integrators for logistics systems as well as the relational factors concerning the transition of services, customers can benefit from transferring risk and increasing their supply network's performance. In terms of transaction cost economic, this study empirically contributes to the explanation of governing systems integrators.

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OVERCOMING THE CHALLENGES OF BEING INNOVATIVE IN OUTSOURCED LOGISTICS PROVISION

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PURPOSE: Logistics Service Providers (LSPs) need to continually adapt to the highly dynamic markets which they operate in if they are to meet the on-going challenge of staying ahead of their competition. To achieve this many LSPs are becoming more self-reflective and asking how they can better manage the innovation process. This paper focusses on this, investigating if LSPs are becoming more "innovative at being innovative" and identifying what challenges LSPs face in developing their innovation strategies.

Innovation, which is commonly recognised as being critical for a firm's on-going success, is an umbrella term that covers a range of areas such as change, improvement, development, learning, new product development (NPD), new service development (NSD) and process enhancement. In a very broad sense it thus can be defined as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rodgers, 1995).

LSPs have a poor reputation for innovation. There has been a "Catch 22" scenario where LSPs have needed to be innovative to provide better value for their customers, but customers have been unwilling to pay for this. As a result, R&D has not naturally fitted into the business model of LSPs and has been neglected so that LSPS are commonly characterised as being "not very innovative" (Busse and Wallenburg, 2011). The research will investigate whether this problem is beginning to be recognised and responded to by LSPs, and if it is, what innovation strategies are emerging. In particular, it seeks to investigate to what extent innovation strategies are customer-centric and to identify how LSPs cope with being "learning organisations", driven by innovation and continuous improvement developments.

DESIGN/METHODOLOGY/APPROACH: A case study methodology is adopted to study how the innovation strategy at a leading global LSP has evolved over recent years. The challenges the LSP is facing in developing a purposeful innovation strategies are examined.

FINDINGS: The research findings concur with Drucker's (1985) view that innovation is manageable. The research identifies lessons of how an LSP can identify and overcome challenges surrounding its innovation strategy and develop a more purposeful approach to being innovative.

IMPLICATIONS: The research has benefit for both research and practice. In terms of research, Flint et al. (2005) noted, "logistics research has largely ignored the concept of innovation" and highlighted that research is lacking in determining how innovation in logistics occurs: in short, whether it is "purposefully managed or more ad-hoc"! This research will contribute to this neglected area. For LSPs, the need for innovation is increasing as competition amongst them intensifies due to increased globalisation and deregulation and due to the increasing demand from shippers for them to extend their range of service solutions (Busse and Wallenburg, 2011). There is clearly a discernible interest into how LSPs can be better at being innovative, which this research will help to address.

KEYWORDS: Logistics, LSPs, Innovation

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WHETHER THE PROCESS IS IMPORTANT IN LOGISTICS OUTSOURCING: AN EMPIRICAL INVESTIGATION IN CHINA

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Abstract
Purpose-This research aims to explore how top management support influence logistics outsourcing (logistics outsourcing intensity and formalized process for logistics outsourcing) and also tested the impact of logistics outsourcing on firm benefits.
Design/methodology/approach-A structural equation model is estimated to test the construct relationships using data collected from 250 manufactures operating their business in China.
Findings-The results show that top management belief does not have a direct effect on logistics outsourcing but the effect was totally mediated by top management participation. Top management participation has a significant and positive impact on formalized process for logistics outsourcing and only positively influence logistics intensity marginally. Both logistics outsourcing intensity and formalized process for logistics outsourcing have a positive effect on cost advantage and service advantage.
Originality/value- This study enriches literature on logistics outsourcing in China by test how top management support influence logistics outsourcing and consider outsourcing intensity and formalized process for logistics outsourcing together to illustrate an effective outsourcing practice.
Practical implications-The results provide implications for top management that participating in logistics outsourcing related activities is effective to enhance logistics outsourcing. The results also provide practical guidelines for logistics managers that formalized process for logistics outsourcing is essential for effective outsourcing outcomes.

Key words: Top management support, Logistics outsourcing, Outsourcing intensity, Outsourcing process, Firm benefits

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TOURISM LOGISTICS STRATEGY WITH SUSTAINABLE DEVELOPMENT: BANG SAEN BEACH, AS ECO-TOURISM DESTINATION IN THAILAND

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Abstract

Nowadays, tourism has become a significant industry in Thailand's economy. Tourism generates high revenues, as compared to the revenues from exporting. Bang Saen Beach, Thailand is a beautiful destination of Thai tourism today. It is an place just 60 kilometers out from Bangkok, capital of Thailand. Bang Saen Beach has become an important tourist destination. However, ever-increasing tourism has created problems there related to the sufficiency of its infrastructure systems and facilities. These problems include growing demand on natural resources and an escalation of environmental pollutants. Further, these problems are pointing to an urgent lack of effective tourism logistical planning and management.

This study applied principles of logistics management to the tourism industry under the hypothesis that moving tourists from Bangkok to Bang Saen Beach more efficiently and effectively, including providing an effective transport networking system, would increase and support tourism on Koh Lan. A demand forecast for tourism into the next decade was statistically calculated in order to provide recommendations for the improvement of infrastructure systems and facilities.

An objective was to examine an appropriate demand forecast model for tourism at Bang Saen Beach. The results could be used for planning infrastructure systems and facilities, including strategies for transport networks and logistics systems to support the future growth. Data was collected from secondary and primary sources, e.g. questionnaire, focus group and in-depth interview. The questionnaire was distributed to 120 potential tourists, with 115 questionnaires being returned, for return of rate at 95.8 percent. Validity and reliability were examined.

The result showed that a time series would be an appropriate model for a demand forecast. It found that tourism to Bang Saen Beach would double in the next decade, especially in public holidays. This result should be used for designing transport and logistics systems from Bangkok to Bang Saen Beach. Effectively designed infrastructure systems and facilities are required to support sustainable tourism on Bang Saen Beach. Further, this study learned that new and fantastic tourist facilities would be increasingly built on the island, underscoring the need for an appropriate plan for managing environmental pollution.

Finally, this study pointed out that a reverse logistics system for garbage management would need to be effectively utilized. Rapidly increasing garbage is a problematic issue for logistics related to a sustainable, green, eco-friendly environment. This study concluded that strategic and integrated logistical management is necessary, with participation from all stakeholders.

Keywords: Tourism logistics, strategy, demand forecasting, Bang Saen Beach, Thailand

THE LINK BETWEEN RESOURCE, DYNAMIC CAPABILITY, AND FIRM PERFORMANCE: EVIDENCE FROM THE LOGISTICS SERVICE PROVIDER IN TAIWAN

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ABSTRACT

Purpose of this paper:
Organisations' specific resources and capabilities (i.e. the resource-based view of the firm) has been elevated to a strategy level for sustainable competitive advantage. However, the theory of resource-based view is often insufficient as a key strategic resource for acquiring sustained competitive advantage because alteration is unpredictable in dynamic environment. When environment changed dramatically, "dynamic capability" provides a new idea on acquiring sustained competitive advantage. Research on the resource-based view of the firm has received much attention in the past decade, but studies in dynamic capability have rarely focused on these aspects. Based on dynamic capability research, a survey of logistics service provider (LSP) in Taiwan was undertaken in order to examine the relationships between resource, dynamic capability and organizational performance by using structural equation modeling (SEM) analysis technique. The results of the research will be useful for manager to improve their management strategy for getting sustainable competitive advantage. Theoretical and practical implications of the research findings will be discussed.

Design/methodology/approach:
This study, based on a survey of LSP in Taiwan, uses structural equation modeling to examine the relationships among resources, dynamic capability, and firm performance. The design of our postal questionnaire was firstly based on a comprehensive literature review and then pilot tested by interviewing both academic and practical experts.

Findings:
One of the research results demonstrates that top managers must enforce and improve the resource and dynamic capability to acquire and maintain these LSPs' competitive advantage.

Value:
When environment changed dramatically, "dynamic capability" provides a new idea on acquiring sustained competitive advantage. Now, logistics industry changed dramatically. Thus it is the best timing to explore the relationship between its LSPs' resources, dynamic capabilities, and performances. Hopefully the local LSPs can use the findings from this research to well prepare theselves to meet the future strong competition from abroad.

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Section 10: Food and agriculture logistics

FOOD SUPPLY CHAIN RISK ASSESSMENT THROUGH BAYESIAN NETWORKS

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Purpose of this paper
Safety in the food supply chain has received much attention recently due to the issues related to public health. Risk assessment of a food supply chain is a prerequisite for risk control. As such, food supply chain risk assessment is becoming more important. The purpose of this paper is to propose a food supply chain risk assessment model based on Bayesian network to control the associated risks.

Design/methodology/approach
Using Bayesian network, a partial risk model of the food supply chain is established to assess the risk. We present an actual study example of the Yuba case in China to show the feasibility of our algorithm.

Findings
Based on the Bayesian network of a food supply chain, and using a probability distribution corresponding to each risk factor, the value of each risk factor can be calculated.

Research limitations/implications
Building a good partial model based on a Bayesian network is difficult, as data on the conditional probability of the risk factors are hard to obtain.

Practical implications
From our results, to properly manage the food supply chain and its attendant risks, the focus must be on placing quality control at the source, i.e., the ingredients that form the production process. Proper logistics process control is only at best a sufficiency consideration.

What is original/value of paper
We have applied Bayesian network modelling to food safety in food supply chain management. Through our illustrative case study, we show that ensuring the quality control over the food manufacturing process is still more important than managing the logistics process.

Keywords
Food supply chain, Risk assessment, Bayesian network
Category of the paper
Research paper

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SUPPLY CHAIN FOOD CRIME & FRAUD: A SYSTEMATIC LITERATURE REVIEW OF FOOD CRIMINALITY

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Purpose of this paper
The papers focuses on considering the variables known to affect the two domains of food crime and food fraud within a supply chain context. Comparing and contrasting known research to help understand and secure the food supply chains, whilst underpinning the gaps needed to deliver UK Government policy in the food supply chain criminality arena (House of Commons International Development Committee, 2013).

Design/methodology/approach
Employing the systematic literature review (SLR) (Denyer and Tranfield, 2006) to navigate through and provide a gap analysis from multidisciplinary sources of literature using the keywords 'Governance', 'Inventory', 'Procurement', 'Resilience', 'Risk' and 'Traceability' to capture traditional Supply Chain Risk Management (SCRM) research for comparison against the areas of 'food fraud' and 'food crime' for Food Supply Chain Risk Management (FSCRM). The outputs of the SLR were compared against each other [SCRM and FSCRM] to identify and strengthen a gap analysis and identification of future research to benefit both academic and practitioner alike.

Findings
The analysis of the literature found demonstrates divergence in views across different research areas (particularly in terms of articles versus peer reviewed research), and in doing so identifies areas for future research within the Food supply chain risk management sector.

Practical implications
The systematic approach employed provides researchers and practitioners with a landscape of current literature, which highlights areas of research to strengthen and support practical application in the mitigation of risk and criminality within food supply chains.

What is original/value of paper
Accepted areas of practice within SCRM were found by this paper to be wanting within the field of food supply crime and fraud. The identified research areas are correlated to the findings of a UK Government report (Elliott, 2014) which is steering policy and this research has identified subsequent research to underpin UK policy creation.

Keywords
Supply chain risk management, Food supply chain crime, Food supply chain fraud.

Category of the paper
Literature Review.

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PRICE SETTING STRATEGIES OF SMALL-SCALE TRADER FOR PERISHABLE PRODUCT

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Purpose of this paper
This paper concerns with price strategies of Small-scale trader for perishable products under price control of Large-scale trader. If Small-scale trader follows Large-scale trader's lower price strategy, total sales will decrease. A few customers may buy the products at high price. If number of the customers is larger than the inventory, the Small-scale trader obtains profit. Purpose of this research is proposing a theoretically explained methodology to obtain highest profit of Small-scale trader.

Design/methodology/approach
We present a price setting problem of Small-scale trader and a model focusing on price setting process. The model consists of two traders, one is Large-scale and the other is Small-scale, and lots of customers. Acceptable price of each customer can be regarded as random variables, and that the acceptable price varies according to certain random distribution.

To explain customer behaviour in the model, we show a joint probability distribution whose random variables are demand and price, where the distribution is obtained with integration of traditional newsvendor problem and price setting problem of Takeno et al (2014). Numerical experiment is conducted on this model to presents model's behaviour represented with relationship between demand and price.

Findings
A methodology to obtain suitable price setting for Small-scale trader is provided under parameter settings of demand, average price, and customer's behaviour. Through the numerical experiment, we show that variance corresponding to customer's behaviour has effect on possibility of sold out, where shipping volume has little effect.

What is original/value of paper
Price setting problem for Small-scale trader is a new problem. We also present a methodology to estimate probability for sold out. The methodology will help in decision making about price setting.

Keywords
Fresh Foods, Inventory Theory, Stochastic Model

Category of the paper
Research paper

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FRUIT SUPPLY CHAIN SIMULATION: A LITERATURE REVIEW

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Purpose of this paper
This paper reviews the current literature on fruit supply chain simulation and contributes a set of findings that capture the state-of-the-art in the field.

Design/methodology/approach
A literature review approach was adopted to capture, classify and summarize the main body of knowledge on fruit supply chain simulation. A total of 81 articles on supply chain simulation have been systematically reviewed according to the objective(s) of the study and the simulation method(s) used.

Findings
The findings reveal that majority of the reviewed studies focused on supply chain structure and design, strategy and policy formulation, supply chain behaviour analysis, and decision support for supply chain management. The most commonly used simulation methods comprise discrete event simulation, system dynamics, and agent-based simulation. Including those studies which adopted more than one simulation approaches, discrete event simulation is by far the most popular simulation technique employed.

Research limitations/implications (if applicable)
Despite a vast body of literature on supply chain management and simulation, the existing knowledge base on fruit supply chain simulation is comparatively limited. This may be due to relatively lesser interest in optimizing agricultural supply chain which could, therefore, provide rich opportunities for further exploration.

Practical implications (if applicable)
The findings may provide valuable reference and guideline to practitioners in the fruit supply chain management community who wish to employ simulation as a tool to assist in decision making.

What is original/value of paper
This study provides valuable reference to researchers who intend to use simulation to improve fruit supply chain performance. It highlights the many areas of intensive investigation in the field and the corresponding simulation approach being adopted. The study also reveals the less investigated areas and approaches in this field which could provide rich opportunities for further exploration.

Keywords
Literature review; Fruit supply chain simulation; Discrete event simulation

Category of the paper
Literature review

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FACTORS AFFECTING VEHICLE UTILISATION: AN ANALYSIS OF THE RECENT DEVELOPMENT IN THE UK FMCG DISTRIBUTION NETWORKS

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Purpose: Maintaining a high level of vehicle utilisation is vital to a cost and carbon efficient transport operation. Recent statistics show that 28.6% of truck kms in the UK are run empty, with the reminder loaded to, on average, only 63% of their maximum weight capacity (Department for Transport, 2015). This paper investigates recent developments in the distribution networks of nine large companies from the UK fast moving consumer goods (FMCG) sector. We aim to identify factors that may be affecting utilisation of transport resources.

Research Approach: The analysis was completed using two comprehensive UK transport data sets for a single month in 2010 and 2013 provided by the participating FMCG manufacturing and retail companies. The data comprised of volumes of inbound, inter-depot and outbound freight flows, origins, destinations, depot location and vehicle type used. The changes in the number and locations of depots, volume of freight moved and delivery patterns over the three year period were then analysed. Finally, main causes underlying the recent developments were explored in a series of follow-up interviews with participating organisations.

Findings and Originality: Between 2010 and 2013, the amount of goods (measured as a number of pallets equivalent) delivered to customers increased by 8% and number of movements increased by 5%. The analysis indicates an increase in the frequency of deliveries, and a drop in the average order size in secondary distribution, indicating a strong Just-in-time (JIT) pressure in the sector. A number of companies in the sample restructured their logistics networks during the period; overall, fewer depots operated in 2013 compared to 2010.

Research Impact: This paper provides an insight into the latest developments in the FMCG distribution networks, and their impact on transport fleets utilisation. The key contributing factors are identified and suggestions for future research provided.

Practical Impact: The findings will support managers in the development of strategies aiming to increase operational and environmental efficiency of logistics activities in the FMCG sector.

Keywords: vehicle utilisation, distribution networks, FMCG, delivery patterns, road freight transport

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THE PROMISE OF SUPPLY CHAIN COLLABORATION: A MYTH OR REALITY? AN EMPIRICAL ANALYSIS OF FRUIT PRODUCERS' PERCEPTIONS

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Purpose of this paper:
In the last few years it has been observed that there is a change in the relationships among supply chain partners from arms-length transactions to collaborative relationships. Supply chain partners started to realise that working in a collaborative way can offer them substantial gains. Literature suggests that there are many benefits for supply chain partners achieving supply chain collaboration. However, achieving supply chain collaboration with partners does not always have the expected benefits. There are a number of challenges mentioned in the literature as the drawbacks of collaboration. Also, enhancing collaboration levels in agricultural supply chains is seen as a source of competitiveness. This research aims to evaluate the impact of collaboration on the business performance of the fruit producers.

Design/methodology/approach:
The research is based on the analysis of key literature in order to explore the concept of supply chain collaboration in the area of agricultural supply chain management. Additionally, a structured questionnaire was developed to measure supply chain collaboration and its impact on producers' business performance.

Findings:
The data is being analysed and some of the findings will be discussed in this paper. The 220 responses collected are analyzed using structural equation modelling techniques. The findings of this study will show whether collaborative relationships of fruit producers help them to achieve better business performance or not. Also, the analysis of the results will suggest whether other organisational characteristics have an impact on collaborative relationships in the agricultural sector.

Value:
This research is expected to provide new insights into how collaboration impacts business performance in the agricultural sector. Through this research the collaborative practices that lead to successful or not business performance will be ascertained. The findings of this study will be useful for agricultural producers, but also for SMEs operating in the agricultural and food sector.

Research limitations & future research:
This research provides an analysis of supply chain collaboration and business performance from the producers' perspective. Future research should evaluate supply chain collaboration from other supply chain actors' point of view. Also, another suggestion for future research is to identify the environmental factors that might impact a collaborative relationship.

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RESPONDING TO FOOD SCARES - USING SCENARIOS TO UNCOVER DECISION-MAKING IN THE EYE OF THE STORM.

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Purpose
Food scares and crises have both immediate and more long-term impacts on consumer perceptions and behaviour. Various studies of food scares highlight the positive impact of quick and transparent reaction by regulatory and other authorities. However, decision-making processes that guide communication during a scare have received little attention. Thus we have a particular interest in: (i) the impact of various media on the approaches taken to communications during food scares and, (ii) from a methodological perspective, the potential use of scenarios to uncover the factors influencing decision-making by a variety of key influencers as the scare unfolds.

Methodology
Based on a literature review and interviews with key informants we investigate the prevalence of food scares over recent years and, in particular, the role of communication strategies during the scare to rebuild trust. Most studies to-date have primarily reviewed communication strategies post-scare and while real-time analysis of communications can be conducted, it is rather difficult to gain access to key influencers during a scare to investigate factors influencing decision-making. Prompted by the pioneering work of Wilson *et al*. (2013) we look to the use of vignettes to create hypothetical scenarios that provide the conditions necessary to explore decision-making as a scare unfolds.

Findings
A scenario describes (textually or graphically) a set of hypothetical sequences of events that might reasonably take place (Kahn and Wiener, 1968). Review of the use of scenarios in decision-making literature indicates that a layered approach to scenario building should be considered, as this would elucidate both key factors influencing decisions and processes and protocols adopted. In particular, a layered approach can unpack agenda setting at various stages and investigate the interplay between various key influencers (such as media (traditional and 'social media'), PR agents, representative bodies, and regulatory and legislative bodies).

While the increasing influence of social media is evident in food crises dialogue, the 'traditional media' continue to play a key role (Kuttschreuter et al., 2014; Raats, 2013). Thus the capability of regulatory authorities and other agencies to communicate in an omni-channel environment requires particular attention.

Conclusions

Trust building, maintenance and repair models need to be designed for an omni-channel media environment. The hypothetical setting provided by scenario methodology provides a useful lens through which we can study the behaviour of various influencers and the interplay between them. Use of such scenarios should take into account the variety of key influencers (including social media) active as the scare unfolds.

Research limitations

This working paper presents early stage research ideas and aims to stimulate discussion on methodological approaches that improve our understanding of decision-making and communication by key influencers during food scares.

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AGRICULTURAL SUPPLY CHAIN COORDINATION UNDER YIELD AND DEMAND UNCERTAINTY ENVIRONMENT

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Purpose of this paper
Contract farming scheme is mutually beneficial for both agribusiness firms and farmers, significantly reducing the imperfections of spot market, such as high transaction risks and costs arising from uncertainty of quality, quantity, price, and so on. However, many problems have been encountered in implementing contract farming schemes due to various reasons, within which low implementation rate is a major reason. The absence of improper design and effective enforcement or incentive mechanism in the contract itself is believed to be the key for the low implementation rate of the contracts. Therefore, this paper aims to develop a fair, mutually beneficial, and risk-sharing coordination mechanism to enhance the implementation rate of contract farming supply chain.

Design/methodology/approach
We investigated a contract farming supply chain consisting of a risk-neutral agribusiness firm and a risk-averse farmer for the production and supply of agricultural products facing stochastic yield and market demand. Based on the analysis of the common characteristics of the agricultural products and the participants in the contract farming supply chain, we examined the effects of yield and demand uncertainty and the degree of the farmer's risk aversion on decision-making behaviors. In addition, we designed a RPG (Revenue sharing + Production cost sharing + Guaranteed money) coordination mechanism to improve the implementation of contract farming scheme based on real practices.

Findings
Our analyses provide managerial insights on the contract terms of the agricultural supply chain. We show that the production quantity decreases as the farmer is more risk-averse and faces higher yield uncertainty, while the retail price subsequently increases. However, the wholesale price is influenced by the interaction effect of the farmer's risk aversion and yield uncertainty. The retail price is influenced by the interaction effect of demand uncertainty and price elasticity. In particular, we show that the loss due to the competition increases as the farmer is more risk-averse and yield uncertainty is higher. The cost allocation ratio of the RPG mechanism borne by the agribusiness firm increases in the yield and market demand uncertainties and decreases in the farmer's risk aversion. Specially, if the farmer is extremely risk averse, as well as the yield and demand becomes extremely higher, the RPG mechanism cannot achieve perfect coordination of the agricultural supply chain.

What is original/value of paper

This study makes several noteworthy contributions to the existing literature on the area of contract farming. First, we study contract farming from supply chain management perspective using analytical approaches, which constitutes a novel departure from previous studies. Second, we take into account of the unique characteristics of contract farming supply chain in the developed model (including stochastic yield, stochastic demand, the risk-averse decision maker, unbalanced power structure), and examine how these unique characteristics influence the optimal decisions and utilities of the supply chain, which making our problem setting uniquely different from the assumptions made in previous studies. Third, we design a

new RPG coordination mechanism to sustain and strengthen a contracting relationship in the long term from supply chain coordination perspective. Moreover, our analyses lead to several interesting observations and managerial implications in contract farming supply chain practices.

Keywords
Agricultural supply chain, Risk averse, Uncertainty environment

Category of the paper
Research paper

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A CONCEPTUAL FRAMEWORK FOR MANAGING REPUTATIONAL RISK IN GLOBAL FOOD SUPPLY CHAIN

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Purpose of this paper
The global food supply chain benefits consumers around the world to have seasonable fruit and vegetables throughout the year as well as a wide variety of affordable fish and meat which may be conveyed from foreign countries or even half-way around the world. However, in recent years, the emergence of a series of food scandals (such as horse meat scandal in the United Kingdom and baby milk in China) has resulted in loss of not only profit and market share but also reputation of entire actors in the related supply chain. Therefore, reputational risk is a salient issue in the current global food supply chain. This paper presents insight into mechanism and proposes a management framework of reputational risk in global food supply chain.

Design/methodology/approach
Through investigating systematically business cases as well as existing literature theory about global food supply chain, supply chain risk management and reputational risk, this paper establishes a conceptual framework to analyze and manage reputational risk in preventive, proactive and reactive manners.

Findings
This paper will discuss interrelationship between supply chain actors in term of driver, source, and impact of reputational risk along with mitigation strategies.

Value
This paper is expected to contribute a novel approach in reputational risk management to the supply chain risk management literature and support supply chain managers to prevent and recover reputational risk in their supply chain in the context of a plethora of product recalls in recent years.

Keywords
Supply chain risk management, reputational risk, conceptual framework

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Section 11: Supply chain performance management

CHALLENGES FACING THE LOGISTICS INDUSTRY WITH INCREASING DEMAND FOR 'SAME DAY' DELIVERY

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Purpose of this paper
The paper will report on new research into the challenges faced by the logistics industry arising from increasing demand for 'same day' parcel services, and, on the measures being taken to tackle them.

Design/methodology/approach
The key players are identified as a triad of *shipper, carrier* (LSP) and *customer*. Since the literature is limited and 'same day' practices are changing fast, expert-oriented qualitative research has been chosen, to allow an in-depth understanding of the field. Following Fontana and Frey (2005), it is hoped that experts will be able to explain processes and customer requirements, since they are privy to the ongoing market requirements. A stratified random sampling approach (Bryman and Bell, 2003) was employed to select shippers and carriers for interview. A separate interview was conducted with one Technology Service Provider (TSP), as TSPs are less numerous. The interview questions were driven by both academic literature and general and logistics press; to capture real world developments.

Findings
The findings reveal collaboration to be an effective approach for the logistics industry, with impacts on delivery speed and efficiency (Wang et al, 2007). Insights into the role that ELMs are obtained, particularly in relation to freight consolidation, and how innovative collaboration can facilitate an effective 'same day' delivery platform. The research also reveals the influence of firm size on strategy, with larger more vertically integrated players being less dependent on collaboration.

Research limitations/implications
Qualitative research involving nine interviewees has enabled the researchers to gain a preliminary understanding of the issues. A survey will be employed to achieve a larger sample, and these findings will be used to inform the questionnaire design.

Practical implications (if applicable)
The research findings will help to inform LSPs of the choices available to them as they respond to increased demand for 'same day'.

What is original/value of paper
The paper will contribute to academic knowledge of the express parcel industry and the increasing role of collaborative approaches and technology.

Keywords
'Same day', logistics

Category of the paper
Research paper.

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THE ROLE OF SUPPLIER ASSESSMENT IN BUILDING RELATIONSHIP BETWEEN THE ENTERPRISES IN THE POLISH MARKET

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ABSTRACT

Purpose of this paper: The main aim of this paper is to present the role of selection and evaluation of suppliers in building partnerships between the enterprises which are operating in the Polish market. This evaluation allows buyers to significantly limit the level of risk especially in the case of new suppliers. Through a preliminary evaluation of the suppliers, the buyer gathers evidence of the suppliers' ability to achieve the expected level of product quality through a trial purchase, the quality of processes through an audit or the economic situation of suppliers through due diligence. Many international companies help local suppliers to meet the requirements by offering them support in the form of consulting and training through the special development programs.

Design/methodology/approach: The article describes the results of empirical studies carried out in 182 enterprises operating in the Polish market. The aim of the survey was to identify the criteria and forms of selection and evaluation of suppliers. The selection of companies was focused on producers and service providers in the B2B market, who have implemented management systems in accordance with the international standard ISO 9001.

Findings: The results of empirical study indicate that companies operating in Poland, in order to build the partner relationships with suppliers carrying out an evaluation of suppliers are focusing mainly on technical quality of the products, delivery and favorable price conditions, flexibility, effective evaluation of communication processes, product safety, terms of this guarantee. The results of this study indicate that companies concentrate on the evaluation criteria such as technical quality suppliers of products (no defective products), favorable price conditions, on time delivery, ensuring continuity of supply, the reaction time for orders and to complaints, warranty obligations, vendor flexibility (the ability to changes in the contract), and the willingness of the supplier to reduce costs.

Value: It should be observed that the Polish companies are adapting to global trends currently associated with the evaluation and selection of suppliers. These trends are focused on taking into account the criteria related to the implementation of social responsibility elements in the evaluation of suppliers.

Keywords: evaluation of suppliers, building relationship in supply chain, supplier development programs

SYSTEMATIC ENHANCEMENT OF THAILAND LOGISTICS PERFORMANCE

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Purpose: This paper aims to develop a decision support system (DSS) for enhancing Thailand logistics performance along the supply chain. It is measured with several indicators (LPIs) whose one supports some LPIs, whereas conflicting with others. Eventually, the optimal LPIs are suggested systematically.

Design/methodology/approach: The proposed DSS undergoes two main steps as follows. Firstly, the LPIs adopted in Thailand are understood in order to identify their parameters as system understanding. Secondarily, the parameters are linked as system conceptualization. The so-called causal loop diagram shows which parameters significantly influencing Thailand logistic performance.

Findings: Thailand logistics performance is enhanced when all of the LPIs are optimal. However, several LPIs are conflicted with others. The conflicting LPIs are originally dominated by the significant parameters. Consequently, the significant parameters are selected and optimized systematically.

Value: Nowadays, Thailand logistics performance is measured through several conflicting indicators. They are enhanced using trial and error. To avoid the unsystematic technique, this paper proposes system thinking in a diagram of causal loops to support decision makers for enhancing Thailand logistics performance.

Research limitations/implications: As a research based on industries in Thailand, it may be limited and unable to be applied straightforwardly for other countries.

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AN ASSESSMENT OF SUPPLY CHAIN RELATIONSHIP QUALITY IN AN EMERGING MARKET

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Purpose of this paper: This paper aims at examining the role of Relationship Quality (RQ) in influencing supply chain responsiveness. Supply chain responsiveness indicates at minimizing the cycle time or reducing the inventory to zero. The focus of this research paper is to analyse which of the RQ factors have a significant influence on supply chain responsiveness in Indian context. The significant factors should be understood by the managers as critical for improving supply chain responsiveness.

Design/methodology/approach: This study employs use of Structural Equation Modelling to analyse the aforementioned relationships. Scale items pertaining to RQ factors are culled through extant literature. Data is collected from the members of supply chain pertaining to their perceptual understanding towards RQ with respect to other members of the supply chain. This study will add to the existing literature by bringing in a fresh perspective on the RQ factors pertaining to supply chains in Indian context. It is worth noting that RQ factors have been brought up intuitively in many cases and therefore this study attempts to add more relevance to the existing literature by considering the RQ factors holistically from a larger set of research works.

Findings: The hypotheses which are significant will have strong implications for the supply chain managers. RQ factors viz., trust, commitment, satisfaction, etc. are likely to have a strong influence on supply chain responsiveness.

Value: This study will also add significantly to the literature on supply chain relationship quality which is currently limited especially in the sense that the main factors of relationship quality viz., trust, commitment, satisfaction, etc. have not been examined together. This will also be useful for the practicing managers in improving relationships with the other members of the supply chain.

Practical implications (if applicable): Practicing managers would need to change their perspective towards other members of the supply chain from a transactional one to a more focused and relationship oriented one.

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COMPETITIVENESS ENHANCEMENT OF A BIOPHARMACEUTICAL PLANT IN THAILAND

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Purpose of this paper: This paper aims to analyse key success factors for enhancing competitiveness of a biopharmaceutical plant in Thailand along its supply chain. Eventually, it suggests decision makers the optimal ways to enhance such the competitiveness.

Design/ methodology/ approach: The key success factors of biopharmaceutical industry are preliminarily studied along its supply chain by reviewing the related literatures and interviewing the related experts. Then, the preliminary study is analysed on the basis of value chain. Finally, the key success factors are used for evaluating and enhancing the competitiveness of a biopharmaceutical plant in Thailand.

Findings: The key success factors of the biopharmaceutical supply chain consist of organisational factors (i.e. human resource, infrastructure, and technology) and external factors (i.e. regulations, government supports, collaboration, and partners). They contribute a biopharmaceutical plant to create more value with less cost, more quality and better lead time with sustainable competitiveness.

Value: There are a lot of significant ways to enhance the competitiveness of a biopharmaceutical plant in Thailand. However, it has not been studied, analysed, evaluated, and suggested systematically. Such the gaps are bridged by this paper.

Research limitations/ implications (if applicable): This paper is studied using only one case of biopharmaceutical industry (a plant in Thailand). Its scopes may be limited and unable to be applied straightforwardly for other biopharmaceutical plants.

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TEMPORAL RELATIONSHIPS BETWEEN COAL PRICES AND BALTIC DRY INDEX

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Purpose of this paper:
To understand the long-run and short-run interactions between coal prices and Baltic Dry Index (BDI), the aim of this study is to investigate the Australian coal price (AUC), the U.S. coal price (USC), and the BDI using time series approach.

Design/methodology/approach:
Quandt-Andrews test was conducted first to investigate whether there are structural changes in our collected data. Then we applied the approaches of unit root test, Granger causality test, Vector autoregressive model, Johansen's co-integration test, and vector error correction model to examine the long run and short run relationships between the coal prices and BDI.

Findings:
Findings of this study indicate the existence of a structural breakpoint for all data series in 2008, the year of global financial and economic crisis. In addition, there are bidirectional Granger causalities between AUC-BDI and USC-BDI according to Granger causality test. From the co-integration test, we also proved that there was a long-run interaction relationship between the USC-BDI. However, in the short run, the BDI has a negative dynamic effect on USC.

Value:
Although previous studies have shown the relationships between coal prices and freight rate, there is relatively little research on the temporal relationships between coal prices and BDI. Such interaction information is especially helpful to the dry bulk shipping industry because it provides detailed understanding of the long-term and short-run dynamics that are important for the development of reliable forecasting models.

Research limitations/implications (if applicable):
Other explanatory variables might be included to investigate the relationships between coal prices and BDI.

Practical implications (if applicable):
Reliable prediction models can be developed by identifying the mutual affects between coal prices and BDI. Besides, ship owners and charterers can refer our findings regarding short-run dynamics to control the risk of sudden price changes in the spot market by selling or buying futures contracts that are based on the expected future value of the indices in the Baltic International Financial Futures Exchange market.

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DETERMINANTS OF ENVIRONMENT MANAGEMENT PRACTICES ADOPTION FOR LOGISTICS COMPANIES IN MALAYSIA

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Purpose of this paper:
This paper aims to analyze the factors influencing the adoption of environment management practices in Malaysia logistics industry. The determinant factors are composed of technological, organizational, environmental, and environmental awareness and attitudes dimensions.

Design/methodology/approach:
A questionnaire survey on the environment management practices adoption of Malaysia logistics companies was conducted, and 204 samples were analyzed from 1,144 companies. The Dillman Total Design Method was used in conducting the survey.

Findings:
Research results reveal that relative advantage and compatibility of environment management practices, organizational support, quality of human resources, regulatory pressure, and governmental support have significantly positive influences on the adoption of environmental management practices for Malaysia logistics companies. Environmental uncertainty and environmental management practice's complexity have significantly negative influences on environmental management practices adoption. However, the influence of customer pressure is not significant for Malaysia logistics companies. This paper also suggests implications and opportunities for future research.

Value:
The model and variables in this paper propose a new understanding about determinants factors in adopting environment management practices in the logistics companies. It also envisioned offering a lens in which further research can be directed to enhance environmental reputation and outcomes of firms through new environmental management practices and the sustainable long-term competitive advantages of the firms.

Research limitations/implications (if applicable):
The generalizability of the findings is limited as the study focuses only on logistic industry in Malaysia

Practical implications (if applicable):
The model suggests applied clarifications to problems encountered by logistics companies, and will be relevant to a wider audience of logistics industries. The framework is intended to clearly advise senior executives of the importance of adopting environment management practices. Companies that plan to adopt environmental management practices will be able to make managerial decisions based on the findings from this research.

Keywords:
Technological dimension, Organizational dimension, Environmental dimension, environmental awareness and attitudes dimension, Environmental Management Practices.

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A STUDY OF IMPLEMENTING PERFORMANCE MEASUREMENT IN THAI AUTOMOTIVE INDUSTRY

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Abstract

Performance measurement system (PMS) is critical in today 's businesses. It is a power tool that assists organizations to evaluate resource utilization so that they can strategically manage and properly and continuously control what to achieve their objectives and goals. Companies use PMS to ensure that they are achieving continuous improvement in their operations in order to sustain a competitive edge. It allows; not only monitoring business performance related to business objectives, but also evaluates the performance compared with similar company performance.

However, the literature revealed that organizations have paid little attention to PMS implementation. The paper explored and investigated issues concerning the implementation of performance measurement in Thai Automotive Industry. It is somewhat new topic in Thailand, especially in automotive industry. No research has been done in the area for Thai automotive industry. Depth-interview survey was used to specifically obtain more deep information from various managers of Thai automotive companies . Validity and reliability were examined. To obtain the data, 7 different companies in Thai automotive industry would be randomly selected. The data collected were categorized, clustered and analysed by using content analysis method. It then used cross-site analysis for exploring and discussing issues. Finally, it provided conclusions and recommendations for improving employees' performance and organizational effectiveness of Thai automotive companies.

Keywords: Performance Measurement, Culture, Financial Measures, Non-Financial Measures, Effectiveness, Efficiency

PERFORMANCE BASED LOGISTICS CONCEPT IN THE GLOBAL LOGISTICS MARKET

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As logistics expertise emerges as the vital power in the globalized market, investors tend to concentrate on their firm's main intentions while outsourcing the logistics operations. Becoming one of the most time and capital consuming aspect of global companies; logistics is now an intensive know-how requiring domain. Performance Based Logistics (PBL) is a new look at the logistics operations, supply chain and acquisition of these services; originated from high capital demanding market of military aviation.

In this paper, the new-born logistics approach "PBL" with its basic application pace is examined; a literature survey in this field is presented, identification of right customer metrics due to requirements is discussed and implementation differences from modern logistics for public acquisition agencies and global companies is assessed with its opportunities and risks.

A new look at the global logistics market from PBL's point of view reveals that systems should be assessed incipiently from the identification of requirements to reverse logistics and disposal phase as a whole for more effective logistics operations management. This approach is efficiently feasible via PBL by using accurately selected metrics. PBL is a new opportunity for public agencies and global firms in terms of product/system lifetime management. However, it is not a universal solution for every system. Therefore it should be tailored based on particular requirements and unique measures.

Purpose of this paper is to illustrate the new-born logistics approach "PBL" with its different aspects and assess its effects on the present global logistics structure. The major capital consuming market of military aviation, the birthplace of PBL, is in connection with multiple industrial organizations. The concept of PBL started to draw attention of global companies as it had been imported in "Federal Acquisition Regulation" of US Government and has started to be popular across Europe. This new concept is a fresh look at expectations and acquisition of logistics operations; therefore it's important for efficient lifetime management of systems and products for public acquisition agencies and major companies.

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HOW DOES LOGISTICS ARISE THE ECONOMY UNDER THE FREE TRADE AND REGIONAL ECONOMIC? TAKE TAIWAN FOR EXAMPLE

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There are a lot of researches by various means to prove the benefits logistics brings for economy and livelihood. Logistics achievement report from World Bank also points out that a country with better logistics ability attracts foreign direct investments and shorts time and tangible as well as intangible costs for entering local markets. In recent years, plenty countries, either emerging countries or developed countries, prevail negotiations of free trade agreement. Also, it brings related products such as free economic pilot zones in Taiwan or free trade zone in Shanghai which emphasize reforming and innovating a new system to strengthen economic activities and interactions between areas. However, will economy be escalated as expected? This research validates by applying econometrics. We use the amounts put in related infrastructures for improving international logistics with dependable variables composed by GDP from 2010 to 2014 and foreign direct investments to calculate if a series constructions have positive effects. Additionally, which group or what industry do these positive results reflect? Based on the consequences we have, we suggest specific actions to those countries which urge economic liberalization. Also, we distinguish countries according to income levels and geography differences so that we can give proper suggestions to distinct countries. Finally, in the research we prove that related infrastructures are not necessary for economic liberalization and livelihood improvements.

Key Words:Free Trade Agreement, Free Trade Zone, Spillover Effect, Econometrics Model

LOGISTICAL BEST PRACTICES: ASSESSING THEIR IMPACT ON CORPORATE PERFORMANCE

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Purpose of this paper:
Globalization of manufacturing practices, environmental degradation, and modern business and organizational structures are factors that have a considerable impact on corporate policies and strategies. Hence, firms all over the globe have looked into inter-enterprise, supply networks as the means for achieving operational agility and flexibility without negatively impacting the environment. This paper investigates the impact of well-known logistical practices on corporate performance.

Design/methodology/approach:
Multifactor analysis, multiple regression analysis, and means t-tests are used to investigate the impact of well-known logistical practices on corporate performance. A survey in the form of a questionnaire was applied to medium (i.e. between 100 and 500 employees) and large scale (i.e. more than 500 employees) organizations. The questionnaire was developed based on the published literature and consisted of four sections measuring: Customer Relations, Supplier Relations, Environmental Awareness, and Firm Performance. Personnel from a total of 186 companies were surveyed. 185 completed questionnaires were received. 61 questionnaires were eventually eliminated from the analysis due to different reasons. The remaining 124 surveys were utilized for a Multivariate Analysis using the SPSS statistical software.

Findings:
Through Multiple Regression analysis, it is shown that a focus on customer relations, supplier relations, and environmental awareness has a significant impact on a firm's performance. Additionally, performed T-tests validate the premise that firms that strongly develop a customer relations, supplier relations, and environmental awareness focus ultimately exhibit a superior performance as compared to those that do not.

Value:
Recommendations are made with regard to customer relations and supplier relations based on the findings and through feedback attained from the responses to the questionnaires.

Research limitations/implications:
The surveys included a limited number of respondents, not enough to draw conclusions by industry, only by size. The survey was also restricted to medium and large scale organizations. It is a well-known fact that most small firms do not have adequate managerial and organizational structures. It may be worth exploring the degree of logistical chaos that is present in small organizations.

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THE IMPACT OF ALTERNATIVE RACK LAYOUTS ON ECONOMIC AND ERGONOMIC PERFORMANCE MEASURES IN ORDER PICKING

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Purpose of this paper
Manual picker-to-parts order picking ranks among the most critical activities in a warehouse. In recent years, researchers and practitioners have repeatedly pointed out the need to improve the performance of this activity, and proposed measures to reduce travel distances by planning picker routes or storage assignments. Just recently, researchers have started to analyse the impact of order picking on the well-being of the order pickers by studying how the manual picking process impacts human learning, fatigue or injury risks. The present paper studies how the layout of racks and the way products are stored on racks in the forward area of an order picking warehouse impacts economic and ergonomic performance measures in order picking.

Design/methodology/approach
To estimate the impact of order picking on the well-being of the order pickers, this paper develops a mathematical model of the order picking process. The purpose of the model is to evaluate different rack layouts and different ways to store products on the racks. The model considers both order picking time and worker health risks (expressed in terms of energy expenditure) to evaluate different rack layouts.

Findings
The results of the model show under which conditions certain rack layouts (picking cartons directly from pallets, picking cartons from racks etc.) should be used in an order picking warehouse to minimize both economic and ergonomics performance measures.

What is original/value of paper
The paper at hand is one of the few works that integrate ergonomic measures into a decision support model for order picking, and it is thus one of the few works that highlight the trade-off between ergonomic and economic performance measures in order picking. The model developed in the paper could be used as a decision support tool in practice to evaluate different ways for storing products on shelves in the forward area of a warehouse.

Keywords
Warehouse manual picking, economic analysis, ergonomics evaluation

Category of the paper
Research paper

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MEASURING SUPPLY CHAIN EFFICIENCY: A CASE OF EXPORTING LONGAN FROM THAILAND TO INDIA

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Purpose of this paper: Logistics costs have a significant role in international trade (Behar and Venables, 2010). The aim of this paper is understand the structure of logistics cost and supply chain efficiency in the international trade in order to reduce such costs and therefore improve the international supply chain efficiency.

Design/methodology/approach: The structure of international logistics cost and supply chain efficiency was developed from the literature (Gunasekaran et al., 2001; Banomyong and Beresford, 2001) that propose the cost model. Then developed to fit with the context of exporting Longan from Thailand to India by consulting the relevant document as well as interviews with Thai export and India import experts. The developed structure was then used to measure the logistics cost and supply chain efficiency of six agricultural co-ops in Thailand.

Findings: It was found that transports and warehousing have a significant contribution in the logistics cost. However the results show that there are several hidden costs such as costs related to the hygiene and quality control and assurance. Transaction costs in dealing with administration and document are also considered a burden in the logistics process in terms of both time and money. Moreover, costs related to supply chain risks (both process and environmental risks) are the key to supply chain efficiency.

Value: This paper is the first that examine the logistics costs of international trade between Thailand and India.

Research limitations/implications (if applicable): The results of this research may limited due to the use of data in single product and between only Thailand and India.

Practical implications (if applicable): Thai exporters and/or India importers can asses their logistics and supply chain performance with this framework. Then they can improve by applying the suggested techniques to reduce such cost and hence improve their supply chain efficiency.

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MASS CUSTOMISATION AND FASHION LOGISTICS PERFORMANCE MEASURES OF COMPLETE GARMENT KNITTED FASHION PRODUCTS: SAMAND'OR – A CASE STUDY

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Purpose of this paper
To present an example of how complete garment knitting technology can be used for mass customisation of knitted products. It is possible to produce a ready-made garment directly on the knitting machine, without time-consuming post-knitting processes such as cutting and sewing. Samand' Or located in Takashimaya department store in Tokyo, a shop for on-demand production of fashion, uses this technology for customisation of knitted fashion. Here the client can be a co-designer and customise a garment in accordance with their personal taste in style, material, pattern, and colour.

Design/methodology/approach
A case study of Samand' OR's design and production concepts is done. The method employed is of an inductive approach based on company visits, interviews and participant observations of customers and store personnel.

Findings
The result in the SWOT analysis shows a high sell-through factor, no stockpiled inventory of ready-made garments, and a positive shopping experience for the customer. The sell-through factor is almost 90%–100%, compared to the average of 65%–70% in ordinary fashion retailing (Mattila et al., 2002).

Research limitations/implications
A limitation in this research is that only one company was studied. The study can be extended by more in-depth interviews with customers to solicit their thoughts on being involved in designing a garment.

Practical implications
The garment industry has always had problems with long lead times. The consequence of having to sell "stale" fashions at reduced prices has a negative impact on economic performance (Christopher et al., 2004). It is currently of great interest to anticipate what will happen if complete garment technology, mass customisation, and fashion logistics are combined. An understanding of these three elements working in combination brings new knowledge to the fashion business.

What is original/value of paper
A business's aim is to be profitable – a particular challenge in the fashion industry, where customer demand constantly changes. This volatile market requires an agile supply chain. It is hoped that this will contribute to the industry discussion of how complete garment knitting technology can be applied in the supply chain of fashion products. Supply chain management takes a wide view of configurations, a definition that embrace everyone in the company for a successful business (Gattorna, 2010).

Keywords
Fashion logistics, mass customisation, knitting technology.

Category of the paper
Case Study.

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Section 12: Education and training

ENGAGING THE ACADEME WITH SUPPLY CHAIN INDUSTRY: THE EDUCATION INTEGRATOR ROLE

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Purpose of this paper:

To investigate the role of the education integrator as a catalyst for purposeful industry-academe engagement in an era of Web 2.0-enabled open learning. It addresses pedagogical issues within the disciplne, the skills required by practitioners, and novel approaches to education provision and engagement.

Design/methodology/approach:

Examination of the causal relationships between tertiary education providers and their supply chain industry consumers provides impetus for the design of an education integrator concept, using a developmental research approach. Feedback on the proposal is obtained from major New Zealand exporters and regional decision makers with the aid of thematic analysis.

Findings:

Lack of purposeful engagement between the academe and industry is a significant issue inhibiting supply chain competitiveness. Provider self-interest and structural inflexibility is hindering delivery of sufficiently responsive and relevant SC teaching and research. Enthusiastic industry support was received for an education integrator concept that combines international best practice resources into responsive stair-cased qualifications and offers timely decision support at points of supply chain need.

Value:

Focusing attention of supply chain decision makers onto a novel turnkey concept conceived using a developmental research approach, avoided the generation of yet more lists of industry needs and helped to further refine the education integrator concept.

Research limitations/implications:

The small number of interviewees conducted and the single location (New Zealand) may limit generalizability of the findings. Future research could usefully address both aspects via further interviews conducted in a range of national settings.

Practical implications:

The academe's inability to engage meaningfully with industry ultimately has serious implications for the productivity and competitiveness of both sectors. Industry support for the proposed education integrator concept must overcome resistance from incumbent education providers who will require motivation, flexibility and commitment to embrace this new open learning philosophy.

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TEACHING SUPPLY CHAIN MANAGEMENT AND ENTREPRENEURSHIP JOINTLY TO EXPAND STUDENTS' ENTREPRENEURIAL PERSPECTIVE

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Abstract
Purpose:
There has been a big buzz on college entrepreneurship lately in the U.S., and fusing the elements of innovation and entrepreneurship into regular curriculum is considered a new engine for fuelling the future growth of higher-education institutions. Supply chain management and entrepreneurship classes are usually taught separately in business classrooms, and yet the knowledge and skillsets pertinent to these two subjects are inseparable and indispensable when it comes to planning and launching new business ventures. Thus, it is valuable to understand the intersection of these two subjects so as to expand the respective curriculum to embrace their interrelated elements. The goal of this paper is thus threefold: (1) review what entrepreneurial spirit and practice mean in the context of higher education; (2) summarize the common themes of educational efforts based on a set of universities of different size and prestige; and (3) explores how the two subjects can be taught jointly in respective classes to enrich students' learning and knowledge.

Design:
The intersection of the two subjects is pursued through a course project, which I have designed in my global logistics class to enable both undergraduate and graduate students to experience how to design supply chain and logistics channels for bringing new products and technologies to potential global markets. The project is based on a real start-up's plans for commercializing its latest patent in the field of organic chemistry. The details of the project and how it is linked with the class materials and enhances students' entrepreneurial mindset are provided.

Findings:
The course project results are presented and areas for future improvement are discussed. In particular, possible ways for integrating the core elements of supply chain management and entrepreneurship into respective courses are proposed. The limitation of the study is that no student learning outcomes are captured yet.

Value:
The value and originality of the paper are revealed by at least two perspectives. The first is that it provides a useful means and complements a university-wide endeavour for enhancing students' entrepreneurial behaviour if that is viewed as a critical skillset for today's college students. The other is that it is one of the first pedagogical efforts to integrate interrelated elements of supply chain management and entrepreneurship into each other's course, which adds a new flavour and dimension to each subject. The paper will be of interest to educators and practitioners in both fields.

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A STRATEGIC SUPPLY CHAIN MANAGEMENT: A STRATEGIC CAREER?

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Purpose of this paper
In spite of the popularity of the term supply chain management there appears little consensus over what a career in SCM might look like. This paper incorporates an HRM perspective to address this question.

Design/methodology/approach
The paper reports on part of a structured literature review covering 27 journals and 91 articles.

Findings
What was found in the course of the work? This will refer to analysis, discussion, or results.

Research limitations/implications (if applicable)
Only anecdotal evidence is provided as empirical findings are not part of a literature review.

Practical implications (if applicable)
The paper reported here can only be one part of the work in progress.

What is original/value of paper
By incorporating a HRM perspective the paper builds a more sophisticated framework of examining supply chain careers

Keywords
Career, SCM, skills.

Category of the paper
Literature Review.

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EXPLORING QUANTITATIVE SKILLS PROVISION IN EUROPEAN LOGISTICS AND SUPPLY CHAIN EDUCATION

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Purpose of this paper:
This paper reports on an ongoing research project investigating the current state of students' quantitative skills in European higher education, teaching techniques to impart quantitative skills to students in logistics and supply chain courses, and whether such techniques are making a difference.

Design/methodology/approach:
A literature review was used to develop open-ended research questions that at present have been undertaken in the first round of a Delhi method and a protocol to explore the three research objectives outlined in the purpose above. Thirty-one universities in the UK, France, Denmark, Sweden and Finland were approached to participate in the Delphi study and eleven responses were received.

Findings:
A majority of respondents considered students lack sufficient quantitative skills which may inhibit their ability to meet employer needs. However, only a few respondents provide additional techniques to impart these skills and these do not go much beyond basic spreadsheet, statistics and usual inventory economic order quantity analysis. As a result, many respondents could not say if a difference was being made.

Value:
This project and related empirical study is investigating an under-researched aspect of the state of logistics and supply chain management students' quantitative skills and teaching techniques to impart knowledge to them in their programmes, which are important in an increasingly data analytics-driven business environment.

Research limitations/implications:
The empirical study is ongoing and so far has comprised a single-round Delphi method with responses from eleven universities. Thus, study findings are limited however the strength of responses suggests trends may be indicative.

Practical implications:
Preliminary suggestions for European higher education institutions are that they need to validate employer requirements for students with good quantitative skills and accordingly change their curriculum if it isn't meeting such requirements.

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REFLECTIONS ON 1993 AND ALL THAT: WHERE ARE WE NOW?

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Purpose of this paper: 1993 saw the inaugural International Symposium on Logistics (ISL). 1993 also saw the establishment of the European Operations Management Association (EurOMA) the European wide extension of the then United Kingdom Operations Management Association (OMA). OMA had already begun the path to creating the inaugural EurOMA conference but, seeing the need for a distinct yet related activity focussed on logistics, part funded the first ISL. Given the strategic nature of the creation of ISL we seek to review the long term impact of the inaugural conference and determine the value that has been gained by the EurOMA committee's initial investment and the wider academic community from the first cohort of papers that were presented.

Design/methodology/approach: We undertake a bibliometric analysis of the inaugural ISL proceedings (Pawar, 1993), as well as any subsequent journal publications of the conference papers, using an approach inspired by information science research. We utilise a combination of Google Scholar, Scopus and CrossRef to identify citing journal publications. The analysis includes determining the time series of citations from 1993 to 2014, reviewing the citing papers regarding their scope and method, and evaluating the extent to which the cited papers have contributed to the logistics, supply chain and other disciplines.

Findings: Altogether 54 papers were included in the inaugural ISL proceedings in 1993, of which ten were converted to journal papers. We found 65 citations for 17 conference papers and 189 citations for 10 journal papers. Conference paper citations demonstrate a cyclical pattern while journal paper citations grow gradually to a current level of ~13 per year. These citations indicate the benefits of the inaugural ISL beyond the discipline of what we call 'logistics'. Much of the research presented focussed on method and/or tool development with a strong emphasis on practical problem solving. The papers cover a broad range of topics with the unit of analysis ranging from a single firm to networks, and covering different elements of the value added process from supply to distribution.

Value: The research has utilised a method more often associated with information science. We have provided insights into the impact of the 1993 cohort of papers and shown their value to the logistics, supply chain, and management community. EurOMA's initial investment has led to a long term effect that shows continued growth in terms of number of citations received. The method adopted may be utilised by other researchers to determine the impact of other logistics and operations management conferences.

Practical implications (if applicable): The paper demonstrates that conference publications can bring value to the academic community, both directly and as a bridge towards journal paper publication. This evidence is useful for both conference organisers and attendees when evaluating the benefits of such events.

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MODELING SUSTAINABLE SUPPLY CHAINS USING SERIOUS GAMES: A COMPARATIVE ANALYSIS OF GERMANY AND POLAND

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Category of the paper: Research paper

Purpose of this paper

This research is based on a comparative analysis of Germany and Poland; two European countries that trade extensively with eachother but with differing levels of economic development and logistics infrastructure. Germany is Europe's largest economy and export leader, with a world class logistics infrastructure. Poland is an emerging economy that owing to its transit situation in central Europe plays a key role as a supply chain hub to Eastern Europe and the rest of the world. Its supply chain infrastructure is expanding but still contains bottlenecks and other inefficiencies. The research imperative is as follows: there are few studies that have investigated best practices in sustainable supply chain management from a German-Polish perspective; there is currently no systematic theoretical framework in the literature in the field of performance evaluation and development of sustainable supply chains and modelling of supply chains by using educational games.

Here the role of supply chain sustainability is examined and modelled using the approach of serious games i.e. games that educate, train and inform (Michael & Chen, 2006). These games are intended to provide an engaging, self-reinforcing context in which motivation and education of participants takes place. Semini et al. (2006) show that games can be seen as an extension of simulations, and that a game provides a more explorative environment. The idea is that the explorative and risk free environment will allow for the creation of new knowledge based on the experience in the game for the player, and that the results at the same time can be used for improving the underlying simulation models, thus contributing to the development of a systematic framework.

Taking the viewpoint that supply chain competitiveness will increasingly depend on use of sustainable logistics, we test the following hypotheses:

H1: Simulating sustainability-related supply chain flows using serious games can contribute to improved supply chain management activities.

H2: The use of serious games enhances student appreciation of the practical implication of/potential impact of sustainable issues along the supply chain.

Design/methodology/approach

To test the hypotheses we critically analyse academic literature, government reports and associated references. The data collected will contribute to a case study, with the main output being the development of an approach to using serious games in sustainable supply chain management.

Findings

We are drawing on past experience of serious games to inform the research design. According to established learning models for experiential learning, players improve their understanding of dynamic systems behaviour during playing, provided that the complexity is not too high. Furthermore the use of simulation games contributes to the creation of new knowledge according to Blooms revised taxonomy on cognitive learning. However, experience also shows that the learning outcome improves with the implementation of Learning Analytics providing real time feedback.

Value of paper

To date a comparison of the infrastructure of both countries from a sustainable supply chain perspective has not been examined in detail. More specifically little exists that shows dependencies, similarities and differences. The development of a tool to identify, assess and model sustainable supply chains, using serious games to aid decision making will be of value in a number of contexts. The academic community will benefit from a modelling point of view to expand and acquire new knowledge and the government/business community will benefit from a practical point of view to make the right decisions in logistics process modelling, taking into account environmental aspects.

Keywords
educational games, sustainable supply chain

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THE IMPACT OF LEAN INITIATIVES ON EMPLOYEE'S SATISFACTION: THE CASE STUDY OF A PILOT PROJECT IN A SERVICE COMPANY

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Purpose of this paper
When lean is applied in service areas, benefits rapidly emerge (Piercy and Rich, 2009). Lean thinking aims to increase process efficiency and strive for continuous improvement among teams, which require fully committed employees (Treville and Antonakis, 2005). Millennium bcp is a bank facing restructuring due to the financial crisis. It created a special Division with the purpose of disseminating and implementing Lean philosophy and its tools. A pilot project was implemented in two Divisions and its results are to be expanded. The purpose of this article is to analyse if lean initiatives from the pilot project had any impact on employees' satisfaction at work and which adjustments are required to expand the pilot to other Divisions of Millennium bcp.

Design/methodology/approach
A case study approach is used. Rathje et al (2009)'s model to measure Lean Success and Treville and Antonakis (2009)'s model to assess Employee's perception about Job Characteristics are used and crossed. A questionnaire applied to all the employees in the pilot Divisions at the bank and a 71% response rate was achieved.

Findings
Findings show that although employees state that they have Lean Understanding and a positive perception of new Job Characteristics, employees tend to return to old practices, which highlights lack of both employee engagement and reinforcement from the leading Training Team. Lack of reinforcement lead to a decline in employees' perception about Lean Success in all its dimensions. Although Lean initiatives have a positive impact on employee's satisfaction at work, they perceive higher level of Autonomy, Leadership and Work Facilitation when Management Commitment is higher and they use lean tools more.

Research limitations/implications (if applicable)
As this research is based on a pilot project and a single case study, findings are only valid in the studied pilot project.

Practical implications (if applicable)
Outcomes of this research had immediate practical application as the managerial recommendations produced are relevant to a successful spread of the pilot project to the remaining Divisions of Millennium bcp.

What is original/value of paper
This paper contributes to literature by linking Lean success implementation with employee's satisfaction at work. Additionally, provides management recommendations for Millennium bcp on how to adjust their procedure before expansion is performed.

Keywords
Lean Management; employee satisfaction; case study.

Category of the paper
Case Study.

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